

THE CATALYST

Q1 2019



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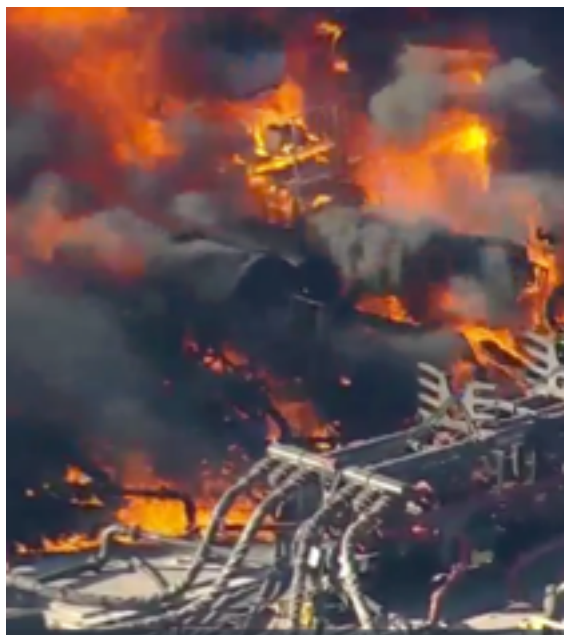
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ABOUT JOIFF

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

If you have a request for an article or advertising to be included in the Catalyst, please contact the JOIFF Secretariat, details below.

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CHAIRMAN'S MESSAGE

Dear JOIFF Catalyst readers,

I want to encourage you that every effort you make, every action to elevate our individual and collective ability to respond is worth every moment of your time and commitment. Keep pushing into your respective discipline and partner with others who do the same. There is an axiom that states "An action repeated makes a habit, a habit repeated makes a character, and character determines destiny..." Notice it starts with action.

As I often repeat, incidents in our industry have an annual societal cost of death and destruction that devastates lives and costs billions annually. Every single act we make within this profession influences our ability to mitigate escalation and manage consequences of incidents. So let's keep our focus in 2019.

I have heard recently that the Hemming Group has closed down their full range of fire related magazines. I have no details as to why, but I do know that they provided a critical component of technical information and resourcing for our profession and their publications will be sorely missed. We will work as best we can to help fill some of that gap. This edition of the Catalyst has consequently expanded as you will notice as you peruse the articles and adverts of its sponsors. Thank you to those who provide articles and to our sponsors, without whose support we could not do this work, these single acts...

JOIFF maintains a very small staff, with all of the Board being volunteers, and the masterful work of Fulcrum Consultants serving as the JOIFF Secretariat. We do this to manage costs and keep JOIFF accessible to all of our membership, both those of large and well-funded organizations and those who have extreme restrictions on their resourcing. An organization has a collective character too, and the goal for JOIFF is to have a character of relentless commitment to elevating to greater levels of excellence, ourselves, our members and the communities and organizations we touch, everywhere in the world. JOIFF members and sponsors continue to step in by being active participants, writing articles, spreading the word and offering your time and commitment. I personally want to thank you all. The door is always open.

And lastly, thank you for taking the time to read this edition of the Catalyst. I am confident that it will prove to be both enlightening, and challenging. Enjoy!!!

With highest regards,

Randal S. Fletcher (Randy)

JOIFF Chairman





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

Australia

Warehouse Fire & Chemical Spill Mystery

Brazil

Truck Loading Fire Manguinhos Refinery
Rio

Canada

Irving Refinery Explosion

China

22 Killed, Chemical Plant Explosion
Zhangjiakou

India

LPG Leak Triggers Panic at Panambra

Italy

2 Dead 17 Injured in Petrol Station Blast

Nigeria

Fuel Tanker Explodes, many Feared
Dead

Russia

Electrozink Refinery Fire, 1 Dead, Three
Injured

Siberian Oil Facility Fire Contained

South Korea

Oil Tanker Explosion Caused by Paper
Lantern

USA

Fire Burns at Oil and Gas Site

Propane Train Derailment Forces
Evacuation

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?

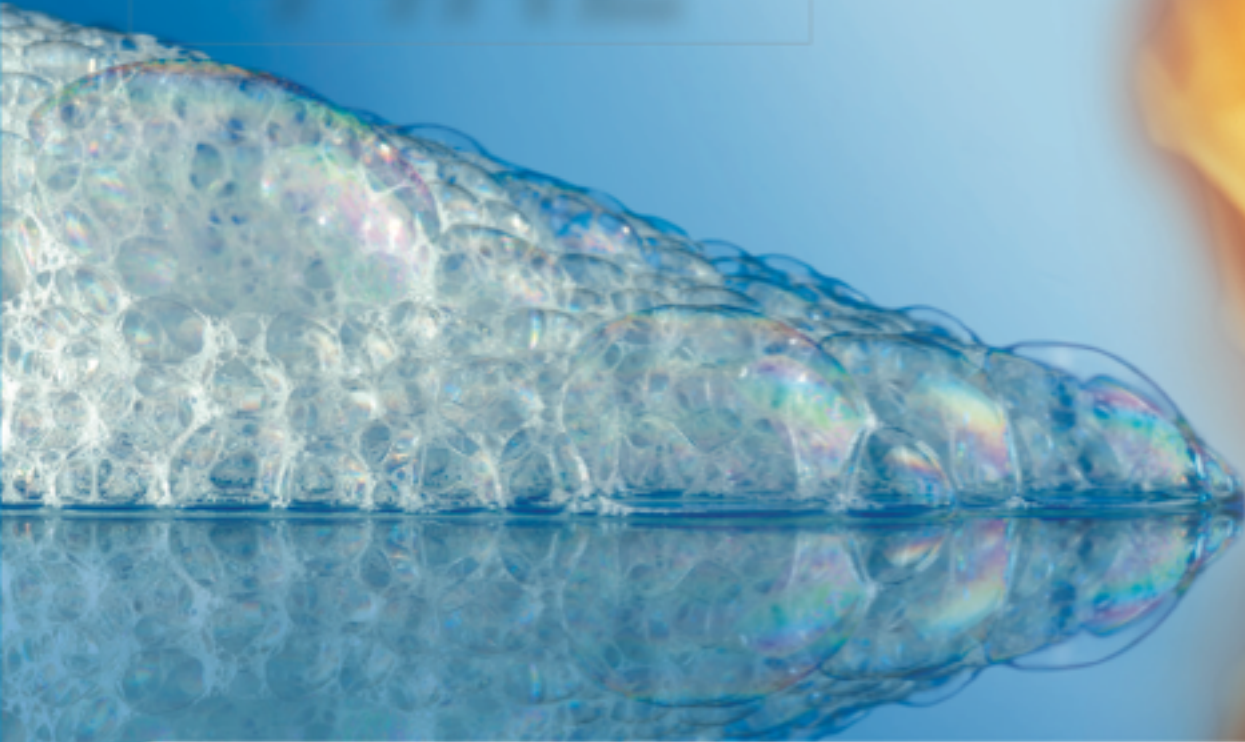
JOIFF shares valuable information with its members aimed to improve the level of knowledge of Emergency Responders and to work to ensure that members benefit from the misfortunes of some to educate against the same mistakes being repeated. Industry needs to ask is it doing enough to educate Industry 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

During October, November and December 2018, the JOIFF Board of Directors were pleased to welcome the following new Members:

FULL MEMBERS

CHS McPherson Refinery, McPherson, Kansas, USA, represented by Scott Swanson, Supervisor: Health, Safety & Security and Lonnie Mullen, Emergency Response Coordinator/Fire Chief. CHS McPherson Refinery is a 105,000 bpd process refining gasoline, diesel, propane and other light ends to supply their member owners that stretch from the Central United States up through the Great Lakes regions of the USA. CHS McPherson Refinery has been in business since the mid-1930's and is an active member of the AFPM, API, NFPA and a VPPPA Participant Site.

INPEX, Perth, Australia represented by Gino Zaza, Security and Emergency Management Lead. INPEX is a leading independent global oil and gas explorer and producer, with headquarters in Perth and offices in Darwin, Northern Territory, Broome and The Kimberly. INPEX is active in the Timor Sea and the Carnarvon, Browse and Bonaparte basins and is making multi-generational contributions to the Australian economy, particularly the Northern Territory and Western Australian economies and communities.

IRP Fire and Safety Limited, Cunupia, Trinidad, represented by Sisir Redoy, Training Coordinator. IRP Fire and Safety Limited supplies fire fighting, gas detection, fall protection equipment and has been servicing the Fire, Safety, Oil and Gas, Marine and Environmental industries, both nationally and regionally for over forty-six (46) years. IRP provides practical training to simulate real life expected experiences with interactive practical exercises designed for critical equipment that ensures the safety and protection of those that use it during an emergency.

Jaheziya, Abu Dhabi, United Arab Emirates, represented by Humaid Al Hajeri, Head of Training and Christopher Lawson, Training Manager, Offshore and Maritime. "Jaheziya" is the Arabic word for "readiness" or "preparedness" and is the brand name of Tawazun Safety, Security and Disaster Management City. Jaheziya is a training provider delivering a variety of emergency response training for the Offshore Oil and Gas and Industry with accreditation from OPITO, NEBOSH, STCW(FTA- UAE). Following a recent audit, Jaheziya has been awarded JOIFF accreditation.

Safety Region Fire Service Central and West Brabant, BK Roosendaal, The Netherlands represented by Nico Koolen, Strategic Manager Moerdijk and Sander Raes, Deputy Team Chief. Safety Region Central and West Brabant is a civil fire department in a partnership between 26 municipalities and emergency services covering the area from Oisterwijk to Bergen

op Zoom and from the Belgian border to the province of Zuid-Holland. This area includes a number of heavy industrial/chemical companies. The Fire Service operates in a three-shift system.

Wild Geese Group, Kuala Lumpur, Malaysia, represented by Daniel McCowen, Director Operations, Michael Herrmann, Chief Operating Officer and Aslina Binti Ismail, Director Administration. Wild Geese Group is a training organisation operating through a global network of alliance partners predominantly supporting the offshore Oil and Gas Industry. Wild Geese Group also provide operational support to Industry for emergency and Crisis Management activities at their purpose built Managed Emergency Response Centre (MERSC).

CORPORATE MEMBERS:

BIO-Ex, Montrottier, France represented by Olivier Houlbert, Managing Director, Audrey Rossard, Technical Manager and Alexandre Haberkorn, Europe Sales Manager. Bio-ex is a French company, part of Leader Group (fire fighting solutions) and based near Lyon, France. BIO-Ex develops, produces and markets high performance fire fighting foam solution including fluorine C6 fire fighting foam range and new generation fluorine free fire fighting foam.

HD Fire Protect Pvt. Ltd., Thane, India represented by Miheer Ghotikar, Director. For over 2 decades, HD Fire Protect Ltd. has been involved in designing, developing and manufacturing a broad range of world-class firefighting equipment and systems that have been meeting ever-changing and demanding industry standards. HD's product range consists of sprinklers, valves and accessories used in fire sprinkler systems, deluge valves, deluge skids, pre-action systems, water spray nozzles, foam proportioning systems and discharge devices, mobile foam units, fire monitors and custom engineered skids which have been tried, tested and successfully accepted in over 60 countries worldwide.

TIE Peleng Ltd., Nizhny Novgorod, Russia represented by Svetlana Pronova, International Contract Manager/Interpreter. TIE Peleng is a leading global manufacturer of fire, rescue, and emergency apparatus. Since 2003, TIE Peleng have developed a dynamic range of models, with base chassis options from international manufacturers such as IVECO, MAN, Mercedes-Benz, and Volkswagen and leading domestic manufacturers such as KAMAZ, GAZ, and URAL.



INDIVIDUAL MEMBERS

During Q 4 2018, the Directors were also happy to welcome **Albert Aidoo, Accra, Ghana**, a member of Ghana National Fire Service, Ghana Institute of Planners and Institute of Human Resource Management, Ghana; **Bob Houchin, Singapore**, who has worked for 40 years in the fire truck industry and **Jason**

Sertori, Kinshasa, DR Congo who is Officer in Charge of the United Nations Fire and Rescue Unit Monusco (West), DR Congo.

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

NEWS FROM JOIFF MEMBERS - PFIZER PHARMACEUTICALS UK

In 1999, work began in JOIFF to develop accreditation for the purpose of providing third party verification that the training provided for emergency responders to industrial incidents

- is competency based,
- meets or exceeds minimum standards of content and quality
- gives recognition of achievement to those who successfully complete each course or programme.

In his paper to the recent JOIFF International FEHM Conference in Malta, Kevin Deveson, Director Research and Development Operations UK and Belgium, Global Pfizer Insurance Risk Group (EMEA rep) described how JOIFF accreditation was used for another purpose – to provide third party verification that the response resource to emergencies that an organisation provides internally, meets or exceeds minimum standards of quality and expectations. Pfizer UK, Sandwich Kent is the first organisation to be awarded JOIFF accreditation for this purpose.

The risk in Pfizer's facility in Sandwich includes hazardous chemicals, high pressure vessels and bulk storage of toxic, flammable and pyrophoric/catalyst materials, chemistry/biology labs, ammonia. The facility employs a large population and is in proximity to local town. Before 2012,

Pfizer maintained a "Works Fire Department" with a dedicated emergency response team providing 24/7 cover but following a reorganisation, the Works Fire Department was disbanded and replaced by a safety squad, fire wardens and first aiders to deal with local incidents.

In October 2015 Pfizer had a major incident and the County emergency services were called but full intervention did not commence until more than 20 minutes had elapsed since the alarm was raised. Following this incident, it was decided that rather than training and maintaining local first aiders plus safety squad members and fire wardens, Pfizer would focus on training a specialist First Responder Team (FRT) with enhanced skills to facilitate an emergency response. Effective response to the facility risks, including competent use of suitable PPE including breathing apparatus, needed to take into account "First Person on Scene" for incidents involving medical, hazmat, basic fire and fire systems awareness, response to fire alarms, response to incipient fires using portable fire extinguishers and response to general incidents requiring salvage work and other Business Resilience related issues.

New job roles were developed and loaded into the Pfizer training data base to ensure that ALL training was formalised and recorded. Certifications were added to some existing

training courses to mandate annual refreshers e.g. Chemical Decontamination and Fire Wardens. It was agreed that training would be spread across various dates and held on site where feasible, with volunteers acting as a pool of trainers for much of the training.

As the new system was developing, the support team requested accreditation for the concept and training programme. Drawing upon experience with the previous Works Fire Team, Pfizer approached JOIFF to carry out an independent audit of emergency procedures and to measure them against Pfizer standards, National and local legislative requirements and Industry good practice. The audit covered Incident Command and Control, First Aid, Medical Response, Fire related incident response, HazMat spill and response and training and emergency planning.

The audit report highlighted good practices on site with opportunities for enhanced

performance in some areas e.g. improving time to intervention, refresher training and building competence of the First Response Team.

Following the audit the project plan was developed, new First Responders were appointed and trained, the external emergency response services visited the site on numerous occasions and the First Responders were in place and in operation by February 2017. Since then have successfully responded to numerous live calls and exercises.

The Pfizer UK, Sandwich First Responder Programme has made a huge impact to the internal community by giving everyone working in the facility the confidence that if something does go wrong the team are just moments away to provide support.

Pfizer recognised the Pfizer Sandwich Responder Programme when it was the all-round Team Winner in the UK OWNIT Culture awards.

JOB OPPORTUNITES

The Catalyst is pleased to offer to JOIFF Member organisations seeking to recruit professionals in the Fire and Emergency Response Sector the facility to advertise such vacancies in The Catalyst.

The Catalyst is published once every quarter.

Send the details to: JOIFF Secretariat
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The CrossFire's Safe-Tak valve automatically reduces monitor flow by 90% if it slips or slides.

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TFT's New Industrial Booster OSC



H2K FOAM SCHOOL 2019

April 1-5



JOIFF



For the 4th year in a row, H2K and Dr. Sthamer organise an international Foam School at the training centre in Vernon France. The Foam School is an interactive blend of theory, workshops, demonstrations and practical firefighting. Instructors from H2K and foam manufacturer Dr. Sthamer provide the 5-day JOIFF accredited training program focusing on new developments and insights on foam systems, firefighting foams and polar solvents.

The training is specially designed for those who have to deal with or have responsibility for emergency response in case of large-scale flammable liquid firefighting but also for insurance company personnel and fire engineers to gain more insight into fixed and mobile foam systems.

The unique setting upon a former refinery site with all its utilities transformed into well-equipped industrial training and testing objects, offers ideal scenery for this internationally oriented industrial firefighting event.

For more information and our online registration form, please go to:

www.h2k.nl/trainingen/foam-school





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OPENING NEW FALCK SAFETY SERVICES AND FIRE ACADEMY TRAINING CENTRE SHAPING THE FUTURE OF SAFETY



About Falck Safety Services and Fire Academy

Falck Safety Services and Fire Academy is a company in the Netherlands that focuses on education, safety training and safety consultancy. Its main target groups are the chemical and petrochemical industries, the public fire service and the offshore, maritime and wind industries. The Maasvlakte-Rotterdam training centre offers one-day and multiple-day knowledge and training programmes to approximately 25,000 course participants every year.

On Tuesday the 16th of October 2018, Allard Castelein, CEO of the Port of Rotterdam, officially opened the Falck Safety Services and Fire Academy Maasvlakte-Rotterdam training centre. This new training centre teaches and trains fire brigades from the public and (petro) chemical sector together with the offshore, maritime and wind industry in how to prevent incidents thus provides an effective response to calamities or crisis situations.

This is the third location in Falck Safety Services and Fire Academy's 33-year history in the Netherlands. The latest insights in education and training, safety, occupational hygiene, the environment and the safety training standards that apply to the industries have been leading in the realisation of this training centre.

Allard Castelein opened the training centre not without a reason. Also 33 years ago the, formally, Rotterdam Municipal Port Authority was one of the initiators for the realisation of the first training

centre. Today, the training centre still contributes to safety of the Port of Rotterdam and far beyond, because of its international reputation.

The new 6.5 hectares training centre is more than one hectare larger than the old training centre and offers sufficient opportunities for future expansion and further development based on the wishes of the industries and new insights in the field of safety.

Allard Castelein, CEO of the Port of Rotterdam said "I am happy that this centre has been kept at the port of Rotterdam because of its important role in terms of safety. We have joint ambitions. Safety is our number-one priority in the port. And not just for local shipping but also for residents, people working in the port, companies, and professional and recreational users of the port area. The Falck Safety Services and Fire Academy centre has a vital role in this respect: live practice and simulations result in an interactive realistic experience and bring

knowledge and practice closer together".

René van den Bosch, Managing Director Falck Safety Services Central Europe said "I am very proud of the result that we have presented to you today. With our new training centre we are ready for the future. I am thankful to all partners and employees who have contributed to this result".



JOIFF AND FOAM:



Foam is one of the most important tools used by emergency responders across a range of incidents and is the key tool used to mitigate fire and non-fire incidents involving flammable liquids, expanding vapour clouds, controlling particles of man-made fibres in the event of an aircraft crash etc. Perhaps because of its importance to emergency response in Industry, for many years, Foam has been a very contentious subject, at times polarising the industry.

When the JOIFF Secretariat was appointed in 2001 and began to organise, develop and promote JOIFF, the importance of Foam and the fact that there were strongly held views on the subject was recognised and through the first editions of The Catalyst in 2001 and 2002, JOIFF provided the platform for members of JOIFF who were manufacturers and users of Foam to publically discuss different aspects of Foam. These editions are still available for free download from the Catalyst pages of the JOIFF website.

Continuing its policy of disseminating information on Foam, in 2010, JOIFF published the JOIFF Guideline on Foam which was made available for free download from the JOIFF website. In the years that followed, regulatory requirements and changes in the manufacture and use of foam were introduced which resulted in major changes in the Foam market and JOIFF revised the 2010 Guideline to reflect current Good Industry Practice and in October 2018 the JOIFF Guideline on Foam Concentrate was published and is available for free download from the JOIFF website.

Note from the Editorial Board of The Catalyst:

The word “catalyst” is defined as “a thing that precipitates change” and since its first edition in March 2001, the JOIFF quarterly publication The Catalyst, has worked to precipitate change for the better with regard to emergency response in Industry.

In continuation of this policy, JOIFF is pleased to publish this edition of The Catalyst as a special Foam edition, giving experts the opportunity to offer their opinions on serious current issues relating to Foam. The Editorial Board of The Catalyst hope that the opinions given by the authors of the articles in this edition will inform readers and give them further information to assist them in understanding some of the diverse opinions on this subject.

Neither JOIFF nor the JOIFF Secretariat Fulcrum Consultants endorses any article or opinion expressed, but they wanted to bring to the fore, different sides of the issues. The views and opinions expressed in the articles in this edition of 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.



ENVIRONMENTAL IMPACT & MANAGEMENT OF FLUROSURFACTANT-BASED FIREFIGHTING FOAMS

BY IAN ROSS PH.D., JONATHAN MILES PH.D., DANIELLE TOASE PH.D.,
JASON LAGOWSKI AND PETER STORCH

Fluorosurfactants have been used in firefighting foams since the 1960's, but in the last few years, many users have switched to fluorine free foams (F3) in response to the increased extinguishment performance of the new generation F3 foams and potential environmental liabilities, reputational risk and possible 3rd party litigation associated with use of fluorsurfactants.

Fluorsurfactants used in fire fighting foams belong to a large group of several thousand emerging contaminants termed per- & polyfluoroalkyl substances (PFASs) which are increasingly being discovered in drinking water supplies, water bodies and in various species that form part of our food chain. As a result of PFASs impacts to drinking water supplies, an increasing number of communities face the need to find alternative water supplies as a result of their presence above

concentrations deemed safe, which tend to be exceptionally low per trillion (ppt) (ng/L) levels. This has created rising public concern, press attention [see references 1-7 at end of article] and thus political focus on PFASs.

Protecting human health and safety through effective fire suppression is the foremost priority of every fire fighting foam system. However, a balance between minimising the environmental impact, liabilities and the long term harm caused by use of PFASs in firefighting foams needs to be considered to manage the overall risk of fire protection.

This article aims to provide an overview of the accelerating environmental regulations regarding PFASs, a brief summary of recent foam testing activities and potential solutions to navigate risks associated with legacy and ongoing use of PFASs in firefighting foams.



ENVIRONMENTAL IMPACT FOAM - CONTD..

PFASs Risk to Human Health and the Environment

Historically, PFASs were used in firefighting foams designed to extinguish liquid hydrocarbon Class B fires, such as aqueous film forming foam (AFFF), film forming fluoroprotein foam (FFP) and fluoroprotein foam (FP) [ref 8]. Firefighting activities represent one of the most environmentally emissive uses of these chemicals, through both training exercises and incident response.

Regulation of long-chain "C8" PFAS ingredients of these foams,

regulators and are also now becoming subject to rapidly evolving regulations, with short-chain PFASs regulated in Sweden, Denmark, Germany, Italy, Belgium, Switzerland, Canada, and 12 U.S. states.

There are many more proprietary PFASs present in firefighting foams than are regulated, such as in C6 fluorotelomer based AFFFs. These polyfluorinated varieties, have evaded detection by common analytical methods but in the environment will all eventually transform to create the

(C8 and C6 etc.) show any sign of being biodegradable and have been described as "forever chemicals". Whilst an understanding of the toxicity of C8 PFASs evolves, much less is known regarding the toxicity of the C6 fluorotelomer products. There have been reports of the increased toxicity of the bioactive transformation intermediates of fluorotelomers [12, 13]. The long-chain PFASs accumulate in humans through consumption of impacted drinking water. The short chain PFASs are more

proprietary C6 fluorotelomer foam spill in Australia in 2017, with regulatory compliance requested measuring PFASs using TOP assay, seems to be an example of the future potential liabilities associated with holding and using C6 foams. Figure 1 shows the first use of an ozofractionation system to comprehensively treat 15,000 m³ of PFASs impacted wastewater, as determined using TOP assay.

Foam Evolution

Recent independent tests evaluating the performance of F3



Figure 1 Ozofractionation used to treat more than 15,000 m³ of PFAS-impacted wastewater

including perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA), in drinking water at ppt levels is driving focus on the whole class of PFASs. Shorter chain (C6) replacements for C8 are present in current PFAS-containing foams, and are also being increasingly regulated in many locations..

As environmental regulators globally accelerate their focus on PFASs, the continued use of long-chain PFASs in firefighting foams is perceived as posing a potential business risk to many sectors. If fires are extinguished using these products, there may be substantial consequential costs for environmental management and clean-up, in addition to reputational risks and possible litigation from affected 3rd parties. Many short-chain (C4-C7) PFASs, introduced as replacements for C8, have also captured the attention of some

extremely persistent perfluorinated PFASs commonly subject to regulation, so are termed 'precursors'. A limited number of these fluorotelomer precursors are now themselves regulated, such as in Sweden, Germany, Denmark and Switzerland. Firefighting foams comprise hundreds of individual PFASs which have not been accounted for until recent analytical advances have enabled the polyfluorinated PFASs to be measured indirectly, using a recently adopted technology termed the total oxidizable precursor (TOP) assay [9-11]. Regulators in Australia have recently applied this advanced analytical tool for sampling multiple environmental matrices, with the TOP assay now being used regularly in North America and Europe as a result of its commercial availability. None of the thousands of PFASs

mobile in the environment than the long-chained variety so have greater potential to be detected in drinking water supplies, whilst the understanding of their toxicology and bioaccumulation potential is being actively researched. There is also some evidence that short-chained PFASs accumulate in the edible portion of crops, making them a potentially larger environmental threat. Numerous countries are now regulating an increasing number of PFASs, including precursors in addition to both long and short chain varieties, while the latter are still commonly used as commercial replacements (e.g. C6 in firefighting foams). Restrictions have been imposed on the use of all PFAS containing firefighting foams in South Australia and Washington State, and as of 2019, the European Union is also considering similar regulations. Large scale remediation of a

foams by LASTFIRE to extinguish increasingly larger diameter fires have been very successful. In 2017 tests in Europe showed F3 foams performed well for extinguishment of spill fires and small tank fires with various techniques including monitor and pourer application in both compressed air foam (CAF) and conventional application equipment [14]. During 2018 successful demonstrations of extinguishment of 40m and 30m long fires was achieved using multiple application methods at Dallas Fort Worth Airport. The use of CAF processes allowed foam to travel 40m over a deep burning fuel surface to extinguish the fire in less than 3 ½ minutes at an application rate of just half that of the NFPA 11 standard rate used for conventional equipment. It's clear that the new generation of F3 foams and advanced foam distribution systems such as the



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CAF process have evolved and can provide fast and effective fire extinguishment with negligible long term environmental consequences, as PFASs are no longer needed for the majority of fire extinguishment scenarios. LASTFIRE has emphasized that it is critical to use a proven combination of foam concentrate, application equipment and foam properties to provide optimum efficiency. Not all combinations are equal and there is still work to be done with different fuels and other fire scenarios.

Foam Transition

Successful foam transition takes a well-developed, site-specific strategy prepared by a qualified team of fire engineers, environmental engineers/scientists, technology providers, equipment specialists and operations contractors [16]. Some of the considerations associated with foam transition include:

1. Maintaining compliance with fire protection regulations and insurance accreditation;
2. Implement the transition while maintaining a functional fire suppression system to protect human health and assets.
3. A good understanding of the design basis of the fire protection system and operational knowledge of existing equipment;
4. Compatibility assessment of system components with new foam;
5. Effective decontamination of existing equipment in contact with foam to prevent cross-contamination of new foam;
6. Proper planning for containment and disposal of waste generated during transition;
7. Effective secondary containment, and inspection and maintenance procedures are required.

Residual contamination of historically used PFASs can create

future liabilities if appropriate cleanout of equipment is not conducted. Biodegradable, non-toxic solvents have been developed and applied to prevent rebound and effectively extract PFASs from equipment, as shown in Figure 2.

There are ongoing challenges associated with managing PFASs including potential legacy management of C8 contamination of soil, groundwater and concrete surfaces, whilst C6 represent a source of future contamination. There is evidence that some fire training areas can remain a source of C8 PFASs for some 20 years following their last use and that the surface of concrete can continue leaching PFASs for decades.

There are many evolving solutions to manage PFASs releases to the environment, such as concrete surface treatments, soil stabilisation and technologies using ultrasound which can destroy PFASs, via a process termed sonolysis, creating innocuous fluoride [15]. Mobile sonolysis units to destroy PFASs in firefighting foam concentrates are currently being constructed for commercial use, which will significantly reduce the costs of foam disposal.

Conclusions

To conclude, the growing

concerns regarding drinking water impacts from C8 PFASs, is driving a dramatically increased regulatory, media and political focus on the whole class of PFASs. At the same time the performance of F3 foams at extinguishing fires has markedly improved. So now the balance between potential harm caused and liabilities associated with continued use of PFAS based foams, given the comparable extinguishment performance of F3 foams, makes evaluation of how to move away from C8 and C6 PFAS based foams a wise commercial decision.

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Foam Cleanout/Decontamination

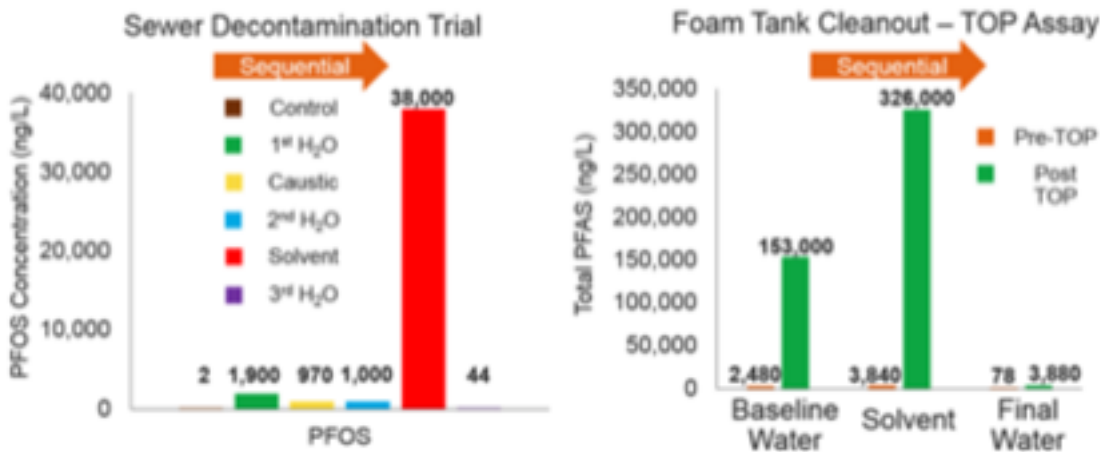


Figure 2 Data from a foam transition decontamination case study in Australia indicating the effectiveness of a biodegradable solvent for PFAS mass removal compared to water or caustic washes.



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Editor's note:

Arcadis is the leading global Design & Consultancy firm for natural and built assets applying deep market sector insights and collective design, consultancy, engineering, project and management services. They have wide ranging experience of managing contaminated land sites, delivery of site assessments and development of management strategies to mitigate perceived risks from industrial and other pollutants. Arcadis has 27,000 people active in over 70 countries that generate €3.3 billion in revenues.

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DISTURBING IPEN FLUORINE FREE FOAM (F3) POSITION PAPER SEEMS TO REJECT SCIENTIFIC EVIDENCE

BY MIKE WILLSON

The International Pollution Eradication Network (IPEN) is well-respected, over 100 public interest NGOs doing some good work. It's mission - a "Toxics-Free Future for All." A worthy ideal - but most would expect it to be achieved fairly, based on factual scientific evidence of efficacy, efficiency, reliability and safety. Imperative when stakes are high - protecting people's lives, minimising damage and escalation to critical infrastructure, our environment - upon which our socio-economic future welfare relies. Is it reasonable to expect rigorous checks of all claims before release, especially to the United Nations Stockholm Convention Persistent Organic Pollutants Review Committee (POPRC)? This paper contains over 60 misleading and factually incorrect statements - too many to be accidental. See for yourselves, available at https://ipen.org/sites/default/files/documents/IPEN_F3_Position_Paper_POPRC-14_12September2018.pdf It seems to reject proven scientific facts, claiming somehow "Fluorine Free Foams can do all that Fluorinated foams can do", without critical analysis or substantiating verification.

The US FireFighting Foam Coalition (FFFC) quickly sent a strong rebuttal to UN's POPRC confirming "The IPEN paper contains numerous inaccuracies, omissions and misleading statements." ... "The foam manufacturers listed below, all of whom sell both fluorinated and fluorine-free foams (FFF), do not agree with many of the conclusions contained in the IPEN paper on the efficacy and environmental impact of firefighting foams. They specifically reject the conclusion that current-day FFF can provide an equivalent level of performance to AFFF agents for all class B applications and hazards, and thus the use of AFFF agents is no longer necessary and can be phased out."

A detailed full review correcting these errors has also been sent to UN's POPRC, highlighting factual evidence contradicting its misleading, unsubstantiated, confusing and too frequently incorrect F3 statements - available directly from the author at willsonconsulting26@yahoo.co.uk. These corrections were designed to bring more clarity and understanding to this complex topic plus details of three large scale F3 incident failures- fast becoming essential reading for anyone trying to understand complex

implications, inter-relationships and consequences of modern firefighting foam usage. It aims to help others understand often ignored facts, curtailing substantial over-reach of F3's claimed "abilities" to bring much needed common-sense into this complex arena. This summarises some of those findings.

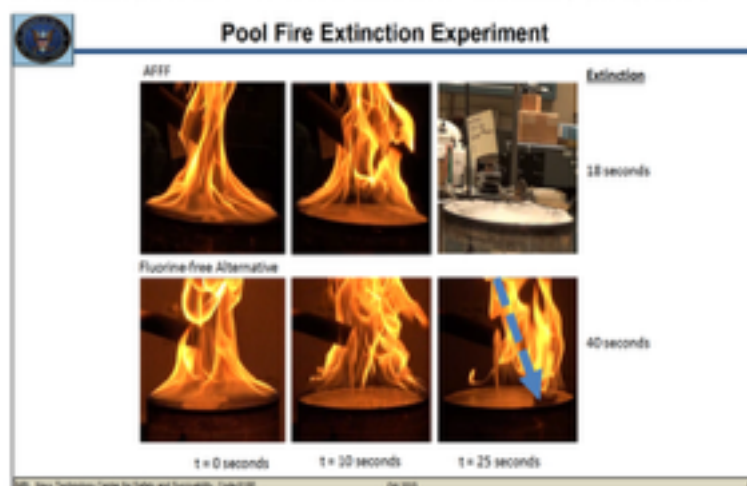
F3s can prolong fires - endangering life safety

An example, p22 (section 1.4) claims "There is absolutely no evidence, anecdotal or otherwise to support Fluorine-free foams endanger life safety for both fire fighters and members of the public.", which is proven to be false. Significant

differences are evident in comparative testing on volatile fuels like Jet A1, gasoline and polar solvent fuels. The longer fires burn, the longer life safety is at continued risk.

2015 US Naval Research Laboratory findings confirmed earlier 2008 research by Schaefer that F3s were only capable of providing 30% the vapour sealing capability of AFFF on gasoline. So 2-3 times more F3 is required to deliver similar AFFF capability. This reduced below 10% (3 mins) for F3 on warmed heptane (50°C), compared to AFFF resisting vapour release for 35 mins, 11 times longer. Such differences are endorsed by IPEN Appendix V (p59) clearly stating "The

Comparison AFFF v Fluorine Free Foam Extinguishment on same n-Heptane pool fire - US Naval Research Laboratory (NRL), 2015



Source: Hinnant K, et al 2015 - "Evaluating the Difference in Foam Degradation between Fluorinated and Fluorine-free foams for Improved Pool Fire Suppression," US Naval Research Laboratory, ARL-TARDEC Fire Protection Information Exchange Meeting, Aberdeen Proving Ground, MD, October 14, 2015.



POSITION PAPER REJECTS EVIDENCE - CONTD..

Comparison F3 v AFFF equally mixed with gasoline and placed in a petri dish. When a flame is introduced above the foam blanket, F3 immediately ignites and sustains ignition until it burns away, while AFFF resists ignition, ...and does so for more than 10 minutes.



Source: Jho, C, 2012 – You Tube comparative video tests “Flammable Firefighting Foams – Evidence superior burnback when AFFFs are used on volatile fuels like gasoline www.youtube.com/watch?v=luKRU-HudSU

poorer performance of F3 in this case can be overcome with a higher application rate.” and “At low application rates (approximately 4 l/min/m²), a ‘gentle’ F3 application is recommended due to the known ‘fuel pickup’ effect.”

F3s without fuel shedding and poor vapour sealing – place lives at increased danger

AFFF development was accelerated after the USS Forrestal aircraft carrier disaster in 1967 to avoid it happening again. 134 lives tragically lost, 161 injured, 21 planes destroyed and 40 planes damaged, when a fluorine free protein foam – like modern F3 versions – without fuel shedding ability and poor vapour sealing, proved unsuccessful.

Especially when US research in 2012 showed modern F3s when contaminated with fuel become flammable. Watch “Foam Flammability!” video

www.youtube.com/watch?v=luKRU-HudSU proving beyond doubt that F3s pick up fuel, sustain ignition, can flashback suddenly, placing life safety at unnecessarily increased danger.

Testimony by two leading fluorine free foam manufacturers at USA's Washington State House Environment Committee in February 2018, confirmed these facts. Solberg's Chief Chemist explained “...although suitable for shallow spill fires, when F3s plunge below the surface in fuel in-depth fires it picks up fuel, comes to the surface and actually burns. ...We are actively telling people do not train with fluorinated foams, use non-fluorinated foams wherever you can, but maintain the short-chain chemistry AFFFs and AR-AFFFs that need to be used for critical situations like airport rescue firefighting and large catastrophic fuel in-depth fires...” His colleague added “a whole lot more F3 is needed on

big fires which also has environmental concerns, ... tanks are extremely difficult without proper use of fluorinated foams.” Resulting legislation, passed 27 March 2018 exempted: oil refineries, fuel terminals, airports, military applications & chemical plants from PFAS foam restrictions, effective from 1st July 2020 - except for training where F3 use is required from 1st July 2018. Common sense seems to have prevailed.

18 of 19 supposed “Myths” are FALSE

A similar rejection of scientific evidence in 18 more supposed IPEN “Myths” ensues. Each accurately addressed, and individually corrected in the full detailed report. F3s do have an important role to play, by protecting smaller fires where higher application rates can be used, and where foam cannot be contained, like many Fire Brigade call outs, firefighter training and systems testing.

F3s are already proven NOT well suited to large volatile fuel in-depth fires where foam is forcefully applied – like virtually all MHF fires – including airports.

Two similar aircraft fires: Different foams deliver different outcomes

A June 2016 Boeing 777 major engine and wing fire in Singapore gets extinguished in 2 minutes using fluorotelomer AFFF/FFFP foam, before all 241 passengers and crew safely disembarked. The plane returned to service some weeks later.

An August 2016 Boeing 777 detached engine fire in Dubai burned for 16 hours under foam attack, destroying the aircraft. Miraculously all passengers and crew escaped before the fire took hold. A brave firefighter tragically died in a fuel tank explosion 9 minutes after the crash. IPEN's Appendix 1 confirms Dubai International Airport as a major F3 user, apparently since 2011. Was it used in this incident or not? Why over 2 years later has the final Investigation Report still not been issued, explaining this firefighting failure? Were lives at increased risk? Seconds count to save a life. Those same seconds also count in minimising pollution impacts to our environment from less firewater run-off and less risk of containment overflows. Why did a July 2016 planned F3 ICAO Level B fire demo get substituted last minute by a C6 AFFF in 32°C Singaporean conditions? Because “too many environmental factors were not under our control to do F3.” This same fire was unable to be extinguished twice using F3 the day before in humid 32°C conditions, catching the fuel separator alight - indicating



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virtually no fire control. C6 AFFF provided effective control and extinction without edge flickers, despite humid 32°C conditions.

Three major F3 incident failures – more than coincidental.

Two environmental disasters resulted from major incidents where F3 was used. Fredericia Port in Denmark was reportedly deemed “one of the worst environmental disasters in recent Danish history”. A low volatility Palm Oil and liquid fertiliser fire, which even fine watersprays may have been able to extinguish. Danish Ports authority confirmed “more than 100 people had been deployed in clean-up efforts to remove a thick layer of palm oil, water and foam.”

Also perhaps that Boeing 777 destroyed after 16 hours burning in Dubai.

August 2018 major Footscray chemical factory fire in Melbourne, Australia, reportedly taking 17 hours to gain “control” by Fire Brigade, and over 5 days to completely extinguish all hotspots. Only PFAS-free foam was used as confirmed by EPA Victoria, yet firewater runoff into a local river included PFAS - detected at 16x recreational water quality levels, presumably as breakdown products from the fire. Victoria's Chief Environmental Scientist confirmed the incident was “probably as bad as it could be” and the chemicals from the fire

have had a “massive” impact on the system. “We've had more than 2,000 fish killed,” she said. 55 million litres of contaminated runoff water were pumped from the creek by day 3, into chemical waste facilities and WWTPs, plus removal of 170 cubic metres of black sludge, to try and save it. Two weeks later PFOS creek levels downstream of the fire site, returned to below health based recreational water levels. Let's remember ...IPEN suggests F3 has “no drawbacks and no remediation costs associated



with its use”.

A major 1996 UK chemicals fire and explosion was effectively and efficiently controlled in 2 hours and extinguished in 4 hours using fluorotelomer AR-FFFP, even though surrounded by another chemical complex, fuel depots, a major port, industrial units and residential areas. No escalation or severe run-off were reported issues. Where is the evidence of F3

success or reliability on major volatile fuel and aircraft fires? The UK Environment Agency concluded in 2014 “foam buyers primary concern should be which foam is the most effective at putting out the fire. All firewater runoff and all foams present a pollution hazard.” Recognition that speed can be critical in saving lives, reducing damage to critical infrastructure and producing less pollutant to adversely affect our environment from the whole incident.

The problem with remote yet potentially catastrophic risks – they do sometimes materialise, then otherwise very reasonable decisions start to look very Unreasonable, ...even criminal.

F3 use does not prevent costly clean-up

F3 can also require extensive clean-up and remediation requirements after use. PFAS emanates from breakdown

products in most firewater runoff including structures and vehicles, likely exceeding water quality values, even when F3 is used. This likely requires collection, containment, analysis, and remediation – but expect 2-3 times more volume and much higher resulting BOD loads, killing more fish and aquatic life, potentially increasing (not decreasing) environmental harm where F3

is used. Particularly when C6s are neither considered Bioaccumulative, nor Toxic. Australian airport fire training areas using F3 since 2010 still require remediation, because the concrete training pads are saturated with legacy PFOS, leaching during each training with F3, and even when it rains. Evidence that F3 usage does not exempt users from remediation requirements, as misleadingly implied by the IPEN paper.

F3s are proven slower to control and extinguish volatile fuel fires, increasing (not decreasing) smoke and life safety risks to communities, overflowing containment areas and extending the whole incident, because F3s lack fuel shedding ability. Inadequate F3 vapour sealing also increases risks of slower extinction, unpredictable sudden flashbacks and incident escalation adding repair costs, business interruption, job losses, community disruption, unnecessary danger to life - and likely remediation costs as part of the whole incident clean-up.

Are C6 health risks overstated by some?

The 2018 Australian Department of Health Expert PFAS panel reported to the Minister “There is no current evidence that supports a large impact on an individual's health.” from PFAS chemicals ... and “In particular, there is no current evidence that suggests an increase in overall cancer risk.” Short-chain C6 fluorsurfactants have typical human half-lives averaging 32 days, excreted through the urinary system and although environmentally persistent are not considered toxic or bioaccumulative. Unlike legacy C8s which are confirmed bioaccumulative, toxic and



Independently witnessed ICAO Level B fire test results, Denmark 2012, compared to those results assessed against today's ICAO Level B test criteria (post 2014 ICAO update).

Table 17: Results From Fire Tests To ICAO Level B (2012)							Now under 2014 ICAO Level B (Jet A1) criteria
Test No.	Nozzle	95% CONTROL	99% CONTROL	EXTINCTION	25% BURNBACK	PASS/ FAIL	
Test Fuel: Jet A1. Foam Premix: with fresh water							
Product A - F3: 6%							
3	UN86	0' 35"	0' 45"	None	N/A	FAIL	FAIL
4	MMS	0' 30"	0' 45"	1' 58"	(6' 45")	FAIL	PASS
Product B - F3: 3-6%							
9	UN86	0' 40"	0' 45"	1' 24"	(1' 50")	FAIL	PASS
10	MMS	0' 35"	0' 55"	None	N/A	FAIL	FAIL
Product C - F3: 3%							
35	UN86	0' 50"	1' 05"	2' 00"	(8' 30")	FAIL	PASS
36	MMS	0' 50"	1' 45"	None	N/A	FAIL	FAIL
Product D - F3: 3-3%							
38	UN86	0' 55"	1' 05"	1' 40"	(9' 50")	FAIL	PASS
Product E - F3: 3-6%							
37	UN86	0' 40"	0' 55"	1' 50"	(8' 05")	FAIL	PASS
MMS (Modified Military Specification); FFR (Foam Expansion Ratio); QDT (Quarter Drainage Time); CT (Control Time); EXT (Extinguishment Time); BB (Burnback Time) Source: RPI 2012 Report							
Source: Resource Protection International, 2012 - Fluorine Free Foam (F3) fire tests, Falck Nuberg Training Centre, Esbjerg, Denmark - Report P-1177. With additions reflecting current ICAO Level B acceptance criteria (since 2014 changes) most would now PASS.							

persistent with typical human half-lives of 3.8 years (PFOA), 5.4 years (PFOS) and 8.5 years (PFHxS). The Australian 2015 Firefighter study confirmed testicular cancer increases were likely caused by inhalation and skin absorption of volatile breakdown products from fires (smoke particularly). Some are proven carcinogens like Benzo(a)pyrene. 79% of all firefighter responses were structural, vehicle and bush fires where fluorinated foams are not used.

Diluting fire test standards helps no-one

Where is the evidence of F3 effectiveness claimed by IPEN - beyond small indicative fire tests? Of particular concern when ICAO diluted its small Level B and Level C fire tests 2014, extending fire extinction times from 60 to 120secs. 2012 Danish independent witness testing to ICAO Level B confirmed all five F3s tested Failed - some were certificated to Pass. Results were generally worse when tested with a modified military specification nozzle, probably more representative of practical equipment being used, than the higher performing handmade UN186 nozzle

required for ICAO testing. Most of these test results if submitted since 2014 would Pass this weakened ICAO Level B test. How can that improve passenger safety? Shouldn't this IPEN F3 Position Paper's misleading misinformation concern us all? Shouldn't we closely re-examine claims of low environmental impact - before regulating to exclude more environmentally benign C6 fluorinated foams, and thereby potentially put lives at increased danger? No foam is perfect, all can pollute, but scientific facts are needed to adequately understand and unravel this complex area of inter-related impacts and consequences. So let's ensure we deliver better outcomes to:

- Save people's lives - from faster, effective, reliable use of less foam and water resources.
- Minimise damage to critical infrastructure - providing socio-economic benefits to our communities, and
- Create less damage to our receiving environment - from less smoke and damaging noxious firewater effluent).

Mike Willson © 13 December 2018

BIO – MIKE WILLSON BSC HONS, MCIM

Mike is an internationally recognised firefighting foam and foam systems specialist with over 30 year's experience of developing, testing, comparing and reviewing fire performance and environmental impacts of both fluorinated and fluorine free foams plus their delivery devices and integrated fixed systems. He was also instrumental in developing improved tank fire, bund protection and LNG recommendations in the EN13565-2: 2009 Foam Systems Standard.

Mike is an active member of the Fire Protection Association Australia's Technical Advisory Committee on Special Hazards, including firefighting foams and foam systems, across most sectors involving flammable liquids, further developing his technical specialist knowledge on protecting Class B flammable liquids. He has co-ordinated several emergency foam responses to major incidents worldwide. Since 2000 he has been at the forefront of the debate concerning legacy C8 issues and potentially suitable C6 and F3 alternatives, providing guidance to end-users and regulators, trying to ensure life safety and fire protection capability is not being unintentionally compromised. He can be contacted by e-mail: willsonconsulting26@yahoo.com.au



PRESS RELEASE



As part of their ongoing evaluation of new generation foams, LASTFIRE, the international forum of oil companies developing best practice standards in storage tank fire hazard management, has carried out a further series of tests, working with Dallas Fort Worth Research and Training Centre, to develop greater knowledge on the capability of new generation firefighting foams, including both Fluorine Free and new generation (post USEPA Stewardship) "C6" fluorosurfactant based concentrates. The tests followed on from previous work carried out by LASTFIRE which showed that such foams could, with appropriate application rates and equipment (as with all foams!) provide adequate protection for some limited size tanks storing some fuels, but, amongst other issues, additional work was required to determine maximum flow lengths for foam travel over unignited and burning fuel surfaces for other situations.





LASTFIRE FOAM APPLICATION TESTS, DALLAS, FORT WORTH AIRPORT

As part of their ongoing evaluation of new generation foams, LASTFIRE, the international forum of oil companies developing best practice standards in storage tank fire hazard management, has carried out a further series of tests, working with Dallas Fort Worth Research and Training Centre, to develop greater knowledge on the capability of new generation firefighting foams, including both Fluorine Free and new generation (post USEPA Stewardship) "C6" fluorosurfactant based concentrates.

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The earlier work included the successful extinguishment of gasoline tank (11m diameter) fires with both Fluorine Free and C6 types of foam concentrate but it is highlighted that generic conclusions regarding

performance of different foam types should not be made because extinguishing capability is very much dependent of the foam concentrate and application device combination. In particular, the earlier work showed that Compressed Air Foam (CAF) generated foam could potentially provide significant advantages in terms of application rate requirements over conventional aspirated foam application and still provide the same levels of risk reduction.

Articles have been published on the LASTFIRE work by the Energy Institute and Industrial Fire Journal as well as detailed reports being prepared by LASTFIRE. Based on the proven effectiveness of CAF based application during these tests there was confidence in the methodology, but it was necessary to carry out larger

scale tests to ensure that other aspects such as the distance of flow capability over longer distances as required by large diameter tanks, bunds or spill fires could also be proven. LASTFIRE therefore moved to another phase of testing to determine if the results could be scaled up to help assess suitability of the foams for larger incidents.

A cooperation was established with Dallas Fort Worth Fire Training and Research Center (DFW FTTC) as they had also carried out test work on Fluorine Free Foams and the issues facing the oil industry are similar to those facing the aviation sector so cooperation and networking is paramount in order to ensure that limited budgets are used as efficiently as possible and that there is mutual knowledge sharing.

The original intention was to

carry out a number of tests including both monitor and pourer application using Fluorine Free foams that had performed well in previous tests with both conventional aspirating and CAF based foams. Also, a comparison with a C6 fluorosurfactant based foam was planned.

However, due to problems with the test pan being jeopardised and extremely heavy rain and strong wind conditions (the worst on record for the area!) during the allocated test window, it was not possible to complete the intended programme. The problems with the test set up highlighted the need for a permanent facility to carry out large fire tests.

Fortunately, the tests that were possible gave extremely useful results. The remaining tests will be carried out in 2019 but meanwhile this article summarises the results to date.

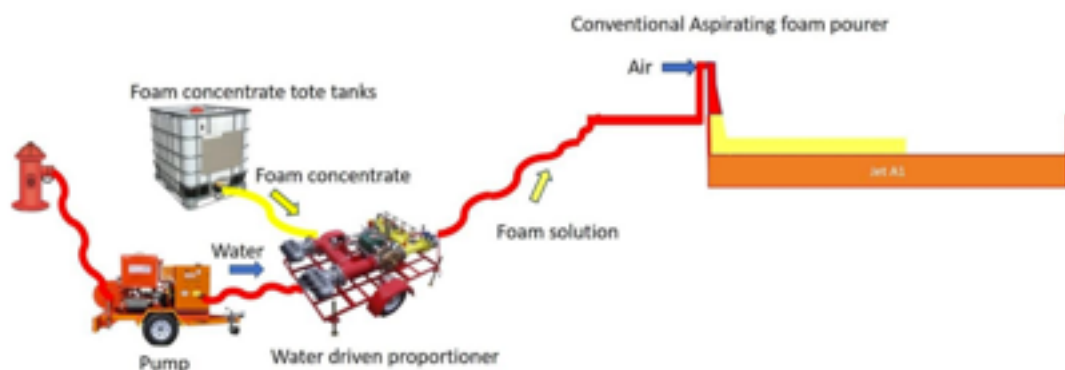


Fig 1. Schematic of Test set up for Conventional Aspirating Pourer Application



Test conditions

The latest work evaluated both conventional aspirated and CAF foam using "semi-gentle" foam pourer application equipment over ignited fuel surface distances of 30m and 40m respectively. The fuel used was Jet A aviation kerosene.

A Fluorine Free Foam specifically designed for industrial incident application at 3% proportioning was used.

Two main tests were carried out.

One involved CAF pourer application at 2lpm/m² into a 40m long, 8m wide pan, the other conventional pourer application at 4lpm/m² (the standard NFPA 11 foam solution application rate) into a 30m long, approximately 3m wide pan. In both cases the foam travelled rapidly over the fuel surface extinguishing all areas including the edges of the hot metal pan. In the 40m test, when the foam had reached approximately 30-35m, problems began to arise with the integrity of an outer containment structure. Consequently, contingency plans were implemented which included application of additional foam (of the same type) into the area surrounding the actual test pan by handline. Some of this entered the pan itself but did not have any significant effect on the foam flow. In fact it could be argued that the direction of application hindered the flow from the pourer. As the foam under test

reached the 40m mark a back up foam pourer (again using the same foam) at that "far" end of the test pan was also actuated but by then all edge flickers had been extinguished.

The conclusion was that the foam had performed exceptionally well. From video footage of the test it was noted that full extinguishment was achieved in 3'27" from time of actuation. The time taken for 30m of the test pan to be extinguished was 2'23". (30m is the maximum distance implied in standards for foam flow to be effective.)

In the second, 30m pan, test, the foam solution flow rate was adjusted to provide an application rate of 4lpm/m² in accordance with NFPA 11 application rate for such systems.

Foam travelled rapidly over the fuel surface and gained virtual extinguishment with edge flickers and a small corner only still ignited in 2'32".

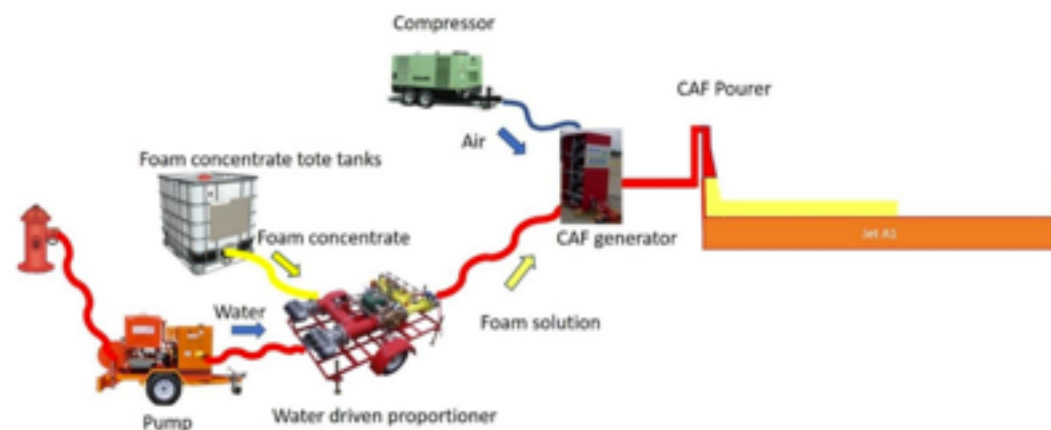


Fig 2. Schematic of Test set up for Compressed Air Foam application

For pictures of the sequence of tests contact the author at info@lastfire.org

Comparison of CAF application and Conventional Aspirated Foam Application

The comparison of time to 30m flow length extinguishment is as follows:

- CAF application at 2lpm/m² – 2'23"
- Aspirated foam pourer at 4lpm/m² – 2'32"

The tests also clearly showed that the foam generated by the CAF pourer can travel at least 40m over a burning fuel and seal against hot tank walls leading to full extinguishment.

Conclusions

It is clear from the results that this particular Fluorine Free foam was very effective in these tests, especially when applied as a CAF based foam.

It is again emphasised that this work has been carried out with one specific Fluorine Free foam

on one fuel type with specific application devices but the results are in line with those obtained in the earlier tests comparing performance (with both pourer and monitor application) with that of fluorosurfactant containing foams on gasoline fires.

The next steps

Having validated the standard LASTFIRE test from the previous work, this protocol will now be used to compare performance of this same foam but with crude as the fuel and further tests will be carried out to optimise foam properties. This work is planned to be completed by end of 2018. The completion of the larger scale test programme is targeted for April/May 2019.

This test work applies to all foam applications. It represents the most comprehensive programme of foam testing driven and managed by end users for more than 35 years. LASTFIRE also develops best practice guidance for foam usage during this crossroads that all end users are facing – and this of course is led by end users on a non-commercial basis.

Anyone interested in participating in this future test work or any other aspects of LASTFIRE work, from any industry sector, should contact info@lastfire.org.



PRESS RELEASE: PERIMETER SOLUTIONS EXPANDS PRESENCE IN THE GLOBAL FIRE FOAM MARKET COMPANY COMPLETES ACQUISITION OF THE SOLBERG COMPANY



St. Louis, MO – Perimeter Solutions, one of the world's leading producers of fire retardants, foams, and water enhancing gels for managing wildland, industrial, and municipal fires, today announced it has completed the acquisition of Solberg, the firefighting foam products division of Amerex Corporation. Solberg produces foam systems hardware and advanced firefighting foam concentrate technologies under the SOLBERG®, RE-HEALING™, ARCTIC®, and FIRE-BRAKE® brand names.

Solberg foam products address rising demand for technology that meet stringent fire performance criteria, and environmental safety standards. The Green Bay, Wisconsin-based company brings over 50 years of foam industry knowledge and formulating expertise to Perimeter Solutions, including a new generation of environmentally-friendly

fluorosurfactant and fluoropolymer free fire foam.

"The acquisition of Solberg was a natural next step for Perimeter Solutions global fire safety business. This acquisition significantly expands the company's commitment to client service, diversity of capabilities, and technical excellence in market-preferred foam products," stated Perimeter President and CEO, Edward Goldberg. "We are thrilled to add the highly talented, industry experienced Solberg team to our growing fire safety business and to our expanding group of valued customers."

Perimeter Solutions will integrate Solberg's global operations within its existing manufacturing and sales ecosystem to expand its global technology and supply position in fire suppressant foam technology.

"We are excited to join the Perimeter Solutions family. As we looked for the right partner to continue our journey it was important to find an organization whose core values aligned with ours," stated Solberg's President Bill Smith.

"Perimeter Solutions is that partner. Perimeter Solutions is a great organization that is committed to customer service and is focused on developing innovative fire foam solutions for high-hazard, high-risk environments. Together we will truly be able to offer our customers the most innovative range of foam concentrates and foam systems hardware for use in industrial, institutional and commercial markets."

Perimeter Solutions holds a major manufacturing position in Class A foam products for municipal and wildland firefighting in North America and is a top innovator with

superior technology capabilities in the Class B foam market globally. The Solberg acquisition enhances Perimeter Solutions' manufacturing capabilities with an additional state-of-the-art foam concentrate production facility in North America and expanded footprint in Europe and Asia Pacific.

About Perimeter Solutions

Headquartered in St. Louis, Missouri, Perimeter Solutions operates as a leading specialty chemicals business, producing high quality lubricant additives and firefighting chemicals with a broad product offering across fire retardant and fire suppressant foam applications. Perimeter Solutions is the only company with fire retardant products qualified for use by the US Forest Service (USFS). Perimeter Solutions produces major brands known throughout the world like PHOS-CHEK® and FIRE-TROL® retardant, foam and gel products; AUXQUIMIA® foam products; and BIOGEMA® extinguishing agents and retardants. For more information, visit us at www.perimeter-solutions.com.

THE REACTOR COLUMN

Plus ça change, plus c'est la même chose – the more things change, the more they stay the same

The Catalyst introduced The Reactor Column in its first edition in March 2001 to provide a "virtual soapbox" for JOIFF members who have something to say and this Column ran in the Catalyst until 2010. In researching the background for this Foam Special edition, we came across a Reactor Column in the March 2002 edition of The Catalyst and reproduce it here to ask the question "are we moving forward or standing still ??" Hoping is not enough; it's our duty as JOIFF members to make a difference! Write to The Reactor Column if you would like to stimulate change remembering "The day that you plant the seed is not the day that you eat the fruit !!

FOAM DEBATE

What an excellent debate has developed on different strategies in using Foam in recent editions of The Catalyst. As you have seen, the debate has widened and it has been very interesting to read the different opinions expressed and the growing number of issues that are being addressed by contributors to the debate. One of these issues is the very important one of possible Environmental impact in the event of a Fire being allowed to burn and the possible damage that run-off of firefighting agents can cause. It was therefore of particular interest to read in the February 2002 edition of FIRE magazine, an article that stated that the UK Environment Agency had recently commissioned research into the feasibility of allowing controlled burns in circumstances where extinguishing fires could pollute the Environment. The article reports that the initial research highlighted a degree of agreement on the principle of protecting the Environment providing there were no risks to health and Safety. Apparently, the research concluded that while there are instances when controlled burns would have a lesser environmental impact than putting the fire out, making such a decision to adopt such a measure is a difficult one. So the issue is not as clear-cut as some would have us believe !!

Editors' note: Contact The Reactor with comments, problems, ideas or anything at all that you would like to be heard. The Editors may decide not to print all or part of comments received and they may be edited. The opinions expressed in this Column are not necessarily the opinions of JOIFF, its Directors or the JOIFF Secretariat Fulcrum Consultants.





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.

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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.

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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.

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

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THE 2018 JOIFF INTERNATIONAL FIRE AND EXPLOSION HAZARD MANAGEMENT CONFERENCE

MALTA 29/ 30 OCTOBER 2018

BY RANDAL S. FLETCHER, JOIFF CHAIRMAN

So... you either went to the conference and are personally and professionally elevated through the time spent, or you missed an exceptional opportunity. The JOIFF 2018 FEHM conference was worth every ounce of effort that went into it, and more. It was loaded with engaging and powerful speakers and topics, well-presented and diverse sponsors and a blend of delegates that offered an endless array of perspectives and experience for all who attended. The venue was a perfect and elegant backdrop to the entire event.

This article is not meant to be a technical summary, but rather a brief sampling of presentations and speakers to provide just a bit of texture and context of their topics and messages - and does not fully capture the range and complex learnings and experiences that were happening on a constant basis during the conference. My goal is to provide a relational linkage of the speakers presentation for your enlightenment, and hopefully to stimulate you to delve deeper into the respective topics and ideas. To find a greater level of detail, please consult the conference program.

Thad Allen: He rose to the pinnacle of his profession as the Commandant of the US Coast Guard, operated in the eye of the hurricane called American Politics, the Media circus, and the public eye, during some of the largest natural and man-made disasters in US history and not

only was effective, but by all accounts was a master at them all. Admiral Allen used the Deepwater Horizon incident of which he was the Federal incident Commander as a key platform for his message. One key idea presented was to recognise the critical need for emotional intelligence when dealing with the myriad of interests and perspectives during an event. Being technically accurate, and operationally sound are critical components, but they will mean nothing from a strategic perspective if you cannot get the relationships and the perceptions aligned.

Brad Byczynski: Among his vast array of experiences in response from the front lines to the top of the response discipline on a multinational scale, responding to incidents on a global scale, and from a vast array of incident types, he also served as the Responsible Party Incident Commander



during one of the largest incidents in modern US history, The Deepwater Horizon incident. This role positioned Brad to offer a different perspective of the strategic considerations discussed by Admiral Allen. Each layer of a response has its own considerations, and helping each level succeed requires a different approach and application of technical and organisational savvy. One size does not fit all. Having the bandwidth and depth to understand and modify your approach accordingly is fundamental to overall success.

Steve Hamblen: As a PhD in environmental science, developing his own very successful businesses in a range of disciplines and contexts, serving on the board of the Federation of American Scientists and on the Board of a major university provided a completely different perspective on his role as the Waste Management and Decontaminations Branch for a three state area of the Macondo Spill (Deepwater Horizon incident) response. His role at the front lines allowed him to see first-hand the challenges of making what are sound strategic decisions, work at the tactical level. The

communications and organisational challenges confronted on a minute by minute basis introduce discontinuities that are often not seen beyond the line. Being aware of them is the first step in managing them effectively.

Mark Scoggins is the kind of legal counsel (lawyer) you want/need on your side. He has risen to the top of the profession in one of the most challenging legal contexts in the world, the UK. His depth of experience in dealing with some of the highest impact and profile incidents requires our attention to his guidance and advice. Bottom line, if you open your mouth, you had better be prepared to back what you say. If you don't write it, or write it correctly, it didn't happen. If you are not well documented you are exposed. And the truth in the eyes of the law is only that which is objectively verifiable, and only as precise, all else is suspect, regardless of what you think you know to be true...

Gary McFadden has spent a considerable career understanding Risk management and process safety, and is considered to be at the top of his discipline. His work is to make those in



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decision making positions regarding inherently safer design, risk evaluation, and mitigation/prevention fully aware of the impact of their actions, good or bad. All decisions have consequences. Turning your back on the lion you trained from a cub doesn't remove the inherent danger he presents, and neither does getting comfortable with the risks we face every day make them less dangerous. Making clear technologically sound evaluations is the foundation of improving the risk profile for High Hazard industry.

Kevin Deveson demonstrated that any responding organisation that is willing to reach outside of itself to enhance its capabilities, and gain an objective perspective, places itself in the best position for improvements and success. Most response organisations are quite content with their myopic, self-protective approach, certain that they have it already figured out and do not need external perspectives. I see this all the time. By bringing in JOIFF to provide an independent view, and taking on board the guidance and recommendations, he was able to partner with a resource that aided him in his efforts to prepare his organisation to respond in a systematic and deliberate way. It is a process

and takes time and commitment, and humility to allow others to provide input. The outcomes speak for themselves. Mr Deveson's leadership and willingness to partner with expertise reflect the best mind set and attitude our industry professionals must maintain to remain effective and relevant.

Kevin Westwood: Kevin keeps himself on the cutting edge of understanding response science and technologies, and works to keep the profession dynamic in how it thinks about response and the convergence of the latest learnings. Drones are not an emerging technology; they are fully functioning and emerged. What isn't emerging is our professions embracing and applying this exceptional resource. But it is getting better all the time. The live demonstration during the conference showed in real time the diverse applications and "real time" usefulness of this tool. It provides situational awareness, helps assess and manage responder risk, and provides dynamic assessment capabilities. The demonstration was a showcase of how we must embrace and think about this critical tool, and more importantly, how we need to continue to embrace technology and make it practical to response.

Jose Torero: Jose is a powerhouse of depth and technical accuracy matched to an ability to synthesise science into real world applications. He is world recognised for both his body of work in fire engineering, and for his efforts to insure that sound fire engineering finds its way into inherently safer design and specifications, academia and legislation. The basis of a quality FEHMP effort is found in a firm scientific foundation. So much of what we assume is fundamentally wrong when analysed with appropriate science and technology. Jose began his presentation by stating that he was not entertaining, and proceeded to provide an absolutely riveting presentation that challenged all in the room. His expert analysis of the Grenfell high-rise incident highlighted some of the challenges and gaps we have employed in the past and forget to apply to the future at our own peril. The principles of building design translate fully into the high hazard industry and what we learn from one must be transposed into the other.

Raymond Bras and Jeroen Konijnenberg brought together a Public private partnership that actually works. For those who have strived to make these types of relationships develop and

maintain understands what an exceptional piece of work this is. All entities, businesses have at their heart a driving self-interest and it is difficult to blend different response philosophies and economic perspectives, legal limitations, and various technologies. In responding to actual complex incidents, they were able to demonstrate how such a relationship can, not only work, but significantly improve the prospect of successful response. Their careful critique of the chain of events, the analysis of the science a work, and the blending of the resources to bring about the right outcomes provide a clear example of how we need to think about this approach to response relationships

Niall Ramsden is a recognised expert who has spent a significant part of his considerable career in analysing foams and tank fire applications. His work with Last Fire continues to evolve as he strives to help industry wade through the myriad perspectives and opinion. He works to bring facts and technology to bear on the art of firefighting foams. The considerable mounting pressures regarding foam and its environmental impacts coupled with the need for an effective tool for combating liquid hydrocarbon fires



THE 2018 JOIFF INTERNATIONAL FIRE AND EXPLOSION HAZARD MANAGEMENT CONFERENCE

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introduces challenges that penetrate deep into high hazard industries ability to effectively mitigate escalation and consequences of these types of events. Continual learning is the key and the additional testing and conceptual regimens being recently employed offer additional insights into this critical body of knowledge.

Eric Lavergne has been at the forefront of tank fire response technique and equipment design through the Williams Fire Hazard and Control organisation, part of Johnson Controls International. He is arguably one of the most experienced professionals in this industry. He has either been directly engaged himself or provided technical expertise and guidance in the “real world” of response. Theory and concept are put to the test and the learnings he has gleaned through decades of response on a global scale were brought to bear as he introduced challenges to how we conceptualise the convergence of the science of tank firefighting and the art of making it work in the real world. He demonstrates that you cannot escape the science and technical considerations.

Eric Yap: As the principle “owner” of a Nation’s emergency response capability Commissioner Yap is clearly at



the forefront of employing emerging technology and the latest thinking into what can be a slow and monolithic emergency response profession. As I have stated many times, we are typically decades behind our own learnings in this industry. Commissioner Yap is part response professional, part organisational leader, part innovator and part politician. All of these disciplines and skills must be brought to bear if we hope to progress and develop organisational response capability in the response industry. Commissioner Yap demonstrates the fact that with the right balance of solid vision, a protracted and planned approach, communicating effectively across the government, public and private sectors, and sound fiscal planning, it is possible to be on the cutting edge of response organisational and

technological development and the resultant capability. The Singapore response organisation is clearly the prototype of how we need to think about response moving into the future. We need to embrace technology in a systematic, yet aggressive way, and make it “real” within our organisations.

Pine Pienaar is a legend within the South African response community and well beyond. He has spent decades working through the limitations and constraints the refining and petchem industry response discipline has faced. He was able to build what is arguably the best trained and equipped response team on the Continent. It is a labour that requires passion matched to a relentless technical soundness and perseverance in the face of an industry leadership that constantly needs reminded of the criticality of a balanced emergency response capability. Like Commissioner Yap in Singapore, Mr. Pienaar was able to marshal the right approach to build the capability that organisation has today. The lessons learned apply across the board to any organisation seeking to grow.

These presentation all integrated into a holistic theme of science, technology, organisational construct, relationship building,

leadership, followership, and the relentless pursuit of real response capability.

To the speakers: We are grateful for your time and energy. Your work was stunning, and left us all better within our profession on a variety of levels. On behalf of JOIFF and all the delegates, Thank You.

To the Sponsors – Johnson Controls International, Auxquimia, Bristol Fire Engineering, Dr Sthamer Foam, Fomtec, REV-Ferrara, US Fire Pumps - we are grateful for your excellent and continuing support which allows JOIFF to present such events. Also we would like to thank the following Exhibitors for your valuable support - Falck Consulting, FireDos, Gexcon, H2K, Hytrans Fire Systems, ISTC, Rectrix, SpecPozhTech & TexPort. JOIFF is proud to have Commercial Partners that are on the forefront of making modern technologies and innovations accessible and affordable, and continue to partner with the scientists and end users to bring it all together.

And of course the delegates are why we were there in the first place. Thank you all for making the conference what it was, and thank you for your valuable time. I trust we added value back to you and look forward to the future.



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EXTENSION SERVICE

A firefighter in full protective gear is shown from the side, fighting a large fire in an industrial setting. The firefighter is wearing a silver heat-reflective suit, a helmet with a face shield, and yellow boots. They are holding a hose and spraying water or foam onto a large, intense fire that is rising from a circular base. The background is dark and industrial, with metal structures visible.

Our employees fight fire and so do our products

*My name is Magnus.
I am working with product
development at Fomtec.
This picture is from a fire
test in Sweden. Follow us
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COMPETENCE-BASED EDUCATION AND TRAINING: BE AWARE OF YOUR RISKS!

BY KEES KAPPETIJN (KSS) AND RONALD DE ROOS (H2K)

EDITORS NOTE

Kees Kappetijn is consultant at/owner of JOIFF member organization Kappetijn Safety Specialists. The agency advises organizations about the design of corporate emergency response organizations, and education and training of crisis teams (especially levels 3 and 4). www.kappetijn.eu

Ronald de Roos is CEO/owner of JOIFF member organization H2K. The agency organizes fire service training and industrial training, and advises organizations about optimizing incident control. www.h2k.nl

Introduction

Knowledge, competence, role-awareness, and a strong sense of responsibility are the keys to the effective workings of a corporate emergency response organization (ERO). But what exactly do the people in the response and crisis organization have to know and be able to do? What is 'the norm'? A statement: to secure an adequately equipped and trained emergency organization, simply describing tasks and roles won't get you there; you need a solid, substantive foundation with a risk and scenario analysis and a competence-based framework. Start at the beginning, be aware of your risks!

The majority of the corporate emergency and crisis organizations is designed with Emergency Response (ER) as focus. Chemical companies in the lower and higher Seveso-categories often have solid First Responder teams or corporate fire services. Healthcare institutions often emphasize emergency response teams with a large medical component. The big common

denominator for all those types of emergency organizations is that knowledge and competence are the benchmark for a properly functioning emergency organization, but companies often struggle with the question of how to determine what type of organization is needed and what demands that organization should meet. That requires customization per corporate branch, even per company.

Design of a Corporate Emergency Response Organisation

An emergency response organization brings together people, materials, vehicles, personal protective equipment and information. Usually, the emergency response organization should be able to deploy at any given moment at an extremely fast rate: 0 to 60 in 3 seconds. So the design of an adequate ERO deserves some thought on the following issues:

- Risks and impact analysis;
- Design of the emergency response organisation;
- Roles and cooperation

with partners;

- Tasks and responsibilities.

With these four consecutive process steps, it should become clear what performances the emergency organization should be able to provide and what members of a corporate emergency response organization should know and be able to do.

Risks and impact analysis

To establish an integral, competence-based education and training framework for a corporate emergency response organization, companies should get back to basics; the threat and risk profile of the company. Which unplanned and unwanted events can disrupt the work processes, what issues can lead to incidents and accidents, how do the credible and normative scenarios usually unfold, and which interests of the organizations are under threat when that happens? When a company knows its risk profile and has made visible what impact that profile has on the business continuity, choices can be made to protect people, environment



and assets, and with that the deployment need and equipment of the emergency response organization.

ERO-design and stratification

An important step leading to competence profiles is determining the basic structure, or basic stratification, of the emergency response organization. The structure of an emergency response organization is often a four-layer model:

- **Level 1:** Execution of emergency service tasks by Emergency Response Officers, First Responders or fire service and security teams at an operational level;
- **Level 2:** Leading emergency response teams designed for the ERO by for example ERO shift leaders, fire service team leaders, security team leaders and control room leaders;
- **Level 3:** Coordination of multiple ERO-teams and fine-tuning with external emergency services by calamity- coordinators, corporate emergency service officers, company representatives or incident commanders;
- **Level 4:** Providing environment/stakeholder management to safeguard strategic organizational interests by management teams or boards of directors and their supportive staff.

Acknowledging such a basic stratification when designing an emergency response organization is an incredible help in developing a competence-based framework. It helps pull the focus to the expectations of every role in this structure, and simultaneously sketches the interpersonal relationships and dependencies in the internal emergency organization and

the connection to the structures of the external governmental emergency services.

Roles and stakeholders

Every company should appoint the roles in the emergency response organization that are necessary for managing risks. If the ambition of an organization is limited to meeting the legal standards of the Working Conditions Act, then basic respondents are enough: people who fulfill the basic set of tasks of firefighting with small extinguishing materials, First Aid, alarming, evacuating, and guiding and informing external emergency services. People who, like OSHA states, fulfill that emergency service set of tasks defensively, or risk-avoidant. If specific risks occur, First Responders might be necessary. A Seveso-company with a solid corporate fire service has a more offensive unit, and also fulfills the role of Company Representative or Incident Commander.

The necessary competences to fulfill a role in the ERO are strongly dependent on the safety philosophy of a company and on how little or many stationary fire safety measures are present. Working with roles in a four-layer structure adapts well to the deployment of governmental emergency services. There too they have such a stratification. So the described roles in the ERO and the connection to and coordination with the governmental services have a big influence on the competence-based framework of an emergency response organization.

Tasks and responsibilities

Finally, dividing the tasks and responsibilities to the people of the ERO. Roles that require other competences than that daily activities of the workers. Being competent for the regular

operational, staff or chief function does not automatically mean that you are competent for a role in the ERO, in which action is often required under stressful circumstances and outside of the regular office hours. Properly describing competence profiles in terms of tasks, responsibilities and authorizations is essential in determining what officers must know and be able to do at the abovementioned levels.

From competences to function profiles

When the risks and scenarios are known and the choices for the foundation and the design of the emergency response organization are made, the tasks to be executed can be translated into roles, people and their function profiles. The described process steps are essential in developing and designing a corporate emergency response organization that fits the risks and types of incidents. That way, a fitting system can be set up for becoming and staying competent, in which responders only take on that knowledge and acquire those skills which are actually necessary to properly perform the tasks set out for them. For example by making the choice: yes to firefighting with stationary monitors and grab rescue, but no to firefighting in buildings or deployment in gas

suits; that way a competence profile can be drawn up for this specific emergency responder, which stipulates the attainment targets for the necessary knowledge and skills.

Which competences belong to which role? Though a framework can be universal, competence profiles are always tailored to the organization. There are norms for competences for general emergency service work, but no norms for competences for specific roles in an emergency response organization. Competences should follow the core of the four layers: emergency service workers at level 1 should be competent to perform first aid and deployment tasks and work with gear and PPE, team leaders at level 2 should be competent to lead, prioritize and organize team-safety. Level 3 has competences for coordinating an incident, weighing interests and collaborating with stakeholders like governmental emergency services and the competences at level 4 consist in large part of decision-making in crisis management and communication with internal and external stakeholders about the crisis management strategy.

Framework conditions

To properly fill out the competence-based education



COMPETENCE BASED TRAINING.... CONTD..

of officers in an emergency response organization, a few framework requirements should be met:

- There should be a distinction between the proper method of competence-building: through a theoretical or practical method, a Virtual Reality method/computer simulation or a method with realistic practical circumstances on training grounds. Each level and position has its own mix;
- In the practical circumstances of the training grounds, three positions should be combined that do not and cannot be incorporated into one: the instructor/teacher, the assessor and a safety officer. Every officer has their own education tailored to their role;
- The availability of a registration system is indispensable. For each person, you should be able

to track their acquired competences and see which competences are up to date with adequate training, and which competences have become rusty and require some attention. Such a registration tool should not be seen as an "accountability tool for failures" but as a "motivational tool for personal development";

- Competences should be built from objective and verifiable criteria, which should mark clearly when someone has or has not mastered the competence;
- Competence profiles cannot be voluntary. They are not only the basis for targeted performance in a certain role, but also for safe deployment of the emergency worker and their team. That means that someone who is (temporarily) insufficiently competent does not fulfill the role for which those competences are required.

Sane employment policy protects people and provides them with the possibility to regain their competences and catch up on their backlog ASAP.

Becoming and staying competent

The competence profile and the role-descriptions tied to that are the input for designing the process steps toward becoming competent. For every person a competence-based 'proficiency-plan', in which is stated which theoretical and practical skills they should possess and based on which criteria that knowledge and know-how is tested. And with what frequency, because a one-time education or training does not cut it. Knowledge and skills should be kept up to date and moreover, should be periodically adapted to changing insights and new techniques and tactics.

The underlying message of the described step-by-step model

is: don't think too lightly about developing and designing an education and training system. It costs time, money and energy to safeguard that a corporate emergency response organization is tailored to the specific risk-image and that the officers are sufficiently equipped with materials, knowledge and skills to perform and deploy effectively. However, it costs more money if a calamity shows that people are not (sufficiently) competent to execute their role, which caused a small incident to escalate. Corporate sectors in the industry can join forces, for example by drafting a collective 'refinery' or 'tank storage' competence-based framework, based on corporate processes and the accompanying risks. But in the end, it's the local choices and considerations that determine the education and training framework.

NEWS FROM JOIFF ACCREDITED TRAINING PROVIDERS - JAHEZIYA

The Catalyst congratulates Jaheziya Training Provider, Abu Dhabi, who during Q 4 2018, underwent a robust audit and was awarded JOIFF accreditation.



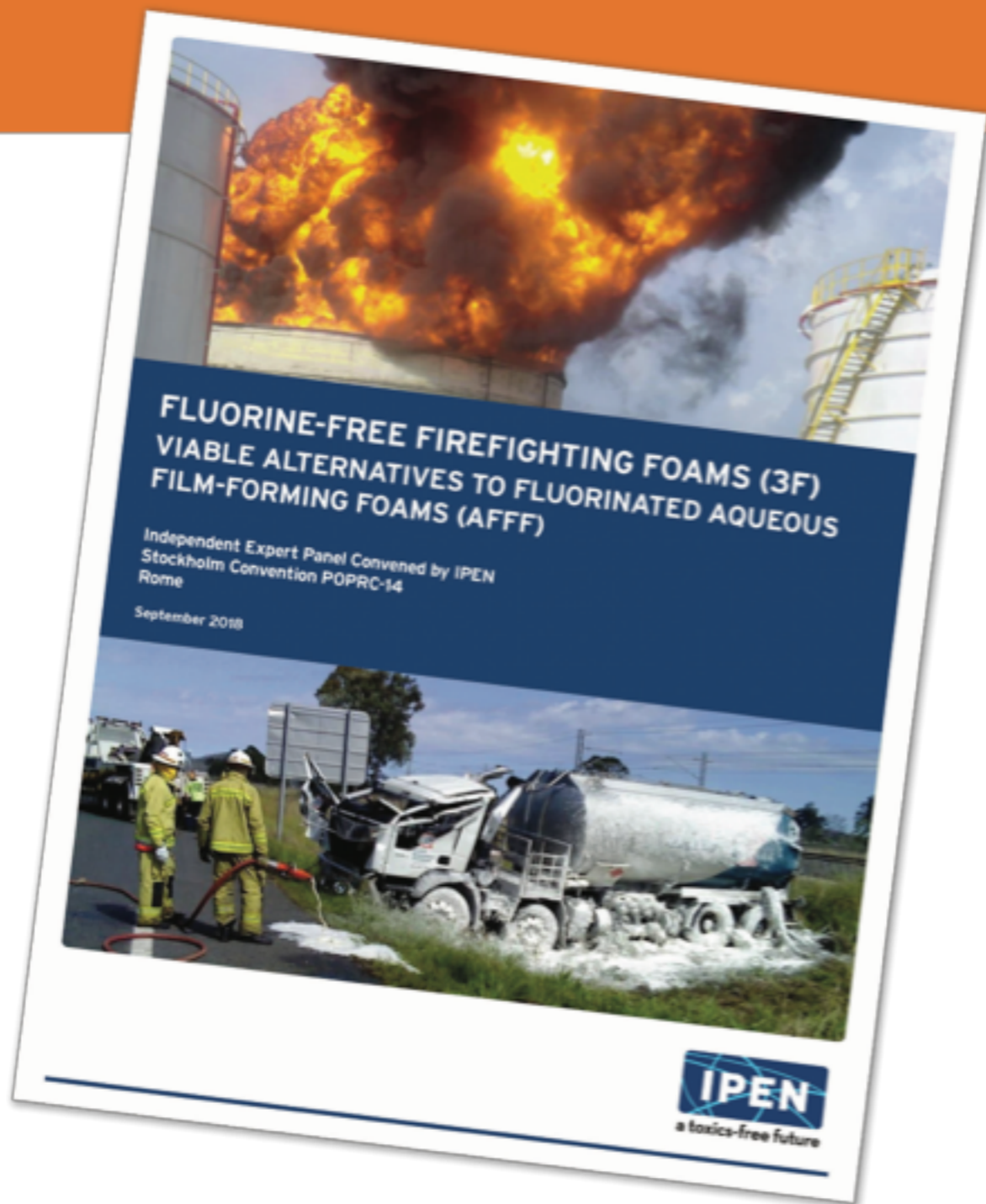
Presentation of Certificate of JOIFF Accreditation

Left to right: Chris Lawson, Manager, Training - Maritime & Offshore Jaheziya, Humaid Khalifa Al Hajeri, Head of Training Unit, Gerry Johnson JOIFF Director, Alec Feldman JOIFF Director



Pressurised fire prop in Jaheziya





**IPEN 2018 POPRC-14 Report is based on
Misinformation and Missing Information:**

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JOIFF

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Emergency Response and Fire Hazard Management



JOIFF Africa Fire & Explosion Hazard Management Conference - South Africa – JUNE 24th - 25th 2019

"Diverse Challenges Facing Emergency Responders In Africa"

***Hosted by Pine Pienaar Rtd Chief Fire Officer Sasol Secunda Emergency
Services and supported by the Petrochemical Fire Chiefs Committee***

Gracelands Hotel Casino & Country Club - Secunda - June 24th - 25th 2019



JOIFF – The International Organisation for Industrial Emergency Response and Fire Hazard Management, Primary Sponsor Advanced FST & Event Host Pine Pienaar – retired Chief Fire Officer, Sasol Secunda Emergency Services, would like to extend a personal invitation for you to attend the JOIFF Africa Fire & Explosion Hazard Management Conference 2019

The 2 day Conference is designed to provide a unique opportunity to join with High Level International & Regional Fire & Explosion Hazard Management specialists to listen, discuss and network with the World's & Sub Saharan Africa's foremost experts and specialists on F.E.H.M. Pre Preparedness.

FREE JOIFF MEMBERS Delegate Package Includes:

- Pre Conference Drinks - Evening Reception Networking Event
- Delegate Pass for 2 Day Summit
- All Refreshments & Snacks During Summit Breaks Including Buffet Lunches
- Discounted Accommodation Rates at Venue Hotel (whilst rooms still available)
- Invitation to Attend the Gala Dinner
- Invitation to attend Demonstration

Who should attend.

Industrial Fire Chiefs – Municipal Fire Chiefs – Senior Fire Fighters – Fire Engineers – Policy Makers – Regulators – Fire Engineers – Fire Safety Consultants – Fire Risk Consultants – Occupational Safety Managers – Process Safety Managers – Safety & HSE Managers – HSEQ Managers – Risk Managers – Security Managers, Ops Managers – Industrial Safety and Training Managers

Delegate Places are Limited

For further details on Delegate or Exhibitor Packages the JOIFF Africa Fire & Explosion Hazard Management Conference 2019 please call or email Event Director Paul Budgen +44 (0) 203 286 2289 - Email: pbudgen@edicogroup.net or go to

<http://www.joiffconferences.com/>



JOIFF



Advanced FST, Your #1 partner in mitigating risk in the Petro-Chemical, Oil & Gas Industry

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| ✓ Bristol/Corodex | ✓ Rectrix |
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| ✓ Rural Metro | |

Through these partnerships, Advanced FST has established **The A-Team**... a single source solution for the mitigation of risk throughout the industry. From fire suppression surfactants; fire apparatus & apparatus components; high volume pumps; mobile firefighting equipment; monitors, nozzles; storage tank protection; portable pumps; transitional firefighting systems and drones, through to detailed risk & GAP assessments; facility evaluation; foam testing services; incident reporting & fire investigations; risk mitigation programs; live training; simulation training through to select outsourcing of trained personnel; complete outsourcing of personnel, equipment & vehicles (apparatus)... everything under one roof with the highest level of quality and service delivery.

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Contact Lee Marques at +27 73 744 2553 or leem@advancedfst.co.za
Trevor Fildor at +27 82 651 2580 or trevor@industrialfire.co.za
Armand Barnard at +27 82 327 0230 or armand@advancedfst.co.za



One of the products and services offered by The A-Team is the new, exciting Drone program. Just some of the applications of the Drone in the Petro-Chemical, Oil & Gas Industry are:

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| ✓ Incident Command & Control | ✓ Infrastructure Inspection |
| ✓ Asset Management | ✓ 3-D Surveys |
| ✓ Simulation Training | ✓ Gas and Vapour Cloud Emergencies |
| ✓ Firefighting Operations | ✓ Radiation Emergencies |
| ✓ Damage Assessments | ✓ Search & Rescue Operations |



JOIFF ROLL OF HONOUR



The following people were awarded JOIFF qualifications during October to December 2018.

JOIFF DIPLOMA

Paul Vincent Le Grange Dip.JOIFF
Fire Commander, ADNOC Refining
Abu Dhabi , United Arab Emirates

Sipho Mbebe Dip.JOIFF
Cape Town Refinery
Astron Energy (Pty) Ltd., South Africa

Lee Palfreyman Dip.JOIFF
Station Manager, Colchester Fire Station. Essex
County Fire and Rescue Service, UK

Lee Palfreyman Dip.JOIFF has been a member of the British Fire Service for over 30 years serving in both London Fire Brigade and Essex County Fire and Rescue Service. He is currently the Station Manager at Colchester Fire Station, Essex, a position that he has held for over 8 years.

He was asked to become a member of the Essex Petrochemical Officer team in 2013 due to his work ethic and his "can-do" attitude. Following his initial training at the Les Williams Xtreme workshop in Texas during 2013 his enthusiasm has grown and he has attended numerous courses and seminars around the UK.

He has been instrumental in drawing up a Foam logistical strategy for use within Essex County Fire and Rescue Service and wider afield. He is also a key member of the training delivery team that educates Essex County Fire and Rescue Service's officers, along with officers from other Fire and Rescue Services, in the field of Petrochemical firefighting on the JOIFF accredited 5 day course that Essex County Fire and Rescue Service delivers.

Lee has worked closely alongside Haltermann Carless, a leading international supplier of hydrocarbon-based speciality products and solvents, for a number years to build a strong relationship to ensure the Service is familiar with all the risks, hazards and process and support the site in developing new firefighting strategies for the future.



Matt Stone Dip.JOIFF
Instructor, The Fire Service College, Moreton in Marsh, UK

Matt Stone Dip.JOIFF has been employed at the Fire Service College for the last 5 ½ years, the last 3 of which have been as an Instructor. Matt has experience as a retained Firefighter with Gloucestershire Fire and Rescue Service and now with Hereford and Worcester Fire and Rescue Service.

Whilst working at the college Matt has gained the following qualifications:

- SFJ Level 3 Award Breathing Apparatus Instructor
- SFJ Level 3 Fire Behaviour Training Instructor
- SFJ Level 3 Road Traffic Collision Instructor
- Safe Working at Height Technician
- Level 3 in Education and Training.



JOIFF ROLL OF HONOUR

JOIFF TECHNICIAN



Ewen Duncan Tech.JOIFF,

Ewen was presented with his Technician certificate at the JOIF Annual General Meeting which took place before the JOIFF International Fire and Explosion Hazard Management Conference in Malta in October 2018. Detail of Ewen's success in the JOIFF Technician programme was published in the Q4 2018 edition of The Catalyst.

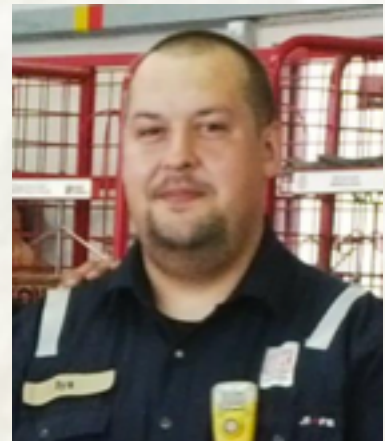
JOIFF LEADERSHIP 1 (TEAM LEADER)

Ilya Boyko Dip.JOIFF, Emergency Rescue Service Manager Health, Safety & Environment Department LUKOIL Mid-East Ltd., West Qurna 2 Project, Basra, Iraq

Ilya Boyko Dip.JOIFF started his career as a rescuer in the Russian Federal Air Mobile Rescue Troop (Centros pas) followed by a move to Moscow Specialized Fire-Rescue Troop. In 2014, he joined LUKOIL Middle East oil project in Iraq as a Team leader, later becoming an ERS Manager.

Having completed the JOIFF Diploma in March 2018, Ilya Boyko Dip.JOIFF started working on the JOIFF accredited Leadership 1 (Team Leader) programme which he successfully completed in December 2018. On successfully completing the Leadership 1 (Team Leader) programme, Ilya wrote:

"I am happy to have finally completed the Leadership 1 (Team Leader) program – my next step the JOIFF Leadership 2. (Officer) program. The course was challenging and makes you reflect on the activities you undertake during everyday duties as well as research other activities. Overall it was a good experience and a great refresher, I look forward to continuing my learning in 2019".



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NEWS FROM JOIFF ACCREDITED TRAINING PROVIDERS

ARC FIRE TRAINING SERVICES LTD.



Eric Dempsey, Managing Director and Senior Instructor Arc Fire Training Services Ltd. recently presented Arc Fire's JOIFF accredited 5 day Crisis Management & Emergency Response seminar for Buried Hill Oil & Gas in Ashgabat, Turkmenistan. The seminar was attended by company senior managers, health & safety reps, emergency response team leaders and others with roles in the company Crisis Management system was delivered via a Russian interpreter and Eric reports that the feedback for the course content and delivery was very high. Following the seminar a letter from management of Buried Hill said "According to the results of a survey, the participants highly appreciated the level and style of teaching as well as the course content. In the course of the training our participants gained knowledge that formed a base for their future practice".

JOIFF QUALIFICATIONS



The JOIFF Diploma is a competency programme for personnel who respond to emergencies. It covers necessary key skills, learnt and demonstrated by the student in practical training and exercises that allows them to deal competently with site emergencies.

The JOIFF Technician programme is to allow the emergency responder to enhance their knowledge and skills having already demonstrated their competence in Key Skills.

Graduate of JOIFF is awarded to a person from any JOIFF Member Organisation who has a minimum of 5 years full time service in an emergency response role and has shown professional attainment in Industrial Hazard Management activities.

JOIFF Member is awarded to a person from any JOIFF Member Organisation who has a minimum of 10 years full time service in an emergency response role, has demonstrated competence and shown significant professional attainment in Industrial Fire and Explosion Hazard Management activities and has been successfully assessed as competent through recognised training in the range of activities in Industrial Fire and Explosion Hazard Management.

The highest award that JOIFF can bestow is FJOIFF JOIFF Fellowship. This is awarded by recommendation of the JOIFF Board of Directors to an individual who has made an outstanding contribution to Industrial Hazard Management



JOIFF ACCREDITED TRAINING CALENDAR 2019

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Crisis Risk Radar 1 day	19 Feb
Crisis Spokesperson 1 day	12 March
Silver (TGC) COMAH Representative	5-6 Feb

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H2K THE NETHERLANDS

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Vernon, France (5 days) 1-5 April

Website: www.h2k.nl Email: info@h2k.nl

Tel: +31 174 414 872

The dates offered here have been provided by
JOIFF accredited training providers.
If you wish to find out any information or make a
booking, please contact the training provider
directly - contact information provided.

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DIARY OF EVENTS

January

20 – 22 Intersec, Dubai, UAE

February

27 - 28 Fire Protection of Rolling Stock, Berlin, Germany

28 – 2 Mar Fire and Security India Expo, Mumbai, India

March

26 – 27 Simulation & Training for Resilience & Safety Symposium,
London, UK

April

8 – 13 FDIC International, Indianapolis, USA

9 – 11 The Fire Safety Event, Birmingham, UK

16 – 17 FIREEXPO West Africa, Lagos, Nigeria

17 – 18 Emergency Show, London, UK

May

14-16 Fire Australia 2019

June

24 – 25 JOIFF Africa FEHM Conference, Secunda, South Africa

July

17 – 18 Institution of Fire Engineers AGM and Conference,
Brighton, UK

September

4 - 6 IAFPA-ARFF 19th Annual Conference, Honolulu, Hawaii

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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Email: joiff@fulcrum-consultants.com
Website: www.fulcrum-consultants.com

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