THE CATALYST

Q1 2020

JOIFF

THE INTERNATIONAL ORGANISATION FOR
INDUSTRIAL EMERGENCY SERVICES MANAGEMENT

FOAM FEATURE:

Are Small Scale Fire Tests Adequate?
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ABOUT JOIFF

JOIFF, the International Organisation for Industrial Emergency Services Management is a not-for-profit organisation dedicated to developing the knowledge, skills and understanding of personnel who work in and/or who are required to provide emergency response to incidents in Industry, primarily High Hazard Industry, with the aim of ensuring that risks in Industry are mitigated and managed safely.

The 4 pillars of JOIFF aiming to support its Membership in preventing and/or mitigating hazardous incidents in Industry are: Shared Learning – improving risk awareness amongst JOIFF 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 and Professional Affiliation - networking and access to professionals who have similar challenges in their work through Conferences and other events and the prestige of being a member of a globally recognised organisation of emergency response.

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. Commercial Members of JOIFF are organisations that provide goods and services to organisations in the High Hazard Industry.

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

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MESSAGE FROM THE CHAIRMAN

Dear JOIFF Members & Catalyst Readers,

I am honoured to write to you as the new Chairman of the prestige organisation, JOIFF, the International Organisation for Emergency Services Management and I assure you of my best intentions to further the aspirations of JOIFF to the best of my ability.

We are entering a new year and thinking back over the past year, many challenges were very successfully resolved through the dedication of the Board Members. I need to take this opportunity to extend the Board of Director's and my personal gratitude towards two Directors, both Fellows of JOIFF, who decided to move on, namely our Chairman for the past 8 years, Randal Fletcher as well as one of our founder members, Kevin Westwood. The Board extends to both of them its appreciation for their services over the years.

The Board has decided that the two vacant positions on the Board will not be filled, but instead we decided that we want more direct involvement by JOIFF members. To enable this, we decided to form a "Management Advisory Team" (MAT for now!) and the role of this team will be to support the Board in building and securing the future of JOIFF – more information on this will follow soon.

On the Shared Learning front, JOIFF will be staging a one-day Foam Summit in February 2020 and more information is available on the JOIFF website. Our intention is also to follow this event up with regular quarterly webinars, where we will strive to involve all members via the internet. Watch this space for more information.

I would also like to invite all JOIFF members to participate in the Shared Learning drive that forms one of the pillars of JOIFF – all members are in need of continuous learning and this invitation is directed to all the JOIFF Members.

I trust that you will find the new edition of the Catalyst both appealing and that the contents will add to our Shared Learning Pillar for all members.

The JOIFF Board of Directors wishes all its members a prosperous 2020 and may JOIFF grow from strength to strength by the active involvement of all our members.

Kind regards,

Pine Pienaar

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Chairman JOIFF Board of Directors.

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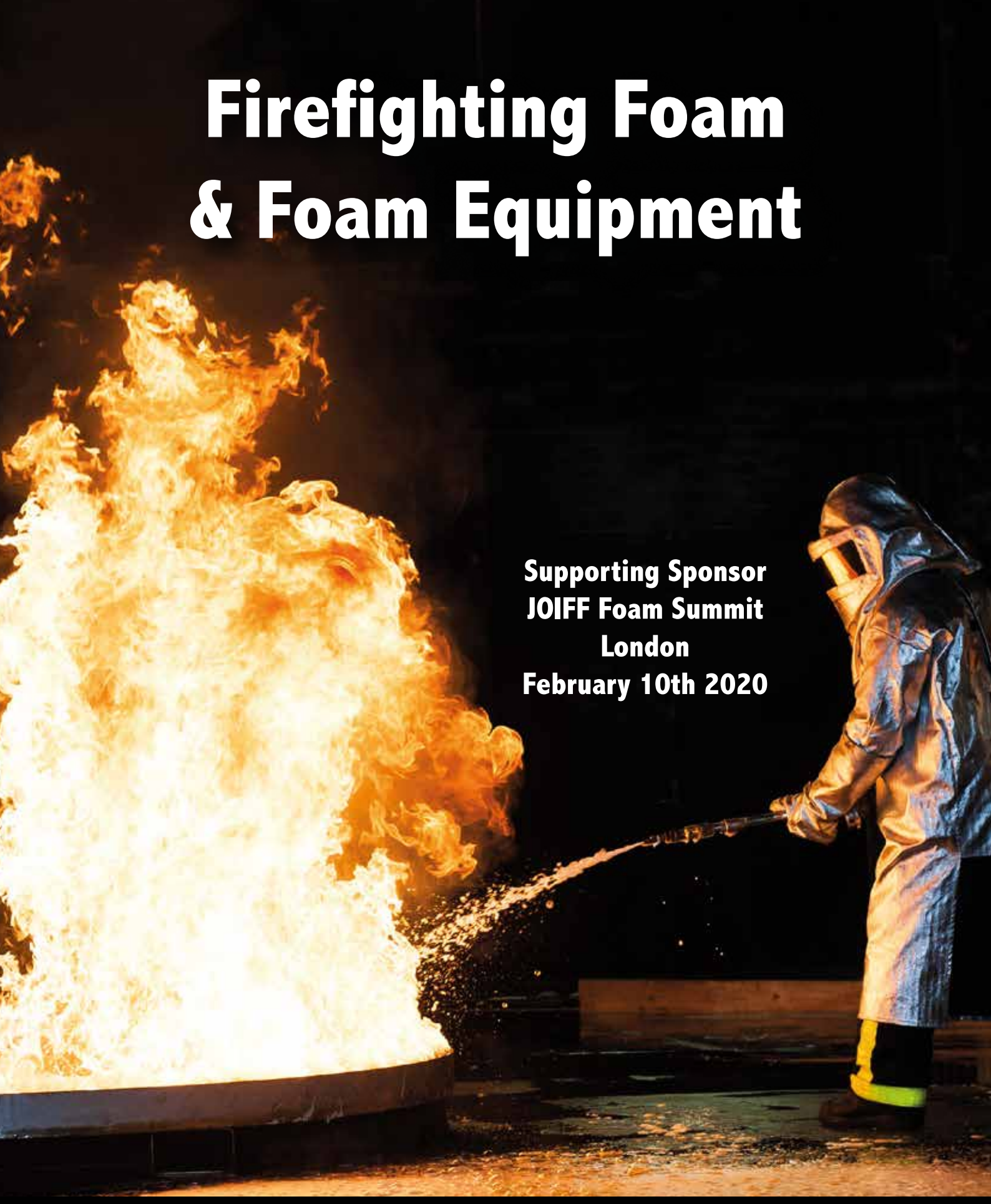

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CONTENTS

5 - 23 FOAM FEATURE

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SHOULD WE BE TRUSTING SMALL-SCALE FIRE TESTS TO PROVIDE ADEQUATE LIFE SAFETY?

by MIKE WILLSON

EDITOR'S NOTE:
The Catalyst is happy to publish this article submitted by Mike Willson and we would like to emphasise that the article is the author's position and opinion and JOIFF is completely neutral and does not hold a position on Foam.

Are we over-reliant on small scale fire testing approvals? Are they providing adequate realistic re-assurances of public safety, in our firefighting foam decision making? Some are beginning to question their relevance, and how far we should be trusting some small tests with capability of still protecting life from death - under the harsh and demanding conditions of a major fire incident. Have we eroded safety margins to a point where lives are now at unexpectedly increased danger?

Some fire test approvals are rigorous, robust, challenging and go beyond the minimal - probing potential and evident problems that could occur in the line of duty. A classic example is US MilSpec, now in latest 2017 PRF 24385F (SH) w Amndmt2 form, allowing Fluorine Free Foam (F3) to be accepted - providing they overcome the challenges presented and pass all tests. MilSpec's 2017 declared objective: "acquire and use a non-fluorinated AFFF that meets performance requirements of US Department of Defense, which it is researching to that end, but a viable solution may not be found for several years." MilSpec was driven by desires of avoiding repetition of 1967's terrible USS Forrestal disaster, when tragically 134 servicemen died, 161 injured, 21 planes destroyed and 40 damaged. The F3 used had multiple agency approvals, but no inherent fuel repellency and limited vapour suppression (just like modern F3s), so was unable to control the fire before munitions caused mayhem. It hastened effective AFFF development to prevent such tragedies recurring. Have we taken notice?
MilSpec, born during that intense development, minimises risk of failure - before approval, providing regulators and foam users robust confidence of effectiveness and reliability - to save lives. Numerous realistic variables are tested under tough conditions of low application rates; fresh and salt water; reduced strength effectiveness; compatibility with dry powder (plus other foam agents); and speed of action on volatile fuels. A range of secondary considerations are also included - corrosion resistance; storage stability; aquatic toxicity; biodegradability and oxygen demand - factors aiming to ensure minimised environmental harm from its emergency use – which F3s seem unable to meet. The Federal Aviation Administration's (FAA) Technical Center 1994 report confirmed "It was demonstrated, using comparative data from numerous small – and large-scale fire tests, that the small-scale MilSpec fire tests correlate with large scale test results." Large-scale means fire areas of 16,000ft2 (1,486m2) using Jet A fuel at application rates of 0.05gpm/ft2 (2.03L/min/m2), delivering average control times from multiple tests of 28 secs for aspirated, and 24 secs for non-aspirated nozzle delivery. Averaged control application densities achieved were 0.023gal/ft2 (0.94L/m2) and 0.02gal/ft2 (0.81L/m2) respectively.

IS PASSENGER SAFETY BEING COMPROMISED?

Although MilSpec qualification is required to protect passengers at all US airports, most of the world seems accepting of a far less challenging International Civil Aviation Organisation (ICAO) test standard at Level B or Level C. Why? NFPA 403:2018 extends the former 2 min response time to 3 min and even misleadingly suggests ICAO Level C is somehow equivalent to MilSpec, without any justification – similarity of application rate is where equivalency seems to end, as the comparative data in Table 1 confirms.
ICAO's fire test standard only requires a single freshwater fire test close to 15°C, without repetition to pass. Latest 2014/15 ICAO amendments also seemingly erode safety margins by extending extinction time from 60 secs to 120 secs, allowing persistent edge flickers prohibited in most foam approval tests. Previously unacceptable foams now pass. If passengers, crews, airport personnel, and firefighters were surveyed, would they really be willing to compromise their personal safety just to allow use of lower quality but non-fluorinated foams in life-threatening fire events? ...Would you be willing to take that risk?

Criterion	US Mil F 24385F 2017 spec. (3%)	ICAO 2014 revision Levels B and C (3%)
Fire tray shape and area	Circular 28ft² (2.6m²) and Circular 50ft²† (4.64m²)	Level B: 4.5m x 4.5m Level C: Circular 7.32m²
Fuel type – fire test	Unleaded gasoline	Jet A1 or Kerosene
Fuel type – burnback pot	Unleaded gasoline (1 Gal, 3.8L)	Gasoline or Kerosene (2L)
Fuel quantity	10 gals (37.85L, no spec water base) -28ft²; 15 galls (56.77L) - 50ft²	Level **B**: 100L fuel Level **C**: 157L fuel (over equal water bases)
Foam nozzle & flow rate	Mil spec 2 gal/min (7.5L/min) Modified Std nozzle	UNI86, 11.4L/min Special high performance nozzle
Nozzle pressure	100psi (7 bar)	6.3-6.6 bar
Concentrate storage stability (pre-fire test)	10 days @ 65°C	NR
Application density (small)	0.07g/ft² (2.92L/min/m²) 28ft² (fresh and saltwater)	Level **B**: 2.5L/min/m² (single freshwater test only)
Application density (large)	0.04g/ft² (1.64L/min/m²) 50ft²‡ (saltwater only)	**Level C:1.56L/min/m²** (single freshwater test only)
Ambient/ foam temps.	23°C±.5°C (ie.17-28°C)	≥15°C (*some certs. show 0°C*)
Nozzle movement	Complete freedom of movement	Fixed position
F and F-free allowed	Yes	Yes
PFOS & PFOA analysis	Measured	NR
Total Fluorine content	Measured	NR
Foam % tests	3%; 1.5 % (lean)‡†; 15% (rich)*†	3% only
Fire pre-burn time	10 secs	60 secs
Foam water quality	Fresh & Sea ‡	Fresh only
Foam application time	90 secs	120secs
Total extinction (pass)	30 secs (3%), 45 secs (1.5%) 55 secs (15%), 50 secs 50ft²	120 secs
Burnback pot size/fuel (both centre tray)	0.3m dia, 50mm tall, 1 gal ULG (3.785L)	0.3m dia,200mm tall, 2L ULG/Kerosene
Burnback pot ignition time	60secs end foam application	120 secs end foam application
Burnback re-involvement (pass)	≤25% tray in 6 mins (3%)#, 5 mins (1.5%)#, 3.3 mins (15%)* 6 mins (50ft²)*	≤25% tray in 5 mins (single freshwater test only)
Total fire tests to Qualify/Certify as Passed	7 Fire extinctions & burnbacks, fresh and seawater, after 10 day 65°C	1 (fire extinction & burnback – freshwater only)
Film, sealing, corrosion, compatibility, storage etc.	✓	NR
Compatibility with Dry Chemical fire test	≥6 mins burnback	NR
Aquatic toxicity test	LC50 ≥500mg/L	NR
Biodegradability, BOD/COD	20 day Biodeg. 65% COD ≤1,000k mg/L (3%)	NR
Strict drum & label spec.	✓	NR
Qualified Agent Database	✓	NR

Table 1: Comparison of 3% foam requirements for 2017 MilF Spec. v the latest 2014/15 ICAO Levels B and C. fire test.

The implications are evident in 2012 Danish Research Institute independently witnessed ICAO Level B fire testing. Despite some ICAO Level B approved F3s being tested, all failed the test. Using a modified Military specification nozzle (MMS) more accurately replicated the foam quality from most ARFF delivery devices, but results were generally worse. However, these same results assessed under the 2014/15 ICAO changes allows four F3s to now pass, becoming approved for aviation use around most of the world. How does that improve life safety?

FAA in its Jan.2019 national Cert-Alert confirms "The FAA is committed to ensuring safety at our nation's airports, while also balancing environmental concerns. The FAA and other organizations continue to conduct

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TRUSTING SMALL-SCALE FIRE TESTS CONTINUED

research on fluorine-free firefighting foams." It also cautions that "Currently, the fluorine-free foams on the market do not match the performance of their fluorinated counterparts, and they require more agent to extinguish fires quickly. Fluorine-free foams are not able to provide the same level of fire suppression, flexibility, and scope of usage as MIL-PRF-24385 AFFF firefighting foam." FAA is constructing a new research facility to find environmentally acceptable alternative agents, without compromising existing MilSpec levels of safety.

A recent Aug. 2019 Australian Senate Inquiry's Report into the provision of rescue, firefighting and emergency response at Australian airports recognised these concerns "The committee was alarmed by the evidence regarding firefighting foams, and the fact that the foams in use at Australian airports may not have been tested to Australian standards. The committee notes that ICAO's international framework for testing foams may not be suitable for the conditions at local aerodromes."

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)

Test No.	Nozzle	95% CONROL	99% CONTROL	EXTINCTION	25% BURNBACK	PASS/ FAIL	NOW under 2014 ICAO Level B (Jet A1) Criteria	NOW under 2014 ICAO Level B + Kerosene?
SOLBERG - RF6								
3	UNI86	0' 35"	0' 45"	None	N/A	FAIL	FAIL	PASS
4	MMS	0' 30"	0' 45"	1' 58"	(6' 45")	FAIL	PASS	PASS
DR. STHAMER - Moussol FF 3/6								
9	UNI86	0' 40"	0' 45"	1' 24"	(7' 50")	FAIL	PASS	PASS
10	MMS	0' 35"	0' 55"	None	N/A	FAIL	FAIL	PASS
SOLBERG - RF3								
35	UNI86	0' 50"	1' 05"	2' 00"	(8'30")	FAIL	PASS	PASS
36	MMS	0' 50"	1' 45"	None	N/A	FAIL	FAIL	PASS
FOMTEC - Enviro 3x3 Plus								
38	UNI86	0' 55"	1' 05"	1' 40"	(9' 50")	FAIL	PASS	PASS
BIOEX - Ecopol								
37	UNI86	0' 40"	0' 55"	1' 50"	(8' 05")	FAIL	PASS	PASS

MMS (Modified Military Specification); FXR (Foam Expansion Ratio); QDT (Quarter Drainage Time); CT (Control Time); EXT (Extinguishment Time); BB (Burnback Time).

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) some would now PASS.

Submissions highlighted ICAO's fire tests don't reflect summer temperatures at half Australia's 26 ARFF airports, experiencing 184 days at or above 40°C across the nation, during 2018.

It recommends the regulator "Civil Aviation Safety Authority [CASA] implement a testing program for the firefighting foams in use at Australian airports, in accordance with International Civil Aviation Organization guidelines. The testing should take place under conditions unique to Australia (such as higher ambient temperatures), to establish whether the foams operate effectively to extinguish aviation fires." in the interests of the travelling public's safety.

This Inquiry concluded "The vital role of aviation rescue and firefighting services in keeping flying passengers and crew safe should not be underestimated. A properly resourced and trained ARFFS is critical in optimising the chances of survival for travellers and crew, should the worst happen in an aviation accident." The impact of these recommendations should extend far beyond Australia, as many airports worldwide see summer temperatures exceed 35°C.

Recent US Naval Research Laboratory (NRL) findings are similarly concerning. Substantially divergent extinguishment results for four commercial F3s were found on gasoline compared to easier extinguishing heptane. Fluorinated foams deliver similar results on both fuels, but not F3s. This has disturbing implications for major international fire test standards using heptane, but intended as a comparative "read-across" for gasoline, including EN1568-3; UL162, FM5130; Lastfire etc. Using F3 heptane approvals for gasoline hazards could be placing everyone in unexpectedly increased danger – right now. NRL cautions "It is likely to involve significant out-of-the-box thinking & chemistry, particularly if one tries imitating some of fluorocarbon surfactant's more important properties." ...Like fuel repellency. Shouldn't we have known?

UK's 1988 Fire Research Station research echoed these concerns "Increasing vigor of application can change a promising-looking foam into an ineffectual one." It also found "Other test methods, including the widely used Underwriters Laboratories [UL162] use heptane, where although consistency should be good, severity and realism are open to question. ...In the case of firefighting foams, reproducing severe conditions calls for much higher impact velocities than those found in existing standards. ...Realism also calls for fuels in common use or fuels formulated to simulate them. Final judgement of a foam's effectiveness should be made on a full-scale "severe" version of a test, which in turn bears limited resemblance to the typical demonstration." MilSpec has done this... which others have? Incorrect assumptions of equivalency, both between gasoline v heptane, and test v commercial nozzle velocities, have worrying implications for public safety.

Despite recent F3 improvements, C6AFFFs work fast, reliably, flexibly to control all hydrocarbon fuels similarly effectively, providing exceptional re-ignition resistance, minimising potentially carcinogenic smoke and breakdown products affecting firefighters and nearby community health. C6AFFFs also reduce foam usage, minimise run-off, reduce containment overflows potentially causing major pollution when F3s are used - as occurred at Melbourne's Footscray Aug. 2018 chemical factory fire disaster.

Why do we still blindly trust everyone's life safety to such potentially "shaky" mediocre small-scale fire tests, which increasingly seem inadequate at representing realistic "worst case" incident scenarios, we are likely to face? Is it complacency? Do some see achieving "approval" as the end-game, ...rather than just indicating likely ability?

When it all starts unravelling, reliable foams that work quickly, effectively, efficiently - whatever the conditions, become essential. So "fair-weather" foams surely have no place in any firefighter's tool-box – when the cost could be heavy - in lives?

Bureau of Meteorology 2018 Max temps and days above 40°C recorded at Australian Airports.

Location	2018 MAX. temp. recorded (°C)	2018 Days above 40 °C
BRISBANE	38.1	0
Cairns	42.6	3
Townsville	41.7	2
Mackay	39.7	0
Rockhampto	41.5	5
SYDNEY	43.7	3
CANBERRA	40.6	1
MELBOURNE	42.4	1
ADELAIDE	41.4	4
PERTH	40.9	1
Newman	46.7	51
Karratha	43.4	21
Port Hedlanc	45.3	47
Broome	42.3	2
DARWIN	37.3	0
Alice Springs	45.9	43
Total 2018 Days >40 °C		184
Key:	>40°C	>37°C

EDITOR'S NOTE:

Mike Willson BSc Hons, MCIM 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 coordinated 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

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EVALUATION OF THE FIRE PROTECTION EFFECTIVENESS OF FLUORINE FREE FIREFIGHTING FOAMS - SUMMARY REPORT

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The Fire Protection Research Foundation (FPRF) contracted Jensen Hughes and the Naval Research Laboratory (NRL) to conduct an experimental program to assess the firefighting capabilities of fluorine free, Class B firefighting foams on fires involving hydrocarbon and alcohol-based fuels.

The objectives of this study were to determine the fire extinguishment and burnback times for five fluorine free foams (FFFs) and one short chain C6 Aqueous Film Forming Foam (AFFF) formulation (for baseline) as a function of application rate (gpm/ft 2) and foam discharge density (gal/ft2) for a range of test parameters including foam quality/aspiration,fuel type, water type and fuel temperature. The data provides a general characterization of the firefighting capabilities of FFFs as a "Technology" or a "Class" of foams for use in standards making decisions.

The deliverables from this project were used to provide guidance for foam system application standards (e.g., NFPA 11: Standard for Low–, Medium–, and High–Expansion Foam) and to identify any future research needed to further understand their capabilities and limitations. The assessment was conducted as a blind study where the foams were given generic names and the manufactures of the foams are not identified.

The experimental approach consisted of conducting a parametric assessment of the critical variables that could affect the fire protection performance of new foam formulations using the Underwriters Laboratories UL 162 –Standard Foam Equipment and Liquid Concentrates as basis for the investigation. Per UL 162, FFFs fall under the broad category of "Synthetic (S)" Foams. UL 162 defines a "Synthetic" foam as one that has a chemical base other than a fluorinated surfactant or hydrolyzed protein. Since UL 162 was used as the basis of this assessment, the test parameters for "Synthetic" foams were used throughout this assessment. It should be noted that UL does not verify the composition of the foam concentrate, nor does it assess the fluorine content of the foam (at least not at the time that this report was written).

During the current revision cycle of NFPA 11, a new category of foams was proposed to address these new formulations (i.e., SFFF; Synthetic Fluorine Free Foams). Since this category / NFPA 11 was still in draft at the time this report was written, the fluorine free foams included in this assessment were still referred to as FFFs but would fall under the SFFF category if adopted by NFPA 11. The variables assessed during this program included the following:

- Two Discharge Types: UL Type II with polar solvents and UL Type III with other fuels;
- Six Foam Types (all UL Listed) : one Alcohol Resistant C6 AFFF (AR-AFFF), three Alcohol Resistant FFFs (AR-FFF1, AR-FFF2 and AR-FFF3) and 2 hydrocarbon listed FFFs (H-FFF1 & H-FFF2);
- Four Fuel Types: Heptane, Gasoline (MIL SPEC and E10) and Isopropyl Alcohol (IPA);
- Fuel Temperature: Ambient Temp.60 oF and High Temp. 85oF;

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The tests were conducted in two series. The first test series (Series I) focused on assessing the capabilities of these foams at a representative lower foam quality/aspiration (foam quality representative of a non-aspirating discharge device). The second series (Series II) was added to re-assess the foams at a representative higher foam quality/aspiration (foam quality representative of an aspirating discharge device). One hundred sixty-five tests were conducted during this assessment. As a general observation, the results of these tests were consistent with UL listed values with a limited number of exceptions.

To summarize the results, the baseline C6 AR-AFFF demonstrated consistent/superior firefighting capabilities through the entire test program under all test conditions.

For the FFFs in general, the firefighting capabilities of the foams varied from manufacturer to manufacturer making it difficult to develop "generic" design requirements. This may also be the case with AFFFs but only one was tested during this program (i.e ., no data to assess variability). The AR-AFFF performed well against all test fuels included in this assessment (IPA, Heptane, and Gasoline (MILSPEC and E10). The FFFs did well against heptane but struggled against some of the scenarios conducted with IPA and gasoline (both MILSPEC and E10), especially when the foam was discharged with a lower foam quality/aspiration.

The FFFs required between 2-4 times both the rates and the densities of the AR-AFFF to produce similar results against the IPA fires conducted in with the Type II test configuration. During the Type III tests, the FFFs required between 3-4 times the extinguishment density of the AR-AFFF for the tests conducted with MILSPEC gasoline and between 6-7 times the density of the AR-AFFF for the tests conducted with E10 gasoline. From an application rate perspective, the FFFs typically required between 1.5 to 3 times the application rates to produce comparable performance as the baseline AFFFfor the range of parameters included in this assessment.

When comparing the capabilities of the AR-FFFs and the H-FFFs, the H-FFFs typically demonstrated better capabilities. In general, for the tests conducted with the lower aspiration, the extinguishment densities for the AR-FFFs were about twice that of the H-FFFs. This difference was reduced through the use of the higher aspirated foams during Series II. For the tests conducted with the higher aspirated foams, the extinguishment densities for the AR-FFFs were, on average about 1.5 times that of the H-FFFs. However, the AR-FFFs required a higher flow/application rate than the H-FFFs against the E10 fires to achieve those results.

When comparing capabilities of the AR-FFFs to the H-FFFs, the AR-FFFs required about twice the application rate to produced similar capabilities as the H-FFFs for the lower expanded foam and about 1.5 times the rate for the higher expanded foam. Consequently, the use of higher aspirated foams reduced the differences in capabilities between the two types of FFFs (i.e., alcohol resistant V and hydrocarbon FFFs). With respect to FFF types , the original two AR-FFFs (AR-FFF1 and AR-FFF2) demonstrated similar firefighting capabilities and typically required about three times the application rates of AR-AFFF to produce comparable performance for the lower aspirated foams. For higher aspirated foams, the AR-FFFs required about twice the application rates of AR-AFFF to produce comparable performance. The third AR-FFF (AR-FFF3) added at the start of Series II did about 25% better than the original two AR-FFFs but could not be included in every comparison due to a limited data set.

There was some variation in capabilities between the two hydrocarbon FFFs with H-FFF2 requiring between 25%-50% more agent (application rate) than the AR-AFFF for the lower aspirated foams and about 15%-30% more agent (application rate) than the AR-AFFF for the higher aspirated foams. H-FFF1 required between 50%-100% more agent (application rate) than the AR-AFFF for the lower aspirated foams and about 30-40% more agent (application rate) than the AR-AFFF for the higher aspirated foams.

With respect to elevated fuel temperatures, the results were consistent over the range in ambient/fuel temperatures included in this assessment. With that said, it is understood that fires involving boiling flammable liquids are much harder to extinguish than fires that are combatted prior to the transition into boiling.

The type of water (i.e., freshwater versus saltwater) had minimal effect on the firefighting capabilities of the FFFs and varied between foams.

In summary, the results demonstrate that FFFs have come a long way but there is still a lot more to learn about their capabilities and limitations (although there is a lot of promising data). As of today, FFFs are not a "drop in" replacement for AFFF.

However, some can be made to perform effectively as an AFFF alternative with proper testing and design (i.e., with higher application rates/densities).

Due to its oleophobic properties, AFFF has two separate mechanisms that combine to aid in the extinguishment of a flammable liquid fire; a water/
surfactant film that forms on the fuel surface and a foam blanket(i.e., matrix of bubbles) which both serve to seal-in the flammable vapors resulting in extinguishment (i.e., shutting off the fuel vapors that are burning above the fuel surface). FFFs have only the foam blanket to seal - in the vapors. As a result, the capabilities of FFFs will be highly dependent on the characteristics of the foam blanket (which depend on the associated discharge devices as well as the foam type itself).

The film produced by AFFF has provided an additional level of protection for systems and discharge devices that do not produce aspirated foam.
Additional attention will need to be given to the discharge devices identified as
part of the UL listing when fielding these foams.

Additional discussions on aspiration and foam quality in general are being added to NFPA 11.
It was recommended that the tested/listed foam qualities (i.e., expansion and 25% drainage) be included on UL listing data sheet(s).

Additional research is currently being conducted by other organizations to identify a range of optimal foam properties (which may be manufacturer specific). The results also show that the legacy fuel (heptane) used to list/approve foams, may not be a good surrogate for all hydrocarbon-based fuels. Specially, some foams struggled against other fuels (like gasoline) as compared to heptane. Going forward, it was recommended that FFFs be tested and listed for a variety of hydrocarbon fuels (e.g., gasoline, E10, Jet A, etc), similar to approach currently used for polar solvent listings /approvals.

Ultimately, end users will need to design and install within the listed parameters in order to ensure a high probability of success during an actual event. This applies to the not only to the discharge devices but also to the proportioning systems as well (due to the highly viscous nature of some
of the FFF concentrates).

The full 92 page report can be found in the "News & Research" Section www.nfpa.org

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INTERNATIONAL RESEARCH PROJECT INTO MUTUAL AID ORGANIZATIONS: 'VISIBILITY' INCREASES APPRECIATION

by: KEES KAPPETIJN and PHILIP STOHR

For three years, Kappetijn Safety Specialists (KSS) has been conducting an international research project into Emergency Response Mutual Aid for JOIFF. How widespread are mutual aid organizations in the world? How are they organized? What are the experiences, in terms of governance, financing, operational effectiveness, and added value for the partners involved? Lessons and best practices from which the members of JOIFF can benefit. A glimpse of the findings of the research project: the appreciation from stakeholders for a mutual aid initiative increases the more the initiative offers secondary and facilitating services to the stakeholders involved. Also it appears that more specialization requires a larger scale.

KSS started in 2016 with the research project, for which JOIFF provided access to its worldwide network. Through various appeals the members were asked to lend their assistance. Additionally, several prominent mutual aid organizations were visited to get a closer look at their organizational structure and work methods. Some of the cases of the research project were the national SMC-network for tank firefighting in Sweden, BP in Geel (Belgium), Shell and Lyondell in Wesseling (Germany), Nesté in Finland, the industrial area of Sohar in Oman, FER (the emergency response organization of the MOL refineries in Hungary), OMV Petrom in Romania, Wilton International in Teesside, and Essex Petroleum Mutual Aid (EPMA) in England.

COLLABORATION IN INDUSTRIAL CLUSTERS

The initiative for an international comparative research project came from the developments in the field of industrial emergency response in the Netherlands over the last few decades. Since the first public-private mutual aid emergency response team saw the light in the port and industrial area of Rotterdam in 1998, similar mutual aid firefighting organizations have been established in other industrial areas. Like the Amsterdam Mutual Aid System and Amsterdam Ymond Mutual Aid (AMAS-AYMA), the fire service in the Port of Moerdijk, the private fire service of Sitech for the industrial cluster Chemelot in Geleen, and, more recently, the Unified Industrial Fire and Rescue Service Amsterdam, which will become operational in the first quarter of 2020 in the Port of Amsterdam. A remarkable similarity between the Dutch initiatives is the acknowledgement of the parties involved that they are better able to provide a specialized industrial emergency response organization tailored to the risk profile of the area by combining their powers. In the Netherlands, a government party is often involved in the mutual aid initiative alongside the collaboration between the companies. In almost all cases it concerns clustered industrial zones, among which a few port areas, that have comparable safety and security issues. Think of issues concerning business continuity, a stable investment climate, the safety of the surrounding area, and the public health.

The Dutch examples concern port and industrial areas with strong interconnections of their corporate processes and logistical chains, where the companies and the government are already dependent upon each other (for example with issues concerning area management, infrastructure, traffic, and transport). By extending that collaboration into the themes of safety and fire care an effective firefighting organization can be maintained for a lower cost that can focus on both public and industrial (often maritime) fire care. With better safeguards for preparedness, operational strength, and quality than if the companies settled in the area and the authorities were to invest in these issues separately.

The research project attempted to gain an insight into as many possible mutual aid initiatives across the world as possible, in order to better evaluate and evolve this type of collaboration. Which similarities and differences are there between countries, which types of mutual aid models can be distinguished, and which factors decide why a chosen collaborative model is or is not successful in a certain area? A part of the research project was conducted in collaboration with the Dutch Institute for Physical Safety, which was looking for the Dutch models and their underlying benchmark for its Transport & Energy Safety Lectorate. The results of the KSS research project will be presented in a whitepaper, which will soon be made available to the members of JOIFF.

SEVEN INVESTIGATED THEMES

The research project, conducted across the period 2016-2019, covered seven themes. To start, factual information about the participating mutual aid organizations was inventoried, in order to compose a fact-file of every organization. Name and geographical location of the collaborative agreement, information about the size and nature of the site, the business activities, and the risk profile. After that, information was gathered on the partners involved, the size of the organization, the manner in which the mutual aid initiative is governed and supervised, and the

IPEN Mis-Information

"the best F3 products on the market are able to match the performance of many MIL-Spec foams"

– **R.A. Klein, MD, PhD, Corresponding Author**
IPEN POPRC-14 Report
September 2018

US Navy Information

"We need to come up with fluorine-free foam. But what's available now can't meet (MIL-) specification."

– **John Farley, Director of Fire Test Operations**
US Naval Research Laboratory (NRL)
C&EN "The price of fire safety" January 14, 2019

As a result of the US EPA's voluntary 2010/2015 PFOA Stewardship Program, a total of fourteen (14) C6 AFFFs are currently on the US MIL-F-24385 Qualified Product List (QPL).

Current F3 Foams have not only failed US MIL-spec fire performance and key properties such as compatibility, but also failed ICAO level B fire tests at 32° C and higher ambient temperatures.

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financial allocation at the foundation of the collaboration. The research project also looked at whether other tasks were executed aside from operational industrial fire care to the benefit of the partners, and whether there have been investments in a quality management system with norms and guidelines as a safeguard for the quality and continuity of its service provision.

RESULTS OF THE RESEARCH PROJECT

One remarkable observation is that the Netherlands has comparatively many instances of mutual aid organizations in which the government is more or less involved (public private partnerships). Outside of the Netherlands companies are more likely to uphold a collective emergency response organization among themselves, without the involvement of the government. In some cases, the law appears to put restrictions on collaboration between authorities and businesses. Moreover, a limited amount of trust between the government and the industry, as well as the local culture, can play a role in the possibilities and the goodwill of parties to enter into a collaboration.

Another important finding is that there is no blueprint for organizing industrial fire care based on mutual aid. The possibilities and conditions for companies and authorities to work together are different everywhere you look. Apart from rules and regulations on a national level, issues like geographical location, infrastructure, and the availability of means and manpower decide the reach of a collaboration and which mutual aid model fits best to the risk profile and the safety requirements in the area. It is always a custom job!
In all investigated cases, it seems most important that the partners have an aligned vision for safeguarding the safety in the area. Parties have to dare to look across their own boundaries do discover the added value of collaboration. A strong commitment from the boards of directors of all partners is indispensable for the mutual aid organization to succeed. The involvement of a partner with a neutral profile towards the mutual aid can help connect the other parties.

Where the Netherlands seems to be unique is in the amount of integration of the collaboration. Multiple mutual aid organizations in the Netherlands have a completely interwoven structure in terms of execution, supervision, financing, and governance. One theme here is never up for discussion: the operational lead during a deployment always lies with the safety authority and the mayor. Often, added value can be created when the reach of the mutual aid initiative isn't limited to the execution of emergency response, but other tasks and activities also fall under the collaborative agreement. The added value of a mutual aid organization increases as the organization becomes more 'visible' to the partners involved and offers them a peace of mind through other forms of service provision. Think of tasks like training and practicing with the internal emergency services of the participants, maintenance (checks) of fire water mains and fire safety systems, and (support in) drafting response plans and a company's emergency plans.

Finally: size matters. The more a mutual aid organization performs tasks with a higher level of specialization, size starts to play an important role. For instance, investing in specialized materials and teams for hazardous incident control or facilities for large-scale and complex firefighting (e.g. tank and bund firefighting) requires the working area to be of such a size that those tasks can be executed in a cost effective manner, while maintaining quality and continuity.

Parallel to the mutual aid research project for JOIFF, KSS performed a benchmark project in the spring of 2018 for the Port of Rotterdam, in which they compared the public private interpretation of the industrial emergency services of the Unified Fire and Rescue Service Rotterdam with Emergency Response Mutual Aid organization in other international port and industrial areas.
At the request of the Port of Rotterdam, KSS compared the Rotterdam model with the working methods in the ports of Antwerp, Hamburg, Singapore, and Houston. The analysis showed some great variation in terms of organizational and financial models. In Houston, the participants in CIMA (Channel Industries Mutual Aid) individually keep up their own organization, including vehicles and materials. CIMA provides protocols and procedures for operational collaboration during large scale disasters and assistance with additional coordination capacities and overarching deployment of individual capacities. In Antwerp, Seveso companies pay extra taxes with which the government can prepare itself for large-scale calamities with plans, extinguishing agents, and large-scale materials. And in Singapore, the government works with an instrument similar to the Dutch fire service assignment in order to place so-called CERT's (Company Emergency Response Teams) on locations with a special risk profile (among which industry). Companies are then still mandated to organize their own fire service capacity, which they in turn fulfil individually.
KSS provided support to the vision of safety of the Port of Rotterdam with this benchmark project. A bonus was a renewed motivation to start looking at other ports: RTFC/Corpus Christi, SMC/Sweden, and Amsterdam where a public private partnership will kick off in 2020. The leading argument for contributing to a collective emergency response organization by companies is that companies who participate in it can count on a higher level of safety, thanks to a trained, professional, and specialized firefighting organization that knows the company and its processes well, and regularly trains together with the corporate emergency service. Moreover, companies in Rotterdam that have been legally appointed to uphold a private fire service, can now get by with a less involved 'personal' fire service and can instead maintain a first response unit, because any other deployments will be performed by the mutual aid organization.
So fully integrated as the Port of Rotterdam is now organized is hardly the norm in other ports. The steps taken there have essentially resulted in eight fire stations with specialized materials and a highly trained and guaranteed occupation, instead of 50 if everyone would have organized their own emergency services. Other ports are keeping a keen eye on Rotterdam in that regard.

FRAME BY:

ALAN DIRKS
(Program Manager Policy & Planning at Port of Rotterdam)

KEES KAPPETIJN & PHILIP STOHR
Benchmark project for Port of Rotterdam.

Accredited by JOIFF

5-day training | May 25 to 29, 2020

Advanced Industrial Firefighting

H2K organizes 5-day training courses on Advanced Industrial Firefighting. The JOIFF-accredited training program is designed for those who have to deal with or have responsibility for emergency response in industrial settings and organisations, such as refineries, chemical plants, pharmaceuts, agrochemicals, food industries, etc.

The course is a blend of theory, workshops, demonstrations and practical firefighting (ratio theory-practice is 40/60). The program focuses on advanced principles of emergency response in industrial incidents, and providing a vision on different approaches.

Spinel Training Centre is one of the course locations. This fire training centre in the vicinity of Rotterdam, offers a wide variety of training objects. All common industrial incident scenarios can be trained under realistic conditions.

Practical Information

Course duration:	5 days (Mon to Fri)
Dates:	May 25 to 29, 2020
Location:	The Netherlands
Requirements:	Basic understanding on industrial firefighting

More information on the training program and a subscription form can be found at www.h2k.nl

Course Topics:

- Advanced principles on industrial firefighting and industrial emergency response.
- Challenges related to (petro) chemical terminals and hydro carbon products.
- A vision on emergency response and priority setting during incidents.
- Credible scenarios and the different response strategies.
- Fixed firefighting systems and extinguishing agents.
- Cooperation with municipal fire brigades.
- Actual lessons learned and common dilemmas in incident response.

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PROPORTIONING TECHNOLOGY FOR HIGH-VISCOUS (FLUORINE-FREE) FOAM AGENTS: THINGS TO CONSIDER

FOAM FEATURE

The success in firefighting depends, to a great extent, on the correct proportioning and handling of foam agents which are used in fire extinguishing systems. Special attention must be paid to the foam agents' physical properties – most prominently, to their viscosity. Highly viscous foam agents have some special requirements to proportioning technology in the course of this.

ABOUT THE AUTHOR

Ingo Weiss is the Head of Sales at FireDos, an expert on foam agent proportioners. "The viscosity of foam agents is important because it has a major influence when selecting the proportioning system," he explains.

The higher the viscosity, the less fluid is a liquid. The lower the viscosity, the more fluid it is. With the viscosity of foam agents, it is distinguished between - Newtonian fluids, e.g. the low-viscous extinguishing agents AFFF, HiEx, Class A and multi-purpose foam agents and - non-Newtonian fluids, i.e. pseudoplastic foam agents such as AFFFAR and FF (fluorine-free foam agents).

The foam agent to be selected depends on the type of intended use or the risk to be protected from. Is it about flammable solids or about fluids? Polar fluids require other foam agents for extinguishing than non-polar fluids do. Also, the depth of the fluid is one decision criterion.

High-viscous foam agents: Which proportioning technology is the right one? The viscosity of foam agents has a major influence on the correctness of proportioning. Highly viscous foam agents have a significantly higher pressure loss while flowing than low-viscous foam agents do. This rules many proportioning technologies out which are based upon pressure ratios. In turn, such proportioning technologies are suitable where the high-viscous foam agent is delivered by pumps. As air trapping is the biggest problem when handling high-viscous foam agents, displacement pumps are the only suitable pump type. Off-the-shelf barrel pumps do not qualify as too much air would be trapped during delivery. The high viscosity would prevent this air from escaping, making the foam agent useless.

Requirements to the foam agent pump: The suction line is what really matters. The foam agent's viscosity influences the pressure loss of a pump significantly while flowing through the suction line. The correct dimensioning of the suction line is therefore crucial for correct proportioning of the foam agent. When considering the most important operating parameters of a pump, the correlation between foam agent viscosity, pump suction capacity and the suction line diameter, becomes clear:

NPSH value: Every pump has a specific NPSH value, also referred to as suction capacity. The value can be taken from the manufacturer's datasheet. It depends on the pump type and the number of revolutions. Putting it simply, the NPSH value is the negative pressure or the pressure drop which the pump generates inside the suction nozzle.

Volumetric efficiency: Flow rate actually delivered in relation to flow rate theoretically delivered.

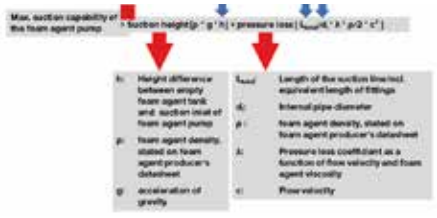
Dimensioning of the suction line for the foam agent pump: Two limitations must be considered when dimensioning the suction line: Firstly, the maximum permissible flow velocities; and secondly, the pressure loss in the suction line.

Flow velocity: Depending on their viscosity, foam agents have different maximum permissible flow velocities. For foam agents with a viscosity similar to water, which is independent of the state of movement (Newtonian fluid, e.g., AFFF foam agent), a flow velocity of 1.0 to 1.2 meters per second in the suction line should not be exceeded. For pseudoplastic foam agents with a viscosity depending on the state of movement (non-Newtonian fluid, e.g., AFFF-AR foam), a flow velocity of 0.6 to 0.8 meters per second in the suction line must not be exceeded. Exceeding the permissible flow velocities may lead to evaporation of foam agent components and the hazard of explosion-like increase in volume, showing as a pressure surge.

Dimensioning of the foam agent suction line: The suction line of a foam agent pump must be dimensioned in such a way to take pressure losses under different operating conditions into account:
- minimum / maximum expected water flow rate
- minimum / maximum expected foam agent temperature in the suction line.

When calculating the dimensioning of the foam agent suction line, several factors must be considered. This includes the height difference between the foam agent tank and the foam agent pump, the foam agent density, acceleration of gravity, the length of the suction line as well as the pressure loss coefficient as a function of the flow velocity and the viscosity of the foam agent, and finally the flow velocity.

The following factors for the suction line layout can be influenced:
- h, the height difference between foam agent tank outlet and foam agent pump inlet
- Ltotal, the length of the suction line
- di, the diameter of the suction line



No pressure loss calculation can be made without indication of viscosity since the pressure loss coefficient is calculated as follows:

$$Re = di * \frac{c}{\gamma}$$

Re Reynolds number
d_i Internal pipe diameter
c Flow velocity
γ Dynamic viscosity

For Re smaller than 2350 (laminar flow):

$$\lambda = \frac{64}{Re}$$

For Re larger than 2350 (turbulent flow):

$$\lambda = \left[2 * lg * \left(Re * \sqrt{\frac{\lambda}{2{,}51}}\right)\right]^{-2}$$

This formula can be used to calculate the dimensioning of the foam agent suction line between tank and pump.
However, not only the correct dimensioning of the suction line is crucial. To avoid faults in the delivery of the foam agent through the foam agent suction line, the following should be observed:
- The suction line should be constructed as easy, short and straight as possible. Non-steady piping layouts and blind lines should be avoided.
- Also, a common suction line for several tanks as well as a common suction line for several foam pumps should be avoided.
- In addition, attention should be paid that the foam agent tank connection and all fittings in the pipework have the same size like the suction line itself.
- Furthermore, the suction line must be vacuum-tight (no pressure test).

Conclusion

Viscosity is the most important physical property of a foam agent with regard to proportioning, and is decisive for its possible application in the case of a fire. Highly viscous foam agents can be applied efficiently only if the proper proportioning technology, based upon pumps, is used. The correct proportioning of a foam agent depends on the dimensioning of the foam agent suction line. Apart from the correct calculation of the dimensioning, many more parameters must be observed. In practice, it must be ensured e.g. by short and straight lines that nothing can compromise the delivery.

With GEN III, FireDos offers a complete proportioner type series for the delivery of highly viscous foam agents GEN III is a hydraulic-driven foam agent proportioner for firefighting.

The compact and sturdy system is suitable to handle all types of foam agents, even extremely high-viscous, alcohol-resistant and fluorine-free foam agents. In addition, GEN III allows cost-saving and eco-friendly testing of the proportioning rate while no foam is produced – no foam agent is used and no premix has to be disposed of.

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FOAM FEATURE

JOIFF FOAM SUMMIT 2020

"WHERE ARE WE NOW & WHERE ARE WE GOING?"

Radisson Edwardian Hotel at Heathrow Airport
Date: February 10th 2020
London, United Kingdom

On the 10th February 2020 JOIFF – The International Organisation for Industrial Emergency Response & Fire Hazard Management - will host the JOIFF Foam Summit at the Edwardian Radisson Hotel at Heathrow Airport, London, UK.

The JOIFF Foam Summit 2020 will provide an independent, balanced & holistic view of Fire Fighting Foam & the issues affecting Industrial Fire Fighting.

The Topics that will be presented & discussed by Global Industry experts at JOIFF Foam 2020 will include:

- FireFighting Foam Overview "Where Are We Now & Where Are We Going?"
- Effectiveness Of FFF In Industrial Operations
- Experience of Managing the Transition From AFFF to FFF
- Compatibility & Usability of FFF In Real Life Fire Conditions
- International Regulation/Risk/Liability – PFAS
- ARFF – Views and Case Studies
- High claims, clean-up costs and health problems of firefighters – do we know enough about F3 foam to be able to state that this cannot happen with F3 foam?
- Effectiveness of new foam during extinguishment, the application rates and application time, and the % of Foam concentrate required.
- Suppliers & Manufacturers Perspectives.

The JOIFF Foam Summit is part of the JOIFF commitment to provide and disseminate independent and unbiased information to JOIFF members and the wider High Hazard Fire Industry.

You are invited to register your attendance online – Please note that places are limited and offered on a "first come first served basis".
The JOIFF Foam Summit delegate place is free of charge to JOIFF Members.
Non JOIFF Members £125:00 per person and includes morning and afternoon refreshments and lunch.

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FOAM FEATURE

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LAUNCHES A NEW RANGE OF FLUORINE FREE FIRE FIGHTING FOAMS:

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With that vaPUREx® LV 1% F-10 is particularly suitable for forceful application onto petroleum products giving a fast and safe vapour suppression.

All products of the new vaPUREx®–line offer both a high environmental sustainability and high extinguishing performance: Its special formulation reduces formation of emulsions with the fuel and allows for direct foam application to non-polar fuels. The fine bubble structure and compact foam blanket reduces the danger of re-ignition of areas of the fire that are already extinguished.

vaPUREx® LV 1% F-10 is readily and 100% biodegradable. It is free of fluorine and silicon compounds, preservatives or other persistent or environmentally disadvantageous substances.

b) Dr. STHAMER's NEW vaPUREx® LV ICAO B 3% F-10 is a 100% biodegradable fire extinguishing foam concentrate designed for direct foam application on aviation fuels. It is type tested and certified in accordance with Annex 14 ICAO Level B. As vaPUREx® LV is a low-viscosity, newtonian liquid it can be used with all standard mobile and fixed proportioners up to its lowest usable temperature of -10°C. A sophisticated blend of active materials very effectively prevents the foam from forming emulsions with the fuel despite the absence of fluorinated chemicals. This facilitates effective vapour suppression and thus a fast firefighting success and good burn back stability.

All products of the new vaPUREx®–line offer both a high environmental sustainability and high performance: Its special formulation reduces formation of emulsions with the fuel and allows for direct foam application to non-polar fuels. The fine bubble structure and compact foam blanket reduces the danger of re-ignition of areas of the fire that are already extinguished. vaPUREx® LV ICAO B 3% F-10 is readily and 100% biodegradable. It is free of fluorine and silicon compounds, preservatives or other persistent or environmentally disadvantageous substances.

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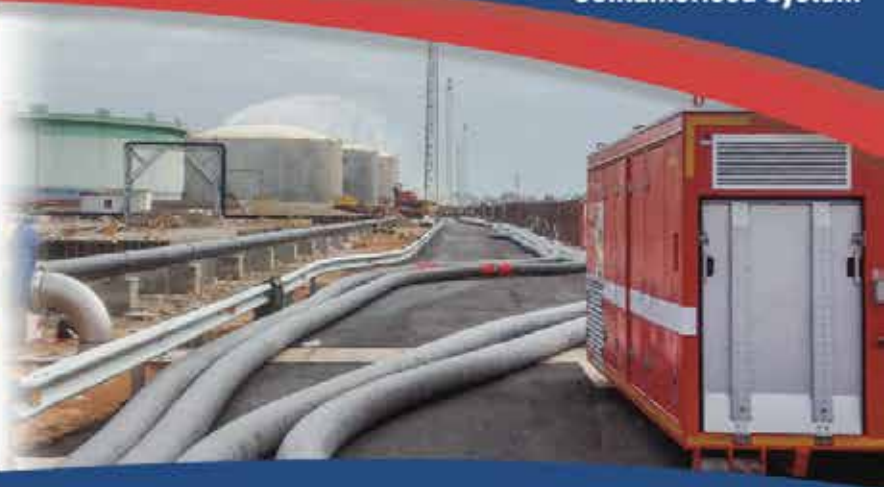

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FUNCTION PRINCIPLE AND THE IMPORTANCE OF KNOWING THE VISCOSITY OF THE CONCENTRATE.

FUNCTION PRINCIPLE
A water motor-driven pump system is a mechanical way of dosing firefighting additives into the water, without the need of external power or pressure balance.

FIREMIKS is such a system and it consists of two volumetric parts, one water motor and one concentrate pump, connected to each other through a direct drive coupling. Through the rotation of the pump drive, the concentrate is pumped into the water motor outlet, where dosing occurs. With this solution the water motor acts like a combined flow meter/drive for the foam pump, so automatically achieving the correct ratio between water motor and foam pump (= dosing rate within approved tolerances) without use of any external flow meters, valve regulating systems or orifices.

A water motor may either be a positive displacement (volumetric) type motor or an open turbine. The difference between these two options is that, with a turbine as drive, the flow and pressure range will be limited as a turbine motor is only partly volumetric. Furthermore, with a Pelton type turbine a part of the water flow will be wasted.

FIREMIKS is on the other hand a fully volumetric system with a positive displacement water motor instead of a turbine. The water motor rotor has 8 (or 10) working wings, which gives an early and stable volumetric function of the water motor. The tight interior design, along with low friction vanes, reduces noise level and vibrations. All this makes it possible to maintain the mathematical ratio between water motor and concentrate pump in a wider pressure and flow range, furthermore 100% of the water is used for the firefighting and no water Is wasted.

FIREMIKS can be installed anywhere between a water source (hydrant or main water pump) and one or several nozzle(s), (monitor, spray pipe, foam chamber, sprinkler head, low- ex, medium-ex or highex). It does not need a pressure tank; one only connect it to an atmospheric foam tank which can be
replaced even under operation if necessary, using a simple valve switch. Such freedom of placement also makes it possible to design for the fastest possible reaction time – the closer to the discharge, the sooner the foam reaches the hazard.

The importance of knowing the viscosity of concentrate to choose the right type of foam pump.

Today the different brand and types of foam concentrate comes in a wide range of viscosities. To be able to select an appropriate proportioner one needs to know the viscosity of the concentrate and if it is Newtonian or non-Newtonian. Water motor driven foam pump systems equipped with Gear pump are particularly suited for use in systems with higher flow rates, such as deluge systems and large fire monitors. Gear pumps are also very suited for high viscosity concentrates. The Gear pumps are equipped with counter rotating gears that creates an even flow that doesn't agitate the concentrate, furthermore the gears seal even better with high viscosity additives.

Water motor driven foam pump systems equipped with Piston/plunger pumps are particularly suited for use in systems with low start flows, for example sprinkler systems. Piston pumps are also very suited for low and medium viscosity concentrates. Important to know is that Piston pumps have a limit upwards to high viscosity concentrates due to the Piston pump principle; for each revolution the plunger sucks concentrate and then presses it out and the concentrate goes from zero to full speed twice per revolution. If the static viscosity is too high with non-Newtonian concentrates, the concentrate will not flow smoothly and therefor the correct dosing rate might not be achieved.

FIREMIKS proportioners are offered with both types of pumps, Gear and Piston (plunger). Among several important factors, by them flow and pressure, we always collect info of the concentrate, incl. viscosity, before we propose which type of pump we will offer our unit with.

Both pump types can also be supplied in Mobile versions. With a Mobile unit (or installed in a Fire truck) a fire brigade can lay out a system consisting of one FIREMIKS proportioner and e.g. three, four or five nozzles working

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WATER DRIVEN FOAM PUMP PROPORTIONER CONTINUED

independently of each other, at different heights and lengths from main water pump.

FIREMIKS is available in different flow sizes, from max capacity of 150 lpm up to 12,000 lpm, and with fixed dosing alternatives of 0,5% 1%, 2%, 3%, and selectable 0,3-0,6-1% or 1-2-3%. Other dosing options are available on request. Due to its comparable lower weight, compact design and no need of external energy, installation of a FIREMIKS is relatively easy compared with for ex. Bladder tanks system. It can, if requested, be supplied with a dosing return valve enabling regular tests without consuming any concentrate, an economically and environmentally beneficial option. FIREMIKS meets applicable parts of NFPA 11 and NFPA 1901 and production is made according to European directive 2006/42/EC = CE marked. A selected line of six sizes are FM-approved, incl. different water motor material: hard anodized and PTFE-coated ALU, Bronze or Stainless steel. We offer also Third-party inspection certificates from for ex. DNV-GL, towards NFPA 11 and/or EN 13565 for the whole range.

Some reference examples are Pertamina Oil - Indonesia, Rosenbauer Tunnel protection - Austria, Jotun A/S - Norway, Wärtsilä/Singapore Marine - Singapore, Port of Koper – Slovenia, DOW chemical – Netherlands, Engie Axima – France, La Farge – Serbia, Hexion GmbH – Germany.

FOR MORE INFORMATION,
GO TO WWW.FIREMIKS.COM

JOIFF

ROLL OF HONOUR

During October, November and December 2019, the following persons were awarded JOIFF qualifications:

JOIFF DIPLOMA

ADNOC FUJAIRAH TERMINAL DIVISION
UNITED ARAB EMIRATES

Ebraheim Al Ali Dip.JOIFF
Ebraheim has been a firefighter in Fujairah Terminal and FOIZ Oil Industrial area for 8 years. He completed Fire fighter 1 and 2 qualifications in ADNOC Jabel Dhana Terminal in 2012 and worked in Port of Fujairah as a Firefighter and pump operator for 5 years. Currently he is an assistant lead firefighter and he also contributes in the training and coaching of newcomers and plans exercises/drills on a daily basis to maintain the team's skills, competency and confidence.

Sulaiman Ismaeil Othman Dip.JOIFF
Sulaiman responds to incidents involving fire, hydrocarbon and toxic gas release, rescue and fire loss control related situations and medical emergencies within Fujairah Terminal and FOIZ Oil Industrial facilities to minimize loss of life and property damage. During this activity he supervises fire service personnel and auxiliary fire team members as appropriate and assumes responsibility of Incident Commander until relieved by the Chief Fire Officer. He also supervises all testing, inspection and repair of all fire and life support equipment including BA, portable fire extinguishers and the testing and maintenance of a range of fire fighting vehicles, systems and equipment ensuring 24/7 availability and is focal point/coach/mentor of training and developing of new recruits.

The following persons in ADNOC Fujairah Terminal Division also successfully completed the JOIFF Diploma programme:

Jothibasu Kadukaparambil Dip.JOIFF

and

Ali Al Yahyaee Dip.JOIFF
Fahd Al Shtairy Dip.JOIFF
Ali Mohamed Abdulla Dip.JOIFF
Hassan Al Yammahi Dip.JOIFF
Jamal Al Darmaki Dip.JOIFF
Salah Al Mansoori Dip.JOIFF
Naser Al Abdouli Dip.JOIFF
Hamad Alyammahi Dip.JOIFF
Sulaiman Al Shtairy Dip.JOIFF

GREATER MANCHESTER FIRE AND RESCUE SERVICE
MANCHESTER, UNITED KINGDOM

Ian Redfern Dip.JOIFF
Ian joined the Fire Service in 1999 and he is currently working for Greater Manchester Fire and Rescue Service where he has undertaken various Station Manager roles. He is currently in the Operational Support Department where one of his work streams is to oversee the procurement of equipment suitable to mount a large scale foam attack. On successfully completing the JOIFF Diploma qualification Ian said "This qualification has assisted me in broadening my knowledge and understanding of the industry and will enable me to ensure the validity of the pre-attack plans that the local crews will be completing for the high hazard storage tanks".

Martin Foran Dip.JOIFF
Martin joined Greater Manchester Fire and Rescue Service (GMFRS) in the year 2000 and since then he has dedicated his career to firefighting, technical rescue and more recently to coordinating GMFRS' International Search and Rescue team. He applied for the role of Petrochemical officer in GMFRS in 2017 and since then he has developed his knowledge, skill and experience in Petrochemical and High Hazard Storage Firefighting which has enabled him to advise GMFRS, fire crews and COMAH sites on actions to take in the event of fire.

Dave Swallow Dip.JOIFF
Having worked for Greater Manchester Fire and Rescue Service for 18 years Dave is currently a Station Manager for two stations, one of which has a Top Tier COMAH (Seveso) site within its list of risk premises. On successfully completing the JOIFF Diploma qualification Dave said "Having completed this Diploma to support the other development for my role as Petrochemical Officer, I now feel far more equipped to deal with an incident on this and other petrochemical sites within our service area."

Mike Branney Dip.JOIFF from Greater Manchester Fire and Rescue Service also successfully completed the JOIFF Diploma programme.

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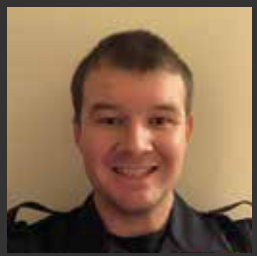
SCOTLAND



Stephen Lister Dip.JOIFF
Stephen has been with INEOS Chemicals Grangemouth Emergency Response Team for over 2 years as a firefighter on D shift. Stephen joined the Scottish Fire and Rescue Service as a retained firefighter at Falkirk fire station, a position he still holds. He also spent some time as a firefighter at Dundee Airport before joining up with INEOS Chemicals Grangemouth Emergency Response Team. On successfully

completing the JOIFF Diploma, Dave said "I have spent the last 18months doing my JOIFF diploma learning all about the industrial side of firefighting. I found the Diploma system very easy to navigate and it was set out easy enough to understand fully what was required. I also found that there was no pressure to get this done in any set time which assisted in researching the questions and gaining the relevant knowledge. I have enjoyed my time doing this programme and very honoured to have achieved the final qualification. I have gained a wealth of skills and knowledge so far and look forward to a rewarding and challenging career. I would like to thank my management team and most importantly my colleagues on D shift for their support in terms of helping me gain the knowledge to complete the Diploma"

Grant Morrison Dip.JOIFF from INEOS Chemicals Grangemouth also successfully completed the JOIFF Diploma programme.

UNITY FIRE AND SAFETY SERVICES LLC
MUSCAT, SULTANATE OF OMAN.

Yousef Al Wardi Dip.JOIFF from Unity Fire and Safety Oman successfully completed the JOIFF Diploma programme

JOIFF TECHNICIAN

ADNOC FUJAIRAH TERMINAL DIVISION
UNITED ARAB EMIRATES

Ibrahim Bayram Tech.JOIFF
Ibrahim joined Akdeniz University Vocational School of Higher Education Firefighting and Fire Safety Programme, Antalya, Turkey in September 1997. On graduation in September 1999 he joined the army where he served 16 months as a firefighter, achieving the rank of sergeant. He has worked as an emergency responder int Abu Dhabi Civil Defence Quick Intervention Unit followed by Emirates Global Aluminium and in June 2011 he joined ADCO - Abu Dhabi Company for Onshore Petroleum Operations Ltd. now trading as ADNOC Onshore - where he is currently in the Fujairah Terminal Division. Previous to successfully completing the JOIFF Technician programme he successfully completed the JOIFF Diploma programme.

Ferda Gunduz Tech.JOIFF
Ferda started his career within the oil and gas industry at BP Turkey ATAS where he worked for 13 years following which he took the Deputy Chief Fire Officer position at Baku Tbilisi Turkey Crude Oil Pipeline project. After a short period he was promoted as Chief Fire Officer in this project and then he worked in the TUPRAS refinery in Turkey as a Fire specialist. Ferda is now a member of the emergency response team in ADNOC. Previous to successfully completing the JOIFF Technician programme he successfully completed the JOIFF Diploma programme.

Saud Abdalla Al Jafar Tech.JOIFF and Fahd al Ali Tech.JOIFF also successfully completed the JOIFF Technician programme during Q4 2019.

JOIFF LEADERSHIP 2 (OFFICER)

LUKOIL MID-EAST LTD.
WEST QURNA 2 PROJECT, BASRA, IRAQ

The following Officers successfully completed the JOIFF Leadership 2 (Officer) programme having first successfully completed the JOIF Diploma and the JOIFF Leadership 1 (Team Leader) programmes.

Wisam Al Najarri Dip.JOIFF
Sarmad Al Hameed Dip.JOIFF
Hasan Al Kabi Dip.JOIFF

JOIFF GRADUATE

Saud Abdalla Mohamed Abdalla Grad.JOIFF
Saud Jafar was a member of Special Forces from 2003 to 2006 after which he changed career and was employed at EGA (Emirates Global Aluminum) where he worked for one year. He then joined Dubai police force in the CID (Crime Investigation Department) where he worked from 2007 to 2011 following which he joined ADNOC Onshore as a firefighter in 2012. In October 2017, he was promoted to Fire Officer. Prior to being awarded Graduate of JOIFF, Saud successfully completed the JOIFF Diploma and JOIFF Technician programmes. Saud introduced, encouraged and is mentoring many of his colleagues to participate in the JOIFF eLearning programmes and a number of the students that he has introduced have successfully completed the programme and others are still working on them. On learning that he was being awarded the Graduate of JOIFF status Saud said "I am very proud to have been awarded JOIFF Graduate.

Matt Brown Grad.JOIFF
Matt is an accomplished health and safety practitioner, and skilled emergency response professional, with over 19 years of solid experience gained from service with local authority and industrial emergency response organisations. He began his career in emergency response as a retained firefighter in Avon Fire and Rescue Service UK, moving to Essex County Fire & Rescue Service UK and then to the drilling, oil and gas industry with LUKOIL International Services, Abu Dhabi Company for Onshore Oil Operations, and Abu Dhabi Gas Industries Ltd. Through his career he has gained communication, organisational and problem-solving skills and is equipped with veritiable success in creating effective rescue plans, as well as structuring and facilitating comprehensive fire safety programs to achieve maximum awareness. His expertise extends to the handling of hazardous materials, conducting fire risk assessments, safety audits and inspections, and promoting safe working practices and he is skilled in preparing and presenting industrial safety briefings and training sessions and well versed in safety compliance regulations. Prior to being awarded Graduate of JOIFF status Matt successfully completed the JOIFF Diploma, the JOIFF Leadership 1 (Team Leader) and the JOIFF Leadership 2 (Officer) programmes. On learning that he that was being awarded the Graduate of JOIFF status Matt said "To even have been considered for the title is a great honour, and I will now proudly display the post nominal. To be associated and recognised by the organisation will surely enhance my career, and I will endeavour to remain a valued representative of JOIFF in the future".

Phillip Petersen Grad.JOIFF
Philip is currently Fire & Safety Engineer Health, Safety and Environmental Department West Qurna 2 Project, Yamama Project, Medina, Iraq Lukoil International Services B.V. He has extensive experience and competence for many years across a full range of emergency service management. On learning that he was being awarded the Graduate of JOIFF status Phillip said "I am honored to have the opportunity to be nominated for the Graduate JOIFF. In my continuous drive for professional development I have undertaken various educational programs, however the qualifications I regard utmost are the JOIFF Diploma, Team Leadership I and II. The learning and progression that was gained through these programs was invaluable in improving my professional competence in this industry. Unlike other training programs JOIFF provided a robust malleability to training that accommodated for the remote and hazardous environment that I work in. The structure of learning allowed for critical scrutinization of current best practice and evidence-based research which empowered me to consider a variety of international standards from various sources such as Europe, UK, USA, and Australasia.

My prior education in this industry was primarily based upon structured programs that did not accommodate for the complexities and adversities of this industry, JOIFF challenged my assumptions and propelled my knowledge to critically evaluate how I performed my role and the consequences of my

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The Robot-TINO is a remote-controlled emergency response unit designed to fight or to mitigate fires and other hazardous events.

The unit is specifically designed to support firefighters during firefighting or fire mitigation operations in industrial process areas, tank farms, tunnels or anywhere congestion may create dangerous situations for the fire brigade. The unit is powered via a compact diesel engine. Robust and sized to overcome difficult conditions such as those that are often found by emergency responders. The unit is protected against heat radiation with a cooling system which allows the Robot-TINO to get closer than ever to the fire origin to suppress it with higher probability of success.

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Firefighting Robot

OPTIONAL

- Dual water/foam and dry chemical monitor provision
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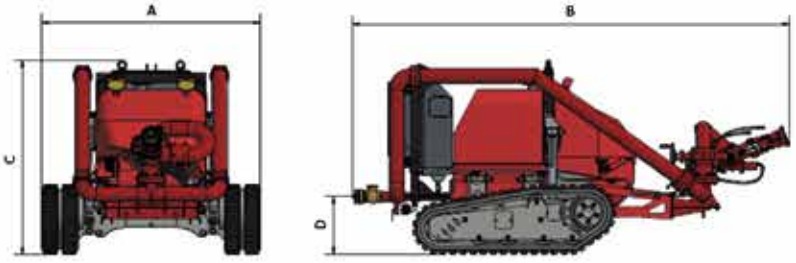
- Toxic/explosive gas detector
- Thermographic systems

DIMENSIONS AND WEIGHTS



Monitor Body	ØA BSP	A mm	B mm	C mm	D mm	Monitor Working Angles α	Monitor Working Angles β	Max. Flow rate lpm
4"	4x2 ½"	1700	3400	1500	439	+15°	+85°	8500

MORE INFO ON: WWW.ROBOT-TINO.COM

ROLL OF HONOUR CONTINUED

actions. Understanding the business of the industry was an element that was not considered in my role prior to undertaking the JOIFF training, recognizing the relevance of hazard and risk-based cost effectiveness became more acutely apparent, and with this, developing strategies that ensured business continuity and resilience to economic and organizational adversities. This resulted in the development of training programs for our Firefighters and Control Room Operators that were directly influenced by JOIFF's learning curriculum. I believe that this qualification will propel my career in this industry and I am honored to be the recipient of this title.".

Simon Williams Grad.JOIFF

Simon has extensive experience in fire and rescue, starting as a firefighter and working his way through the ranks to Assistant Chief in Aerodrome firefighting, working in various locations around the globe, including some of the most hostile environments. In 2013, Simon was part of the start-up team on the Lukoil WQ2 petrochemical project, Iraq. Tasked with developing a first rate fire and rescue team and response to the entire projects risk panorama. His skills in leadership, training and inspection came to the fore, ensuring he became a key member of the team, and leading from the front, he continues to strive for excellence refusing to let the departments standards drop. Prior to being awarded Graduate of JOIFF status Simon successfully completed the JOIFF Diploma, the JOIFF Leadership 1 (Team Leader) and the JOIFF Leadership 2 (Officer) programmes.

MEMBER OF JOIFF

Clement Motlogelwa MJOIFF

Clement has over 19 years of firefighting and training experience, 14 of which were in the petrochemical industry in the training fraternity. Starting his career in the South African National Defense Force, after the completion of the Basic Military Training, he was transferred to join the Fire & Rescue Services as part of Military Skills and Development Service (MSDS). He was later transferred to the Air Force Fire Training School where he worked as Fire and Emergency Service Instructor and was later recruited to join SASOL Secunda where he took on the role he held for 10 years of Training Officer in the Emergency Management Training Academy He was appointed as a Manager of the Emergency Management Training Academy, Secunda Chemicals Operations in April 2015 and is now responsible for creating and implementing training programs and overseeing the development of careers, setting performance metrics, evaluating productivity and helping workers create long-term career plans within the organisation. He currently serves on the South African Emergency Service Institute Training Committee as a CoOpted member and serves on the Tshwane University of Technology Advisory Committee as a member.

FELLOW OF JOIFF

Jamie Fleming FJOIFF

Jamie started his career with Cleveland County Fire Brigade, UK as a Retained Duty System fire fighter in 1997. In 2001 he joined SembCorp Asset Protection (Formerly ICI Fire Service), working as part of a team providing protection to one of Europe's largest clusters of Tier 1 COMAH (Seveso) sites, comprising of both Petro & Aggro chemical risks. After ten years on Teesside, he took up a position of Fire Officer with Abu Dhabi Company for Onshore Oil Operations (ADCO) on the United Arab Emirates ADCOP project. Three years later, Jamie was given the opportunity to work for Lukoil on their first major International project in WQ2, Iraq where he is now Guard Commander. Jamie Fleming is the first person to have successfully completed the entire JOIFF career path – JOIFF Diploma, JOIFF Technician, JOIFF Leadership 1 (Team Leader) and JOIFF Leadership 2 (Officer) programmes. Throughout his career he has brought JOIFF to organisations that had no knowledge of JOIFF and in particular he has promoted and worked with many students over a number of years to guide them to complete JOIFF qualifications. For his outstanding involvement with and contribution to JOIFF, Jamie has been awarded the honour Fellowship of JOIFF, the highest award in JOIFF.

Paul Frankland FJOIFF

Paul is currently the Commercial Director of Falck Fire Services UK. Although Paul's role at Falck now centres on the development of new opportunities for the business such as the recent acquisition of Glasgow and Aberdeen Airport Fire Services, he has over 30 years' experience of managing and delivering high end industrial emergency response teams and solutions into blue chip clients' prevention, response and recover processes across the globe. Paul is passionate about protecting his clients' assets and ensured that JOIFF aligned to those critical operating standards whilst working as part of the senior teams in ICI, Enron, Sembcorp and now with Falck. In consideration of his long standing contribution to JOIFF as a Director of the Board since 2006 and Finance Director of JOIFF since 2012, Paul has been awarded the honour of Fellowship of JOIFF, the highest award in JOIFF. On hearing this news, Paul commented "I am delighted to accept the award of Fellowship of JOIFF. The organisation brings many values to businesses operating in high hazard industries and driving a consistent approach to help mitigate risk is both challenging and exciting".

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

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CRISIS MANAGEMENT IS ON THE RADAR

by TIM BIRD

We have found there is a fundamental problem with many corporate risk management systems. All too often we find organisations handicapped by an approach to risk management that cannot possibly work in the best interests of the business.

Specific problems we see include:

- only covering operational and safety risks;
- combining risks by business function;
- aggregating risk scores until they become meaningless.

The worst offender, in the context of crisis management, is perhaps failing to include high-impact, low-probability risks. The main reason seems to be around perception of likelihood: if the system determines likelihood based on historical data, then it will probably not take account of high-impact risks that threaten continuity of the business. These high-impact risks disappear off the radar.

We are helping some clients to work round this, but for every one of our clients now using the risk radar, we see another ten clients still poring over the excel spreadsheets they call the risk register.

This is not to say that the traditional risk register does not have its place: it is fine for showing progress with implementing controls. But have you ever felt a bit suspicious how those aggregated scores conveniently bring the treated risk just under the acceptable threshold?

Following a crisis, if they conduct a thorough Root Cause Analysis, most organisations notice signals they could have detected, which might have warned them of a potential impact. If you ask them at that point whether they would like to have known of course they say 'yes'. Even if there is only a remote probability of a high-impact risk materializing, we want to know it exists.

What makes the difference?

That's where our Crisis Risk Radar comes in: We help you scan your environment for those high-impact, low-probability risks; and we help you evaluate them (or plot them) on the radar. We realise your organisation is unlikely to get rid of the trusty risk register and we advocate running the Risk Radar alongside them, so the risk committee can see the additional richness they bring to the process.

Some of the benefit we bring to clients is through our understanding of extrinsic threats. Clients know most about the intrinsic risks to your business, though. Our role is mainly about facilitating an internal team of subject matter experts, to elicit a range of plausible impacts, based on a handful of risk issues. Once we have a grasp of the nature of each risk, we negotiate and agree the overarching strategic direction the organisation wishes to take in each scenario. From there, our clients can identify opportunities for both preventative and responsive measures. If the risk is static on the outer edge of the Risk Radar, then it may just need monitoring. If the risk is evolving and potentially heading for impact, then options for change may need to be considered and action taken.

This is a relatively simple approach to managing high-impact risks, and the highly visual Risk Radar approach seems to get attention. It is applicable to issues such as pandemic, BREXIT, market and regulatory risks, as well as the more familiar threats such as those found in a safety report for a COMAH-regulated site. In no way does it purport to be a replacement for the corporate risk register, but we feel it adds a much-needed dimension to traditional risk management systems.

EDITOR'S NOTE:

Tim Bird manages Eddistone Consulting Ltd and the Response Academy. He has a unique approach to building competence in emergency management, especially in High Reliability Organisations. Since 2002, Eddistone has designed and run several hundred exercises, including multi-agency and industrywide, with over 150 organisations including BP, Microsoft, National Grid, Centrica and NATO.

For more information, contact Tim at opportunities@eddistone.com or +44 14336 59800

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Internationally Falck is a brand well known within all high-risk sectors and in particular as the leading provider of high quality, outsourced RFFS and professional consulting services. Falck's aviation credentials are first class and current services stretch across the world to a multitude of countries from Brazil to New Zealand, from Sweden to Singapore and far beyond.

In the UK Falck's pedigree in aviation RFFS comes right from the highest levels, where UK Operations Director John Trew can draw on his large team of aviation experts as well as his own extensive experience through a full career at BAA, Heathrow, Gatwick and the CAA. Leading a team brimming with in-depth knowledge allied to exemplary experience of delivering risk, compliance and audit services specifically within the aviation RFFS sector means there is very little that the team come across that they have not encountered, and managed successfully, before.

In the last months Falck has announced partnerships with two airports to provide outsourced RFFS services, which is testament to the quality of service they provide and to the increasingly competition that the airport marketplace is facing.

Increasingly airport owners and operators are looking for differentiators and Falck can provide exactly that, freeing client management teams to focus on the core commercial activities and developing the future of the airports themselves, safe in the knowledge that their partner is protecting their assets, clients and reputation.

There is a wind of change flowing through the aviation RFFS marketplace in the UK and Falck are very proud to be the flag-bearers.

FOR MORE INFORMATION, CONTACT:
PAUL FRANKLAND, COMMERCIAL DIRECTOR,
FALCK FIRE SERVICES UK LTD.
TEL: +44 (0) 1642 212225
EMAIL: PAUL.FRANKLAND@FALCK.COM

JOIFF ACCREDITED eLEARNING PROGRAMMES

INTRODUCTION:

JOIFF accredited eLearning programmes have been developed after many years' experience in training emergency responders at every level. The programmes are computer based and learnt and demonstrated by the student in their workplace. Each student is assigned an individual electronic portfolio which sets out a structured training path and in which each student's training and progress is tracked. As the programme progresses, it provides a traceable system of assessment and verification of each student's competence.

Instruction/assessment takes place within a time frame established by site management/the student in the work place where, as they go through the programme, each student demonstrates competence in each of the clauses of the units. An assessor is appointed to each student reviewing their work as they progress and confirming "competent" or "not yet competent" for each of the clauses as they go forward.
Assessors are usually the site's in-house trainers / fire team leaders / fire officers / instructors / assessors who have the relevant background and competence. The work is externally verified remotely by the administrators of the programme.

PROGRAMME CONTENT:

The programmes comprise Units, Elements and competences and are drawn from National and International Standards and experience and Good Industry Practice.
It is not necessary to follow the units and elements in sequence, how the work on the programme is completed is at the discretion of the site management/student. A number of the elements can be covered in normal station training, providing it is assessed.

COMPLETION AND POST NOMINAL:

All programmes are accredited by JOIFF, the International Organisation for industrial Emergency Services Management. Students who successfully complete a full programme receive a JOIFF accredited certificate and in agreement with JOIFF a number of the programmes count towards JOIFF qualifications and use of JOIFF post nominals.

APPROVED PRIOR LEARNING AND EXPERIENCE:

Subject to approved assessment and verification, suitable and relevant formal Approved Prior Learning and Experience (APLE) gained by the student during a period of up to two years prior to the commencement of the programme is acceptable as part of the recognition of competence required in the programme. Equivalency where claimed, must be by verification.

PROGRAMMES:

The Diploma programme is JOIFF accredited as the JOIFF Diploma and covers key skills for emergency response in High Hazard Industry and ensures competence within both emergency response and knowing the facility in which the emergency responder operates. The programme consists of 24 Units in which there are over 100 elements and in excess of 700 competences. The outcome on successful completion is that student is awarded a Diploma certificate and can use the post

nominal Dip.JOIFF The Technician programme is JOIFF accredited as the JOIFF Technician and provides the platform for persons engaged in emergency response to enhance their knowledge and skills having already demonstrated their competence in Key Response Skills in High Hazard Industry. To achieve full success in demonstrating the competences in this programme requires the student to do individual research and study. The outcome on successful completion is that student is awarded a Technician certificate and can use the post nominal Tech.JOIFF

LEADERSHIP 1: (Team Leader) – leads a team of 5 to 8 persons - programme is JOIFF accredited and provides to persons who are technically competent to a recognised standard and have core educational skills, the path to the knowledge and skills for an emergency response Team Leader role in emergency service delivery. To achieve full success in demonstrating the competences in this programme requires the student to do individual research and study.

LEADERSHIP 2: (Officer) - leads multiple single Teams of emergency responders - programme is JOIFF accredited and provides to persons who are technically competent to a recognised standard and have core educational skills, the path to the knowledge and skills for an emergency response officer role in Team Leadership and Management for persons who lead multiple single teams of emergency responders. To achieve full success in demonstrating the competences in this programme requires the student to do individual research and study.

Responder to Hazardous Materials Incidents programme is JOIFF accredited and covers the awareness and operational skills required by emergency responders, learnt and demonstrated in
training and exercises that allows them to deal competently with emergencies involving hazardous materials identified within the Response Area Emergency Response Plan where they are employed.

To achieve full success in demonstrating the competences in this programme requires the student to do individual research and study.

Emergency Response Control Room Operator programme is JOIFF accredited and provides to persons who are technically competent to a recognised standard and have core educational skills, the path to the knowledge and skills for an emergency response Control Operator. To achieve full success in demonstrating the competences in this programme requires the student to do individual research and study.

The JOIFF accredited eLearning programmes for emergency response to industry have been developed and are marketed and administered by JOIFF Member organisation and JOIFF Secretariat Fulcrum Consultants. For further information, email info@fulcrum-consultants.com

JOIFF QUALIFICATIONS

Dip.JOIFF

This is awarded to persons who have successfully completed the JOIFF Diploma programme which 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.

Tech.JOIFF

This is awarded to persons who have successfully completed the JOIFF Technician programme which allows emergency responders to enhance their knowledge and skills having already demonstrated their competence in Key Skills.

Grad.JOIFF

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 Graduate can be awarded through Route 1 for persons who have successfully completed the JOIFF Diploma and JOIFFF Technician programmes or Route 2 by demonstration of a significant level of suitable and relevant competence in emergency response through knowledge, skills and understanding.

MJOIFF

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

AMJOIFF

Associate JOIFF Member is awarded to non-operational personnel who have made significant contributions to the development and profile of JOIFF over a number of years by their actions and their work activities.

FJOIFF JOIFF Fellow

The award of JOIFF Fellow is by recommendation of the JOIFF Board of Directors and is given to an individual who has made an outstanding contribution to Industrial Hazard Management activities in support of JOIFF.

For further details contact the JOIFF Secretariat
joiff@fulcrum-consultants.com

JOIFF ACCREDITED TRAINING PROGRAMME FOR 2020

INTERNATIONAL SAFETY TRAINING COLLEGE, MALTA

Tel: + 356 2165 8281/2
+ 356 9998 5211
Email: enquiries@istcollege.com.mt
www.istcollege.com.mt

BAI Breathing Apparatus Instructor 10 Days
LNG Awareness –5 Days
Fire Fighting Foundation Course –10 Days
13TH – 24TH APRIL, 2020
Team Member Course – 3 Days
9TH – 11TH MARCH, 2020
1ST – 3RD JUNE, 2020
Fire Team Leader Course – 5 Days
9TH – 13TH MARCH, 2020
1ST – 5TH JUNE, 2020
Road Traffic Collision Technician Course - 1 Week
4TH – 8TH MAY, 2020

SERCO INTERNATIONAL FIRE TRAINING CENTRE DARLINGTON, UNITED KINGDOM

Tel: +44 (0)1325 333317
Email: bookings@iftc.co.uk
Website: www.iftcentre.com

3 day JOIFF Occupational Fire Fighter
6TH-8TH APRIL 2020
14TH – 16TH SEPTEMBER 2020

2 Day JOIFF Fire Fighter Refresher
25TH-26TH MARCH 2020
1ST- 2ND OCTOBER 2020

5 day JOIFF Team Leader
8TH-12TH JUNE 2020
12TH – 16TH OCTOBER 2020

RELYON NUTEC FIRE ACADEMY MAASVLAKTE - ROTTERDAM

NetherlandsTel. +31 181 376 600
Email: bookings@nl.relyonnutec.com

Industrial Fire Brigade Incident Commander Course (IFBIC) 5 days
Industrial Fire Team Leader (IFTL) 10 days
Industrial Fire Team Leader Remain Qualified (IFTL RQ) 3 days

YASSINE MARINE SERVICES YMS TRAINING CENTRE - SFAX, TUNISIA

Tel : +216 36 408 290
Email: yms.training@y.marineservices.com

Courses throughout the year on request.

Foundation Course 4 days
Fire Team Member 3 days
Fire Team Leader 3days
Helicopter Firefighting and Rescue 1 day
H2S awareness 1 day

H2K THE NETHERLANDS

www.h2k.nl
Tel: +31 174 414 872
Email: info@h2k.nl
Web: www.h2k.nl

Annual International courses

Foam School 5 Day
30TH MARCH – 3RD APRIL 2020
Advanced Industrial Firefighting 5 Day
Tank and Bund Fires 3 Day
Integrated fire safety of IBC tanks and tank containers 3 Day

EDDISTONE CONSULTING LTD, INCORPORATING THE RESPONSE ACADEMY UNITED KINGDOM

www.Eddistone.com
www.responseacademy.co.uk
Email: opportunities@eddistone.com
Tel: +44 1433 659 800

All courses on your own site,
or at the Eddistone Training Suite.
All courses can be requested.

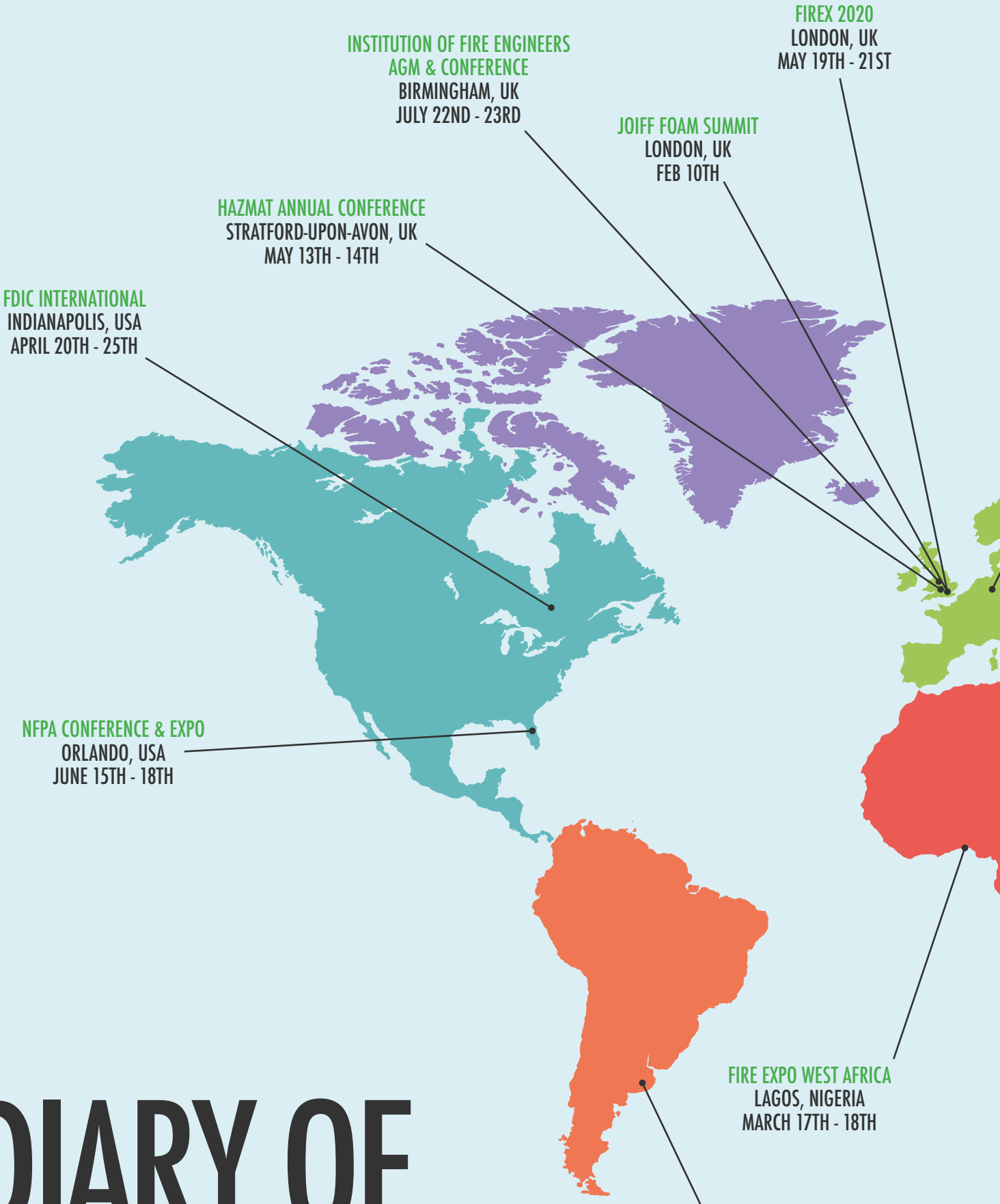
Site Forward Controller (SFC) 1 day
30TH JAN 2020
Site Incident Controller (SIC) 2 days
27TH -28TH FEB 2020
Crisis Risk Radar 1 day
04TH FEB 2020
Crisis Spokesperson 2 days
12TH MAR 2020
Site Main Controller (SMC) 3 days
04TH-06TH MAR 2020
Crisis Leadership 1 day
23RD APRIL 2020
Silver (TCG) COMAH Representative 2 days
28TH – 29TH APRIL 2020

ARC FIRE TRAINING SERVICES LTD. UNITED KINGDOM

www.arcfiretraining@ntlworld.com
On your own site.
Subject to Risk Assessment & Facilities.
For further information contact
arcfiretraining@ntlworld.com

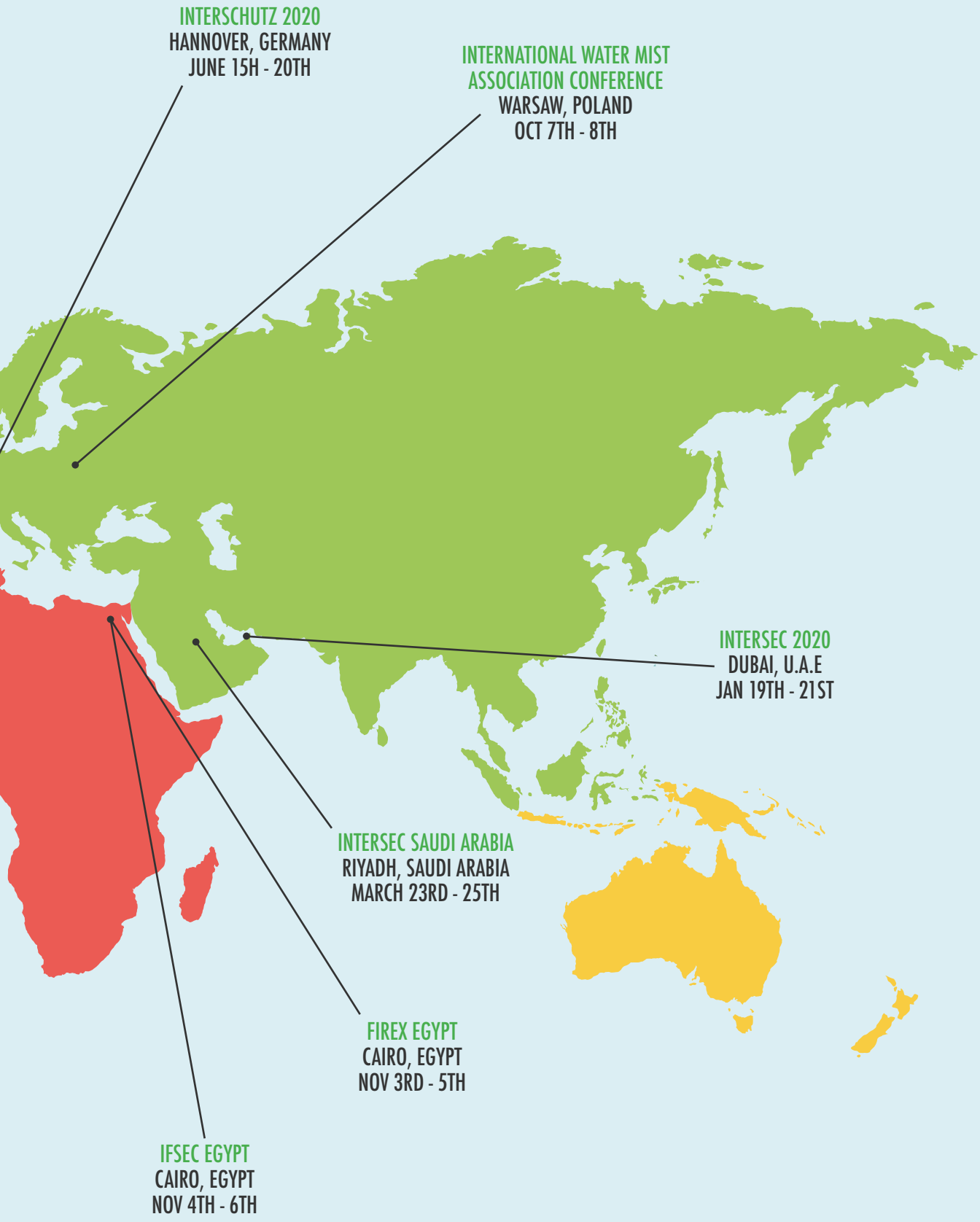
Site Specific Courses
Fire & Safety Foundation
4 x 1 Day Modules
Incident Controller 2 or 4 Days
SCBA Initial & Refresher
Confined Space Entry
Confined Space Train the Trainer
(with SCBA for High Risk)
All as required

Crisis Management & Emergency Response Seminar
DUBAI 22ND MARCH 2020
06TH DECEMBER 2020



DIARY OF EVENTS 2020

PLEASE CONTACT THE JOIFF PUBLISHERS 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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