THE CATALYST JOIFF

Q2 2018

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Thanks to Kevin Westwood for the cover image

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ABOUT JOIFF

Full Members of JOIFF are organisations which are high hazard industries and/or have nominated personnel as emergency responders/hazard management team members who provide cover to such organisations. Corporate Members of JOIFF are organisations that do not meet the requirements of Full Membership but who provide goods and services to organisations in the High Hazard Industry.

JOIFF's purpose is to prevent and/or mitigate hazardous incidents in Industry through its 3 pillars:

- **Shared Learning** – improving risk awareness amongst our members
- **Accredited Training** – enhancing operational preparedness in emergency response and crisis management.
- **Technical Advisory Group** – raising the quality of safety standards in the working environment of High Hazard Industry

JOIFF welcomes enquiries for Membership - please contact the JOIFF Secretariat for more information.

JOIFF CLG is registered in Ireland. Registration number 362542. Address as secretariat. JOIFF is the registered Business Name of JOIFF CLG

ABOUT THE CATALYST

The Catalyst is the official emagazine of JOIFF, the International Organisation for Industrial Emergency Response and Fire Hazard Management. Our policy is to bring you articles on relevant technical issues, current and new developments and other happenings in the area of Fire and Explosion Hazard Management Planning (FEHMP). The Catalyst is published quarterly - in January, April, July and October each year.
Readers are encouraged to circulate The Catalyst amongst their colleagues and interested parties. The Editors welcome any comments – please send to fulcrum.consult@iol.ie

In addition to The Catalyst, information relevant to FEHMP is posted on the JOIFF website.

Disclaimer: The views and opinions expressed in The Catalyst are not necessarily the views of JOIFF or of its Secretariat, Fulcrum Consultants, neither of which are in any way responsible or legally liable for any statements, reports or technical anomalies made by authors in The Catalyst.

JOIFF

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CHAIRMANS MESSAGE

JOIFF members and guests,

The JOIFF International Conference scheduled for 28th and 29th October in Malta is rapidly approaching. We have an amazing list of speakers, and a very high quality list of sponsors. The depth and expansive range of expertise and perspective in such an intimate setting is a rare opportunity that we hope you will take advantage of.

Review the conference notifications, peruse the list of speakers, and make your plans now. Many have already signed up, and in order to keep the event up close and personal, there are a limited number of spaces available. Don't delay too long in signing up.

I will comment more in subsequent Catalyst editions, but for now, I hope you are intrigued into action, and trust you will be delighted and amazed.

Do know JOIFF continues to drive forward with our many goals and objectives. These are established based upon our 3 pillars – Shared Learning, Accredited Training and Technical Advice - input from our members, lessons from incidents, opportunity, matched to our resourcing and time. As a highlighted example, we recently met with some of our JOIFF members in Mumbai India this past month. Our members there and others want to expand JOIFF's presence and leverage off of the International conference work that we do. It is the progression of discussions we have had with JOIFF members there for a while and a very excellent next step.

I will not outline all of the initiatives in this edition, but do know that we are continuing to work on yours and the Industry's behalf. Enjoy this edition as always and as I always do, consider this a formal invitation to get involved. Your contributions are what makes this all work.

With highest regards,
Randal S. Fletcher (Randy)

JOIFF Chairman

SOME INDUSTRIAL INCIDENTS THAT TOOK PLACE DURING THE FIRST QUARTER OF 2018

China
LNG road tanker incident causes injuries

Czech Republic
Tank Explosion, Six Fatalities During Cleaning Operation

East China Sea
31 sailors still missing – crude oil tanker fire could last for a month

India
Oil tanker fire off Gujarat coast, all 26 crew members rescued

Indonesia
Oil Spill Clean-Up Kills Two

Italy
Tank Explosion Kills Two Maintenance Workers

Nigeria
Oil depot gutted by fire in Lagos

Singapore
Pulau Busing oil storage tank fire extinguished after 'massive operation': SCDF

Taiwan
Explosion and fire at CPC Oil Refinery

Orders CPC to partially halt Talin Refinery after fire injures three workers

USA
5 missing, 17 rescued in Oklahoma oil rig explosion
LNG tanks taken out of service due to leaks

Note from the Editor.

Most reports of incidents that occur, some of which are listed here, are familiar. After all major incidents, recommendations are made but how many of the recommendations are implemented. How many are forgotten over time until another similar incident occurs?

JOIFF shares valuable information with its members aimed to improve the level of knowledge of Emergency Responders and to work to ensure that members benefit from the misfortunes of some to educate against the same mistakes being repeated. Industry needs to ask is it doing enough to educate Industry so that incidents such as these will either not be allowed happen again, or if they do they can be effectively dealt with.

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NEW MEMBERS / FIRST QUARTER 2018

During January, February and March 2018, the JOIFF Board of Directors were pleased to welcome the following new Members:

FULL MEMBERS

Alexarya Corporation International, Chandigarh, India, represented by Capt. Suniel Sharma, CEO/President and Capt. GS Ghuman, Director. The core training provide by Alexarya Corporation International is maritime training courses and refresher courses and they also provide safety services, training on Fire Safety and other subjects for Industry. Training is both practical and using simulators

Birmingham Airport, United Kingdom, represented by Mark Buckingham, Head of Fire and Emergency Planning. Birmingham Airport's full time rescue and fire fighting service provides cover for this major International Airport with 2 fuel farms on site. The primary role of the airport fire service is to provide fire cover for every single take-off and landing of an aircraft 24 hours a day, 7 days a week (approx. 100,000 per annum at BHX).

BASF Española SL, Tarragona, Spain, represented by Jordi Leandro-Blanca, Emergency Response & Security Manager. BASF Espanola S.L. was founded in 1966 and manufactures chemical products. The emergency response team provides to the facility, services in firefighting, hazardous materials handling, fire prevention, fire and hazmat training and crisis management.

CPK NK "Rosneft" NKI, Western Siberia, Russia, represented by Maxim Lopatin, Rector, Anna Sidorova, Secretary and Natalya Shelukhina, HSE Lead Expert. Rosneft is the leader of Russia's petroleum industry and the world's largest publicly traded petroleum company. CPK NK Rosneft NKI is the Corporate Institute and it is located in the Siberian administrative area of the Russian Federation. This is the educational department for the Rosneft Company and it provides training for all professions in the Company, qualification enhancement, vocational education, in-house training for all Rosneft product lines including drilling, well service, emergency response, production, elaboration of safety standards, contingency response plans, engineering. high pressure, vessels, lifting equipment, BA, first aid, safety, substances, electric hazard and other mandatory state controlled courses and international training in well control and stuck pipe in cooperation with AST LLC.

Gatwick Fire Service, Gatwick Airport, United Kingdom, represented by Chris Knowles, Station Manager, Simon Petts, Airport Fire Manager and Ian Burke, Watch Manager. London Gatwick is the second-busiest airport by total passenger traffic in the United Kingdom. Gatwick Fire Service was established in 2010 and today provides a full and comprehensive fire and rescue service for the airport which is a registered COMAH (Seveso) site.

Gunvor Petroleum Antwerpen nv, Antwerp, Belgium, represented by Bart Heylen, Department Head Operational Safety. Gunvor Petroleum Antwerpen is a medium sized oil refinery in the port of Antwerp, the largest petrochemical cluster in Europe. Gunvor Petroleum Antwerpen refines crude oil of various types and a large part of its production is exported to overseas and neighbouring countries. It also sells a number of by-products such as sulphur for the manufacture of rubber, matches, etc.

ITC (International Training Centre), Sfax. Tunisia, represented by Ezzeddine Kacem, Training Centre Manager. TC Tunisia is the leading provider of offshore safety training courses working in the offshore and onshore oil and gas industry, specialising in Safety and Offshore Survival and Maritime Training. ITC Tunisia conducts all of its operations in line with an approved Quality Management System ensuring the highest quality and standard of operations.

CORPORATE MEMBERS:

ADN Fire Safety Pvt Ltd., Mumbai, India, represented by Mukesh Ajmera, Chairman and Managing Director, Akash Ajmera, Director and Dhara Ajmera Rane, Director. ADN Fire Safety is one of India's leading system integrator for providing fire alarm detection, automatic gas suppression, building automation, hydrant and sprinkler systems, mainly for the gas and oil sector, IT industries and large data centres, railway and steel industries , power plants etc.

Moyne Roberts Ireland Ltd., Cavan, Republic of Ireland, represented by Declan Kelly, Managing Director. Moyne Roberts Ltd manufactures fixed and swinging fire hose reels, bespoke cabinets and a range of portable, wheeled and fixed automatic fire extinguishers. Based in the Republic of Ireland, Moyne Roberts has grown to be one of the major fire protection companies in Europe, exporting as it does, across the world. The Company operates under a quality and environmental management system ensuring both high quality and an

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environmentally friendly product range. The Company offers services for products it supplies in installation, servicing and maintenance and also training in their planned preventative maintenance programmes.

SA Fire Protection S.r.l., Cascina, Italy, represented by Sharé Mason, Business Development Manager, Valeriano Barrilà, Technical Director and Angelo Lucio Merulla, Business Development Manager. SA Fire Protection is headquartered in Italy and has 40 years of experience in Fire Protection. SA Fire is structured into three major business units: Fire Engineering Systems, Fire Product Manufacturing and Services. The company supplies an extensive range of top quality fire-fighting equipment and systems primarily for the oil, gas, petrochemical and power generation sectors which includes manual and remote-controlled monitors, deluge valves and skids, gaseous components and systems, fire and gas systems, SIL rated final elements etc.

SpecPozhTech LLC, Moscow, Russia, represented by Vasiliy Shimko, General Director, Bakhodyr Akhmedov, First Deputy General Director and Askarkhuja Akhmedov, Engineer. Since 2007 "SpecPozhTech" LLC produces the unique "Sogda" heat shields and fire barriers based on innovative technology. "Know-how" is protected by several patents in Russia, USA, China and other countries. "Sogda" products protect personnel and equipment from thermal radiation, they withstand temperatures up to 1800°C and reduce the heat flux up to 50 times. The shields and barriers are constructed of a metal skeleton and two mesh panels which are sprayed by water using special nozzles. The shields can be used during fire extinguishing at oil and gas, fuel, chemical, timber and woodworking industry facilities, power engineering, metallurgy and mechanical engineering enterprises, in residential and office buildings and when extinguishing aircraft post-accident fires and fires in subways. Heat shields are used at EMERCOM of Russia, "Gazprom", "Rosneft", "Rosatom" and others.

We look forward to the involvement of our new and existing Members in the continuing development of JOIFF.

NEWS FROM JOIFF ACCREDITED TRAINING PROVIDERS

ARC FIRE TRAINING SERVICES LTD

UNITED KINGDOM

Eric Dempsey, Managing Director of JOIFF accredited Training Provider Arc Fire Training Services UK with the successful students at Arc Fire's recent 5 Day - Crisis Management & Emergency Response seminar held in Dubai, United Arab Emirates.

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ANYTHING THAT CAN GO WRONG PROBABLY WILL

JOIFF member Nathan Calabrese is a member of Washington Township Volunteer Fire Department in Valparaiso, Indiana, USA. Located about 40 miles southeast of Chicago, the department is fully volunteer, has approximately 32 active members, and operates two stations covering a semi-rural area of approximately 40 square miles. He sent us this report of his attendance at a fire incident in late December 2017.

On December 30th 2017, we received an alarm at 20.46 hrs for an active house fire. The temperatures recorded that day ranged from 1.0° F (-17.2° C) and -14.7° F (-25.9° C). I went immediately to Station 1 and made the first engine. Upon arrival we were faced with a fully involved house fire in a pre-manufactured home with no basement. The structure sat on a steel platform frame above a cement slab, and a crawl space below for piping, wiring, and other functional resources. The structure was visibly a total loss upon arrival and initial assessment, but the fire needed to be contained due to other exposures on the Bravo and Delta sides in close proximity and high risk.

Water supply was challenging. With our first engine, we immediately deployed an attack line with a TFT automatic nozzle rated for 95-300 GPM (360-1150 L/M), and a second attack line with a TFT portable ground monitor/nozzle rated for 500 GPM (2000 L/M). Our second engine froze en-route to the scene, and was sent back to station to thaw. A mutual aid engine also froze on-scene after arrival. We initiated a "Tanker Plan", in which our surrounding departments respond mutual aid with their tanker vehicles in order to provide us with a rotating convoy of additional water tankers. There were multiple problems with these tankers freezing either en-route or shortly after arrival on-scene.

We succeeded in knocking the fire down significantly. Advancing closer to the structure and using our TIC, it was confirmed that when the Delta side of the structure collapsed, it knocked the natural gas meter off the side of the structure. Most of the structure was extinguished, but we needed to control the pressurized natural gas plume without extinguishing it. The gas company was contacted, and we were told to expect a wait of an hour or more. We released multiple vehicles from the scene to thaw while we controlled the scene and waited. The gas company arrived just after 01.00 hrs with a mini excavator. Digging a hole in the frozen ground was a challenge, but they finally succeeded to break through, locate the natural gas line, and shut off the natural gas supply to the structure.

Despite running our pump while monitoring the scene and waiting for the gas company, our engine and hose lines still froze in the process. Our tanker, now thawed, returned to scene and we finished extinguishing and clean up. Assignment completed and all units were released from the scene around 02.30 hrs. All frozen hose lines were loaded into a truck, transported to our station, and flaked out on the floor to thaw so that it could then be cleaned and put back in service.

These types of homes are not uncommon in rural parts of the USA. Responsible homeowners in cold climates wrap piping and install other protection products under these structures to protect from the elements and freezing. This homeowner in particular had not taken any of these precautions, and upon his pipes freezing, decided to place a heater under the structure. The heater chosen by the homeowner was an electrically ignited, diesel fuelled, forced air heater (what we commonly refer to as a "torpedo heater"), typically putting out between 100,000 and 200,000 BTU's. It did not take long for the structure to ignite with the amount of heat and fuel being forced under the floor of the structure. There was no loss of life at the incident, as the homeowner and residents were safely evacuated prior to the structure becoming fully involved.

Editor's note: Regardless of the specialised job roles of emergency responders in Industry, most will assist in mitigating any type of incident if they come across it when off duty. All experiences by such a person are potential learning for someone else and one of JOFF's important 3 pillars is Shared Learning. The Catalyst is pleased to receive reports on the great work that our members do in protecting their communities when "off duty" from their job role.

EYE IN THE SKY

BY KEVIN WESTWOOD, B. ENG(HONS) C. ENG, MIFIREE, MEI, FJOIFF, BP GROUP FIRE ADVISOR

"A picture is worth a thousand words"

A quote dating back to 1915 and used by many throughout the years including the great theoretical physicist Albert Einstein. He recognized as did so many that visual information in many cases is more accurate than spoken words. You will have heard of the 'Chinese whispers game - called telephone in the US where information is passed down the line and incredibly within a few iterations the massage has changed beyond recognition.

So, what's the point? The point is that optics of a situation provides many more data points and references to make informed decisions. Its widely recognized by academic studies that the brain interprets imagery more easily that words. And thus, for command and control of an incident scene, having global oversight or 'situational awareness' of the event leads to reduced risk and improved decision making.

Another way of explaining this is to imagine two command scenarios. The first and the one utilized by on-scene Commanders when gathering information from different incident sectors is radio communication from each sector commander. This important communication media has limitations in that the on-scene commander uses verbal information received to build a mental picture of what is occurring. In complex incidents, this can mean many verbal transactions to get the information clearly relayed. Take the second command scenario where clear visual imagery of the incident scene both overhead wide area coverage and where required zoomed and thermal enhanced imaging provide real time continuous streaming to the command post ensures zero ambiguity and instant on-scene data acquisition to inform descisions.

Providing aerial visuals from a purpose designed drone to both tactical and strategic command centers has the added benefit of reducing radio traffic significantly – a common pinch point on airwave resource allocation during protracted events and where multi-agencies use common emergency channels.

The OIC has clear objectives, to save life, reduce the impact on the environment and where possible reduce loss through mitigation of damage to physical assets. This is done by utilization of human and mechanical resources in a coordinated planned tactical manner with the assistance of multiple stakeholders.

The asset owner will be providing process safeguarding, relief and blowdown minimizing totality of primary containment loss. Emergency responders from onsite ER teams to municipal agencies responders and mutual aid partners will be deployed in mitigation activities as directed by the on-scene commander. All focused on one objective to mitigate the event and bring a semblance of order to one of chaos.

A strategically placed drone with optimised sensors on board can provide such oversight as a real game changer in incident command and control.

New Times - New Tools

Technology is our friend and whilst in some quarters there is 'reluctance to change' – fearing the dynamics of modernising the service, it's important to understand that the tide is against us and as history would show it has always been that way - we should embrace and not fear the future operational construct. I can guarantee that technologies like Robotics, Artificial Intelligence (AI), Machine Learning (ML), Virtual and Augmented Reality (VR & AR) will in some shape of form be tools in your emergency response capability set in the very near future. Indeed, many disciplines in the organisations in which we work are using these technologies to drive efficiencies in in the business in many use-cases and operating environments so why not Emergency Response?

Another quote by our friend Albert Einstein;

"Insanity: doing the same thing over and over again and expecting different results"

Technology allows us to improve. In the human form, It's the iterative changes we make, learning from the past experiences in an endeavor to become better in our roles, developing competence – the skills, knowledge and experience. With machines and code its development of tools which allow us to carry out our roles in greater safety, in a timelier manner with greater efficiency and effectiveness.

The 'eye in the sky' the drone has the capacity to provide not only a visual account of what is happening on the ground to provide more effective Sim-Op's management but so much more. As a tethered unit, it has the capacity to sustain flight for protracted incident management up to and beyond 24hrs if required. As a free fly unit, it can provide imagery down to the millimeter with the use of zoom capabilities – sitting of the asset safely relaying imagery as directed by the incident commander or on-scene commander. The other extreme where permission allows is it can fly beyond visual line of sight (BVLOS) to perform Search and Rescue missions or intelligence gathering tens of miles from its home point.

The number of use cases for the drones are growing at an exponential rate and with the inclusion of AI & ML the drones with on board intelligence and fully autonomous capabilities are presenting some real game changing capabilities... These will be the subject of more focused editorials in future catalyst editions...

2ND INTERNATIONAL FIRE & EXPLOSION HAZARD MANAGEMENT CONFERENCE

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JOIFF in association with Johnson Controls, is pleased to invite you to book your place to attend JOIFF's FEHM Conference which will take place at the Corinthia Hotel, St. George's Bay, Malta on 29th and 30th October 2018. The programme will include a blend of technical & operational topics with involvement by our valued sponsors with whom delegates will have the opportunity to see & discuss current & new equipment and technological developments. The Conference will also provide numerous networking opportunities amongst the International delegates who are engaged in Operational Response Worldwide.

JOIFF 2018 CONFERENCE SPEAKERS AND TOPICS

***Eric Yap**, Commissioner Singapore Civil Defense Force*: Philosophy, perspective & directional imperative towards managing complex organisational and legislative mandates; Driving forward thinking into practical application.

***Thad Allen** USCG Admiral (retired) Sr. Executive Advisor*: Insights from Deepwater Horizon and other incidents, of strategic leadership and organisational management during crisis & emergency response. Developing and maintaining capability & cooperation between agencies, private organisations & the public.

***Mark Scoggins**, Solicitor Advocate (formerly Barrister):* Responsibility & accountability profiles for organisations & responders in high risk environments. Lessons from the field to the courtroom.

***JoseTorero** Chair in the Department of Fire Protection Engineering & Director of the Center for Disaster Resilience in the Department of Civil and Environmental Engineering at the University of Maryland (USA) (expert witness Orinfell Incident.):* Hazard & Risk perspectives & their practical implications on response. Matching the science to the practice, & the engineering to the response profession organizations and legislation

***Gene Allen**, TBC Head of Risk for Allianz Insurance Risk Specialist*: Incidents of note; details & response risk profiles. Lessons from major incidents from the insurance perspective.

***Varadendra Koti**, TBC Group Head, S&OR-Fire Reliance Industries Ltd.*: Butcher Island Tank Fire -Key incident timeline & profile, firefighting with foam under complex logistical constraints.

***Brad Byczynski**, BP Global Response Manager & BP Incident commander/Deputy Incident Commander Deepwater Horizon.*: Deepwater Horizon, operational realities during response. A perspective from the industrial/corporate responder. A complimentary presentation to Admiral Allen, from the BP Incident Commander for Deepwater Horizon.

***Garry Mcfadden**, ERM Emergency Management consultants South Africa:* Proactive fire protection design of new construction, & constraints of retro fitting of aging facilities in High Hazard industry, Applying technologies, and response philosophies to reduce risk during the life of an asset. (Consequences to response of extending service life of aging assets).

***Eric Lavergne**, TYCO international NFPA 11 Task Group member, Former President of Williams Fire and Hazard Control :* NFPA 11 Fluorine Free Foams, Objectives current progress & summary of subgroups (Testing Protocols, Recommendations, funding).

***Nial Ramsden**, ENRG Lastfire:* Results of Lastfire's recent testing & next phases of Lastfire testing programs of PFAS and Fluorine Free Foams

***Pine Pienaar**, JOIFF Director & Chief Fire Officer (Rtd.) Sasol Secunda Fulcrum Consultants:* Modernising industrial fire departments, keeping current. Theory & practice.

***Kevin Westwood**, JOIFF Director of Engineering and Technology, BP Group Fire Advisor:* Drones in current use & application. Practical utilisation & live link field demonstration.

***Kevin White**, Queensland Fire and Emergency Services, Operations Business Management office, Brisbane Region:* Developing interagency & industrial cooperation, joint training & capability integration. A practitioners guide.

***Randy Fletcher** JOIFF Chairman BP Global Response Advisor:* Managing within the unknowns. Finding & leveraging the expertise across the response functional boundaries (Response organisations, consultants, manufactures, developers, agencies, and the public). Minimising the illusions.

Note: All topics are subject to change at the discretion of the speakers and approval by JOIFF

For further details on the Delegate Package or the Sponsorship and Exhibition Opportunities contact Event Director **Paul Budgen** on + 44 (0) 203 286 2289 or Email pbudgen@edicogroup.net

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PROPOSAL FOR PICTOGRAMS ON PORTABLE FIRE EXTINGUISHERS.

BY DECLAN KELLY, MANAGING DIRECTOR APEX FIRE/MOYNE ROBERTS IRELAND

Communication is critical to us all, in particular with the ease and speed at which we can travel around the globe today which has made travel for business and pleasure a way of life. There are over 6000 languages in the world and without human ingenuity they could form an impenetrable barrier for communication between people.

In recent times the increasing and rapidly developing use of pictorial images and symbols has become the new universal language. Research from an educational context demonstrates that visual representation, especially pictures, offers a powerful means of communicating and an alternative to written or printed languages. The use of Emoji symbols in digital and mobile apparatus is a growing and widespread method of messaging, furniture flat-packs and electronic equipment such as computers, TVs etc. come with instructions in pictogram format for ease of assembly, safety signage from emergency lighting and airlines safety information cards all now use pictograms to inform its customers of the safety information on board their aircraft to communicate clear and concise information.

His work on the European Standards Organisation (CEN) Technical Committee for portable fire extinguishers, led the writer to consider if the understanding by potential users of the instructions for use of portable fire extinguishers could benefit from the use of pictograms to supplement the ease of understanding the different types of fire extinguishers used and identified by a mandatory colour code in EU Countries. Currently in the market today some EU countries have manufacturers that use up to 4 languages as instructions and other information - currently the EU has 24 official languages so there is difficulty in deciding which ones to choose !!

Portable fire extinguishers vary in sizes generally from 1 to 9kg and the area of coverage for print on these cylinders is limited and the smaller the cylinder the smaller the print. This alone can have an effect on someone trying to find the instructions on use in their language and then trying to read and clearly understand what the instructions say to do.

When a person needs to use a portable fire extinguisher in an emergency they are generally under pressure and could also be in a state of panic. Time is critical in these situations when needing to select the right extinguisher and to immediately and safely operate the device. Therefore the user needs clear instructions - the more visible the better - that are clear and straight to the point. There should be no wasted time looking for his/her language - if it is present at all.

Research shows that the majority of people can interpret diagrams and maps long before they can read the same information in words and sentences. So there should be great benefit in having pictograms and colours as the main focus for the selection of the extinguisher and their safe use.

Modern day portable fire extinguishers can sometimes have far too much information visible on the units. This is not to say that this information isn't necessary but technology today allows us to use alternatives, in particular bar codes and more recently Quick Response (QR) codes. These QR codes are a major development that could assist manufactures of fire extinguishers in complying with standards by having relevant information stored and accessible electronically. Manufacturers could also include promotional messages for tools, spare parts, refill kits or other products and services which would be required by the trained service technician who services, refills and maintains such equipment. QR codes provide numerous opportunities such as storing a training video of how to operate the fire extinguisher and providing access to the data sheet for the particular model. Using QR codes saves money and no paper is needed thus reducing the amount of packaging waste. From the perspective of quality control and improving standards of operation, QR codes could be used to monitor the work of technicians who access and require such information if requiring service or maintenance instructions, perhaps by entering their national registration identification number on a data base or answering a few relevant questions before receiving such information. The use of such technology in this area could revolutionise this industry.

The writer is pursuing this work within the European Technical committee that deals with the manufacturing requirements for portable fire extinguishers (EN 3 series) and he invites persons who would like to comment on his proposals or have any proposals they may wish to share to contact him via email declank@moyneroberts.com

Editor's note: Declan Kelly is Manging Director of Apex Fire/Moyne Roberts Ireland Limited. He is a member of the Fire Safety Services Committee Advisory Group of National Standards Authority of Ireland (NSAI), was a member of the NSAI Working Group that revised IS 291:2002 the Irish standard for maintenance of portable fire extinguishers, is a member of the IS 291 Maintenance Group of IS 291:2015 the Irish Standard for Selection, Commissioning, Installation, Inspection and Maintenance of Portable Fire Extinguishers, is Chairman of the newly formed NSAI Working Group writing a standard on Fire Mains and he represents NSAI on TC 70 the European Committee for Standardization (CEN) Technical Committee dealing with Portable Fire Extinguishers.

DEFIBRILLATION SAVES LIFE

Dublin Airport Fire & Rescue Service is responsible for all fire and rescue duties at the airport in the event of an aircraft accident/ incident and they also provide domestic fire and medical response to the airport facilities. They have fully trained paramedics as part of the fire crew and they provide an emergency ambulance for the airport. The Fire & Rescue Service has installed more than 50 defibrillators throughout the airport and has saved 27 lives in the last 15 years.

Defibrillation is a procedure that is used to treat life threatening conditions that affect the rhythm of the heart such as cardiac arrhythmia, ventricular fibrillation and pulseless ventricular tachycardia. The procedure involves the delivery of an electric shock to the heart which causes depolarisation of the heart muscles and re-establishes normal conduction of the heart's electrical impulse.

Defibrillation was first presented in 1899 by two physiologists from University of Geneva, Switzerland when in studying animals they observed that small electric shocks delivered to the heart could trigger ventricular fibrillation, while the delivery of large electrical charges could reverse the fibrillation.

The machine used to deliver this therapeutic shock to the heart is called a defibrillator.

After a news headline in 2000, that a man died at Dublin Airport due to the absence of defibrillators, Gerry Keogh, Chief Fire Officer of Dublin Airport spearheaded an airport defibrillator programme and in 2003 started with just four defibrillators. A number of staff were trained in their use and within the first week after installation, a person had a cardiac arrest at an airport boarding gate. Two nurses who were at the gate had started resuscitation by the time the Fire and Rescue Service responders arrived bringing a defibrillator with them. They gave the patient a shock and within ten minutes, the person was up and speaking to them. This gave the Airport Fire and Rescue Service great confidence and morale to progress the project.

As Dublin Airport got bigger and more passengers started to come through, the number of defibrillators has been increased and now there are more than 50 defibrillators installed whose use assisted in saving 27 lives. All airport police and fire officers are trained in Cardio Pulmonary Resuscitation (CPR) and 15 taxi drivers who provide service to the Airport have also taken the two day training course in emergency response for cardiac arrests provided by the

Airport Fire & Rescue Service. Doing CPR buys time until a defibrillator can be obtained and turned on. The Dublin Airport Fire & Rescue Service aim to respond to a patient within four to six minutes and then connect them to the defibrillator and shock.

Usually one shock has the desired effect but on one occasion in 2017, a patient collapsed on the Departures floor and it took 14 shocks to get his heart pumping - and he survived.

In a situation of cardiac arrest the longer a patient is left without defibrillation the worse the survival rate gets - for every minute that goes on that no one is interacting, the less are the chances of survival.

Gerry Keogh. Chief Fire Officer Dublin Airport

Gerry Keogh, Chief Fire Officer, has been with the airport's fire services for 39 years and is a great proponent of the use of defibrillators. Gerry has been a member of County Wicklow Civil Defence for many years, was one of the leaders in starting a water rescue unit in Wicklow and the team has carried out many searches over the years. The water rescue team also carry out recue cover for events such as the Round Ireland yacht race and the Bray Air Show which is the highlight of the year in the aviation calendar.

Award to Dublin Airport

Recently, Dublin Airport won the Innovation in Technology and Systems Award for its Fire Alarm App at the Facilities Management Awards recently. The Fire Alarm App was designed to help Dublin Airport Fire Alarm Responders find the location of a fire alarm

DEFIBRULATION SAVES LIFE CONTD....

activation using a graphical map interface so they can react without delay. Dublin Airport IT project manager, Gavan Farrell said the project team was delighted to win the award which recognises the most effective use of a system or technology in Ireland's facilities management sector. "We have approximately 14 000 fire sensors located across both terminals, so speed is key in pinpointing the source of a fire alarm so that any potential impact on the passenger journey is minimised." The Fire Alarm App is the result of a collaboration of work between Dublin Airport's IT and operational safety departments, its fire safety service provider Masterfire and mobile application development specialists, iGuide.

More than 3.8 million passengers have used Dublin Airport in the first two months of this year, which is a 5 percent increase on the first two months of last year. This summer Dublin Airport will have flights to 195 destinations in 42 countries, operated by 56 airlines.

FIREFIGHTERS' PPE, CANCER AND OTHER ILLNESSES

Because of the nature of uncontrolled fires and of the Personal Protective Equipment (PPE) with which firefighters are issued, firefighting can have a number of serious consequences for the wearer – rise in body temperature; dehydration; physiological stress; psychological stress etc. Also, in recent years, it has been recognised that firefighters' PPE is exposed to a range of toxic chemicals, biological pathogens and other hazardous contaminant exposures that can pose dangers to firefighters' immediate and long-term health with increased risk of cancer topping the list.

Firefighters are routinely exposed to the carcinogenic toxins of smoke and soot not only through inhalation but also through exposure via bare skin - on the head, face, and neck.

Chemicals can enter the body:

- through the digestive system,
- through inhalation – e.g. when firefighters do not wear or prematurely remove SCBA, especially during overhaul (post fire activities) and
- through percutaneous absorption i.e. through the skin.

Unlike other line-of-duty deaths that usually occur in one tragic instant, cancer is often a slow killer that blooms only after years of exposure to carcinogens. But it appears that the latency period is shortening, in part because firefighters are being exposed to more carcinogens today than ever before. Fifty years ago, most of what burned in a typical building fire included cotton, wood, and other natural fabrics and materials. Whilst the products of combustion from these materials were not ideal to breathe in, they weren't as dangerous as the products of combustion in today's building fires. Today, all fires in buildings need to be dealt with as hazardous materials incidents because nobody can be sure what toxins may be spewing out as a result of burning plastics, rubber, electronic equipment, fabrics treated with flame-retardant chemicals etc. When these materials burn, the products of combustion include a variety of substances such as acrylonitrile, arsenic, benzene, polycyclic hydrocarbons, cadmium, chlorophenols, chromium, carbon monoxide, dioxins, ethylene oxide, formaldehyde, etc. all of which have been proven or are widely believed to cause cancer and other serious illnesses. These products of combustion seep into the human body through the nose, ears, lungs and unprotected skin and attach themselves to anything that they touch including intervention PPE and firefighting equipment in use and they can remain and off-gas dangerously for a long period after the fire.

Contact with the soiled PPE and equipment increases the risk of the contaminants being introduced into the body. Many of the toxins that lead to health risks are being carried away from the fire scene on the PPE and equipment used by firefighters and if the soiled PPE and equipment are not fully decontaminated or isolated immediately, they will spread the contamination to the inside of the fire appliance, the seats and seat belts that the firefighters use, the fire station where the equipment is deposited, including eating and sleeping areas etc. Sometimes PPE and equipment used in a fire are put in the boot/trunk of a personal vehicle and they remain there spreading contamination when the car is used for "normal" purposes such as bringing the children to school, shopping etc., thus exposing the driver and passengers to serious potential long term danger.

Whilst no direct link has yet been determined between exposure to the contaminants released whilst firefighting to cancer and other illnesses, there is a large and increasing body of evidence that these contaminants do cause cancer and other long term health problems, that dirty PPE and equipment is dangerous and that current cleaning processes do not fully remove the contaminants.

Decontamination and cleaning after exposure to fire conditions is technically very challenging. The effectiveness of decontamination is rarely determined. Most cleaning processes probably remove many contaminants, however not all contaminants are removed with the same efficiency. Current cleaning methods for clothing have evolved based on good practice but they are lacking a scientific basis. There is a large and growing amount of research currently taking place on cleaning PPE to effectively remove all such contaminants, but

FIREFIGHTERS' PPE, CANCER AND OTHER ILLNESSES CONTD....

whether new cleaning procedures adequately do remove such contaminants from PPE has yet to be fully determined

An article in the recent edition of the Industrial Fire Journal reports that cancer is the leading cause of work-related deaths in Europe and firefighters are at particular risk. Research has shown that the raised level of toxin absorption in firefighters was caused by dermal absorption i.e. absorption through the skin of particles contaminating firefighters' clothing. The article says that a new system of decontamination of firefighters' PPE using liquid CO2 has been developed in the Benelux region. After an incident, firefighters deposit their contaminated garments into specially designed boxes which are transported to a decontamination centre. The contaminated clothing is transferred to a drum and is sucked into a vacuum, the drum is pressurised with CO2 gas and because CO2 molecules are very small, they can penetrate the fibres of the garments. As the machine increases the pressure, the CO2 liquefies and breaks the forces attaching the dirt and toxins to the garments. Then the drum revolves very slowly and the CO2 is filtered until all the dirt and toxins are removed and the garments are completely decontaminated.

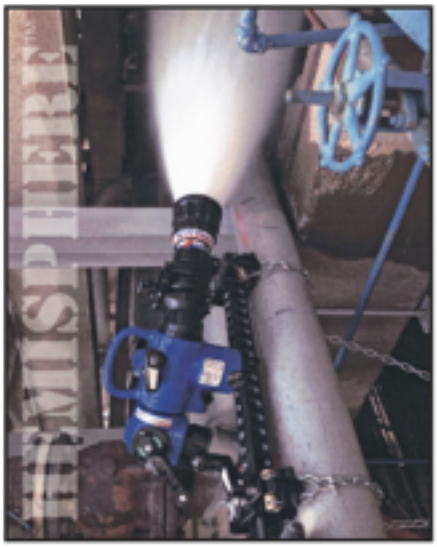
Whilst this procedure is extremely specialised and expensive to operate, there are easy actions that firefighters can take to reduce the risk of exposure. Following exposure to a fire incident, a simple cleaning process of the PPE of the firefighter on leaving the fire scene before removing any PPE, using water, soap and a bristle brush, will remove large debris and a large amount of chemicals that have adhered on the PPE. Then the firefighters should be hosed down from head to foot. The entire process can be carried out in minutes and will greatly reduce the potential for hazardous exposure to toxins and carcinogens.

Good safety working practice requires that before allowing persons to enter a work place, a Risk Assessment of the workplace should be carried out and when risks cannot be avoided or sufficiently limited by technical means of collective protection or by measures, methods or procedures of work organisation, suitable PPE should be chosen that is appropriate for the risks involved, without itself leading to any increased risk.

In the widespread and growing discussion on the hazards of cancer and other illnesses to firefighters during exposure to fire conditions, PPE currently used by firefighters has been clearly identified as the main cause of the transfer of toxins and carcinogens from exposures – in other words, PPE used by firefighters in fire exposures clearly does add to the risks of firefighting.

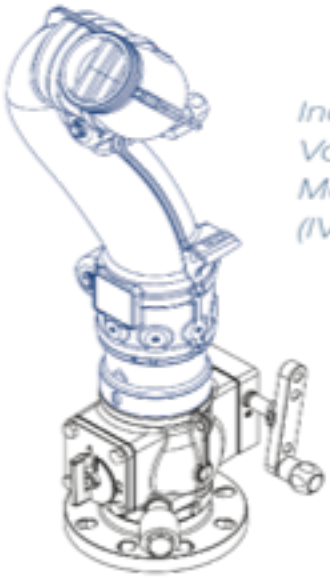
Firefighters must be kept safe in their workplaces and to protect them, it is quite clear that serious and urgent change is required to the management of firefighters and their PPE. The basis of current practices is grounded in the 20th Century as greater emphasis was placed on safety in the workplace and on standards of manufacture for items of PPE. There have been huge changes in the products of combustion from fires in the 21st century than there were from fires in the 20th century and as stated above, today, all fires in buildings need to be dealt with as hazardous materials incidents. Detailed consideration should be given to the conditions to which firefighters are allowed to be exposed in today's World, to the current standards to which PPE for firefighters are required to be manufactured, to the advantages and disadvantages of each item of the PPE used in exposing firefighters to today's hazardous workplaces and to setting minimum standards for the physical and psychological conditions of the firefighters before they are allowed enter hazardous places of work.

Not Just For Suppression



Prevention of hazards and protection of assets is just as important as the safety of your facility turnaround. TFT's Hemisphere was recently utilized as a temporary fire protection tool installed 21 meters in the air to protect a cracking tower where hot work was being performed. The Hemisphere is portable, safe, flows up to 2,000 lpm, and can be mounted almost anywhere in a given industrial environment with a wide selection of clamping options.

For more on the Hemisphere, go to www.tft.com



Industrial Valve & Monitor (IVUM)

Going Above and Beyond

TFT has furthered their commitment to industry by certifying a set of fixed station monitors and in-line valves to be FM approved. The FM approval ensures that our equipment is compliant to the high-loss protection standards that AHJ's for an industrial facility are demanding. Depending on the product category, the FM Approval Classes include 5511 and 1421.


FM APPROVED

Certificate of Compliance

FM Approvals

Designed to Supply Max Flow & Reach

An OS&Y is so traditional and commonplace, choosing a valve to install underneath a fixed station monitor is taken for granted. Can there be anything better? Yes, there can be. That's why TFT designed an FM approved in-line valve that can be installed beneath any fixed station monitor, and has an unobstructed wide open 9.27 cm waterway to result in ONLY .65 bar of friction loss at 9,500 lpm. The valve is easy to maintain because unlike the OS&Y, the gearing for the valve is completely sealed, and the valve is designed with an easy to change valve seat when necessary for maintenance.

Safety With Tactics

Industrial fire schools the world over continue to choose the TFT BlitzFire for the greatest safety and tactical advantage during firefighting operations. The Blitzfire continues to be the only monitor that has a full attack range from 10 degrees to 86 degrees to isolate flange fires and/or mitigate hazards in an overhead pipe rack.

CERTIFICATION TEST OF A 'SOGDA' FIRE BARRIER

BY VASILIY SHIMKO, FIRE DEPUTY GENERAL DIRECTOR: BAKHODYR AKHMEDOV

Modern worldwide trends are characterized by an increase in use of liquefied natural gas (LNG). One of the major problems in providing fire safety of facilities for production and use of LNG is high thermal radiation of burning natural gas. The density of thermal radiation of the LNG flame can reach 220 kW/m2, the temperature is about 1800°C.

Fire safety in case of accidents and burning of LNG can be provided by unique "Sogda" fire barriers, constructed from heat-shielding mesh block panels. They consist of two mesh panels made of stainless steel AISI 304, between which water is sprayed by special nozzles.

To calculate the reduction coefficient of the radiant heat flux density by a fire barrier, a certification test of a "Sogda" fire barrier (1.5-1.5 m) in a small-sized furnace was held in the "standard fire" mode. An image of a sample of the fire barrier fixed to the test furnace is shown below.

Measurements of the density of the thermal radiation flux were carried out at a distance of 0.5 m from the geometric center of the unheated surface of the barrier for 160 min. As a result, the graph of dependence of the coefficient of heat flux reduction kr as a function of time was constructed (Figure 1). Explanation of the reduction coefficient of heat flux density kr.

On the basis of the a/m dependence a physical model describing the processes of heat flux reduction by the mesh block-panel of the fire barrier is proposed. Figure 2 schematically shows the heat flux incident on the mesh surface of the block- panel.

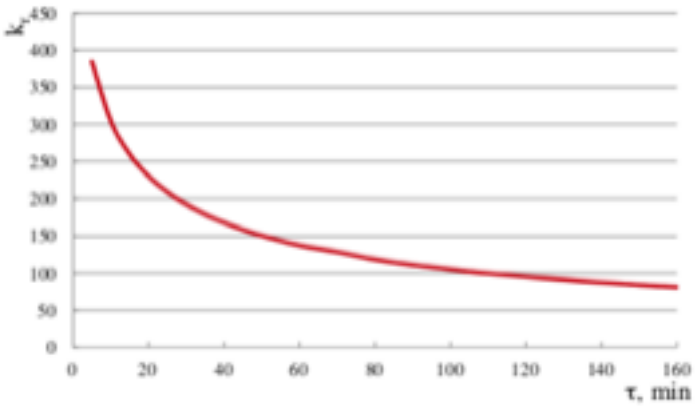


Figure 1 – The coefficient of heat flux density reduction as a function of time

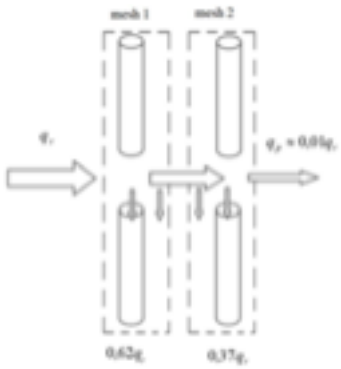


Figure 2 – The scheme of the heat flux reduction by block-panel of fire barrier

The heat flux with density qr [W/m2] falls on the external mesh. This heat flux can be divided into the following: part of heat flux with density qr.m [W/m2] falls on cooled by water metal part of the fire barrier, and part of heat flux with density qr.h [W/m2] falls on the holes of metal mesh.

From geometric considerations

$$q_{r.m} = \frac{F_M}{F} q_r;\ q_{r.h} = \frac{F - F_M}{F} q_r$$

where Fм – surface area of a metal part of barrier [m2], F – total surface area of the barrier [m2]. In this certificate test Fм/F ≈ 0,62. Thus, approximately 62% of the total radiant heat flux incident on the fire barrier can be considered completely absorbed, reflected and scattered by the metal part of the first mesh panel and by water. Herewith, the reduction coefficient of a part of the radiant heat flux passing through the holes in the metal mesh

$$k_h = \frac{q_{r.h}}{q_p} = \frac{(F - F_M)q_r}{Fq_p} = \frac{(F - F_M)k_r}{F}$$

where $k_r = \frac{q_r}{q_p}$ is the reduction coefficient of radiant heat flux density, qp – neat flux density after passing through a barrier. The experimental value of the reduction coefficient of radiant heat flux density kr at the temperature inside the furnace 1030°C is kr = 98. Thus kh ≈ 37.

It can be assumed that approximately 37% of the radiant heat flux incident on the surface is reflected and dissipated due to diffraction phenomena within the fire barrier and is absorbed by the metal mesh and cooling water, as it passes about 1/20 of the heat flux through the barrier holes. A detailed diffraction mechanism at the holes requires additional studies.

As a result, the fire barrier in the above conditions for conducting experiments at a temperature inside the furnace of 1030°C absorbs, reflects and disperses 99% of the radiant heat flux incident on it.

Editors note: you can contact General Director: Vasiliy Shimko First Deputy General Director: Bakhodyr Akhmedov http://spt-rus.com/ sptinfo@spt-rus.com Tel: +7 (499) 235-16-01, +7 (499) 235-31-17

DATES

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RISK AND CONSEQUENCE SOFTWARE TOOLBOX FROM GEXCON

A risk and consequence toolbox tried and tested through real world implementation by Shell is now available under exclusive license from Gexcon.

The global energy and petrochemical company's leading-edge consequence modelling, quantitative risk assessment and pre-incident planning tools are now available to the global community.

Previously only for use on Shell projects, they deliver accurate and proven insights into risks and consequences through software modelling implemented into plant operations with bidirectional learning.

Developed in the field through extensive asset implementation alongside cutting-edge industry research and development, these capabilities have evolved over 40 years to become known and trusted throughout the world.

With continuing research and development from both Shell and Gexcon, the toolbox offers exceptional proven capabilities to drive optimal design and safe operations at high value, high hazard facilities.

Along with exclusive license rights, Gexcon will also provide comprehensive training courses for each product to ensure users are able to take full advantage of all the features.

Consequence Modelling

Fire, Release, Explosion and Dispersion (FRED) software predicts consequences of accidental and design releases of hazardous fluids and gases from process, storage, transport and distribution operations.

With a vast range of fire explosion scenario models based on empirical data, its intuitive, high quality interface enables the user to rapidly understand consequence prediction, providing an at-a-glance overview of the extent of blast waves, gas contours and heat radiation.

Quantitative Risk Assessment

Predicts the risks related to incidents such as releases of flammable or toxic fluid, fires and explosion, performing facility layout optimisation and the domino effects for escalation management.

Shepherd has been relied upon by oil, gas and petrochemical operating companies, engineering contractors, insurers and regulators.

Its easy-to-use, high quality interface enables data to be imported from multiple sources so models and parameters can be exposed to accurate case data.

Pre-incident Planning

PIPA software delivers consequence assessment information to assist in creating emergency response plans and the specification of fire protection requirements.

It enables plant operators, safety engineers and fire chiefs to understand the impact of hazard consequences for any proposed design, comparing concepts and highlighting areas requiring modification.

Easy and simple to use, the software has a variety of outputs from simple graphs showing the size of hazard consequences to full emergency response plans including hazards, protection requirements and justifications.

Speak to Gexcon's sales and marketing team to find out more about the most appropriate software for your needs.

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JOIFF ROLE OF HONOUR

JOIFF is delighted to congratulate the following people who were awarded JOIFF qualifications during October to December 2017.

DIP JOIFF

Francisco Dimco Jr. Dip.JOIFF

Fire Officer, ADNOC Sour Gas, United Arab Emirates

Francisco Dimco Jr. has 13 years of experienced both Structural, International airport, Military Air Base and Oil and Gas firefighter. Presently he is working as Emergency Responder/Driver operator at Al Hosn Gas (Adnoc Sour Gas) Abu Dhabi, United Arab Emirates. Prior to that he worked at NATO Kandahar, Afghanistan Airfield and U.E.A Military Air Base.

Francisco regards his successful completion of the JOIFF diploma to be another achievement to help his career at present and future employment.

Saud Abdalla Mohamed Abdalla Jafar Dip.JOIFF

Fire Officer, ADNOC Fujairah Terminal Division, United Arab Emirates

Saud Jafar started to work from 2003 to 2006 in special forces after which he changed career and was employed at EGA (Emirates Global Aluminum) where he worked for one year. He then joined Dubai police force in the CID (Crime Investigation Department) where he worked from 2007 to 2011 following which he joined ADNOC Onshore as a firefighter in 2012. In October 2017, he was promoted to Fire Officer.

LUKOIL Mid-East Ltd, West Qurna-2 Project, Iraq

The following members of the Lukoil Mid-East Fire Team successfully completed and were awarded the JOIFF Diploma:

- Hussein Malik Hashim Al-Bahli Dip.JOIFF.
- Kareem Mohammed Falih Al-Battat Dip.JOIFF.
- Ali Mahmood Shakir Alhawi Dip.JOIFF.
- Sarmad Nadhim Zbari Al-Hameed Dip.JOIFF.
- Alaa Munther Abdulalah Alrashed Dip.JOIFF.
- Abdullah Sultan Hamza Alrashid Dip.JOIFF.
- Ilya Boyno Dip.JOIFF.
- Adam Sivell
- Alexander Telenkov Dip.JOIFF.
- Sergey Zelenkov Dip.JOIFF.
- Mustafa Abdulkhadim Ali Al-Ameri
- Mohammed Najm Abdulzahrah Ahmed
- Mustafa Sameer Saddam Al-Gharbawi
- Anwer Ibrahim Mandeel Al-Maliki
- Ibrahim Al-Sameri
- Hasan Fadhil Hassan Al-Kabi

More detail in the next edition of The Catalyst.

JOIFF ROLE OF HONOUR

JOIFF LEADERSHIP 2 (OFFICER)

Jamie Fleming MJOIFF

Emergency Rescue Service - Guard Commander, LUKOIL Mid-East Ltd. West Qurna-2 Project, Iraq.

Jamie Fleming is the first person to have successfully completed the entire JOIFF career path – JOIFF Diploma, JOIFF Technician, JOIFF Leadership 1 (Team Leader) and JOIFF Leadership 2 (Officer) programmes.

Jamie started his career with Cleveland County Fire Brigade as a Retained Duty System fire fighter in 1997. In 2001 he joined SembCorp Asset Protection (Formerly ICI Fire Service) in a fulltime capacity, working as part of a team providing protection to one of Europe's largest clusters of Tier 1 COMAH (Seveso) sites, comprising of both Petro & Aggro chemical risks.

After serving over ten years on Teesside, he got the opportunity to work in the Middle East with Abu Dhabi Company for Onshore Oil Operations (ADCO) on the United Arab Emirates (UAE) most ambitious oil & gas projects. He took up the role of Fire Officer on the ADCOP project, which involved the start-up of FUJ-TPO fire and rescue department and mentoring local national personnel.

Three years later, Jamie was given the opportunity to work for Lukoil on their first major International project in WQ2, Iraq where he is now Guard Commander.

Jamie is committed to lifelong learning and is ambitious to keep progressing within the emergency response sphere. He is an advocate of JOIFF as an organisation and actively promotes the benefits of JOIFF within industry. He said "I believe that the only way anything improves is through collective learning and a willingness to share experiences, no one person can provide all the answers and JOIFF offers a platform for sharing knowledge, as well as being a great support mechanism for the industry. I would strongly recommend to anyone working at any level in Industrial Emergency Response to become an affiliate of JOIFF".

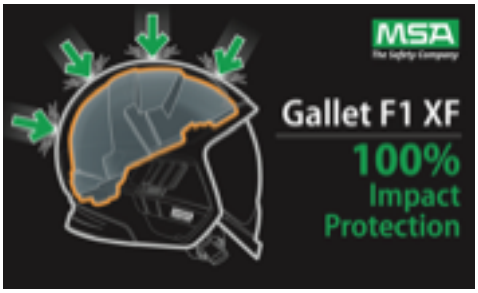
THE CATALYST AND THE DIRECTORS OF JOIFF
EXTEND CONGRATULATIONS TO ALL THOSE MENTIONED ABOVE.

GALLET F1 XF FIRE HELMETS – UNIQUE PROTECTION

IMPACT & THERMAL PROTECTION LEVEL FOR SAVING THE LIVES OF FIREFIGHTERS

Quality of the material selection

MSA never compromises on the safety of wearers. Each component is evaluated and tested using a clear protocol. Because the material itself is not everything, MSA has also chosen not to restrict itself to what is described in the EN 443 standard (helmets for firefighting in buildings and other structures) to ensure maximum safety for wearers, especially with regard to the safety-critical components of the helmet.



Better impact protection with high coverage liner

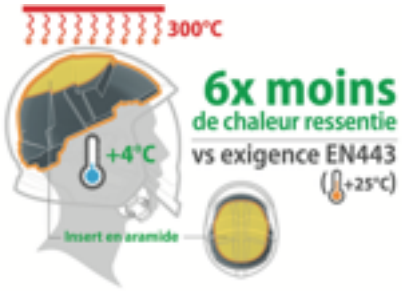
The size of the Gallet F1 XF impact liner has been increased considerably to protect the entire head of the wearer against shock and heat, and not just up to half of the skull. Because shock to the forehead could prove fatal.

Tests conducted internally in our laboratory on several EN443-certified helmets prove that impact to the shell alone, in an area not protected by the impact liner, may seriously injure the wearer. Consequently, MSA decided to go beyond the requirements of the standard, opting for maximum protection rather than limiting itself to the minimum size needed to comply with the standard.

The Gallet F1 XF impact liner consists of shock-absorbing, high-density polyurethane foam with over moulded aramid reinforcement. It provides full protection (impact and penetration) for the top, front & sides of the helmet – and not just for the 5 impact points listed in the EN 443 standard. As a result, the Gallet F1 XF impact liner covers most of the wearer's head. There is no compromise on safety.

Higher thermal performance with aramid layer

The aramid layer on top of the impact liner also provides higher thermal performance. The thermal protection it delivers also proves to offer a major competitive advantage, as is noted by users in hot training sessions or actual fire situations. In many real fire testing situations, it succeeded in negating any heat breakthrough for longer than any other helmet.



The radiant heat exposure test (EN 443:2008 section 4.7) exposes one of the side impact points (left or right) to 14 kW/m² heat flux (approx. 300°C) for 8 minutes. It is then checked to ensure that the temperature measured on the head form does not increase by more than 25°C. After exposure, and within 60 seconds, an impact test (shock or penetration) is performed to check the helmet's mechanical performance when exposed to extreme heat stress. The average temperature increase under a Gallet F1 XF is only around +4°C (average based on 205 lab tests recorded on the Gallet F1 XF), and the force transmitted to the head form is way below the limit of 15 kN, with full protection maintained against penetration.

From standards to the field: Gallet F1 XF protection level saved 2 lives

A helmet impacted with a falling object (sharp or not) while exposed to intense radiant heat, is a potential risk in any structural firefighting situation. Therefore when designing the Gallet F1 XF helmet, MSA engineers carried out intensive research on new materials for the helmet shell and the shock absorption system to protect firefighters' lives in the field.

In 2016, 2 firefighters from a fire brigade located close to Rostock (Germany) had their lives saved by their Gallet F1 XF helmets.

During a call-out to a house fire, parts of the roof structure collapsed. One firefighter fell and was hit directly on the head by a complete cast-iron chimney piece from a height of approximately 3 metres. The other firefighter, a woman, was also hit on the back and neck by falling debris and bricks.

Unbelievably, both of them were able to escape from the dangerous situation completely without injury.

The full protection offered by the Gallet F1 XF helmet protects the lower areas of the head and the neck area. It is impressive that, despite the high thermal impact, the subsequent massive mechanical impact on the helmet caused only very slight damage to the outer shell of the helmet and the inner impact liner with the additional aramid layer remained completely undamaged.

MSA's mission is to continue to ensure that men and women around the world can work in safety and live healthy lives with their families and loved ones.

RISK OF ELECTROSTATIC IGNITION DURING POWDER PROCESSING OPERATIONS

by James Grimshaw

The problem of static electricity in hazardous atmospheres is ever present in many sectors of processing industries. This case study investigates the factors behind the ignition source of a static discharge during a powder processing operation.

Pneumatic transport systems represent the heart of any granular bulk material handling system throughout many industries today. Being an efficient method of transporting granular material, such systems allow for quick transportation of powders between processes enabling companies to keep up with an ever growing demand on production. However, such processes are not without their risks. When the product being processed is considered combustible and has an appreciable portion of fine material, the potential for having an explosion increases dramatically. Fine powders with low MIE (minimum ignition energies) will regularly reach the MEC (minimum explosive concentration) along the conveying system and may be at risk of combustion by several sources of ignition. One such ignition source is electrostatic discharge.

Pneumatic conveying systems have the ability to generate vast quantities of electrostatic charge via the movement of product through the plant equipment. The most common method of electrostatic charging on such process operations is due to tribo-electrification, which is simply the contact and separation of the powder with the walls of the processing equipment, the powder molecules itself or other factors that can cause charging, like surface contaminants.

In this incident a process operator working on a pneumatic conveying system heard a crackling noise when powdered material was being transported between the classifier and the loading hopper. During investigation of the noise, the operator came into contact with a section of the duct and received a significant static shock. Although the operator was unharmed, the severity of the incident warranted a full system shutdown to investigate how static charges had been able to accumulate on a particular section of ducting.

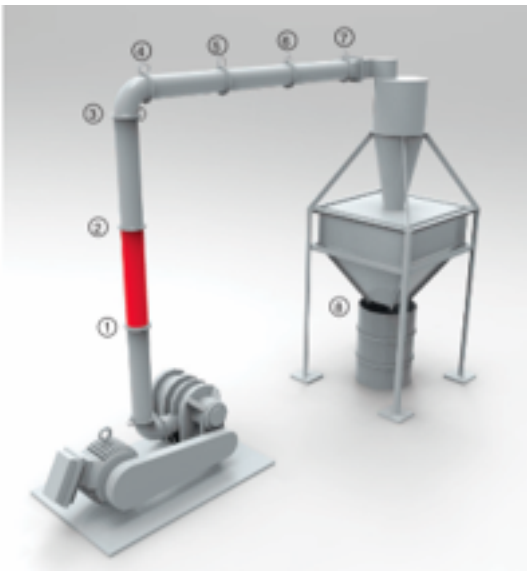
During the inspection the duct was examined and it was identified that the section of duct was not suitably grounded. When tested it was found the duct had a resistance path back to ground well in excess of $10^{11}\Omega$, exceeding the recommended resistance of less than 10 Ω for metal plant items in good contact with ground, stated in IEC 60079-32-1:2013 Explosive atmospheres Part 32-1: Electrostatic hazards, guidance.

Further inspection found that the unusually high resistance was a result of a single grounding clip that had not been properly installed after a clean down operation. Consequently, the piping between the two ducts acted as an isolated conductor resulting in the generation and subsequent accumulation of charge. The lack of continuity to ground meant that the charge could not be dissipated, allowing an excessively high voltage potential to develop on the duct which eventually discharged onto the operator. Given the high rate of charge generation and spark discharge by a poorly fitted grounding clip; a review of grounding and bonding of all metallic parts was carried out. The inspection scrutinised the grounding and bonding integrity of all equipment units, all sections of ducts, bags and cages in the bag filters. As a result many deficiencies were found and swiftly rectified.

The nature of a powder processing operation means that the generation of static electricity is to be expected in all parts of the system because of the movement of the particles through equipment. Therefore, regular maintenance is required to stop material from clogging up the machinery. Regular disassembly for cleaning and maintenance can result in bonding connections being missed or not made correctly when the equipment is reassembled. Vibration and corrosion may also degrade assembly connections so it is imperative to ensure that no parts in the assembly become isolated from a true earth ground.

Fortunately in this particular scenario, a larger scale incident was avoided by the luck of an operator. If the isolated ducting had not been found the outcome could have been very different. A static discharge in the right place through a combustible atmosphere along any section of ducting could have resulted in a significant ignition incident, putting the lives of employees and plant assets at risk.

The most effective way of ensuring complex equipment used in powder processing operations cannot accumulate static electricity is to provide a dedicated static grounding solution that is capable of monitoring the ground connection to components at risk of isolation. Such a solution should also be able to prevent the flow of product and alert personnel to a potential hazard should a component lose its connection to ground. This is especially important if the ground connection point to the equipment is not readily visible or isn't easily accessible for example, the



In this example, the system is configured to ground 7 sections of ducting (1 – 7) and a drum (8). Each channel is individually monitored back to ground to a resistance of less than 10 ohms and interlocked with the control equipment responsible for the flow of product. All monitored channels including the drum (1 – 8) need to have a path to ground (via bonding straps or grounding clamp) before the system will go permissive allowing the operation and flow of product to commence.

grounding clips mentioned in this scenario.

What actions could have been taken to prevent this incident?

It is highly plausible that charge accumulation on an isolated ducting section had resulted from a misplaced grounding clip multiple times during previous operations without a visible electrostatic ignition incident ever occurring. Without a flammable/combustible atmosphere being present in the spark gap when such a discharge occurs, frequent discharges could have regularly gone unnoticed. This is a common feature of process operations that have suffered from the consequences of a fire or explosion caused by static electricity.

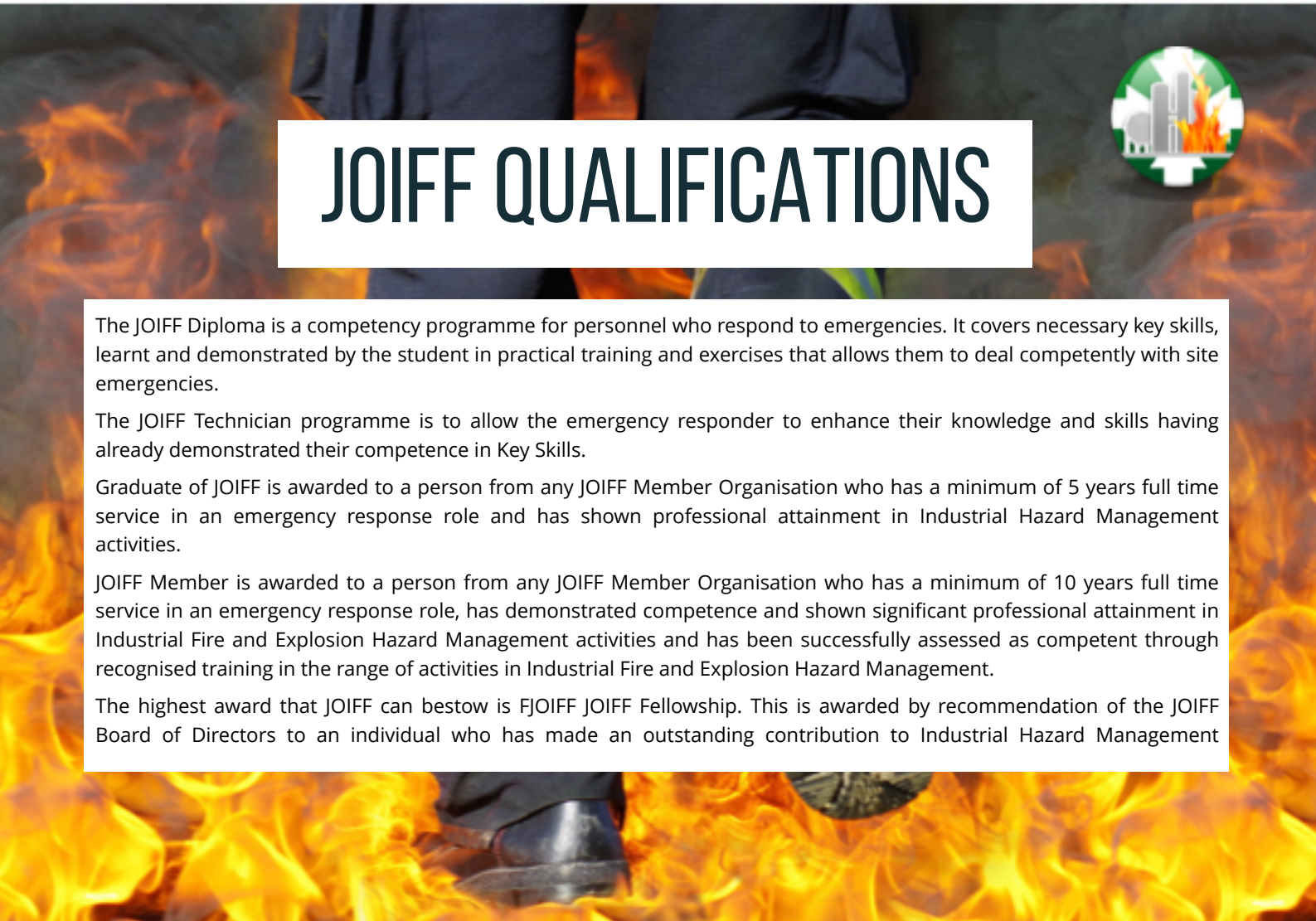
The first place to start is to determine why electrostatic charge was "permitted" to accumulate on the section of ducting. In this case electrostatic charge had been allowed to accumulate because the loss of continuity resulted in the section being electrically isolated from the general mass of ground. Had the section been connected to a true ground, charge would not have been accumulated on its surface. Instead excess electrostatic charges would simply have found their way to ground. So in accordance with industry guidelines like NFPA 77 and IEC 60079-32-1, the isolated section (in this case the length of ducting) should have had continuity through to a verified ground with a resistance of 10 Ohms or less.

Powder processing equipment presents more of a challenge compared to standard applications as there are metal parts that can make up larger assemblies that can be electrically isolated from each other. The risk of removable sections becoming isolated conductors will occur if:

1. Each section does not have a sufficiently low path to ground to safely dissipate charge.
2. The correct reassembly of equipment after cleaning between operations and regular examination of bonding straps between the metal pipework and duct sections by plant personnel is not routinely carried out.

The Earth-Rite® MULTIPOINT II system solves these problems by ensuring that all parts of the equipment have continuity through to ground with a resistance connection of less than 10 Ohms. The reliance on human intervention to perform regular resistance checks is alleviated due to the monitoring and interlocking capabilities of the Earth-Rite MULTIPOINT II. If the loss of continuity between one of the ducting sections to the verified earth ever occurs, the system will go non-permissive and the operation will cease to continue. The system only permits the product transfer process when the ground loop resistance of each utilised channel is less than 10 Ohms, as recommended in the various international standards for the control of undesirable static electricity. The system has cCSAus, ATEX and IECEx approval for use in hazardous atmospheres and meets all current EC directives.

Editor's Note: The author has asked us to point out that this case study is referenced from a third party source and is not in any way linked to the operations of Newson-Gale customers. For further information contact Newson Gale Ltd. Tel: + 44 115 940 7500 Email: groundit@newson-gale.co.uk website www.newson-gale.co.uk



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FIREFIGHTING FOAMS UNDER FIRE?

EUROPE'S TAKE ON FLUORINATED CHEMICALS USED IN FIREFIGHTING FOAM AGENTS

by Dr Thomas Leonhardt

Since in the 1960s the world of firefighting foams was revolutionized by a new type of foam called AFFF – Aqueous Film Forming Foam - AFF-Foams have evolved to become the most powerful tool to fight large fires of liquid combustibles.

Today, decades after their introduction legislators around the world are taking a closer look at some of those chemicals which are responsible for the extraordinary fire performance of the AFF-Foams for their environmental impact. Europe being at the cutting edge of these legislative initiatives. The most recent one just entered into force in 2017.

Per- und polyfluorinated[i] Substances

Substances of this type are so called fluoro organic compounds – chains of carbon atoms which are partly or completely surrounded by Fluorine atoms. This group of substances is often referred to as PFCs (perfluorinated carbons) or PFAS[ii]

The fluoro carbon compounds are generally exceptionally stable against chemical and biological degradation processes hence persistent in the environment. In addition, some specimen have meanwhile been identified being hazardous to human health.

This prompted various authorities globally to take action to regulate PFAS. Europe's Commission being at the forefront of those initiatives.

REACH as the Bases

Basing on the European Chemical Law each member of the European Union is empowered to propose substances it considers hazardous to the Commission for regulation under REACH[iii]. Within the framework of a RMOA[iv] the Legislator evaluates if the hazards to the environment and human health resulting from the use of the substance require it to be regulated and if so to what degree respectively in which way.

The law instruments to regulate substances cover limitations for the manufacturing or use of individual substances or an entire substance group, over the requirement for permitting manufacturing and/or use up to a complete ban.

To date two PFC-type substances each as lead compounds of a substance group have been identified to require being regulated:

PFOS[v]:

PFOS was the first substance of the PFAS-group that was regulated in Europe:

In December 2003, UK introduced plans for restrictions on PFOS-containing products/-chemicals. Three years later, in December 2006 the EU Commission adopted the regulation (EG) 2006/122 (amending regulation (EC) 76/769) prohibiting the manufacturing and placing on the market of PFOS and its precursors[vi] in the EU and installing a threshold limit of 50ppm (=mg/kg) PFOS and /or its precursors in articles and mixtures.

In August 2010, PFOS was voted to be put on the POPs[vii]-List by signees of the Stockholm Convention. The Commission enforced this as European law by regulation (EU) 757/2010 reducing the threshold from 50ppm to 10ppm.

Products containing more than 10ppm (=mg/kg) PFOS or its precursors must not be manufactured in the EU or placed on the market as of 2010 – this particularly includes firefighting foam agents – with no exempt. Firefighting foam agents which have been placed on the market prior to the entering into force of (EU) 757/2010 may need to be checked on their respective content of PFOS.

Any agent exceeding the current threshold limit must be disposed of immediately in agreement with local regulations for a safe disposal (e.g. thermal treatment is special treatment plants). Any further use is prohibited and may become subject to severe fines.

Note: If firefighting foam agents exceeding the threshold have been stored in systems which cannot be disposed of together

with the agent (e.g. storage tanks of fixed systems or fire trucks) the storage containments and all parts having had contact with the foam agent shall be cleaned properly and tested for PFOS contamination prior to any reuse or refill with new foam agent! Note a contamination of the new refilled foam agent to a degree above the threshold limit would immediately dismantle the new agent!

At present, several European national bodies (e.g. Swedish KEMI, German UBA) are planning to work on or are already working on revisiting the restrictions with the target to lowering the threshold limits and cut exemptions.

PFOA[viii]

The second substance of the PFAS type having been regulated in Europe is the Perfluoro Octanoic Acid. This compound is considered to be the end-point of degradation of any so-called C8-compounds[ix] hence is defined as the lead substance for the entire group of C8-Fluorosurfactants and –polymers used in firefighting agents.

In December 2014 Germany and Norway launched an initiative to regulate PFOA originally proposing a threshold of 2ppb = 2µg/kg. February 2015 a first draft of PFOA restriction was published and a 1st public hearing was conducted followed by two other ones in November 2015 and March 2016. In these hearings organizations of both the fire protection industry and firefighters have provided input to all three hearings explaining to the legislators the impact of the initially proposed threshold limits on fire protection. Amongst others aspects of waste generation due to foam agent replacement needs and severe investments into replacing fixed firefighting systems, trucks, or at least parts thereof were discussed.

Legislation status quo

Finally the regulation (EU) 2017/1000 entered into force July 13th, 2017 and affects:

"Perfluorooctanoic acid (PFOA) CAS No 335-67-1 EC No 206-397-9" and its precursors being "Any related substance (including its salts and polymers) having a linear or branched perfluoroheptyl group with the formula C_7F_{15}- directly attached to another carbon atom, as one of the structural elements. Any related substance (including its salts and polymers) having a linear or branched perfluorooctyl group with the formula C_8F_{17}- as one of the structural elements."

In opposite to the regulation on PFOS this time not just the acid and its metal salts are covered but any molecule having a perfluorinated chain of seven or eight carbons hence literally any C8-Technology. According to the (EU) 2017/1000 PFOA and its precursors are generally prohibited to be manufactured or placed on the market as substances as of July 4th, 2020. The threshold for the maximum acceptable content in any product is set to be 25ppb (parts per billion = 1µg/kg) for the pure substance or 1000ppb[x] (=1ppm=1mg/kg) for the totality of all precursors of PFOA in a product.

Thanks to the input by users of firefighting agents and the industry Legislators installed exempts for firefighting foams:

Article 4e allows the continuous use of *"fire fighting foam concentrates which were placed on the market prior to July 4th, 2020"* with no time limit! There is no such thing like a ban of AFFFs or the likes!

This exempt has a big impact on firefighting foams:

- Firefighting foams are not prohibited nor will they be in the near future!
- Any foam agent sourced prior to July 4th, 2020 can be used up with no time limit nor threshold requirement
- All mixtures of (the same!) foam agent can be used up likewise
- Storage containments (fixed systems, trucks, trailers, drop-off-tankers etc.) and other foam containing parts need not be cleaned to meet the threshold!
- Any foam agent sourced July 4th, 2020 or later must meet the threshold limits!

However it is recommended to carefully keep track of the sourcing documentation of firefighting foam agents sourced before July 2020 to be able and prove their age. It may also be considered to request evidence for new foam agents sourced after 2020 from the respective manufacturer that these foam agents comply with the legal requirements.

PfHxA[xi]

Recently the RMOA process was started on a third lead substance – the perfluoro hexanoic acid. The German environmental agency UBA[xii] has proposed to the commission to regulate also PfHxA and ordered a research institute (Oekopol[xiii]) to execute a market study on uses and consumptions of substances which are considered to break down to PfHxA. The Oekopol Institute had sent invitations to stakeholders of the industry, users, trade associations and others to participate into the survey by filling the respective questionnaires.

European Manufacturers of firefighting foams organized in EUROFEU[xiv] consider this legislative initiative to affect any Fluorine containing firefighting foam agent known today. A ban of the substance following the role model of PFOA would literally terminate AFFF-concentrates, FFFP-concentrates and their respective alcohol resistant versions.

While the question whether or not fluorine free foam agents are capable to fully replace AFFFs and the likes in all applications without sacrificing the level of safety is still controversially discussed the manufacturers voiced concerns to take the

FIREFIGHTING FOAMS UNDER FIRE? CONTD.....

powerful tool AFFF away without hard evidence of a fully functional replacement being in place.

So instead of banning the substance and its precursors (as was done with PFOA) the proposal is to regulate its use so that AFFFs and the likes remain available as the ultimate tool where absolutely necessary until a working and full replacement becomes available.

Given the impact of the legislative initiative on PfHxA on fire protection EUROFEU considered it to be of utmost importance to contribute to the survey and assist legislators to gain good data. Hence, after discussion and agreement with the project lead at Oekopol Institute the manufacturers in EUROFEU decided to consolidate their individual data into one set of pooled data which is then provided to Oekopol.

Users of firefighting foams are the experts on fighting fires most effectively with foam agents and know the landscape of available products well. Hence are encouraged as well to get involved from the beginning on and voice their thoughts and concerns to help legislators clearly understand the implications. In spite of being suspected of having a vested interest in selling fluorine containing foam agents manufacturers of firefighting foams are only downstream users of the fluorocompounds serving a market demand. The effect of a potential ban of Fluorocompounds on the business model of making firefighting foams can be considered neglectable yet the impact on fire safety is not.

For any further information request readers are encouraged to contact EUROFEU[xv].

ENDNOTES

i The term per-fluorinated means that all Hydrogen atoms in a hydrocarbon molecule are replaced by Fluorine. In poly-fluorinated carbons not all Hydrogens were replaced by Fluorine.

ii PFAS = Perfluoro alkyl substances

iii Regulation (EG) 1907/2006 on Registration, Evaluation, Authorisation and Restriction of Chemicals“

iv Risk Management Options Analysis – Analysis of Options to minimise the risk caused by a chemical substance or substance group to the environment or human health

v Perfluoroctylsulfonic Acid ($C_8HF_{17}SO_2$; CAS 1763-23-1)

vi Precursors are any substances having the potential to release the particular lead substance during their use or degradation.

vii POPs = Persistent Organic Pollutants, list of substances identified as persistent organic pollutants according to the Stockholm Convention.

viii Perfluoroctanoic Acid (C8HF15O2; CAS 335-67-1)

ix Fluorine containing firefighting foam agents are either of the C8-type having a chain of eight carbons all of which are surrounded by fluorine. Or they are of the C6-Type (such as the 6:2-Telomers) having a chain of only six perfluorinated Carbons. According to studies C6-Type Fluorocompunds are reported to be significantly less hazardous yet still persistent.

x Cited from (EU) 2017/1000

xi PfHxA – Perfluoro Hexanoic Acid; a substance being considered to be the end point of degradation processes of compounds of the C6-Type

xii UBA = Umweltbundesamt

xiii Oekopol – Institut für Oekologie und Politik GmbH, Dr. Olaf Wirth, Nernstweg 32-34, 22765 Hamburg

xiv EUROFEU is the European Umbrella Organization of national trade associations and individual companies from Europe active in the fire protection industry. It consists of 5 sections the newest to be the section FFA (Fire Fighting Agents)

xv Info@eurofeu.org

Editor's note:
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Stat-X has passed International approvals including ISO 9001, stringent US accreditation under UL and is approved to UL2127, as well as ISO 15779, MIL spec testing and others. It is the only condensed aerosol to have undergone independent assessment by the US Environmental Protection Agency and has been cleared for use in normally occupied spaces. Similarly, it is the only condensed aerosol system to gain ATEX/IEC EX class 1 division 2 approval through UL, enabling it to be used in enclosed atmospheres which may be classified as hazardous.

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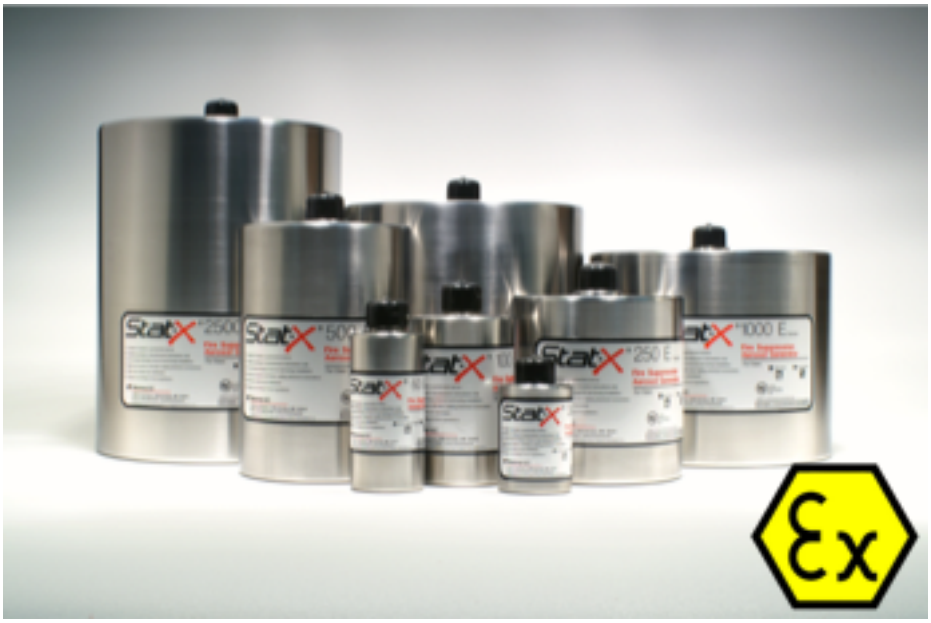

Hytrans Fire System

mobile water supply

HOSES, COUPLINGS AND HOSE RECOVERY UNITS

Industrial Fire fighting asks for more water, more pressure and this needs larger hoses and larger pumps. The mobile water supply systems need to be more flexible but also be more powerful to provide this flow and pressure. However flow and pressure are important it is not the only thing that makes it work. The question is, how do I get the water to the monitor or fire truck in a safe and quick manner without using a lot of manpower?

More water asks for larger hose diameters and we see an increase in the demand for 10" and 12" hoses. Larger diameters are needed to reduce the friction loss and leave enough pressure for direct fire fighting. When transporting large volumes of water over long distances, pressure loss is a big concern. The more pressure is lost, the more pumps are needed to get a high enough pressure at the end of the line to fight fires. The pressure loss in hose increases exponential with the flow and is directly related to the hose diameter.

Although the industry is asking for products that are following international standards we have noticed that these are not always available. For example couplings in the US have locks on Storz and in Europe they're without locks. Red dots on storz > 6" to check alignment is standard with Storz couplings delivered by Hytrans. Other facts regarding hose couplings are

- 6" Storz: generally interconnectable, but even here it is possible to have problems (especially non-hose couplings from different manufacturers)
- 8" Storz: standardized in Europe through industry agreement (Hytrans + 2 of major suppliers)
- Above 8": generally no standard
- 10" & 12" MultiLug: standard set by AWG & Hytrans
- 10" and 12" Storz: many variants, no standardisation. 2, 3, 4 Lug variants, several pressure classes, some have lower burst pressure than high rated hose. General: fittings need to have higher burst pressure than hose because hose needs to burst in a safe way.

For fast deployment of large diameter hoses it is important that the couplings can withstand the impact when they hit the ground at high speed. To lower the weight the lower the force of impact, which shows that the weight of the coupling is a very important factor. A lower weight means less volume and this results in more hose length in the HoseLayer Container. For example the 12" MultiLug coupling of Hytrans is half the weight of a 12" Storz with 4 lugs.

Choosing the right large diameter hose is the key factor in a water transport system. The basic choices are Rubber hose or PU hose. And amongst others one of the main differences between PU and Rubber is the heath resistance of rubber.

Important factors to consider: Working pressure / burst pressure; Heat resistant; Wear resistant; Weight; Elongation / expansion; Flexibility; Coupling; Colour;

Elongation with large diameter hose is a very important factor and should be a key factor in your choice. Tests have proven that hoses with more than 1,5% elongation will move a lot or even "jump" every time they will be pressurised. Reason is the extra length caused by elongation that needs to find its space on the road. Because it is not known where exactly the hose will move the whole hose length will be dangerous area. This also explains risk is not only in the safety factors but more in the use and the behaviour of the system.

Deploying the large diameter hose is one but recovering is another. Although you probably have time and manpower to recover the hose after the fire is extinguished, it is still really hard work if not impossible, if you have to do this manually. To make things easy Hose Recovery units have been developed.

Hytrans has several types available for hoses from 6" up to 12" and for a special project we have already delivered a unit for 16" hose diameter. Thru the years hundreds are in use all over the world. Recently Hytrans introduced a full automatic Hose Recovery Systems called the AutoFlaker. This system can recover up to 12" hoses in diameter without the need of manpower. The only manpower needed is the truck driver, who can control the system from his cabin. Making the system easy to deploy and recover will encourage people to use it and train with it, so they will be prepared in case it really matters.

Contact us:

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http://hytransfiresystem.com/

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"...confident people tend to be more charismatic, extroverted, and socially skilled– which in most cultures are highly desirable features. .....in virtually every culture, and especially the Western world, we tend to equate confidence with competence. So we automatically assume that confident people are also more able-skilled or talented.

In reality however, there is a very big difference between confidence and competence. Competent people are generally confident, but confident people are generally not competent. There are just good at hiding their incompetence and their insecurities– mostly because they are self-deceived themselves, so they generally think that they are much better than they actually are."

TOMAS CHAMORRO-PREMUZIC, From the Harvard Business Review

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If you wish to find out any information or make a booking, please contact the training provider direct, contact email addresses provided.

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Site Forward Controller (SFC) 2 Days	Available on request	**Eddistone Consulting Ltd, Incorporating the Response Academy** www.eddistone.com www.responseacademy.co.uk All courses are available on request, on your own site or at Eddistone Training Suite opportunities@eddistone.com Tel: +44 1433 659 800
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Industrial Fire Team Leader (IFTL) 10 Days	18-29 June 29 Oct - 9 Nov	
Industrial Fire team Member (IFTM) 10 Days	10 - 21 December	
Foam School 2018 Vernon, France 5 days	19-23 March	**H2K Netherlands** p.deroos@h2k.nl Tel: + 31 174 414 872 +31 651 588 089
Tank and Bund Fires Rotterdam 3 days	12-14 June	
Firefighter Training 2 Days	16-18 May	**The International Fire Training Centre** Durham Tees Valley Airport Darlington DL2 1NU Contact: 01325 331125 email: bookings@iftc.co.uk
Firefighter Team Leader Training 5 Days	1-5 Oct	
Firefighting Foundation Course 10 Days	11-12 June	**International Safety Training College, Malta** Tel: + 356 2165 8282 + 356 9990 5211 email: sales@istcollege.com.mt
H2S Awareness 1 Day	May, June, July August	**Yassine Marine Services** **YMS Training Centre** **Sfax: Tunisia** Tel: + 216 36 408 290 email: yms.training@marineservices.com Contact Yassine for other dates during remainder of 2018
Foundation Course 4 Days	16-19 May 20-22 June 18-21 July 15-18 August	
Fire Team Member 3 Days	4-6 June 2-4 July 6-8 August	
Fire Team Leader 3 Days	7-9 May 27-29 June 25-27 July 29-31 August	

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For Industrial and Municipal Firefighting Applications

30,000 GPM

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US FIRE PUMP

DIARY OF EVENTS

April	
23-28	FIDC, Indianapolis, USA
May	
22-24	Securex South Africa, Johannesburg, South Africa
June	
4-7	NFPA Conference and Expo, Las Vegas, USA
19-21	IFSEC International, London, UK
September	
19-20	Emergency Services Show, Birmingham, UK
October	
2-4	Fire and Disaster Asia, Singapore
28	JOIFF CLG 2018 AGM, Malta
29-31	JOIFF International Fire & Explosion Hazard Management Conference, Malta
November	
10-16	Conference on Forest Fire Research, Coimbra, Portugal

Please contact the JOIFF Secretariat with details of any event that you think that JOIFF Members might be interested in attending.

Note: The Catalyst is not responsible for the accuracy of dates and / or venues announced. This is based on information given to the Editors and is published in good faith.

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