

THE CATALYST

Q4 2020



JOIFF

THE INTERNATIONAL ORGANISATION FOR
INDUSTRIAL EMERGENCY SERVICES MANAGEMENT

TECHNOLOGY FEATURE

1. Drone Capability at the London Fire Brigade
2. Using Robots To Assist In Firefighting
3. Virtual Reality Training For Firefighters
4. Benefits of A Virtual Reality Platform

ALSO:

Foam Transition - Have You Done Your Homework?
Disposal of AFFF, FFFP, FP - Challenges and Emerging Solutions
3 Reasons To Practice your Emergency Response
Outsourcing - Emergency Response As A Service
Covid 19 - A Journey From A Fire & Safety Training College

WWW.JOIFF.COM

Performance - Trust - Sustainability



We are open for business
www.fomtec.com

fomtec
Fire Fighting Foams & Equipment



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.

JOIFF CLG is registered in Ireland. Registration number 362542. Address as secretariat.

JOIFF is the registered Business Name of JOIFF CLG

ABOUT THE CATALYST

The Catalyst is the Official magazine of JOIFF, The International Organisation for Industrial Emergency Services Management. The Catalyst is published Quarterly – in January, April, July & October each year. The JOIFF Catalyst magazine is distributed to all JOIFF members and member organisations worldwide. The Catalyst magazine is published by ENM Media on Behalf of JOIFF.

Publisher & Advertising Sales:
Paul Budgen
Tel: + 44 (0) 203 286 2289
Email: pbudgen@edicogroup.net

Office Manager:
Emma Sinclair
Tel: + 44 (0) 1305 45 82 83
Email: emma.sinclair@edicogroup.net

Editorial Coordinator: Annual Non – Member
Gemma Spearing Subscription Rates:
Tel: + 44 (0) 1305 45 82 83 UK & Europe £60:00
Email: gemma.spearing@edicogroup.net Rest of World: £ 90:00

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

Dear JOIFF Members and Catalyst readers,



Floris Knouwds, an eminent relationship therapist, life coach, pastoral counsellor and internet marketing consultant once said “If you feel like giving up (with a project, relationship or an everlasting problem), everything can change if you are willing to try the little things again!”

In the current pandemic world we are living in, it is time to reflect and try the little things again and get motivated by small successes that will start snowballing to way beyond your expectations.

Like all organisations, JOIFF is faced by the challenge posed by COVID 19 and we, the Directors asked ourselves– “under the conditions as a result of the pandemic how can we maximise the benefits to our members under JOIFF’s prime activity, Shared Learning ?”.

The 4 pillars of JOIFF’s policy are:

- Shared Learning – improving risk awareness amongst the members:
- Accredited Training –operational preparedness in emergency response and crisis management:
- Technical Advisory Group – improving standards of operational safety in the working environment and
- Professional Affiliation – membership of a prestigious International organisation:

We decided to raise the **Shared Learning** pillar to a new level when we held the first JOIFF one-day workshop in February 2020 in London, followed up with two online seminars and an online subject matter expert presentation. Next month, in November 2020 we are presenting yet another online seminar, this one on the subject of advancement of technology within the fire protection fraternity.

We were aware that training in emergency services management was very likely to be greatly impacted by the pandemic and we needed to ensure that under the pillar **JOIFF Accredited Training**, JOIFF should provide extra support to our accredited Training Providers who we expected would be impacted by the restrictions required as a result of the pandemic. The Board introduced revised procedures on such training to ensure flexibility and continuity of accreditation whilst still maintaining the high standards required by the system of JOIFF accredited training.

The **Technical Advisory Group** pillar was another pillar that the Directors were anxious to keep growing and currently JOIFF has a number of specialist Working Groups developing JOIFF Guidelines on specific topics. I would like to take this opportunity to thank all the people involved in the Working Groups.

To address the **Professional Affiliation** pillar, particularly where pandemic restrictions make networking very difficult if not impossible, in February 2021 JOIFF will host the first ever virtual conference and exhibition in the field of Industrial Emergency Services Management. Registration for this event is open to all. You can read all about it in this edition of the Catalyst and I invite all our members to not only register for these events, but to become part of the greater team to keep the ball rolling.

Regards,
Pine Pienaar FIFireE; FJOIFF; FSAESI
Chairman JOIFF Board of Directors.

■ DOES YOUR FOAM PROPORTIONING SYSTEM WORK?

All foam concentrates behave differently. Proportioning at the correct ratio can be a challenge. *FireDos* have been working for over 30 years with end-users, contractors and OEM's to overcome their foam proportioning issues. You want the peace of mind & knowledge your system will operate whatever the circumstances. Rely on the foam proportioning system GEN III from *FireDos*.

- ASSISTANCE in verifying your suction line calculation
- WIDE RANGE of viscosity parameters tested and approved by FM
- *FireDos* can physically test and confirm your foam concentrate compatibility with GEN III

Available NOW

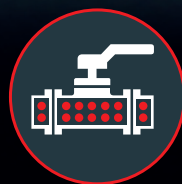
+49 6036 9796-0

www.firedos.com/nextgen3



■ REDUCE RISKS

Purely mechanical – maximum reliability



■ IMPROVE PERFORMANCE

Consistent proportioning rate over a wide operating range



■ REDUCE COSTS

Cost-effective and eco-friendly – proportioning rate testing without foam

- 3 Message From The Chairman
- 7 JOIFF Scholarship
- 9 Roll Of Honour & New JOIFF Members
- 11 JOIFF Industrial Fire & Hazard Management Virtual Conference 2021
- 13 Crisis Management In Extreme Conditions
- 16 Drone Capability at London Fire Brigade
- 20 Using Robots To Assist Firefighting
- 22 UK Fire Service College New Virtual Reality Training
- 27 Benefits Of A Virtual Reality Training Platform
- 29 Foam Transition – Have You Done Your Homework?
- 30 Disposal of AFFF, FFFP & FP – Challenges & Emerging Solutions
- 32 Electronic Foam Proportioning
- 34 3 Reasons To Practice Your Emergency Response
- 36 Outsourcing: Emergency Response As A Service
- 41 Firefighting Approach To PPE
- 43 What Makes A Good Industrial Brigade Incident Commander
- 44 Water Driven Proportioners with High Viscosity Concentrates
- 46 Covid 19 – A Journey From A Fire & Safety Training College Perspective
- 48 JOIFF Accredited Training Programme
- 51 How Do I, The Leader..
- 54 JOIFF Accredited Training Providers



Dr. STHAMER HAMBURG

FOAM FIGHTS FIRE



vaPUREx[®]



Tankfarm Foam

LV 1% F-10

- fluorine free and 100% biodegradable
- newtonian and suitable for any mixing device
- direct foam application with IC rating acc. EN 1568-3
- easy logistics by 1% induction rate



Airport Foam

LV ICAO B 3% F-10

- special foam for Jet fuels and direct application
- newtonian fluid suitable for any ARFF truck
- 3% induction rate for low and medium expansion foam
- fluorine free and 100% biodegradable

www.sthamer.com



JOIFF SCHOLARSHIP

The Board of Directors of JOIFF is pleased to invite emergency responders who are JOIFF members or who are employed/contracted by a JOIFF member organisation to apply for a scholarship to complete the JOIFF Diploma eLearning programme, or the JOIFF Technician eLearning programme. Only one student in any JOIFF member organisation will be eligible.

Three (3) scholarships will be awarded to successful applicants who apply between 01 August 2020 and 31 December 2020. These scholarships will be subject to the terms and conditions currently in operation for these programmes which includes that students who successfully complete the studies will receive a Diploma/Technician certificate and can use the post nominals Dip.JOIFF/Tech. JOIFF as applicable.

Approval of applications of the award of the scholarships will be the sole discretion of an adjudication panel set up by the JOIFF Board of Directors.

Applications by candidates for the scholarship shall be made to the JOIFF Secretariat and must be accompanied by a condensed Curriculum Vitae as well as a short motivation by the student or the student's direct supervisor.

When a scholarship student successfully completes the eLearning programme, their successful completion will be announced in the JOIFF Roll of Honour in the JOIFF official magazine, "The Catalyst". The student will be expected

to submit a short summary of the experience/benefits that carrying out the programme has brought to them and

to the organisation in which they are employed/contracted.

ABOUT THE JOIFF DIPLOMA

The JOIFF Diploma programme has been developed as a cost-effective way to gauge competence of emergency response personnel in dealing with the potential accidents/incidents to which they may be required to respond within their Response Area Emergency Response Plan. This programme covers key skills for operational responders to Industrial incidents, learnt and demonstrated by the student in training and exercises that allows them to deal competently with emergencies identified within the response area where they are employed. The JOIFF Diploma ensures competence within both emergency response and knowing the facility in which the emergency responder operates.

incidents, learnt and demonstrated by the student in training and exercises

that allows them to deal competently with emergencies identified within the response area where they are employed. The JOIFF Diploma ensures competence within both emergency response and knowing the facility in which the emergency responder operates.

ABOUT THE JOIFF TECHNICIAN

The JOIFF Technician programme 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.



BRONTO SKYLIFT

Safety above all

MEET US AT
The JOIFF
Foam Summit 2020

London
February 10th 2020

UNMATCHED EXTINGUISHING CAPACITY

STAY PREPARED FOR ANY INDUSTRIAL FIRE FIGHTING MISSION WITH BRONTO WATER & FOAM TOWERS AND SUPER EXTINGUISHERS. THE WATER CAPACITY IS UP TO 12 000 L/MIN AND ALL THE UNITS CAN BE EQUIPPED WITH ADVANCED FOAM MIXING SYSTEMS.

READ MORE AT
WWW.BRONTOSKYLIFT.COM

JOIFF

ROLL OF HONOUR

During July, August and September 2020, the following persons were awarded JOIFF qualifications:

JOIFF DIPLOMA

Rubin Gilden
ADNOC FUJAIRAH TERMINAL
DIVISION
Abu Dhabi
United Arab Emirates

JOIFF TECHNICIAN

Ebraheim Rajab Al Ali
ADNOC FUJAIRAH TERMINAL
DIVISION
Abu Dhabi
United Arab Emirates

JOIFF TECHNICIAN

Hamad Rashid Al Yammahi
ADNOC FUJAIRAH TERMINAL
DIVISION
Abu Dhabi
United Arab Emirates

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

NEW JOIFF MEMBERS

During July, August and September 2020, the JOIFF Board of Directors were pleased to welcome the following new Members.

SmokeTek International, Ontario, Canada, represented by Keegan Standing, Director. SmokeTek International was recently started with the focus to provide accredited training courses in the fire and emergency response sector, to expand into regions with lower standards in emergency services and bridge their gap with knowledge and training. SmokeTek Instructors have long and extensive experience in emergency response

Structurus Limited, Teddington, United Kingdom, represented by Fares Corbaci, Managing Director. Structurus is a technology company offering specialist services to three niche sectors: Fire, Oil

& Gas, and Aviation. Structurus design and build of fire training facilities, provide oil & gas fire protection solutions for large storage tanks and provide aircraft recovery equipment and training.

INDIVIDUAL MEMBERS

During Q 2 2020, the Directors were also pleased to welcome Johan van Rooyen. Johan is currently Central Fire Brigade Manager at ADNOC REFINING, Abu Dhabi where he manages a Fire Training ground and 5 fire stations including manpower, equipment, emergency preparedness plans execution, staff competency, emergency response procedures and Central Fire Brigade documentation.

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



Well **prepared** for the
heat of the moment

WHY TRAIN AT RELYON NUTEC FIRE ACADEMY?

- Brand new, innovative training location
- 35 years of experience
- Realistic fires: liquid, gas, class A fuels
- Tailor-made scenarios on client's request
- Training supported by XVR (virtual reality), scale models, full scale fire simulators
- 360° safety solutions; education, training and consultancy
- Advice on and training programmes based on national and international industrial standards and best practices

Training centre accredited by:





JOIFF

IN ASSOCIATION WITH



JOIFF INDUSTRIAL FIRE & HAZARD MANAGEMENT VIRTUAL CONFERENCE & EXHIBITION 2021

LIVE EVENT 8th & 9th FEBRUARY 2021

On Demand Conference & Exhibition

10th February - 10th March 2021

30+ Subject Matter Expert On Demand Presentations - Leading Industry Suppliers - Live Meetings & Global Networking

VISITOR REGISTRATION NOW OPEN

JOIFF IFHM vConference is supported by



JOIFF IFHM VIRTUAL CONFERENCE 2021

The Global Covid 19 Pandemic has resulted in all Fire Industry Events to be cancelled or postponed, this included the JOIFF International FEHM Conference 2020. Due to the risks that Covid 19 represents, organisational travel restrictions, lockdowns, reluctance to travel, In house budget restrictions, refusal to allow Senior Safety Staff to attend physical events due to volume of people & the social distancing challenges plus the probable impact of quarantine periods upon return, personal health concerns & community risk

ATTENDING A PHYSICAL EVENT IS NO LONGER A PRIORITY OR EVEN A POSSIBILITY.

Despite this, your requirements for continued Shared Learning and knowledge of the latest technology &

equipment innovations have not gone away and with budgets under pressure and major health logistic challenges due to Covid 19, obtaining this information to justify the latest equipment purchases and Shared Learning is more important than ever.

The JOIFF Industrial Fire & Hazard Management Virtual Conference & Exhibition 2021 is an virtual Online Conference & Exhibition platform that will allow all JOIFF Members and the Global High Hazard Fire Community the opportunity to view Key Note conference presentations, meet and chat with latest equipment and technology suppliers, collate information electronically and communicate directly with colleagues from around the world without having to leave your desk.

EXHIBITION

Meet the Exhibitors in person through live Chat and Video meetings in the interactive Exhibition Area and keep

up to date with the latest technology, collate information electronically directly from the exhibition booth and watch video demonstrations and at the click of a button have all of the information sent directly to your inbox.

CONFERENCE PRESENTATIONS

In the Auditorium we will be presenting 20 + Subject Matter Experts presenting On-Demand Video Seminars on subjects as diverse as Foam, Virtual Reality Training, Drone Technology, Health & Well Being, Crisis Management, Business Continuity In A Pandemic, Robotics, Latest PPE Advances, and many more important topics all available on demand at the click of a button.

NETWORKING

There is a virtual Networking Area where all of the attendees can meet up online and chat or go on a live video meeting. This is to ensure the

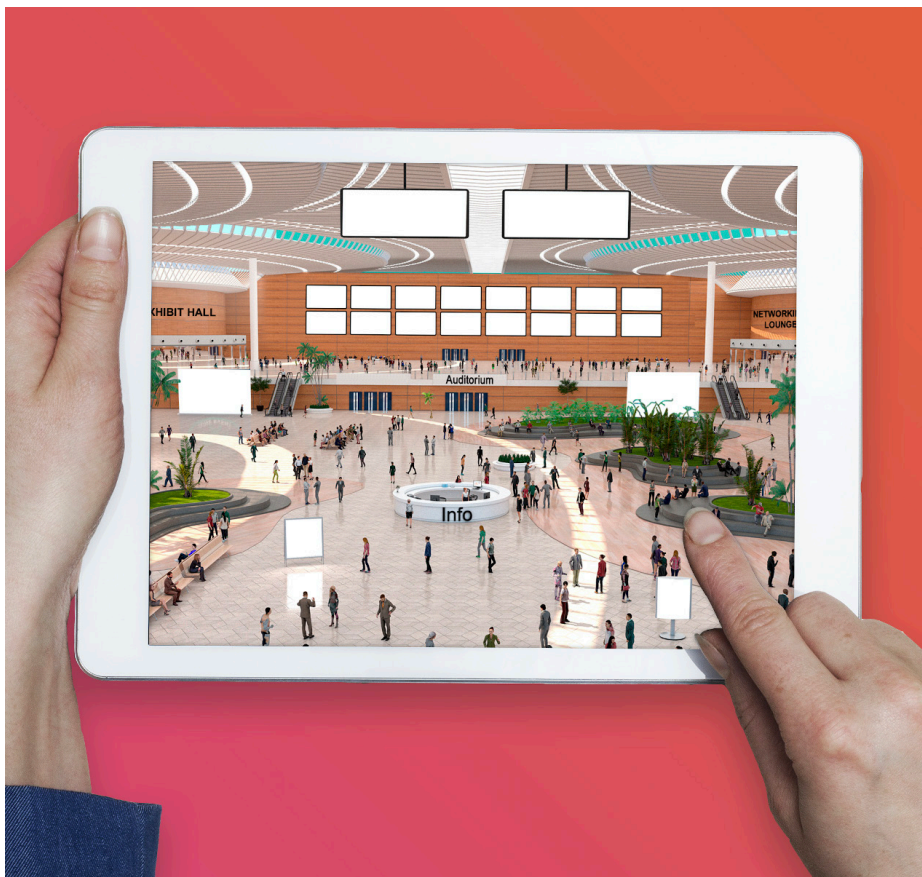
Peer to Peer contact is maintained and you get the chance to network and catch up with old friends and new contacts direct from your computer without the risk and cost of attending an actual face to face event.

To register to join hundreds of other Fire Professionals at this ground breaking event please visit www.joiff.com/events

If you would like further information on the opportunities to Exhibit or Deliver an On Demand Video Presentation @ The JOIFF Industrial Fire & Hazard Management Virtual Conference & Exhibition 2021 please do not hesitate to contact Paul Budgen, Event Director.

Email: pbudgen@edicogroup.net
 Phone: DDI + 44 (0) 1305 831 768

Premier Supporter:



PERIMETER SOLUTIONS

SOLBERG® AVIGARD™ LINE OF FLUORINE-FREE FIREFIGHTING FOAM CONCENTRATES FOR AVIATION APPLICATIONS

New ICAO Level 'B' certified foams concentrate offers excellent foaming, extinguishment and burnback properties

CLAYTON, MO., 5 OCTOBER 2020

Perimeter Solutions announced the introduction of a new line of fluorine-free firefighting foam concentrates for the aviation market. Called SOLBERG® AVIGARD™, the fluorine-free line debuts with two low viscosity, ICAO Level B certified foam concentrates that deliver excellent foaming, extinguishment and burnback properties using both fresh and salt water. Designed for use on Jet A/Jet A1 fuels, SOLBERG AVIGARD 3B has a proportioning rate of 3% and SOLBERG AVIGARD 6B has a proportioning rate of 6%. They are compatible with all aircraft rescue and firefighting (ARFF) equipment. SOLBERG AVIGARD foam concentrates contain no added PFAS chemicals, have no persistence, bioaccumulation, toxic breakdown (PBT) profile and can be considered as readily and rapidly biodegradable.

According to Javier Castro, General Manager for Perimeter Solutions Fire Safety Group, SOLBERG AVIGARD 3B and SOLBERG AVIGARD 6B are among a number of fluorine-free foam

concentrates that the company will introduce to the world in the days ahead. "At Perimeter Solutions, we're engaged in an intensive development program for fluorine-free technology that meets the highest level of fire suppression requirements," he said. "As low-viscosity fluorine-free foams that meet ICAO standards for aviation applications, SOLBERG AVIGARD 3B and 6B can be considered drop-in replacements for fluorine-containing Level B foams used in aircraft rescue and firefighting applications," he said.

NEW TECHNOLOGY ADDRESSES MULTIPLE NEEDS

SOLBERG AVIGARD 3B and 6B are special combinations of hydrocarbon surfactants and additives. They provide fast knockdown and extinguishing performance as well as excellent burnback and vapor suppression. At the same time, they contain no fluorosurfactants, fluoropolymers, organohalogens, PFCAs, PFOA and no PFOS in accordance with EU Directive 2006/122/EC and amended by Council Directive 76/769/EEC. These properties will allow airport facilities to comply with existing and future environmental and workplace regulations and

enhance employee safety - at the same as reducing costs for disposal and compliance.

ABOUT PERIMETER SOLUTIONS

Headquartered in St. Louis, Missouri, Perimeter Solutions is a premier global solutions provider, producing high quality firefighting products and lubricant additives. The company develops products that impact critically important issues of life - issues where there often is no room for error and the job doesn't offer second chances. At Perimeter, we characterize the solutions we develop as 'Solutions that Save' - because it helps underscore what we are trying to accomplish for our customers and the world at large, across all of our business segments. Perimeter Solutions produces major brands known throughout the world like PHOS-CHEK® and FIRE-TROL® retardant, foam and gel products; AUXQUIMIA® and SOLBERG® foam products; and BIOGEMA® extinguishing agents and retardants. More info: www.perimeter-solutions.com.

Media Contact
Resource Advantage
Barbara A. Mecchi-Knoll
bmecchi@resourceadvantage.com



PerimeterSOLUTIONS

Quality Products. Exceptional Response.



CRISIS MANAGEMENT IN EXTREME CONDITIONS

CRISIS MANAGEMENT IN EXTREME CONDITIONS.

I was asked to write an article for our JOIFF colleagues on Crisis Management in Extreme Conditions, as part of the continual learning process that we all should take part in.

Conditions for all of us are relative. If you are in any first world major metropolitan city, Crisis management can be difficult or stressful, but there is one constant. Strong professional assistance is either in the room beside you, or only a phone call away. Most major Emergency Management response organisations have predetermined response plans, policies, and procedures.

Put yourself in a struggling third world country, ravaged by wars, starvation, Ebola, and various other diseases, rampant government corruption and various other hurdles, and try to produce the same response methodologies. Then the situation can be classed as extreme conditions. This is the Democratic Republic of the Congo, (DRC) one of the most complex operational settings you can find.

This article will highlight an opportunity I recently had to put my experience in Crisis, Emergency and Incident management to test in a way one could never imagine. My normal role is as the boss of the United Nations largest Fire service. But in 2019 I was given

temporary role during the significant Ebola crisis of 2018-2019 as the manager of the Tactical Operations Centre for Emergency Ebola response.

The problem was I was going to a place that had never heard the terms Crisis Management or Emergency Management, let alone understand it, or frankly even care about it. The lesson was when in doubt, stop reset and do what you know using tested methodologies.

EBOLA RESPONSE

On 1 August 2018, the Ministry of Health of the Democratic Republic of the Congo declared a new outbreak of Ebola virus disease in North Kivu Province. North Kivu Province is in the Extreme East of the DR Congo, and shares borders with Uganda and Rwanda. Throughout the province there are several large cities, including Beni. The rest of the area mainly comprises of small villages with no infrastructure. This is the province where most of the fighting between rebel groups and the Government occurs.

The United Nations, in response to the crisis initiated a stand alone internal mission to support the Congolese government. The mission was named the UN Emergency Ebola Response Office (EERO) and was designed to bring all stakeholders together to manage, control and stop the outbreak. The response

comprised of Government Agencies, UN agencies, Funds and Programs and Numerous Non-Governmental Agencies (NGOs).

In June 2019, I was reassigned from my usual role to lead the United Nations Emergency Ebola Response teams Tactical Operations Centre (TOC). This centre was in reality the Incident Control Centre, with a heavy tilt on team cohesiveness and planning of response operations, and of course team security in an environment where safety cannot be guaranteed.

When I arrived, the TOC was a paper proposal only, and I was tasked with several politically challenging tasks, including building a cohesive response model with all of the response agencies, building trust and achieving a significant reduction in relation to the use of paid escorts for the Ebola Response Teams. (The Government was charging response teams to provide escorts, although it was part of their primary role).

After being tasked I went away into my office and wrote down the following things

- A) Why does the Boss need this?
- B) Where does one start with this task.
- C) How do we achieve the tasks successfully?



Above: This 55 kilometre trip took eight hours



Above: Ebola treatment centre



Above: UN Uruguayan troops patrolling in the City of BUTEMBO

The answer was quite simple

- A) Stop Ebola spreading
- B) Treat it like a major wildfire
- C) Build trust to achieve the outcome
- D) We need Incident Management part of their primary role).

There is something I have not mentioned yet. The working languages in these areas are French and Swahili, and I only speak English. Just one more challenge to get over.

I believe that when the pressure is on, well trained people will revert to their training as a starting point. The answer was to start again. Reform the command and control structure and break down organisational silos to get everyone working together to achieve the goals, not work alone to be seen to be doing something. For me, the starting point was AIIMS, the Australasian Interservice

Incident Management System.

The international response to the Ebola crisis was significant, the issue is that the Government of the DRC and the key response agencies did not have a common methodology there was none of the five key principles mentioned in AIIMS.

AIIMS is based on five key principles:

- Management by objectives
- Functional management
- Span of control
- Flexibility
- Unity of command

My first meeting with the key stakeholders did not go well. "Who is the new guy walking in here and telling everyone we are doing it wrong" was a common theme at the end. As was "We have done this before".

This is where building trust is so important and was the first step to starting to achieve a more cohesive response model.

Where to start was an easy decision, build a room, and as within the AIIMS principles there was no rank, just positions. We built a large office, no walls just desks and functions. Egos were banned and results were the benchmark expected.

In the room were UN representatives from Military, Police and the EERO, and representatives from each agency, including each Government agency, which was a first.

Step two was assigning roles and responsibilities and being tough if they were not achieved. The requirement for factual reporting was key to gaining

international support for the response, and again this is where teamwork and trust must be first.

As I said previously, we treated the outbreak like a wildfire, and defined perimeters to confine the outbreak. Once these were understood the entire response team worked incredibly hard to keep the outbreak within the set boundaries.

Once the processes, policies and procedures were in place operations became smoother. Attacks on Ebola centres and UN staff reduced and eventually the battle against Ebola was completed. In the end there were the following:

Total number of cases 3444

Total deaths 2264

Total survivors 1167



Jason Sertori Memerg Mgt, MIFirE.
United Nations Fire and Rescue Service
DR CONGO

Telephone +243 818 907 195

Email sertori@un.org

Jason joined the Queensland Fire and Emergency Services in February 1996 and was promoted to Inspector in April 2016 and decided to leave QFES to serve with the United Nations.

Jason has been deployed on numerous occasions throughout Australia to manage large scale incidents ranging from wildfires to floods.

Jason is currently Chief Fire Officer for the United Nations largest mission.

For six months during 2019, Jason oversaw the international Emergency Management response to the Ebola crisis within the DR Congo.

Jason has completed a Master of Emergency Management; and is also a Member of the International Institute of Fire Engineers and holds numerous academic degrees in management and emergency response related fields.



Above: Anti UN sentiment was rife. There were some people who blamed the UN for spreading the disease.

DRONE CAPABILITY

DEMONSTRATES ITS WORTH

Drones give Incident Commanders an aerial view, increasing their situational awareness of fires. Station Officer Lee Newman details how the technology was implemented in London Fire Brigade and the continued benefits.

The Grenfell Tower fire has resulted in revisions to a number of operational procedures and the introduction of new equipment in London Fire Brigade. However, one piece of new technology that was used at the Grenfell incident, albeit post fire, was Kent Fire and Rescue Service's drone capability, which was tasked to fly around the building to identify any external risks and assess building stability, providing essential safety information that facilitated ongoing internal firefighting operations in the Tower. A few months after the fire, I was asked to set up a trial to test the feasibility of London Fire Brigade having a drone capability of its own.

GREAT OPPORTUNITY

I had just joined the Operational Policy and Assurance Department having previously worked as a Watch Manager at a fire station when I was tasked at looking at a drone capability for the Brigade. I had never run a project before and I seized this new opportunity with great enthusiasm.

Understandably, my first port of call was to visit the team at Kent FRS, where I gathered all the information I could about how they went about getting their capability operational, including any advice on things they wished they'd done differently – there's no point in making the same mistakes twice!

My second idea – and one, it transpired, was one of my better ones – was to call on some drone expertise to share the workload of the technical and admin sides of

the project. My colleague Simon Stretch, had vast experience of flying drones with his family's business and he seemed the ideal fit to take the technical side, leaving me to concentrate on the main project and admin role; this appointment paid dividends later, in the main trial phase.

The next hurdle I had to overcome was giving full consideration to all the Health and Safety (H&S) aspects of flying drones within an operational environment. To achieve this, I undertook a full Risk Assessment, working with the Brigade's Head of Health and Safety to achieve the final paper.

Then came the insurance and legal aspects of the project, which, as drone operations was a new concept for the Brigade, raised some new issues, but a workable solution was soon found.

Finally, I had to consider how to manage processing imagery taken from incidents and still meet the requirements of GDPR.. As this was around the time GDPR was coming into effect, rather than inventing a new system I asked our Information Management team if I could use the process they used for processing the imagery from the Fire Investigation team. This meant we would just pass on the SD cards from any incident and the Information Management team would then be responsible for the processing, storing and deleting of files. This was a satisfactory solution agreed by the Brigade's main GDPR advisor and the process was written into our Operations Manual.

SOURCING DRONES

Having covered off all the main bases to operating a drone, we then looked into what drone would best suit our needs on the fire ground.

We spoke with various drone suppliers and arranged for private demos. We also asked other fire and rescue services about their drone capabilities and, after carefully considering all the information and feedback, we opted for the Matrice 210 V1 and a Phantom 4 as a trainer/reserve drone.

We spoke to numerous companies about the possibility of leasing the drone and equipment as I felt we needed to have the option to return it if it did not meet the requirements agreed by the project board. This was resolved by reaching an agreement with a reputable supplier to lease the whole set up to the Brigade on a monthly basis, which enabled me to carry out the trial and extend it if needed (which still is ongoing) without any concerns of being burdened with an expensive set of equipment, should the pilot project have been unsuccessful.

PILOT TRAINING

To make the drone operational, the final piece of the puzzle was to select and train my team of pilots. We had bumped into Essex Police at the Drone Show in London at the end of 2017 and had struck up a good relationship with their drone team. As they were a National Qualified Entity for drone training, I contacted them in early 2018 and asked if they could put a course on for us. I had explored other drone training

centres but due to either being too expensive or too commercial, I opted for the Emergency Services bespoke course designed by Essex Police. The course was delivered in the summer of 2018 and was very well received by my team; we all passed and were PFCO qualified within the week.

Once we had taken delivery of our drone package and had been trained on the new drone we decided to stay non-operational until all of the team had built up flight time and familiarisation with the new kit.

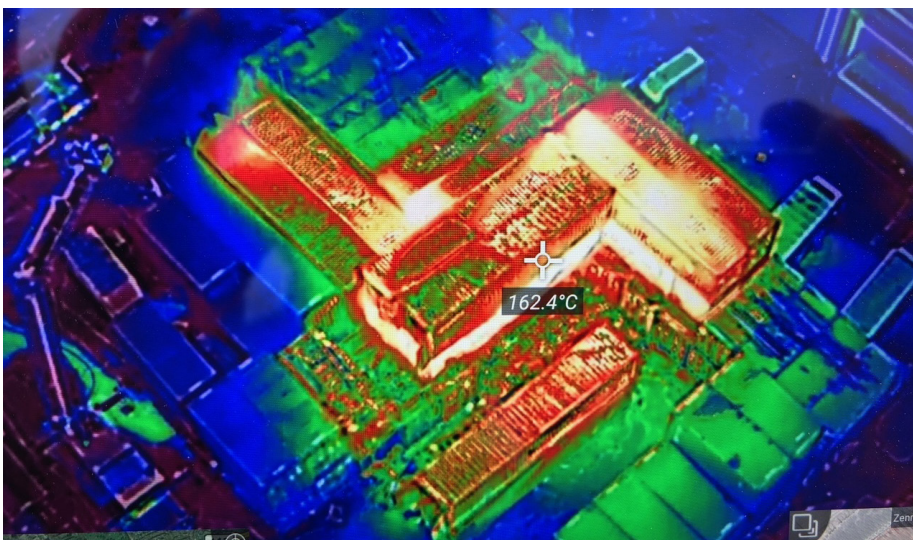
Our Operations Manual was written and submitted by Simon Stretch, my technical lead. Compiling the Operations Manual is a complex task and needs lots of attention and tweaking. This is where having two of us paid dividends – the whole drone operation is governed by the Manual and Simon was able to focus all of his attention on that, which allowed me to put all of my efforts into the admin side of the project. Sharing the workload meant that at no point did either of us become overloaded. This is one of the main learning points from the project for me and I've advised others thinking of starting a drone project about the benefits of splitting these two roles. The Civil Aviation Authority approved the final version of Simon's Manual and we were ready to start operations as the Brigade drone team.

OPERATIONAL TEAM

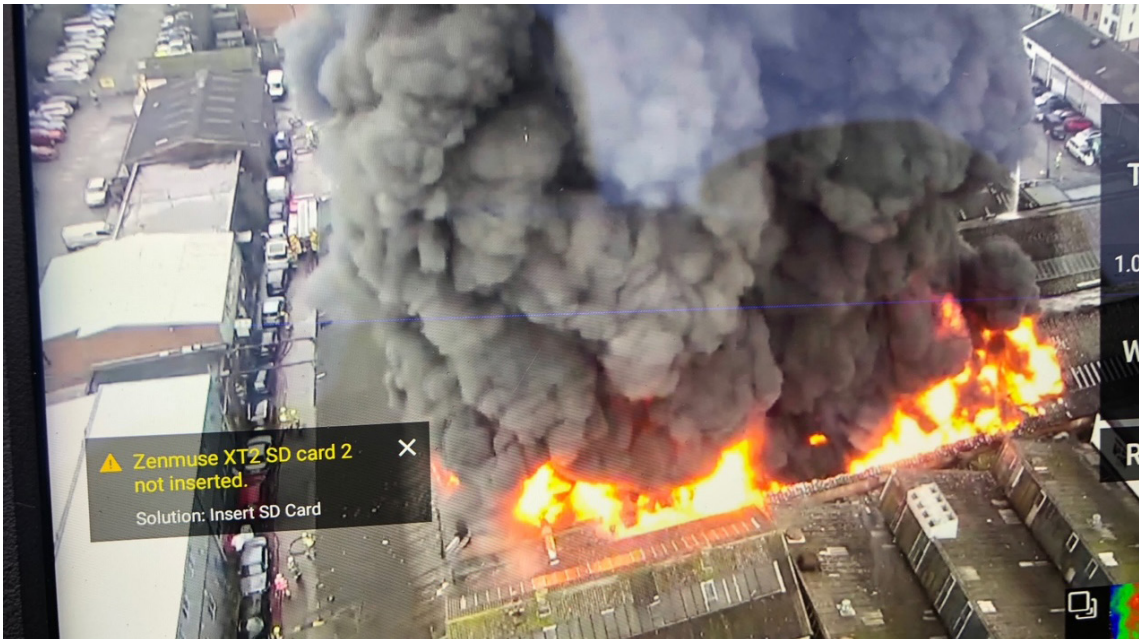
From start to finish – from an idea on paper, researching other fire rescue service drone teams, asking for drone demos, getting the drone pilot qualifications and all of the admin between various departments in between – it took just nine months to get the drone team operational.

On its first day of being available for incidents the team received an order to attend a 15 pump fire at a leisure centre, which was under renovation. We were asked to confirm if there were cylinders on the roof of the building and immediately put the drone to use. The team flew and relayed the camera footage onto a large screen that was fitted into a van provided for the trial. The drone footage was able to identify, to the Incident Commander's satisfaction, the cylinders were actually rolls of asphalt due to be laid on the roof as part of the renovation. If the drone concept could have been proven in one job this was it! The information from the drone allowed the Incident Commander to make a decision not to make it 'cylinders confirmed' and saved a lot of unnecessary extra appliance movements.

Since that first shout, the team has been called out to over 110 incidents of six pumps or more, including persons in water, people threatening to jump and also various missing



NEW TECHNOLOGY FEATURE



which I'm always more than happy to do considering how helpful we found the advice from Kent when we started on this journey.

At the beginning of the project I was following guidance from other people and services, the team was shaped around what I thought would be a good delivery method and how officers on the fire ground would like

persons incidents both in London and into other counties, assisting police forces.

Both Simon and I constantly try to stay ahead of the curve for drone technology and ideas, and recently managed to source a device which will allow us to stream live footage from the drone to Brigade Control. The team at Control will greatly benefit from seeing footage relating to the calls they're receiving from the incident. We can also stream onto tablets, which gives both Sector Commanders and Incident

Commanders better situational awareness and allows them to target their resources more efficiently. We also went as far as to stream onto the Commissioner's and principal officers' smartphones for incidents of note. We have received excellent feedback, with every officer who has been able to use this capability appreciating its usefulness at incidents.

CAPABILITY TODAY

The Brigade's drone capability inventory today includes: a Matrice 210 V2 with a XT2 Thermal camera and Z30 optical; a DJI Mavic 2 Enterprise Dual with multi attachments; a Yuneec 520; a Teradek live streaming device and multiple tablets for receiving the streamed footage. We operate with two Mitsubishi Outlander PHEVs – plug-in hybrid SUVs – and have split the drone equipment into two, with one vehicle carrying the drone and batteries, and the other carrying all of the support kit and ancillaries.

We now have eight pilots trained and operate a 24/7 service. The team is working closely with most elements of the Met Police drone department on joint training and also with Kent FRS and Essex Police. Other fire and rescue services have started to ask us for advice on how we started,

us to operate. This was certainly the case for half the time we've been operating but, recently, between Simon and I, the capability has been moulded to how we see the future and what it holds in the way of drone use. For example, we have just acquired another drone to explore how it might be used for technical rescue operations involving water. There's also the possibility of combining two new concepts into one – London has just invested in fire escape hoods and I have already demonstrated how one might be delivered via a drone to a balcony above the height of an aerial appliance, while using the Mavic Enterprise 2 to relay instructions via the loudspeaker.

These possible new uses are pushing the boundaries of our original concept but they both demonstrate how we aim to stay ahead of the curve, which in my opinion should be the aim of any drone team or emerging fire and rescue service drone project. That is my advice for a successful drone team, it should be one that enables a service to benefit greatly from the technology rather than be a hindrance and drain on service budgets.

www.london-fire.gov.uk and ISO 15384), which does not contribute to clarity.





Your Next Solution in Fluorine-Free Foam

Our Fire Safety Brands: **PHOS-CHEK® SOLBERG® AUXQUIMIA®**

The move to fluorine-free fire suppressant foams is one of the most important developments in the fire safety industry today.

At Perimeter Solutions, we're engaged in an intensive development program for fluorine-free technology that meets the highest level of fire suppression requirements and delivers the most environmentally friendly products on the market.

We're proud to have delivered numerous advances in fluorine-free technology to the market, starting with the first ever Class B fluorine-free foam concentrate – SOLBERG® RE-HEALING. Now, we're introducing SOLBERG AVIGARD™, a low-viscosity fluorine-free foam technology that meets ICAO standards for aviation applications.

What's next in fluorine-free? Call us and we'll tell you.

Solutions that Save. Lives. Property. The Environment.



FOR MORE INFORMATION

Contact any of our worldwide Perimeter Solutions Fire Safety offices or visit:

www.solbergfoam.com

www.Perimeter-Solutions.com

UNITED STATES

1520 Brookfield Avenue
Green Bay, WI 54313

Tel: +1 (920) 593-9445

salesfoamusa@perimeter-solutions.com

EMEA

Polígono Industrial de Baiña, Parcela 23
33682 Baiña-Mieres (Asturias) – Spain

Tel: +34 985 24 29 45

salesfoameea@perimeter-solutions.com

ASIA PACIFIC

3 Charles Street
St Marys NSW 0276 – Australia

Tel: +61 2 9673 5300

salesfoamapac@perimeter-solutions.com

perimeter-solutions.com



USING ROBOTS TO ASSIST IN FIREFIGHTING

In recent years there has been a shift toward keeping people away from hazardous situations where possible. In many countries around the world fire brigades have already implemented the use of remote-controlled solutions (such as robots), with great success as they strive to achieve greater levels of safety. In the same way, there is still an expectation to ensure effective fire suppression even where fire crews maybe be at a reduced capacity. In light of the current COVID-19 pandemic, it would be prudent to support emergency response teams (or individual firefighters), with equipment that can help them to do their job better and as such remote-controlled solution can be of great assistance.

The Emergency response robots allows fire fighters to get closer than ever to the fire while remaining at a safe distance. Every emergency response team has their own needs and requirements. As a result some fire brigades may need to use an emergency response robot in industrial process areas, tunnels and storage terminals, or for terrorist incidents. Not to mention the need for their use in urban areas, and whenever firefighters need to deal with hazardous substances or extreme temperatures. A well designed unit should be protected against heat radiation with a cooling

system to allow the robot to get even closer to the fire origin to suppress it with higher probability of success and without overheating itself. In this regard, the fire brigades can be better equipped to deal with fires while keeping the risks to firefighters at a minimum.

SA Fire Protection, are an Italian manufacturer of fixed firefighting systems and equipment who have developed a highly customisable emergency response unit named the "Robot-TINO" for firefighters which is designed to address all the features mentioned above in to one compact solution. In terms of manoeuvrability, the Robot-TINO gives the user complete flexibility to adjust direction (left/ right; forward/ backward) and height (up/ down movements & tilt). In addition to the high-visibility LED headlights and blinkers the Robot-TINO comes with, the unit can be fitted with cameras or sensors which can be used as a means of gathering intel when assessing the risks in inaccessible or dangerous areas, as well as assisting in search and rescue operations.

Due to its robust and durable design, the Robot-

TINO can enable emergency responders to perform their duties better and more safely. Furthermore, this remote-controlled solution including the firefighting monitor can be installed with other accessories to allow complete operation from a remote location. Depending on what is required, it is possible to fit the Robot-TINO with a wide variety of accessories to suit the needs of the fire brigade such as monitors, dry chemicals, foam, gas detectors or Infrared camera systems. All options available can be tailored and adapted to the specific application and requirements of the Emergency Response Team.

With robotics already playing a key role in firefighting, it is the duty of manufacturers like SA Fire Protection to ensure that there are reliable solutions available to meet the needs of modern firefighters while keeping them as safe as possible.





ON THE FRONTLINE TOGETHER WITH HEROES

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.

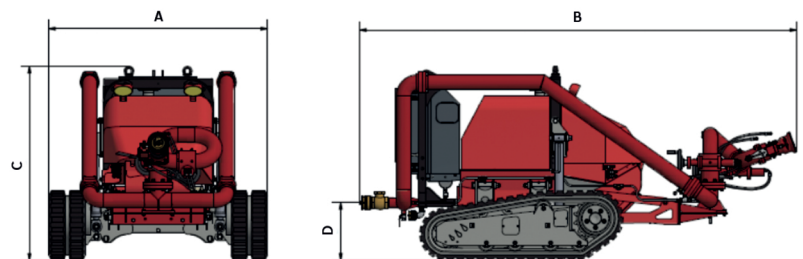
thewidefactory.it

Robot-TINO Firefighting Robot

OPTIONAL

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

DIMENSIONS AND WEIGHTS



Monitor Body	ØA BSP	A mm	B mm	C mm	D mm	Monitor Working Angles		Max. Flow rate lpm
						α	β	
4"	4x2 1/2"	1700	3400	1500	439	+15°	+85°	8500

MORE INFO ON: WWW.ROBOT-TINO.COM



NEW TECHNOLOGY FEATURE

HAVE YOU CONSIDERED USING VIRTUAL REALITY TO TRAIN, DEVELOP AND ASSESS YOUR FIREFIGHTERS?

The Fire Service College, Moreton-in-Marsh, Gloucestershire, in the UK are working with the team from FLAIM Systems in Melbourne, Australia to integrate the use of FLAIM Virtual Reality Firefighter into the day to day delivery of operational firefighter training & development and seeking support to accept and introduce this type of technology into the assessment methodology for firefighter standards.

WHY SHOULD THE FIRE SERVICE USE VIRTUAL REALITY FOR TRAINING?

For a long time now, there has been the promise that new technologies would transform the fire services. Whilst there have been significant advances in a number of areas there has been little to change the way training is conducted. A few years ago, the technology was not capable of providing a realistic alternative or contribution to hot fire training. However, recent developments have now changed the options available

to fire services and industry. It must be stated that the use of VR is not intended to replace hot fire training, but to add to the range of options to be used to train, develop, and assess firefighters.

Research undertaken in the UK shows that training firefighters in a VR environment produces similar outcomes to live training in the traditional manner. Humans learn by repetition and with VR it is possible to repeat training evolutions as often as required.

BENEFITS

There are many benefits for services using VR training that go far beyond improved training outcomes.

COST REDUCTION

One of the main advantages of FLAIM is that the use of this equipment takes the training to the firefighter, not the other way around, as is the case in many services today. The time saved

can be used for training instead of travel. The system can be moved to multiple locations at virtually no cost. It can be used by multiple users in the same location such as a fire station with multiple shifts. Training can take place at any time, night or day and is not adversely affected by weather. Volunteers or on call firefighters would be able to attend at a time convenient to them to undertake training. It enables a degree of flexibility, which is currently not available with the existing training options.

FLAIM allows for continued repetition of performance in a safe classroom environment, where training can be stopped and learning opportunities can be discussed across the delegates with the risk removed. This approach also reduces the requirement to build real practical scenarios, and the provision of extensive assets allocated to achieve the same learning outcomes, obviously this

also reduces cost.

ENVIRONMENTAL CONSIDERATIONS

Fire services have a legal and moral obligation to protect the environment. The use of VR training can aid in this goal. The system simulates the use of water as an extinguishing agent without any discharge. The system uses no water and therefore there is no water runoff. If you compare VR to live fire training the benefits are even more pronounced, whilst creating no air pollution.

When we consider the restrictions on the use of firefighting foams for training, how are firefighters supposed to get this experience, how will they know about full coverage and thickness of foam blankets? All of this can be achieved in the VR environment utilising FLAIM. Real time data is available to demonstrate time taken to bring the fire under control and air consumption.

OCCUPATIONAL HEALTH & SAFETY

There are many advantages from an OH&S standpoint. They include training in a totally controlled environment with no exposure to products of combustion, the physical forces and toxic extinguishing agents, including carcinogenic. VR enables trainees to "enter" dangerous environments and practice safe evolutions in a no risk environment. This approach significantly improves the health and wellbeing of the trainers and the trainees, less exposure to heat and smoke, less physical exertion, and no requirement to change in and out of dirty personal protective equipment, thus reducing exposure to contaminants.

Many of the scenarios would be unsafe to practice in real life such as a BLEVE and gas cylinders, however the system allows firefighters to practice for such uncommon, but risk critical events in a completely safe environment.

The reality is that thankfully the number and severity of fires is decreasing. There are many reasons for this decrease, which includes

community education, early fire detection because of smoke alarms, fire protection systems, including sprinklers and the 24/7 worldwide lifestyles.

Many people do not have the opportunity of experiencing aggressive internal attack in structure fires on a regular basis. Utilising FLAIM they can now learn, practise, and enhance their skills, knowledge and understanding prior to the real event, therefore benefiting from an enhanced level of muscle memory and leads to primes recognition decision making.

A result of using VR for training will result in less injuries on the training ground and because of improved skills, less risk of injury or death at incidents.

CAREER, ON-CALL AND VOLUNTEER FIREFIGHTERS

It is possible to put firefighters in an immersive environment, where they face a range of scenarios ranging from the common to the unusual. Whilst in the immersive environment it is encouraged that the firefighter will wear helmet, full protective clothing and gloves and will experience not only the visual but also radiated heat, noise, and jet reaction. They will also be dealing with the weight and sensation of using breathing apparatus. It all adds up to a very realistic immersive experience in which your decisions and actions will alter the outcome.

As the firefighter moves through the scenarios, a wide range of metrics are also being recorded. These include temperature, height above the floor, volume of water discharged, air consumption and heart rate. The collection of this data allows for meaningful examination of the participants performance, recognition, and exposure to unsafe conditions. Training staff or supervisors can monitor progress and actions in real time on a separate monitor. They can stop the scenario at any time and intervene or allow the scenario to play out.

After debriefing, the firefighter can then repeat the exercise to improve performance as often are required. There are a wide range of FLAIM scenarios available, which include domestic & commercial premises, several transport scenarios, petrochemical and wildfire incidents. However, it is possible to design and develop bespoke scenarios for clients also.

SELECTION OF STAFF

When organisations recruit staff, which includes career, on call or volunteer firefighters, there is a selection process. The use of VR will enable potential recruits to enter various scenarios and potential employers can observe their reactions. Potential recruits are currently exposed to activities, which replicate a range of work-based tasks. A number of these can be performed in the virtual environment. An example is the use of a hose line to enable the candidate to experience jet reaction. In the real world such an experience involves several members staff to ensure the safety of participants. In the virtual world, if the candidate lost control the nozzle would just drop to the ground with no risk to the candidate or staff.

Another significant benefit of using this equipment is it allows potential candidates to physically and mentally experience the role they are applying for. For some it will be a positive experience but for others they may decide this is not a role for them. Such decisions are of huge benefit both to the candidate and the service. The cost of engaging the wrong people has huge impacts on the service.

On the positive side, the use of this technology during recruitment can potentially assist in recruiting underrepresented groups such as women and certain ethnic groups. In addition, the younger applicants will have an expectation that technology plays a big part in their career choice. In volunteer and on call organisations, use of this equipment

NEW TECHNOLOGY FEATURE

may help retention by keeping the training relevant and interesting in a way not possible by existing training regimes.

EASE OF USE

FLAIM is very user friendly. It comes in three large suitcase style containers and can be set up in about 15 minutes. All that is needed is power, a flat open space and a monitor. Any flat open space such as a classroom is an acceptable and suitable space to deliver the training. It does not need specialised staff to operate the equipment as it is very user friendly and can be learnt in a short time, although training on FLAIM is provided on purchase.

OTHER USES

The use of VR is an excellent tool to engage the public as public events such as community engagement and/or open days. It will also be a hit with school children during

fire service visits to schools at the same time as providing the children with practical skills such as home evacuation.

Exposure to the system in public places may result in more applications from people interested in positions as career or volunteer firefighters.

Many services provide training to commercial and industrial clients on a fee for service basis. Potentially the use of these systems opens another income stream and has the benefit of people in the community understanding how to select and correctly use installed firefighting equipment.

In conclusion, fire and rescue services and private sector fire services must ask themselves the question with regard to current training regimes and exposure to risk and should consider the use of this type of technology to support and enhance

training going forward.

Training and desired learning outcomes can be achieved when using FLAIM with reduced cost of delivery, no damage to PPE and operational equipment, improvement to health and wellbeing of training staff and students and no impact on the environment.

Article provided by Ted O'Brien, Director of Product & Quality, The Fire Service College, UK

tobrien@fireservicecollege.ac.uk

www.fireservicecollege.ac.uk

Content contribution by Jeffrey Godfredson, AFSM, Director of International Relations, FLAIM Systems

jeffrey.godfredson@flaimsystems.com

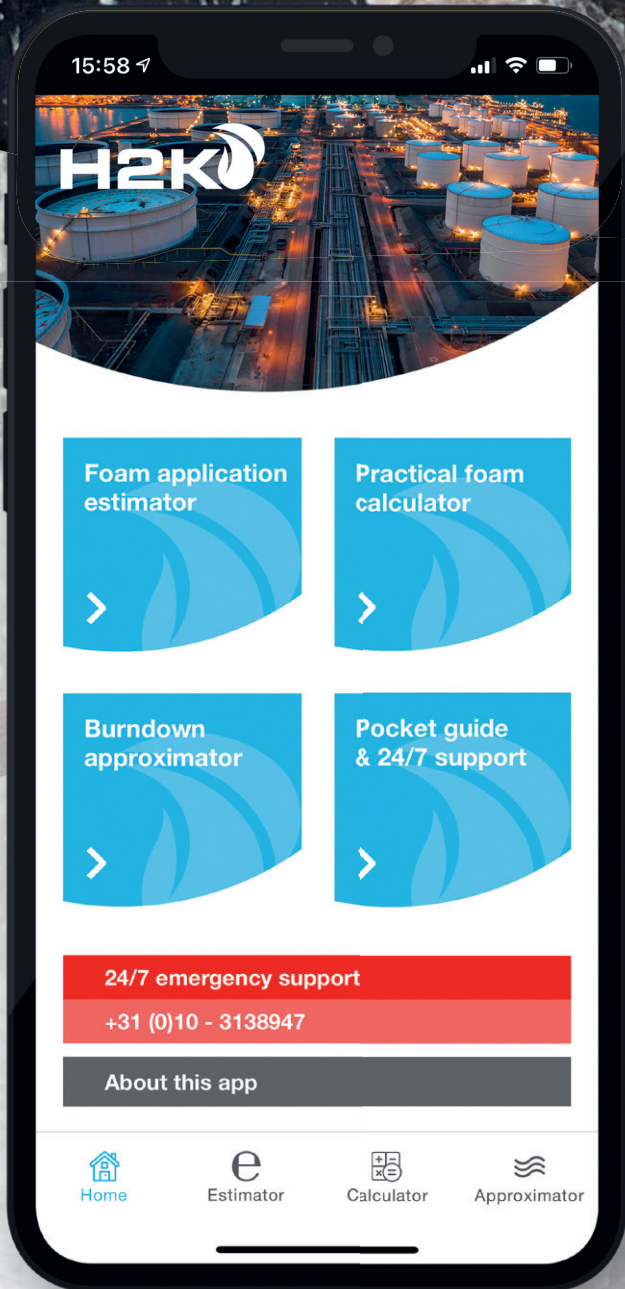
FLAIM Systems www.flaimsystems.com

Dr James Mullins, Chief Technology Officer, FLAIM Systems

james.mullins@flaimsystems.com

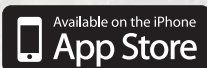


NEW



DOWNLOAD FREE

H2K Foam Calculator





FULL AUTOMATIC HOSE RECOVERY SYSTEM

- Only one person required for long distance hose collection
- One Hose Recovery Unit for multiple containers
- No manpower needed to flake the hose
- Hose deployment up to 20 km/h
- Containerised system

The Hytrans Fire System is developed for long distance and large scale water transport, and has proven performance in:

- Fighting large petrochemical fires
- Emergency cooling operations for nuclear reactors
- Reducing large scale floods



OVER THOUSAND UNITS OF EXPERIENCE!

Hytrans Fire System enables fast and reliable water transport over long distance.

Deployed in minutes with a minimum of manpower!



Hytrans Systems

NEW TECHNOLOGY
FEATURE

THE BENEFITS OF A VIRTUAL TRAINING PLATFORM THROUGH 'SOFTWARE AS A SERVICE' BUSINESS MODEL

Specialist training courses provided to first responders at airports, training academies, fire services, oil & gas companies and businesses working in high-risk environments are currently delivered using conventional tools such as tabletop exercises where members meet in an informal classroom setting to discuss roles and responsibilities during an emergency and form responses to a particular situation, or utilizing training aids such as PowerPoint presentations with static images and videos.

At the other end of the spectrum, simulated large exercise drills can be conducted using complex and expensive command and control software, these can take time to learn, to operate, and cost tens if not hundreds of thousands of dollars in a onetime purchase business model. To enable fire chiefs and training managers to provide better training for their teams, they need to have easy and affordable access to modern day tools such as virtual reality (VR), augmented reality (AR), and computer-generated imaging (CGI) platforms that provide interactive and realistic training experiences: the US fire administration states that

the "use of VR technology allows training for incidents that cannot easily be replicated or may be very costly to recreate, not to mention eliminating the hazards involved in 'live training'." (1) ARVR Journey also highlights that virtual reality is shaping the new training and development industry in multiple ways (2).

Lack of versatility and consistency are also an issue. Preparing training material and finding the right images and video content on the internet for every training session can be a time-consuming and hit-and-miss task that does not guarantee the same training experience across trainees and cohorts. This practice also meant that training managers could be using the same photos or videos on their computers over long periods of time due to the lack of new suitable interactive content which

facilitates a beneficial training sessions and also impacts training quality.

As noted by PwC, "employers are facing a dilemma: Their workforce needs to learn new skills, upgrade existing capabilities or complete compliance training, but may not be able to do so in person given the current environment. Yet, training is especially important now, with employees so keen to gain skills, and it may become even more critical when workers start returning to a changed workplace. So how can employers deal with the challenge? (3)"

Mismatch between physical facilities



NEW TECHNOLOGY FEATURE

and online simulated ones can also prove problematic. Specific to the fire industry, companies with existing training grounds often intend to replicate physical training in a virtual environment before they go out and conduct the “real” training outside. They want to replicate that live training in a safe virtual setting that looks and feels exactly like the facility they already have, to conduct briefings, debriefings, and pre-incident planning sessions.

Due to the high cost of investing in training software, versatile experiences are not available for everyone and that, as a result, it is difficult for trainees to understand the underlying hazards and risks in certain environments correctly.

So, what could be a good solution to solve all these problems and enable chief fire officers and training managers to easily put together an interactive training scene, in a collaborative manner that does not cost tens of thousands of dollars? And how can watch managers at remote fire stations maintain their competencies and keep their teams up to date with their training in a cost-effective way?

The answer may lie in a SaaS subscription model, which can bring down costs, as well as allows all participants to share their experiences and knowledge to benefit the industry, provide better training for all and at a lower cost across unlimited training

scenarios. Doing so would simplify building interactive virtual training environments for everyone working in a high-hazard industry, so that better training experiences can be delivered to their teams.

This approach improves the quality of training being delivered at every location - be it an oil company, a training institution, or an airport. It empowers training managers to recreate simulated hazardous environments and enables them to conduct hazard identification and risk assessment processes more clearly. It also gives them the flexibility to choose from a magnitude of options which has been suggested by their colleagues in the same industry but from a different region.

When expensive training software is prohibitive by high cost, software as a service (SaaS) virtual training model allows for scale, which results in more fire fighters being trained, less injuries, and less costs to business owners and the industry. Scalability in such a way allows for more people to be trained better, especially at remote fire stations where spending large budgets to train firefighters is not possible.

The benefits of having a subscription based training platform not only brings costs down and makes training environments available for everyone, but also being able to deliver better guidance and understanding of the risks involved in a safe environment across a wide range of potential

scenarios, ensuring that when first responders are faced with similar incidents in real life situations they are familiar with it, and they have had the proper training to deal with a wider range of such situations effectively.

The possibilities are endless, and through modern day technology; firefighters from all over the world can benefit from such a solution to enhance their skills and maintain their competencies while sharing knowledge and experience with their peers.

ABOUT STRUCTURUS

Structurus is a U.K. based technology company offering specialist services to three niche sectors: Fire, Oil & Gas, and Aviation. We are the only providers of subscription-based training and facility design software for fire and aircraft recovery applications.

ABOUT THE AUTHOR

Fares Corbaci (Founder) is a mechanical engineer and an executive MBA holder from Imperial College Business School in London. He has over 15 years' experience niche technology projects specialising in fire simulation, aircraft recovery, and oil & gas protection solutions. He specialises in strategy, and his expertise comprises project management, strategic consulting, technology, as well as product and service design. He founded Structurus in 2016 in response to the growing need for specialism and knowledge in this field.

1. Saving firefighter lives - https://www.usfa.fema.gov/training/coffee_break/070820.html

2. Expert View: 3 ways VR is transforming Learning & Development <https://arvrjourney.com/expert-view-3-ways-vr-is-transforming-learning-development-487a021e8334>

3. The VR advantage: how virtual reality is redefining soft skills training <https://www.pwc.com/us/en/services/consulting/technology/emerging-technology/vr-study-2020.html>





FOAM TRANSITION: HAVE YOU DONE YOUR HOMEWORK?

By Peter de Roos and Jochem van de Graaff | H2K

A Seveso company starts using new fluorine free foam concentrate and finds out during training that its fire crew lacks knowledge on the changed characteristics of the new foam: far from perfect. A public fire brigade calls H2K because their foam truck delivers no foam during an incident after changing foam concentrate: near miss? An agency seeking last minute assistance in performing F3 fire tests, one day before tendering for a new concentrate: poorly prepared. Three examples of ill-managed foam transitions.

To H2K this raises big concerns with regards to firefighter safety, public safety, protection of valuable assets and sometimes even protection of critical infrastructure.

More and more parties consider replacing their current foam concentrate to a fluorine free type (F3). Some are already taking steps to do so. With upcoming EU-restrictions and bans on usage of PFAS-components, it is actually a good moment to consider a transition to fluorine free foam. The awareness of companies, public fire brigades and other stakeholders regarding the PFAS-problems has been raised. That in itself is, environmentally speaking, a nice first step.

So, for many parties it is clear WHAT to do. A change to fluorine free foam concentrate is inevitable. So why not get started? The biggest challenge now – as the examples above show – is HOW make this transfer in a responsible and careful way.

Exchanging foam concentrates is not a free exercise. A foam concentrate is a part of a very well-developed and well-balanced system of fire safety that has been established and evolved over the past 50 years. Changing an important part of this system (such as the foam concentrate) should not be taken too lightly! An insufficient thought-out transfer can lead to a possible fail in delivering the required safety, and perhaps even unsafe situations.

To our regret we see a lot of 'swip-swap' changes happening. Empty the system to get rid of the old foam and pour the new one in. Although most (Seveso) companies have strict Management of Change (MoC) procedures in place, somehow the change of foam concentrate seems invulnerable to these kinds of procedures. And with this, a lot of critical focus points are missed. This inevitably leads to potentially dangerous situations.

For our consultancy projects, we use a

performance-based model to guide foam transitions. The model is now published in our new whitepaper. By 'performance-based' we mean that a now working foam system (fixed or mobile) is analysed on its current performance. And that the outcome of the transition, should have equal or better performance.

First step in our approach, is a full analysis of all stakes and stakeholders. The fire chief and operational procurer are namely not the only two. A new type of foam concentrate will influence most likely equipment, insurance, authorities, pre-fire planning, certification, (sub) contractors for maintenance, firefighting training programs, techniques, finance, etc. So, there is a broad playing field with many interests at stake.

Subsequently a definition phase starts. What will happen if we change a foam concentrate in this system? Is the current equipment and material suitable for the new type of foam? What are possible disadvantages of making the change? From our practical experience: a lot is still unknown about the working properties, effectiveness, etc. of fluorine free foam. Especially in larger scenarios with specific fuels.

Hence, we introduce phase three as option phase. What different options

Cont...

are there? Is it for instance better to use different foam concentrates for different specific scenarios? Does a new foam concentrate demand adjustment to pumping and proportioning systems? For this phase our advice is quite simple: testing, testing, testing! We keep re-emphasizing the need for practical and thorough testing to become aware of the up- and downsides of other types of foam in an existing system. It helps to do sufficient market research and make sure all the relevant properties are disclosed. If needed, the obtained outcomes can be

looped back into the definition phase for re-evaluation.

After all questions are answered and uncertainties are resolved the final direction of your transition should become clear. Conflicting stakes, organisational problems and practical obstacles are road mapped and can now addressed through a Management of Change-procedure. Perhaps appointing a formal project manager is needed for proper and orderly implementation.

We believe in this performance-based approach, as it assures our customers and their stakeholders in real and practical safety measures that work. With this systematic and orderly approach, H2K supports its customers to make changes in their complex fire safety and firefighting system.

More on this topic in our new whitepaper 'Foam transition, step by step' available for free through our website www.h2k.nl/en

DISPOSAL OF AFFF, FFFP AND FP: CHALLENGES AND EMERGING SOLUTIONS

Ian Ross Ph.D. Arcadis, Leeds, West Yorkshire, UK.

Increasing attention to the environmental and human health effects of per- and polyfluoroalkyl substances (PFAS) is leading to the development of increasingly conservative (low) regulatory levels for PFAS in drinking water, soil, groundwater, sediments and surface waters [1-5]. As an increasing number of PFASs, including both long chain (C8) and shorter chain (C6, C4 etc.) are regulated in drinking water, surface waters, soils and groundwater [4, 6] and the uses of firefighting foams containing PFASs are being curtailed in multiple jurisdictions, with many foam users are or have transitioned to using fluorine free firefighting (F3) foams [7, 8], with their extinguishment performance proven in International Civil Aviation Organization (ICAO) tests since 2002 [9]. As a result of the transition to F3 foams an increasing volume of fluorinated firefighting foams require treatment, with traditional disposal options being challenged, a series of alternative technologies are being developed.

Firefighting foams that contain PFASs include not just aqueous film forming foams (AFFF) but also fluoroprotein based foams namely fluoroprotein (FP) foams and film forming fluoroprotein (FFFP) foams. These are all used to extinguish Class B, flammable liquids fires, with their ongoing use coming under significant regulatory scrutiny [10]. The ultimate goal of treating water containing PFAS is destruction of the PFAS. The chemical stability that has enabled sales of PFAS for fire response and commercial uses makes this class of

compounds extremely difficult and expensive to destroy in liquid waste streams.

There is often confusion regarding the many acronyms used to describe differing PFAS, so to provide some clarity regarding acronyms, the term PFAS or PFASs describes all the fluorosurfactants that have been characterised in firefighting foams, including C6, C8 and fluorotelomer based foams and all the compounds used in industry which contain a perfluoroalkyl group [11]. To detect these PFAS in firefighting foam and other products the total oxidisable precursor (TOP) assay is required. All fluorinated firefighting foams, characterised to date, contain polyfluorinated "precursors" to the regulated PFASs, so conventional analysis such as use of EPA methods 533 and 537.1 cannot assess the concentrations of principle PFASs in most fluorinated foams [5, 12].

Firefighting foams containing PFASs usually include high concentrations of glycols along with lower concentrations of hydrocarbon-based surfactants. Additives such as polysaccharide gums, sugars, corrosion inhibitors and biocides are also often included [13]. This combination of extremely persistent PFASs combined with high concentrations of biodegradable organics makes fluorinated firefighting foams comprise a complex waste.

As a result of the inability of micro-organisms to biodegrade all PFAS in the environment [14], dispensed fluorinated foams and foam concentrates cannot be treated using biological wastewater treatment plants. Meaning municipal sewage treatment or publicly operated treatment works (POTW) cannot treat PFAS. So any volume of AFFF, FFFP and FP concentrate or foam

mix should not be dispensed to any foul sewer, as biological treatment is not possible using conventional biological wastewater treatment plants [10]. Multiple farms in Maine have now been closed as a result of PFAS associated with biosolids impacting milk and beef [15]. Disposal of fluorine free foams via a sewer will be facile, once the foam vendor has confirmed that all individual ingredients are readily biodegradable. This data can easily be used to support disposal via the sewerage system as conventional biological treatment methods will be effective.

There have been a recent preliminary report describing that an extremely slow growing micro-organism may be degrading PFASs but these initial and limited experiments require repetition [16]. The organism described only survives in iron rich anaerobic environments where it can use ammonium as a source of energy, which are extreme niche conditions. Aerobic wastewater treatment plants and anaerobic digesters have been demonstrated to be ineffective for treatment of PFAS [14, 17]. PFAS have not been reported to be present on the earth over geological time with a very limited number of biogenic monofluorinated organics produced by plants [18], so represent true xenobiotics (foreigners to the biosphere). As microorganisms have not been exposed to PFAS prior to the 1930's it may take millions of years for them to evolve to find a metabolic use for them, with many other compounds being metabolised in preference. Then as PFAS are fully oxidised they cannot be a source of food to microbes (carbon source and electron donor) for metabolism.



The incineration of liquids containing PFASs, such as fluorinated foam concentrates has been common practice for many years. This approach is now proving to be problematic in U.S. with claims that for treatment of firefighting foams, there has been failure to conduct any environmental review and to comply with applicable environmental requirements and that PFAS do not readily burn and are not destroyed under typical incineration conditions [19].

Complete mineralization of PFOS adsorbed to GAC is reported at 1,000°C (Watanabe, et al. 2016). However, reported evidence in the literature is conflicting on the temperatures required for complete defluorination of PFAS. There are unresolved questions on the fate of PFAS present in liquid waste streams subject to incineration. When incinerating liquids, temperatures required for thermal destruction of PFAS will result in steam discharge from the stack, which has been observed during long term flue gas sampling to include PFOS and PFOA. Post-combustion data indicates residuals of PFOS were observed in laboratory incineration trials and in municipal solid waste ash [20]. A former incinerator ash lagoon in Michigan is under investigation as a potential source of PFAS [21] and there are reports PFAS being detected in soil and water close to an incinerator [22], which may indicate that residual liabilities associated with incineration of AFFF concentrates are not extinguished by application of this treatment process. However, despite concerns of incomplete combustion of PFAS in liquid matrices during incineration, incineration remains the primary destruction technology for PFAS in many jurisdictions.

A USEPA brief describing incineration conditions for PFAS indicates that for unimolecular decomposition, fluorinated organic compounds require temperatures above 1,000°C to achieve 99.99% destruction in 1 second residence time [23]. The most difficult fluorinated organic compound to decompose was identified as CF₄ requiring temperatures over 1,400 °C, but is easily monitored, making it a potential candidate for destructibility trials [23]. The US EPA held a PFAS thermal destruction workshop in Spring of 2020 and this subject continues to be an active area of research for the scientific community.

From a waste treatment perspective, wastes generated during foam transition include AFFF, FFFP or FP concentrate, foam mix from proportioning test work, fire water drainage, decontamination solutions, and solid waste in the form of impacted piping, components, and tank bladders.

Alternative treatment systems such as the use of granular activated carbon (GAC) for the long chain PFAS and ion exchange resin (IX) for the short chain PFAS could be applied to treat firewater impacted with PFAS. However, the performance of GAC and resin treatment systems can be severely compromised by other organic compounds in the foam matrix (e.g., natural organic matter and glycols) which can coat adsorption sites and inorganics (e.g., natural anions) which compete with PFAS for binding capacity. Foam fractionation is one alternative treatment process that will not be impacted by co-contaminants.

Other waste treatment alternatives such as cement kilns as demonstrated in Australia show promise as a practical destruction process because of their high temperatures, long residence time, and excess calcium that takes up fluorine. However, along with incineration, cement kilns may also require comprehensive assessment of organo-fluorine compounds in air emissions.

With the immediate need for destructive technologies to effectively mineralise PFAS without forming by-products or gaseous emissions, Arcadis has furthered the development of destructive methods for PFAS which operate effectively at ambient temperature using ultrasound and is also working on trials using electron beams and supercritical water.

Use of ultrasound is termed sonolysis and it can completely destroy PFAS, mineralizing them to form fluoride and carbon dioxide at temperatures around 30°C, with recent work elucidating its potential mechanism of action [24]. This technology is being scaled up and adapted with pre-treatment technologies to address firefighting foam concentrates. Other technologies being applied include electrochemical approaches; however, they convert any chloride or bromide in waste streams to perchlorate and bromate which are pollutants requiring further treatment. To conclude, the commercially available technologies to comprehensively destroy PFAS appear to be lacking or need to be validated. There are emerging approaches which show promise, but require funding to enable their scale up for commercial use, in what is likely an immense emerging market as the need to destroy PFAS in multiple water streams. The need for effective methods of destruction will likely grow, especially considering that fluorinated firefighting foams are being replaced with F3 foams globally.

1. Ray, J.P. PFAS Litigation: Just Getting Started? 2019; Available from: <https://www.americanbar.org/groups/litigation/committees/environmental-energy/articles/2019/winter2019-pfas-litigation-just-getting-started/>.
2. Hogue, C. U.S. class-action case targets nine PFAS makers. 2018; Available from: <https://cen.acs.org/policy/litigation/US-class-action-case-targets/96/i41>.
3. DeMeo, R.A., Brooks, L. D. What in the PFAS is Going On? 2019; Available from: <https://www.youtube.com/watch?v=Ga4N6Y0qhlq>.

4. Ross, I., et al., Emerging Contaminants Handbook. Book, 2018.
5. Ross, I., Kalve E., McDonough, J., Hurst, J., Miles, J., Pancras, T., Per- and Polyfluoroalkyl Substances, in Emerging Contaminants Handbook, M.G. Caitlin Bell, Erica Kalve, Ian Ross, John Horst, Suthan Suthersan, Editor. 2019, CRC Press: Boca Raton, FL, USA. p. 85-257.
6. Ross, I., Hurst, J., Managing Risks and Liabilities associated with Per- and Polyfluoroalkyl Substances (PFASs). CL:AIRE Technical Bulletin TB19 2019; Available from: <https://www.claire.co.uk/component/phocadownload/category/17-technical-bulletins?download=668:tb-19-managing-risks-and-liabilities-associated-with-per-and-polyfluoroalkyl-substances-pfas-2019>.
7. Allcorn, M., Bluteau, T., Corfield, J., Day, G., Cornelsen, M., Holmes, N.J.C., Klein, R.A., McDowall, and K.T. J.G. Olsen, Ramsden, N., Ross, I., Schaefer, T.H. I., Weber, R., Whitehead, K. Fluorine-Free Firefighting Foams (3F) – Viable Alternatives to Fluorinated Aqueous Film-Forming Foams (AFFF). White Paper prepared for the IPEN by members of the IPEN F3 Panel and associates, POPRC-14, Rome 17-21 September 2018. 2018; Available from: https://ipen.org/sites/default/files/documents/IPEN_F3_Position_Paper_POPRC-14_12September2018d.pdf.
8. Bluteau, T., Cornelsen, M., Day, G., Holmes, N.J.C., Klein, R.A., Olsen, K.T., McDowall, J.G., and R. Stewart, Tisbury, M., Webb, S., Whitehead, K., Ystanes, L. THE GLOBAL PFAS PROBLEM: FLUORINE-FREE ALTERNATIVES AS SOLUTIONS FIREFIGHTING FOAMS AND OTHER SOURCES - GOING FLUORINE-FREE. IPEN 2019/Stockholm Convention COP-9 White Paper 2019; Available from: https://ipen.org/sites/default/files/documents/the_global_pfas_problem-v1_5_final_18_april.pdf.
9. Schaefer, T.H., Dlugogorski, B.S., Kennedy, E.M. New Foam Technology, New Found Benefits. 2005; Available from: <https://www.solbergfoam.com/getattachment/c5bef149-b850-48df-81a8-19b977c6daed/New-Foam-Technology,-New-Found-Results.aspx>.
10. Ross, I. and P. Storch, Foam Transition: Is it as simple as "foam out / foam in?", in Catalyst. 2020, JOIFF. p. 1-19.
11. OECD. Comprehensive global database of per- and polyfluoroalkyl substances (PFASs). 2018; Available from: https://urldefense.proofpoint.com/v2?url=https://3A_www.oecd.org/chemicalsafety_risk-2Dmanagement_global-2Ddatabase-2Dof-2Dper-2Dand-2Dpolyfluoroalkyl-2Dsubstances.xlsx&d=DwMFAg&e=ipTxeipKGw9ZbZ5Dlo0lybSxHDHliYksG4icXfalgk&r=vDRSWKVBqGqVUIflmGQWVd5-426hJlO1zHhzz_48Z2Y&m=BF1JbwFkvEqQMZOEFXflimitJ6URbVpHGHL6QovNT4&s=xT5RZuTaOUUt_8RnCuauNNUHDpwevapFMZ9GqEHrwY&e=
12. Ross, I., Houtz, E., Kalve, E., McDonough, J., Hurst, J. and Miles, J.A.L., PFASs and the TOP Assay. INDUSTRIAL FIRE JOURNAL. 2018. First Quarter: p. 26.
13. Kempisty, D.M., Xing, Y., Racz, L., Perfluoroalkyl Substances in the Environment: Theory, Practice, and Innovation. 2019, Boca Raton, FL: CRC Press.
14. Liu, J. and S. Mejia Avendano, Microbial degradation of polyfluoroalkyl chemicals in the environment: a review. Environment International, 2013. 61: p. 98-114.
15. Treat, S.A. With a second farm shuttered due to massive PFAS contamination, Maine legislators weigh easing access to the courts. 2020; Available from: <https://www.iatp.org/blog/202007/second-farm-shuttered-due-massive-pfas-contamination-maine-legislators-weigh-easing>.
16. Huang, S. and P.R. Jaffe, Defluorination of Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) by Acidimicrobium sp. Strain A6. Environ Sci Technol, 2019. 53(19): p. 11410-11419.
17. Zhang, S., et al., 6:2 and 8:2 fluorotelomer alcohol anaerobic biotransformation in digester sludge from a WWTP under methanogenic conditions. Environ Sci Technol, 2013. 47(9): p. 4227-35.
18. Gribble, G., Naturally occurring organofluorines. The Handbook of Environmental Chemistry, ed. A.H. Neilson. Vol. 3. 2002, Berlin, Heidelberg: Springer. 121–136.
19. KALMUSS-KATZ, J. COMPLAINT FOR DECLARATORY AND INJUNCTIVE RELIEF 2020; Available from: https://earthjustice.org/sites/default/files/files/filed_complaint_-_pfas_incineration_suit.pdf.
20. Horst, J.M., J., Ross I., Houtz, E., Understanding and Managing the Potential By-Products of PFAS Destruction. Ground Water, 2020. 48(5): p. 627-32.
21. Kent County, Grand Rapids, Grand Rapids Water Resource Recovery Facility, Former Incinerator Ash Lagoon. 2020; Available from: https://www.michigan.gov/pfasresponse/0,9038,7-365-86511_95645-529272-,00.html.
22. Lerner, S. TOXIC PFAS FALLOUT FOUND NEAR INCINERATOR IN UPSTATE NEW YORK. 2020; Available from: <https://theintercept.com/2020/04/28/toxic-pfas-aff-upstate-new-york/>.
23. USEPA, Per- and Polyfluoroalkyl Substances (PFAS): Incineration to Manage PFAS Waste Streams. 2019.
24. James Wood, R., et al., Ultrasonic degradation of perfluorooctane sulfonic acid (PFOS) correlated with sonochemical and sonoluminescence characterisation. Ultrason Sonochem, 2020. 68: p. 105196.



ELECTRONIC FOAM PROPORTIONING

THE ANSWER TO HIGH VOLUME APPLICATIONS, ACCURACY & PEACE OF MIND.

Question: “Do you know if your foam firefighting system is working TODAY?”

One of the most hazardous risks in a tank storage terminal or other oil & gas installations is the potential for a large hydrocarbon release or spill. If such spills ignite and are not suppressed quickly then they can develop into a major fire scenario, this type of fire can only be extinguished using a fully functioning foam suppression system.

To ensure reliability and confidence in any foam system there are standards and legislation in place regarding periodic testing. These tests may not always be mandatory and with the added concerns of potential environmental damage plus the high cost of clean-up there can be a reluctance from many job sites to undertake such tests. Even where periodic testing is conducted, consideration should be given to the daily status of these systems – it is important to know that assets and employees are always well protected, even between test cycles.

A key part of a foam system is the foam proportioner and whilst simple is always best when dealing with firefighting systems there are instances where a level of additional technology can provide

other benefits and reassurances.

KNOWSLEY SK FOAM PROPORTIONING SOLUTIONS

Knowsley SK has developed multiple solutions to upgrade foam suppression systems, from the simplicity of the “plug and play” Turbinator which meets the requirements of most small to medium applications to the FoamTronic® electronic proportioning system.

FoamTronic® is an electronic foam mixing system which very accurately mixes foam concentrate and water based on the actual firewater demand of the system. This is achieved by continuous monitoring of the firewater and foam concentrate flows using electromagnetic flowmeters and real-time adjustment of the concentrate control valve. The accuracy and stability of the system is based on the combination of specially selected components and a unique control system with state-of-the-art logic developed specifically for FoamTronic®. The control system records all process values and alarms during operation or test which are available via a user-friendly interface.

Due to the selection of high-quality industrial grade instrumentation and flow control valve it is possible to obtain a very precise mixing ratio. With

FoamTronic® technology this accuracy can be controlled to finite levels and will automatically adjust to changes in system demand. The FoamTronic® has the possibility to create two different mixing ratios depending on the activation command coming into the system. The required mixing ratios can be set using the touch screen user interface.

An upgrade to a FoamTronic® system results in a suppression system that can be tested without any negative impact on the environment and at a very low cost. This is possible because the FoamTronic® can test the mixing ratio without mixing firewater and foam concentrate, but still providing an accurate and reliable measurement of the mixing rate.

RETURN ON INVESTMENT

FoamTronic® is suitable for any flow rate and is especially advantageous when looking at large volume flows which are required for tank bund systems or large diameter storage tanks. Multiple tank terminal owners have already chosen to upgrade their systems with FoamTronic®. This upgrade has a short return on investment because the ability to confidently test without mixing foam, or the accuracy achieved in situations where full discharge tests must be undertaken will ensure only the precise amount of foam concentrate required will be used.

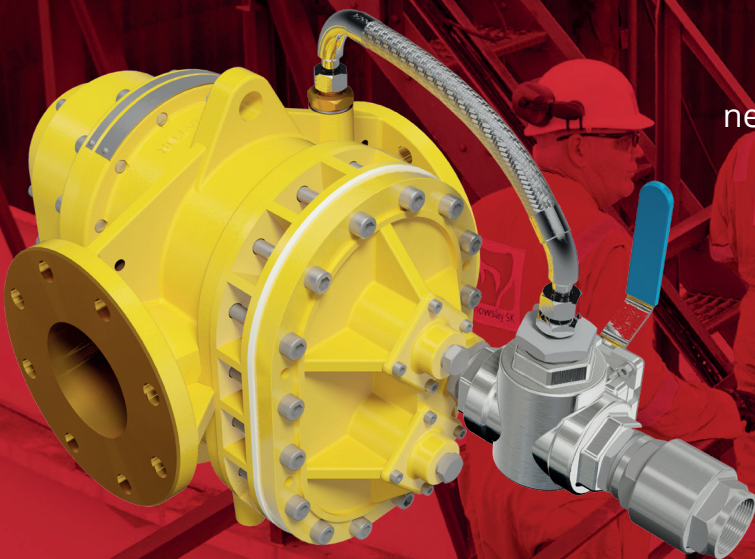
Conf...



FOAM PROPORTIONING SYSTEMS ONE PROBLEM - MULTIPLE SOLUTIONS

Turbinator

Foam Mixing Technology



MECHANICAL



FIXED



TRUCK



MOBILE



Easily installed into new or existing systems

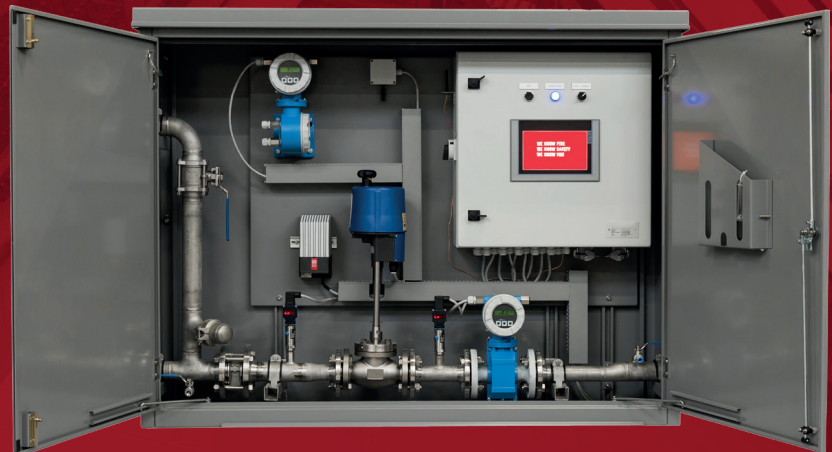


Plug and play



For low and medium flowrates

FoamTronic®



ELECTRONIC



Reduce costs of testing



Pin-point accuracy



For high flowrates

KNOWSLEYSK.CO.UK

FOLLOW US ON SOCIAL MEDIA



Potentially huge savings are made on high flow systems.

The quality and performance of the produced foam depends greatly on the mixing ratio of foam concentrate into the fire water stream for which NFPA and other standards provide tolerance bands, these are typically 30% higher than the necessary proportioning rate.

On small and medium sized systems this "additional" usage of foam liquid may be negligible but when considering very large volume flowrates as may be seen in tank storage applications then the ability to ensure that the accuracy of the foam to water mix is as close as possible to the desired proportioning rate will save considerable volumes of foam concentrate and cost.

In fact, the capital cost of the system will even be reduced because stored volumes of foam liquid and infrastructure will also be optimised.

In operation, or if actual proportioning

tests be undertaken then the amount of foam concentrate expended will also be optimised and with due consideration to the high cost of such liquids a simple return-on-investment calculation can be performed to prove the benefits of electronic proportioning.

RETRO-FIT INTO EXISTING SYSTEMS

An electronic foam proportioner can be installed as a replacement for any inline balanced pressure proportioner where a positive pressure foam concentrate supply is available. This retro-fit will also be future proof against any further changes on the job site to foams of different types and percentages which gives peace of mind when considering capital investment in equipment and the current uncertainty of foam concentrate suitability for some applications.

For more information and to arrange a discussion about a specific application visit us at

www.knowsleysk.co.uk



THREE REASONS YOU NEED TO PRACTICE YOUR EMERGENCY RESPONSE

Fortunately, emergency situations are relatively rare on high-hazard sites in the UK. However, this means that there aren't many opportunities to practice emergency response skills in live situations and glean the benefits of experience and reflection on what worked and what needs improvement. Add in the complications that COVID-19 has introduced to working in groups and there are even fewer opportunities to practice emergency response skills. This sums up exactly why we can't ignore the importance of regular training and exercises. Looked at in terms of the Swiss Cheese Model, COVID-19 is a huge hole just waiting to catch someone out because their emergency response skills have not been kept up to date.

SKILL FADE

With the many demands of the day job crowding out the best intentions of a regular training programme, organisations are often left with what we describe as a 'saw-tooth profile' of competence development. Competence goes up quickly during the training period, then gradually reduces over the following months because the skills are not exercised. This translates into the actual level of preparedness for tackling emergency situations tracking up and down. The point is, learning and development of any type needs to be regularly practised and exercised for it to become embedded.

To address this problem we recommend that organisations develop a competence maintenance training programme in order to assure preparedness and a consistently effective emergency response. This means scheduling time to discuss and review learning as well as carrying out exercises on the practical side in order to keep skills fresh, rather than relying on a ten-minute toolbox talk once every six months.

Regular refresher training helps maintain familiarity with the core processes and common response actions required, such as quickly completing a full site muster and confirming everyone is accounted for.

Larger scale emergency response scenarios that allow the operational-level Emergency Response Team (ERT) to link up with the tactical-level Incident Management Team (IMT) should also be used. This provides an opportunity for the IMT to refresh their skills at the same time. The IMT look at the exercise scenarios from the perspective of protecting the whole site and consider the wider implications and other considerations such as business continuity. Any opportunity to practice and refresh these skills is always valuable.

PERSONNEL CHANGES

Organisations, particularly larger ones, see changes to their personnel on an almost daily basis. Promotions, changes in roles and responsibilities, people joining and people leaving all contribute to the ever-changing profile of an organisation's emergency response capability. Scheduled leave and sickness absence also contribute to the shifting picture. Accurate training records help you track who has been on what course and when, but they cannot predict when someone might leave or change roles. It is vital therefore to regularly review your emergency response capability from an organisational perspective and make sure that a sufficient number of trained individuals are available on every shift to fill essential emergency response roles, such as Site Main Controller (SMC) and Site Incident Controller (SIC).

We recommend that organisations develop a pool of competent individuals with the relevant skills and training sufficient to cover each key role for each shift, as a minimum requirement. We also recommend additional personnel are given the same training, so they can easily provide backup cover when required. It is surprising how often we see the impact that planned and unplanned leave has on the availability of staff and ongoing ability to cover key emergency response roles, particularly if a situation becomes protracted and requires changes in personnel.

It must therefore be emphasised that organisations can achieve a key level of resilience in their emergency response capability by maintaining an adequate number of people with the necessary training. When key personnel become suddenly unavailable others should immediately be able to step up. This therefore smooths out the impact of personnel changes on the profile of your emergency response capability.

REGULATORY COMPLIANCE

Last, but by no means least, there are the Control Of Major Accident Hazards (COMAH) Regulations. One requirement of the COMAH Regulations that organisations need to be able to demonstrate is competence in key emergency response roles, such as SMC and SIC, for example. Organisations need to be able to demonstrate this competence on a 24/7/365 basis. Emergencies can happen at any time so this level of preparedness is a necessary requirement of operations under the COMAH Regulations.

Organisations also need to be able to demonstrate a systematic auditable approach to emergency response management that includes training and competence assurance. Tracking who has been trained and when, and importantly when the next refresher training is due, is an essential component of any robust Safety Management System.

It is relatively straightforward to demonstrate competence in key emergency response roles if the two topics discussed above – skill fade and personnel changes – have been adequately addressed. If an organisation conducts regular emergency response training and exercises and mitigates the impact that changes in personnel could have on the profile of emergency response capability, then this goes a long way towards demonstrating competence and therefore compliance with this aspect of the COMAH Regulations.

EDITOR'S NOTE:

Tim Bird manages Eddystone Consulting Ltd and the Response Academy. He has a unique approach to building competence in emergency management, especially in High Reliability Organisations. Since 2002, Eddystone has designed and run hundreds of exercises, including multi-agency and industry-wide, with over 150 organisations including BP, Microsoft, National Grid, Centrica and NATO. For more information, contact Tim at tim.bird@eddistone.com or +44 14336 59800





OUTSOURCING: EMERGENCY RESPONSE AS A SERVICE

Safety is a crucial precondition that must be met to legitimate a company's license to operate. An adequate emergency response organization that is tailored to the risk profile and scenario analysis of an industrial area is an essential aspect in this matter. For almost all industrial areas emergency response is a support process that differs markedly from the core activities. For this reason one can choose to outsource the fulfilment of this support process to a specialized service provider. This article gives an insight in advantages, possibilities and points of attention when outsourcing emergency response services.

THE MAIN ADVANTAGES OF OUTSOURCING

The main advantage of outsourcing emergency response to a specialised service provider is bringing a specialised company in for the day to day management of the emergency response organization. In almost every case emergency response differs from the companies' main processes. Often this means that work processes and procedures are not designed for optimal daily management of an emergency response organization. However, proper daily management is crucial in a specialized work field like emergency response. To secure the quality, effectiveness and work safety of this type of organization a high level of knowledge and attention

to detail is necessary to i.e. ensure reliable equipment and sufficient training and drills. Dedicated management by an experienced organization helps to secure these essential criteria.

Note that even when outsourcing emergency response services and its daily management, adequate contract management is important. The client companies must be very clear about expectations and the desired level of quality. Including clear key performance indicators (KPI's) and delivery criteria in the contract allows the stakeholders to periodically evaluate and test the emergency response performance and guarantee the quality of service.

THE EMERGENCY RESPONSE SERVICE PROVIDERS: A WORLDWIDE MARKET

Probably, most people don't have a few emergency response service providers in their cell phone or know by heart where to find them. When digging deeper a preliminary market analysis shows that at least 65 service providers can be identified in a worldwide market. There are big differences between these providers regarding i.e. the exact type of services they provide and the markets/areas they serve. The first category we found includes service providers that provide permanent 24/7 on-site services with regard to incident prevention and preparation, such as a company fire brigade. They are located within the specific (industrial) site/area, are able to respond within minutes and are tailored to the specific site. The organization may or may not be built (originally) to specifically service only one site, area or company.

Another type of service provider provides standby services as required. That means services that are on standby during specific activities such as facility turn-arounds, just in case they are needed. Such services are typically project-based and thus for limited time periods (short, medium or long term), and apply to emergency and/or non-emergency incidents.

Yet another type of service providers provides call-off services: services that are dispatched only when they are required during a large-scale incident. They possibly need to come from far away, as they are dispatched from headquarters or operations centres and usually respond within 24 or 48 hours.

To conclude there is a large group of companies in related fields, such as security, technical service providers, medical and training and consultancy companies.

SETTING REQUIREMENTS TOGETHER

Judging a service provider's expected performance can only be done by setting clear requirements and criteria to be met as well as clearly specifying how these will be evaluated. This starts not with a contract but when procuring the required emergency services, regardless whether this is done through a bidding or tender process. Starting point is the Request for Proposal (RFP): a document that invites potential suppliers to submit



a business proposal for the provision of a certain commodity, service or asset. The RFP presents preliminary requirements for the commodity or service, and may dictate to varying degrees the exact structure and format of the supplier's response.

When drafting an RFP it is key to identify requirements and criteria that are key for a good functioning emergency response system that meets your area's needs. A starting point may be to analyse the sources that may drive potential requirements for emergency response, such as:

1. Legal and licensing requirements;
2. (Inter)national standards;
3. Insurance conditions;
4. Contractual obligations;
5. Management considerations.

This is an important step, as proposal selection is the joint domain of the procurement office and the emergency response expert. For example the personnel capacity and training as well as the equipment proposed must be suitable to address the scenario's relevant for your site and the tasks specified; interconnectivity between any equipment proposed and (fixed) systems already present must be guaranteed etc. Consider also the

need to adhere to certain standards as quality insurance and/or to comply with insurance policies or governmental directives.

When multiple companies or sites collectively outsource services it is imperative to check whether requirements differ throughout the stakeholders involved.

SELECTING THE BEST FIT TOGETHER

The goal of any selection process is to identify the best fitting proposal. A first step in an evaluation process should be to weed out proposals that are not suitable, and shortlist the proposals with the most potential. To this end one can define minimum requirements. There are many technical requirements and quality criteria that are to be met before an offer can be considered suitable. For example that a proposal must score at least 70% on the technical aspect to be considered for the financial and final scoring, or that a service provider must have a track record over a certain number of years.

When a service provider for a collective emergency response organization is selected, the evaluation process must be done such that the stakeholder collective involved will support the final choice.

Transparency and involvement are often key elements in such a process. Sharp, predefined evaluation criteria help achieve a transparent and uniform evaluation process. One needs a clear predefined framework stating how many points can be awarded per element of a proposal as well as clear instructions for the evaluators on how to award scores: when does one get i.e. 100, 80, 50, 20 or 0%? Involvement of all parties can be achieved by including a representative per company in the evaluation committee. Support from an internal or external expert, preferably one involved with drafting the Request for Proposal, may contribute to a better understanding of the technical requirements in the RFP and the proposals submitted.

THE STRENGTH OF COLLABORATION: MUTUAL AID, AND OUTSOURCING

There are numerous examples of areas that have an agreement to facilitate the exchange of emergency response equipment or emergency responders between Mutual Aid partners. Similarly there are several examples in which a separate legal entity is established to fulfil the emergency response for the associate stakeholders in the area. Another known set-up is that expensive and



rarely used emergency response resources are funded, maintained and managed collectively. This results in an opportunity to increase effectiveness and quality of service, by effectively and cost efficiently providing preparedness and coverage for large scenarios that have a very low frequency of appearance but a very large impact. Mutual Aid comes in different forms and there is no dominant blueprint.

Outsourced emergency response activities can be the tangible output of a mutual aid initiative in which multiple companies collectively organize emergency response services. An outsourced (collective) emergency response organization can also collaborate with other partners in a mutual aid agreement to cover large scale or specific scenario's that require extensive and/or specialized resources. It is an effective and cost efficient way to provide the needed support for any large scale scenario without having to provide in a very extensive and expensive emergency response organization yourself. As is done in a middle eastern port one could choose to provide 'only' a concise basic capacity on site, tailored to the frequently occurring, most credible scenario's. Knowing that a mutual aid system is in place if any additional support is needed, this results in a cost-efficient and very effective emergency response system.

CONCLUSION

Emergency response is a crucial and very specialized support process for industrial areas. Companies are not necessarily set-up and equipped to provide adequate daily management to a joint emergency response organisation. Outsourcing emergency response services to a specialized service provider may provide a solution.

Before approaching and selecting a service provider it is important to know the market and how it fits to your needs and requirements. Service providers differ in the services they offer, the countries they operate in, their track record etc. The process of defining an agreed Request for Proposal or programme of requirements is an essential step to match the market with companies' needs. Prioritization of the requirements is necessary to avoid making a false step in the process.



Above: Gaby Van Melick

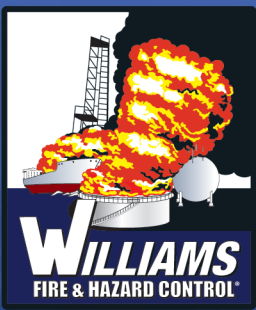


Above: Philip Stohr

ABOUT THE AUTHORS

Gaby van Melick and Philip Stohr are consultants in the field of emergency and crisis management at Kappetijn Safety Specialists, specialising in assisting public and private organisations prepare for large incidents and crises. In its capacity as a consultancy firm, Kappetijn closely follows the developments regarding industrial fire services and works with companies, authorities and knowledge institutions internationally.

For more information visit: www.kappetijn.eu



Formulated to a higher standard... THUNDERSTORM® W813A 1x3 AR-AFFF



Oil refineries, storage tank farms and off-shore drilling operations around the globe demand superior fire and vapour suppression to help safeguard their people and property.

THUNDERSTORM® W813A 1x3 AR-AFFF delivers exceptional firefighting performance against today's toughest flammable liquid fires, continuing the renowned heritage of excellence which the industry has come to expect from the name...THUNDERSTORM®.

- UL 162 / ULC S564 Listed
- EN 1568:2008
 - Part 3 (1A/1A)
 - Part 4, IPA (1A/1A), Acetone (1A/1A)
- GESIP 2012/12 Qualified

Learn more about our complete line of Firefighting Concentrates and Hardware by visiting www.williamsfire.com





FIRE FIGHTING APPROACH PPE

If firefighting under greatly increased radiant heat and based on a risk assessment requires the use of reflective protective clothing, EN 1486 applies for the testing and approval of this PPE.

Proximity suits according to this standard consist of torso, head, hand and foot protection. To meet the high requirements of EN 1486, these proximity suits are always made of several layers of fabric (3-7), depending on the manufacturer's design and counting method. The weight of such suits therefore varies between 7 and 20 kg, depending on the materials used. It is therefore no wonder that consumers want lighter versions of reflective protective clothing with a lower level of protection than in EN 1486 required, as long as the risk assessment allows it.

Such approach suits are manufactured without linings, and can only be tested according to EN ISO 11612 though this standard is addressed to industrial application.

While the test according to EN 1486 covers the entire full protection - i.e. also the gloves -, the approval according to EN ISO 11612 requires them to be tested and approved according to EN 407.

The table below shows the differences between the three forms and the requirements for protection against heat in the respective standard. The mechanical requirements have not been specified here.

Author
Siegfried Assmann
 Project leader EN 1486

Types	DIN EN ISO 11612			DIN EN 1486		
	One layer			3-layers		
Picture source: ALWIT						
Marking	EN ISO 11612:2015 A1 B1 C4 F2 or A1 B1 C3 F2			EN 407:2004 414444		
Requirement/Test Standard	A1 = Afterburn ≤2s + Afterglow ≤2s + no hole formation + no burning debris			EN ISO 6941 see below		
Flame spread EN ISO 15025	A1 = Afterburn ≤2s + Afterglow ≤2s + no hole formation + no burning debris			A1 = Afterburn ≤2s + Afterglow ≤2s + no hole formation + no burning debris		
Convective heat EN ISO 9151 80 kW/m ²	HTI ₂₄			HTI ₂₄		
	Level	min	max			
	B1	4	<10			
	B2	10	<20			
	B3	≥20		≥21		
	HTI ₂₄ = Heat Transfer Index = time in s until temperature inside raised by 24°C					
Radiant heat EN ISO 6942 20 kW/m ²	RHTI ₂₄			RHTI ₂₄		
	Level	min	max			
	C1	7	<20			
	C2	20	<50			
	C3	50	<95			
	C4	≥95				
40 kW/m ²	Not used in EN ISO 11612			≥120		
	RHTI ₂₄ = Radiant Heat Transfer Index = time in s until temperature inside raised by 24°C					
Contact heat EN ISO 12127-1 250°C	Level	min	max			
	F1	5	<10			
	F2	10	<15			
	F3	≥15		≥15		
	Threshold time = time in s until temperature inside raised by 10°C					

EN 407 (gloves)						
Burning behavior EN ISO 6941	Level	Burning time [s]	Glowing time [s]	Radiant heat EN ISO 6942 20 kW/m ²	Level	Wärmeübertragung
	1	≥20	k.A.		1	≥7
	2	≥10	≥120		2	≥20
	3	≥3	≥25		3	≥50
	4	≥2	≥5		4	≥95
Wärmeübertragungstufe = Anstieg der Wärmestromdichte a/Unterseite auf 2,5 kW/m ²						

EN 407 (gloves)						
Contact heat EN ISO 12127-1	Level	C°	Threshold time	Small qty. of molten metal EN ISO 9150	Level	Number of drops
	1	100	≥15 s		1	≥10
	2	250	≥15 s		2	≥15
	3	350	≥15 s		3	≥25
	4	500	≥15 s		4	≥35
Threshold time (15 s) until temperature inside raised by 10 °C						
Convective heat EN ISO 9151 80 kW/m ²	Level	Heat prot. index		Large qty. of molten metal EN ISO 9185	Level	Qty. of liquid FE [g]
	1	≥4			1	30
	2	≥7			2	60
	3	≥10			3	120
	4	≥18			4	200
Heat protection index = raise of temperature inside by 24 °C						
Quantity of liquid metal (FE), that cause no change of skin simulate						

The requirements for protection against convection heat (flame) and contact heat are identical in both standards, provided that the highest performance level is achieved in each case when tested according to EN ISO 11612.

As aluminised PPE is primarily intended to protect against radiant heat, EN 1486 logically requires testing according to EN ISO 6942 with a heat flux density of 40 kW/m², whereas EN ISO 11612 only requires 20 kW/m².

Therefore, when purchasing single-layer PPE according to EN ISO 11612, it is essential to ensure that at least performance level C4 is achieved.

Personal Protective Equipment and more



www.alwit.de



PPE for Firefighters
Industrial PPE
Aluminized industrial PPE
Proximity Suits
Heat protective gloves

Customised advice and
quality since 1954.



... mit Sicherheit Ihr Partner



INDUSTRIAL FIRE BRIGADE INCIDENT COMMANDER

By: Steve Watkins Gijsbert van Pinxteren

Imagine, You are sitting behind your desk and you receive a call that there has been a small explosion in one of your gas refining units. You are worried. It is your first major incident and you are responsible for the coordination of the emergency response. The emergency response plan is set in motion. Those plans that you have vetted and sanctioned, the skills of the response staff, your decisions and how you interact with your team are what stands between a disaster averted or losses in life, huge production losses and reputation of your organisation seen by the outside world. Are you up to it?

WHAT MAKES YOU A GOOD COMPETENT INCIDENT COMMANDER?

Someone who stays calm, can work under stress and can communicate well to motivate their subordinates are obvious traits. Be how do you come up with the correct decisions?

Gary Klein made study back in the 1990's suggested that the best commander used Recognition Primed Decision Making process to make the quickest decisions based on matching

the situation to their experiences in the past. But what if the commander does not have that experience. Incidents in petrochemical plants are rare, which means new commanders may not have been exposed to those decisions. Which poses huge dilemmas.

The latest research in leadership and decision making suggests that there are two decision making modes, Type 1 (intuitive) and type 2 (analytical) decision making processes. Type 1 is the above recognition primed decision

making and type 2 is a formal process in which analyse is done before the decision is made. Type 2, often termed a Conflict Management Model analyses the information received and then assesses that information in terms of risk and threats to come up with tactical options. Then a process of filtering and elimination gives the option that is most promising. The research concludes that both styles maybe adopted depending on the experience of the commander, information available, time constraints

and the situation faced.

At the heart of both models is information gathering and situational awareness. Gathering information and sharing can break down within and between teams and other stakeholders, which can undermine situational awareness and coordination leading to poorer incident management. Lacking in information a commander will need to fall back on pre-conceived procedures to stabilise the situation. More information may in the course of time become available which may affect decisions already made. Can you analyse the information and adjust your plan?

Decisions need to be made in a timely fashion. i.e. we cannot wait for extra information, we need to act now or the situation is rapidly changing or we need to act now to protect of responders and the public at large. The gut instinct is to isolate and extinguish the fire, however going through a risk and threat analyse might come up with an alternative tactic. I.e. controlled burning which would eliminate a greater risk of toxic non fire threat.

HOW CAN YOU GAIN THIS EXPERIENCE IF YOU ARE NO HAVING INCIDENTS THAT REGULARLY?

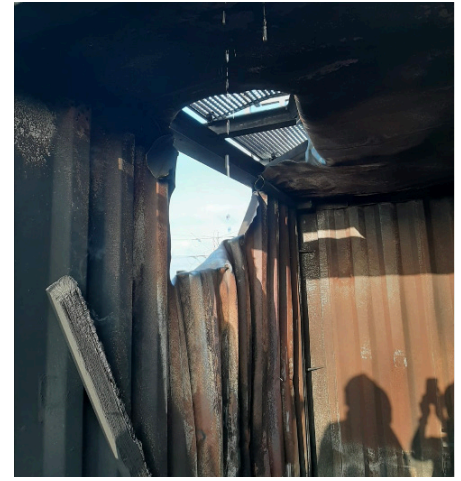
The answer is training, simulations that reflect the reality and challenge the commander under stress. Optimising the decision making process based on

what you face through those simulations. Coaching the interpersonal soft skills needed to lead and get the most of the team.

RelyOn Nutec offers training with personalised mentoring to bridge the gap in skills, rules and knowledge needed for a commander. Our JOIFF accredited Industrial Fire Brigade incident Commander training is designed to help inexperienced commander or aspiring commanders to gain the necessary competencies in incident command. Should the delegate not have a firefighting background, then we offer a short Foundation Course (also online), which aims to bring the delegate up to speed with the basic firefighting techniques and tactics which would be employed in an industrial incident.

Experienced commander need not miss out, because we also run an advanced level for those who need to be challenged.

Whether you are professional facility firefighters or from the production side of a facility, if you are involved in the management of an incident then this course can be invaluable to you. How to gather information, analyse that information, assess the risks and threats, assess the resource needs, make timely decisions and trick and tips to lead under stress. The delegates has during the training the opportunity to test and



develop their skills, in a safe but realistic way. Beside leadership role play and virtual reality exercises, the delegates will be exposed to "live fire exercises" on one of our highly realised industrial process simulators. The simulators look like a miniature refinery units, complete with pressure and flow control rooms, to simulate the information flow to and from the process operators. Together with role play this gives a totally immersive experience. The delegates will not only be mentored on the decision making processes but also the soft interpersonal skills required for effective leadership. Both delegates will receive verbal feedback during the exercises and a formal written performance assessment necessary to for personal development.

WATER-DRIVEN FOAM PUMP PROPORTIONER WITH HIGH-VISCOSITY CONCENTRATES

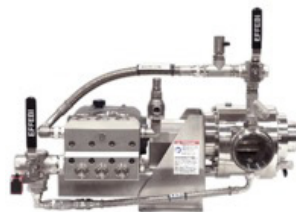
The importance to select the most suitable water driven pump type for high-viscous foam agents, including Fluorine-Free concentrates.

FUNCTION PRINCIPLE

FIREMIKS is a water driven foam proportioning system using two types of pumps to dose the concentrate into the water. The basis to achieve the correct dosing is that the pumps can pump the expected amount of concentrate for a given water flow in a wide pressure range. The approved dosing range (NFPA, FM, UL, EN, etc) for a 3% foam is 3,0 to 3,9%. One important factor is the viscosity properties of the concentrate. FIREMIKS uses two pump types because they complement each other when it concerns the viscosity of different types of concentrates.

Piston/plunger Pumps (-PP) is a reciprocating pump and perform at their best at low and medium viscosities.

Gear Pumps (-GP) on the other hand perform best with high viscosity as their action is continuous and the gears will easily 'grab' the high viscosity fluids



FIREMIKS 1800-3-PP-F-SS-FM with Piston pump



FIREMIKS 2400-3-GP-F-ALU with Gear pump

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.

GEAR PUMP TYPES

Water 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, They 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, such as some Fluorine-free concentrates. We have tested a Fluorine-free concentrate up to around 8040 cSt (Brookfield Viscometer spindle #4, rpm 30) with excellent result. (Contact us if you are interested in summary of test report.) Compound from all observations when testing our units using very high-viscosity concentrate, is that one should, apart from always having gravity feed and as straight line as possible, ensure that diameter on the piping is big enough for the concentrate delivery and to avoid longer concentrate lines. For help with more detailed recommendations of optimal foam delivery line, feel free to contact us.

PISTON PUMP TYPES

Water 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 for correct dosing (normally around 4,000-4,500 cSt) 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 therefore the correct dosing rate might not be achieved. FIREMIKS proportioners is 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 foam pump we will offer our unit with.

FIREMIKS is available in different flow sizes, from max capacity of 150 lpm up to 10,000 lpm, (with units installed parallel on skids, we offer flows up to 20,000 lpm) and with fixed dosing alternatives of 0,5% 1%, 2%, 3%, and selectable 0,3-0,6-1% or 1-2-3%, and on some models 1-3-6%. Other dosing options are available on request.



FIREMIKS 10000-3-GP-F-ALU Belt drive option

ECONOMIC AND ENVIRONMENTAL SAVINGS WITH DOSING RETURN VALVES

All FIREMIKS-units can, if requested, be supplied with a Dosing return valve (DRV) enabling regular tests without consuming any concentrate, an economically and environmentally beneficial option. See also Principle flow chart, pos 21:

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, Al-Ni-Bronze or Stainless-steel ASTM 316 L. We offer also Third-party inspection certificates from for ex. DNV-GL, towards NFPA 11 and/or EN 13565 for the whole range.

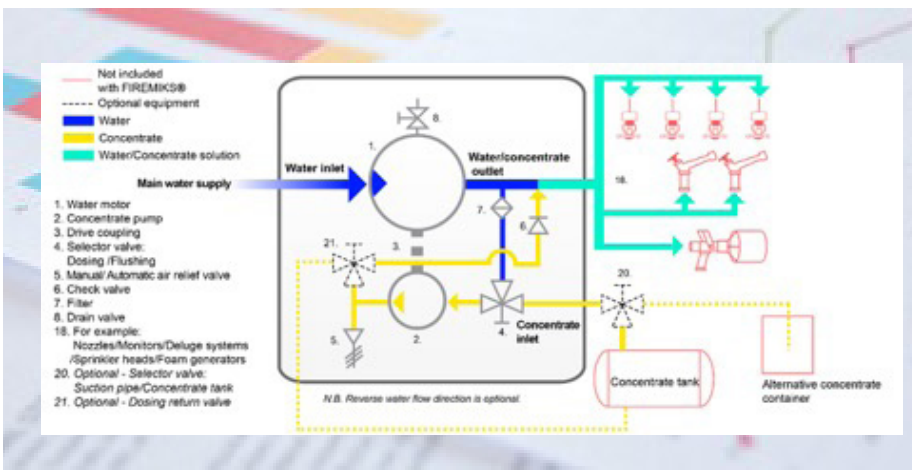


NEW GEAR PUMP GENERATION

We have recently expanded our line of Gear pump model by also offering a Belt drive solution to our standard direct Drive gear models, with this we can now offer an even broader array of suitable solutions for different applications. Including units with separately UL-approved Gear pumps. Some advantages: Lower pressure drops than before can be achieved with optimized water motor speed. Possibility to optimize dosing rate for different operation scenarios, and an even more compact solution with a reduced footprint.



For more information, go to www.firemiks.com
Per Aredal Firemiks AB / 2020-10-05



ABOUT THE AUTHOR

Per Aredal is International Sales Director at Swedish company Firemiks AB, with long experiences of producing water driven foam pump proportioners.



COVID-19: A JOURNEY FROM A FIRE & SAFETY TRAINING COLLEGE PERSPECTIVE

The Oil and Gas and the Hospitality industry were amongst those industries that were hit hardest by the impact of Covid-19 outbreak. As a result, supporting industries such as safety training centres, were also faced with unprecedented difficulties and severe challenges.

In March, when the Covid-19 outbreak became apparent and the pandemic went global, our overseas team were half way through delivering an 8 week advanced firefighting training programme in Kuwait. The world suddenly came to a standstill. In the midst of the unprecedented situation, our first priority was to come up with a plan to quickly bring back our team in Kuwait safely home to their families.

Who would have thought that seven months down the line the planned training would still be on hold? Meanwhile, also in March, our local teams were busy in keeping up with back to back classroom and practical training on our training grounds. Such training was also abruptly

suspended. Many of our clients were forced to cancel and postpone plans for training and several professionals within the industry were being laid off. The change presented severe uncertainty and challenges requiring strong mental resilience.

THE PANDEMIC HAS FORCED OUR PRIORITIES TO CHANGE

Faced with unparalleled operational challenges, teams were required to make do with the bare minimum. Sales and business development came up with plans to minimise business disruptions whilst operations had the challenge to quickly plan and implement new safety protocols to minimise the risk of virus spread. Our front desk team was always available to

respond to the many concerns that were being raised by our clients. As the virus spread across the country and the globe, the management at ISTC have teamed up with our business partners and experts to maintain the morale of our employees and our stakeholders.

AS AN INTERNATIONAL FIRE AND SAFETY PROVIDER, OUR GOAL IS ALWAYS SAFETY FIRST

As a fire and safety training centre our delegates and students are mostly frontline personnel who by virtue intervene in emergency situations, save lives or prevent incidents from happening as part of their daily routine. Unlike a tornado or other emergencies, Covid-19, lingers, leaving us all uncertain

about the next steps.

Today we find ourselves in a new safety reality which we also refer to as the new norm. The Covid-19 pandemic effected the way we work, communicate, shop, travel, connect and of course, the way we deliver training. We understand that many are still concerned about attending a training centre during such times. Precautionary measures are implemented and continuously reviewed in line with government guidelines and health authorities.

SAFETY PROTOCOLS

Safety protocols such as safe distances, new protective equipment and facemasks, provision of hand sanitisation stations, temperature control monitoring, hygiene practices have become the norm and a daily routine. Proper signage and floor markings were installed to manage flow of traffic through the facility and provide visual cues to encourage people to maintain safe distancing. To provide additional peace of mind to our clients and delegates, our marketing team worked on external communication published through our online channels including ISTC's website and social media channels. In addition, a video was commissioned to highlight our approach to minimise the risk of virus spread and offer additional peace of mind to our future delegates.

GEOGRAPHICAL CHALLENGES

Being an island presented a real threat to business continuity especially with airports closing geographical borders and travel restrictions imposed. As an international training centre, ISTC always welcomed and provided training for delegates from around the globe mainly attracting delegates from Libya, Europe and the MENA region. For the first time, our only achievable market was our limited local market. We did our utmost to offer and deliver an uncompromised level of training to our local clients. This was done in parallel with preventive measures in place whilst also meeting levels and standards in line with regulatory bodies such as JOIFF, OPITO and others.

ONLINE AND DIGITAL LEARNING PROGRAM

With a sudden shift away from classroom training, our business development team launched a new range of e-learning programmes and assessments whereby delegates can carry out formal assessments without the need to travel. This could only be possible with the help of our partners, Wild Geese. Some

of our online courses can be found on our website under Digital Courses. Amongst other training solutions, formal assessments are available for health and safety officers, the maritime industry, Emergency Response and Digital Bosiet with CA-EBS. Just like with our traditional training programmes all assessments meet international accreditations required by the industry and also suggest a refresher course to stay up to date with industry requirements.

OUR TRAINING CENTRE

Based in Malta, ISTC provides training to the highest standards in fire-fighting, civil defence, emergency response, disaster management, offshore and marine survival, health and safety and first aid. The unique training facilities have been specifically designed to satisfy the learning outcomes required for the aviation, oil and gas, marine and fire service sectors, amongst others. These facilities are contained within a large incident ground, where realistic risk critical training is undertaken on a daily basis, using real fire and survival training props. With a raft of internationally recognised accredited training including JOIFF and Opito for the oil and gas industry, STCW for the maritime industry, JOIFF and NFPA for both oil and gas and fire services, plus CAA for the aviation sector; ISTC also delivers NEBOSH and IOSH health and safety programmes. Our accreditations mean that whatever training personnel require, they can rest assured that it is to an internationally recognised standard delivered by highly qualified and experienced instructors.

ISTC also offers consultancy services to help customers define and meet their legal requirements. Consultancy services tend to focus upon training needs analysis or assessment of fire safety provision. All business proposals submitted by our consultants are bespoke and tailor-made to each individual client. Depending on requirements, services and/or training can be undertaken in-country or at our centres in Malta and delivered in any language.

If you want to get in touch or learn more about us, contact our experts on info@istcollege.com.mt. We look forward to continue shaping the future of safety training.



JOIFF ACCREDITED TRAINING PROGRAMME FOR 2020



Fire Training Services

ARC FIRE TRAINING SERVICES LTD.
UNITED KINGDOM

www.arcfiretraining@ntlworld.com

Emergency Response Planning – Crisis Management
for Hazardous Environments
Dubai – 6-10th December 2020
Dubai – 14th-18th March 2021
Dubai – 10th -14th October 2021

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 Traine
(with SCBA for High Risk)

On your own site.
Subject to Risk Assessment & Facilities.



H2K
THE NETHERLANDS

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

Advanced Industrial Firefighting 5 Day
Tank and Bund Fires 3 Day
Integrated fire safety of IBC tanks and tank
containers 3 Day

Other courses on request



INTERNATIONAL SAFETY TRAINING COLLEGE,
MALTA

Tel: + 356 2165 8281/2
+ 356 9998 5211

Email: enquiries@istcollege.com.mt
www.istcollege.com.mt

Fire Team Member Course – Based on 3 Days
6th – 8th October 2020
9th – 11th December 2020
3rd – 5th February, 2021
7th – 9th April, 2021

Fire Team Leader Course – Based on 5 Days
12th – 16th October 2020
14th – 18th December 2020
8th – 12th February 2021
12th – 16th April 2021

Fire Fighting Foundation Course –Based on 10 Days
15th – 26th February, 2021
Combined H2S, Industrial Breathing Protection and
Confined Space – Based on 5 Days
8th – 12th March, 2021
LNG Awareness and Fire Fighting - Based on 5 Days
15th – 19th March, 2021

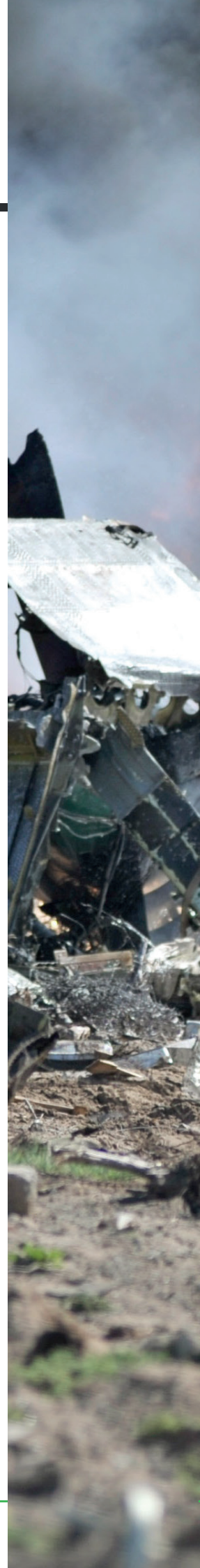
The above courses and other JOIFF accredited
courses on request.



SERCO INTERNATIONAL FIRE TRAINING CENTRE
DARLINGTON, UNITED KINGDOM

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

3 day JOIFF Occupational Fire Fighter
2 Day JOIFF Fire Fighter Refresher
5 day JOIFF Team Leader





YASSINE MARINE SERVICES
YMS TRAINING CENTRE - SFAX, TUNISIA.

Tel : +216 36 408 290

Email: yms.training@y.marineservices.com

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

RelyOn Nutec

360° Safety

RELYON NUTEC FIRE ACADEMY
MAASVLAKTE - ROTTERDAM, NETHERLANDS

Tel. +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



**EDDISTONE CONSULTING LTD, INCORPORATING THE
RESPONSE ACADEMY**
HEATHERSAGE, UNITED KINGDOM

www.Eddystone.com

www.responseacademy.co.uk

Email: opportunities@eddistone.com

Tel: +44 1433 659 800

Site Forward Controller (SFC) 1 day
Site Incident Controller (SIC) 2 days
Crisis Risk Radar 1 day
Crisis Spokesperson 2 days
Site Main Controller (SMC) 3 days
Crisis Leadership 1 day
Silver (TCG) COMAH Representative 2 days

All courses on your own site, or at the Eddystone
Training Suite.

All courses can be requested.



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.

DYNAX CORPORATION

PO Box 285, Pound Ridge, NY 10576 USA

T 914 764 0202 techinfo@dynaxcorp.com

F 914 764 0553 www.dynaxcorp.com

dynaxC6

HOW DO I, THE LEADER,

IMPACT THE WELLBEING AND PERFORMANCE OF THE FIREFIGHTER?



The two critical concepts we have to discuss here are “leader impact” and “wellbeing”. Let’s do it in reverse order and start with what we mean by “wellbeing”.

The field of psychoneuroimmunology (PNI) involves the chemical connection between the mind, the brain and the immune system. This field suggests that a significant number of diseases are caused by inflammation. These diseases can include high blood pressure, heart challenges, Alzheimer’s and Parkinson’s disease, diabetes and osteoporosis. At the heart of this chemical process is the interaction of brain chemistry or neurotransmitters such as serotonin, dopamine, oxytocin, adrenaline and cortisol. It is a see-saw interaction.

Now, let’s bring it closer to the Fire Station. Once the firefighters are in a relaxed state and the team is focused on their goals, there is a sense of achievement and purpose and meaning, the neurotransmitter, dopamine, is released. When the team is well-connected, there is a sense of cohesion, belonging, engagement and adding value to a bigger picture, then oxytocin and serotonin are released. However, the moment that there is a threatening situation, the see-saw will happen. Dopamine, serotonin and oxytocin are suppressed and the body’s fight-flight response kicks in. The almond-shaped amygdala, one of the parts in the brain’s limbic system, activates this stress response. The amygdala has been called the body’s smoke detector. Once it receives a signal that there is danger, it mobilizes the body to fight or flee. Part of this mobilization is then to release adrenaline in the short term and if the stressor stays, it releases cortisol.

This chemical process in the brain is convenient when the firefighters are pumped with adrenaline during an incident. It narrows the firefighter’s focus and helps them deal with a threat such as a fire. The moment the firefighter is back in the station, the prefrontal cortex, which is the brain’s logical reasoning part, will signal to the amygdala that the danger is over. The amygdala will calm down and healthy levels of dopamine, serotonin and oxytocin will be released. Other essential functions, such as digestion, will return to a relaxed, balanced state.

What do we regard as the “wellbeing” of the firefighter? We acknowledge that the firefighter will be more exposed to situations that spark the amygdala due to the nature of firefighting work. However, as firefighters develop cognitive hardiness and resilience, their bodies will recover to a balanced state shortly after the incident. If this doesn’t happen, the body is hijacked by the amygdala and unnecessarily

high cortisol levels are released, which is known as chronic stress. This again stimulates the release of inflammatory mediators, causing inflammation in the body. Hopefully, the firefighter will visit a health practitioner to assist in dealing with the incident’s trauma or help the body recover with medication.

We can conclude with the following: the firefighter’s wellbeing is the ability to apply resilience and recover to a relaxed, balanced state after incidents. The firefighter is back in the Fire Station, busy with meaningful work, connection, engagement and value contribution. The body, therefore, has healthy levels of dopamine, serotonin and oxytocin. Inflammatory mediators are suppressed, and the brain is in a relaxed state where the prefrontal cortex can resume tasks like problem-solving, decision-making and innovation.

This is where concept two comes in, the “leader impact”. What if there is a threat back at the Fire Station? What if the leader is a threat as well? In the past twenty years, we observed and interacted with a lot of team members in organisations. I often found that team members use the following to describe their relationships with their leaders: fear, aggression, unfair pressure, threatening me, unsure, on my guard, not feeling good enough and feeling incompetent. However, when I speak to the leader, it is the direct opposite opinion: I am a good leader, presenting the team with challenges, I care for my team and I will fight for them. I always like to ask only one question. If you have team meetings, do you experience healthy levels of engagement and solution finding? The answer is generally in line with: Some will be silent (flight response), while some will aggressively challenge me (fight response).” By observing these team dynamics, one can already notice the amygdala hijacks present in the room.

Clearly, there is a gap between the leader’s intention and the leader’s impact on the team. We refer to this as the IBI-Model (Intent-Behaviour-Impact). There is a pure intent in the leader’s head, but the team members do not know what the “intent” is when the leader behaves. All they can see is the behaviour and the behaviour makes them “feel” as described earlier. We judge ourselves by our intent and we judge others by their behaviour. To a certain extent, the leader describes his own intent to us, but the team members describe his behaviour.

The real impact of the leadership behaviour is causing an amygdala hijack within the team members. The amygdala constantly scans the environment to detect clues around dangerous situations. This is to ensure survival. It is so sensitive it detects novelty, high emotional content, status and whether we fit in. This is all to ensure the survival of the individual and the social group.

How do I, the leader, impact the wellbeing and

performance of the firefighter? The brain cannot differentiate between a real threat and a day to day stressor. The chemical process is exactly the same. Through their behaviour, if a leader evokes the amygdala stress response, the brain will trigger chronic cortisol release, resulting in the suppression of dopamine, serotonin, and oxytocin. This will impair prefrontal cortex functionality, including problem-solving, decision-making and innovation. It will also harm team relationships, trust and engagement. In the long run, the firefighters will lose their sense of purpose, meaning and value contribution. In return, the amygdala will react to the heightened cortisol and activates the stress response again, which becomes a vicious cycle. Inflammatory mediators are stimulated, and inflammation can start manifesting. All of a sudden, your firefighters become seriously ill. So, what can we do about it? Firstly, remove the most obvious stressor. Conduct debriefing sessions after every incident, ensuring bodies return to a relaxed, balanced state. Get assistance for those who did not build the resilience or who lost it for one or other reason.

Secondly, implement healthy leadership practices. Let’s start with the IBI-Model. Set your intent by always explaining why things are needed, what value it will add, and the firefighter’s role. Ensure they understand their effort really makes a difference and they are busy with meaningful work. Ask them to identify challenges and brainstorm solutions. Praise them for small achievements, indicating the correlation between their efforts and the achievement. If you do this, you are busy with prefrontal cortex work; you have stimulated the pleasure and reward center, and dopamine is released.

Thirdly, it does not help you throw all the good work out by behaving aggressively again. You have to change the way you engage with the team. Ensure you treat them with respect, stay calm and provide opportunities for contribution. Make the team environment a safe place to be. If you tend towards aggressive behaviour, reflect on the idea that you are leading in an amygdala state yourself. Identify your own triggers and learn to calm your amygdala. Don’t lead with this mind state. By now, you know there is no logical reasoning capacity available and you cannot ensure a safe team environment if you are in this state yourself. Also, ensure that other team members do not invade the safety. By providing a safe team environment, oxytocin and serotonin are released.

Fourthly, we acknowledge the firefighting environment is a disciplined, high performance environment. If the firefighters understand this, it will support their sense of pride, achievement and value contribution. There is a difference between an aggressive, fearful climate, stimulating cortisol and a disciplined, challenging environment, stimulating dopamine and oxytocin. Make sure you don’t confuse the two.

Lastly, remember that the good chemicals not only ensure wellbeing, but it also results in better performance. Firefighters will feel healthy, work smarter, innovate more and make better decisions.

Rina Steynberg
Managing Director of Mind Matters Consulting

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 Room 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 JOIFF 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



ADVANCED SAFETY TECHNOLOGIES, LLC.
ASTRAKHAN | RUSSIA

Anna Baranova (Administrator)

Tel: +7 9673 367 561

Email: admin@ast-consult.com

Vyacheslav Kuzin (Deputy Director)

Tel: +7 9627 520 757

Email: vyacheslav.kuzin@ast-consult.com

Website: www.ast-consult.com



Fire Training Services

ARC FIRE TRAINING SERVICES LTD
MERSEYSIDE, ENGLAND

Contact: Eric Dempsey M.JOIFF G.I.Fire.E

Tel: + 44 151 605 0744

Email: arcfiretraining@ntlworld.com

Website: www.arcfiretrainingservices.co.uk



CHS MCPHERSON REFINERY, INC.
2000 S. MAIN, MCPHERSON, KANSAS
67460,

UNITED STATES OF AMERICA

Contact Lonnie Mullen

Office: + 1 620 241-9254

Cell: + 1 620 334-0968

Email: lonnie.mullen3@chsinc.com

Website: CHSINC.COM



CLEVELAND FIRE BRIGADE RISK
MANAGEMENT

HARTLEPOOL, ENGLAND

www.clevelandfire.gov.uk



EDDISTONE CONSULTING LTD.
DERBYSHIRE, UNITED KINGDOM

Tel: + 44 (0)1433 659 800

Email: opportunities@eddistone.com

Websites: www.responseacademy.co.uk

www.eddistone.com



ESSEX COUNTY FIRE & RESCUE SERVICE
UNITED KINGDOM

Tel: + 44 (0)1376 576549

Email: kathy.payne@essex-fire.gov.uk

Web: www.essex-fire.gov.uk



YASSINE MARINE SERVICES
YMS TRAINING CENTRE - SFAX, TUNISIA.

Tel : +216 36 408 290

Email: yms.training@y.marineservices.com



SERCO INTERNATIONAL FIRE TRAINING
CENTRE

DARLINGTON, UNITED KINGDOM

Tel: +44 (0)1325 333317

Email: bookings@iftc.co.uk

Website: www.iftcentre.com

RelyOn Nutec

360° Safety

RELY ON NUTEC FIRE ACADEMY
ROTTERDAM, THE NETHERLANDS

Tel: + 31 181 376 666

Email: fireacademy@nl.relyonnutec.com

Website: www.relyonnutec-fireacademy.com



ADMIRAAL TROMPSTRAAT 12,
3115 HJ SCHIEDAM, NETHERLANDS

Tel: +31 (0)10 313 89 47

Email: info@h2k.nl

www.h2k.nl

FER TŰZOLTÓSÁG

FER TŰZOLTÓSÁG ÉS SZOLGÁLTATÓ KFT.
FER FIRE BRIGADE AND SERVICE LTD
SZÁZHALOMBATTAA, HUNGARY

László Pimper, Managing Director

Fire Chief Zoltán Mészáros

Tel: + 36 20 955 00 72

Email: zmeszaros@fer.hu



THE FIRE SERVICE COLLEGE
GLOUCESTERSHIRE, UNITED KINGDOM

Claire Spender

Tel: + 44 1608 812 150

Email: claire.spender@capita.co.uk

Website: www.fireservicecollege.ac.uk



FULCRUM CONSULTANTS
DUBLIN, IRELAND

Email: info@fulcrum-consultants.com

Website: www.fulcrum-consultants.com



SFAX TUNISIA

Tel: +21697037456

Fax: +21671656170

Email: Ezzeddine.kacem@itc-tunisia.net

TRAINING PROVIDERS



**INSTITUTE OF FIRE, SAFETY & DISASTER
MANAGEMENT STUDIES**
VADODARA, GUJARAT, INDIA
Tel: +91 98250 96033
Email: inquiry@ifdmindia.org /
marketing@ifdmindia.org



**HHSI SAFETY SYSTEMS LIMITED & THE
HUMMINGBIRD GROUP,**
COUVA, TRINIDAD W.I.
Tel: + 1 868 679 1234 / + 1 679 3354
Email: hhslservices@hhslsafety.com
Website: www.thehummingbirdgroup.net



**جاهزية
JAHEZIYA**
A TAWAZUN SUBSIDIARY
**TAWAZUN SAFETY, SECURITY,
DISASTER MANAGEMENT CITY
(JAHEZIYA) ABU DHABI, UAE**
Tel: +971 2 4928500
Fax: +971 2 4928501
E-mail: inquiry@jaheziya.ae
Website: www.jaheziya.ae



**LUKOIL CORPORATIVE TRAINING CENTRE
THE ASTRAKHAN REGION
IKRYANINSKY AREA
RUSSIAN FEDERATION.**
Tel: + 7 8(85144)30843
Fax: + 7 8(85144)30828
E-mail: ctc@lukoil.com
Mariya.Sineva@lukoil.com
Website: www.ctc.lukoil.ru



**PHOENIX FIRE, EXPLOSION INVESTIGATION,
TRAINING & CONSULTANCY**
RIO CLARO, TRINIDAD, WEST INDIES
Tel: + 1 868 742 0744
Email: pfeitc2413@gmail.com; info@phoenixfirett.com
Website: www.phoenixfirett.com



**SASOL EMERGENCY MANAGEMENT
TRAINING ACADEMY
SOUTH AFRICA**
Boikanyo Clement Motlogelwa
Manager EM Training Academy
Tel: + 27 17 610 8212
E-mail: boikanyo.motlogelwa@sasol.com
Isabella De Jongh Administrator:
EM Training Academy
Tel: +27 17 610 6016
Email: isabel.dejongh@sasol.com



**PETROFAC FACILITIES MANAGEMENT LIMITED
MONTROSE, SCOTLAND**
Tel: 0845 606 2 909
Email: bookings@petrofactraining.com
Website: www.petrofactrainingcourses.com



**TECHMA GROUP
DUBAI, UNITED ARAB EMIRATES**
Contact: Nicole Santos
Tel: +971 4 371-2859
Email: nicole@techmasupport.com



**INTERNATIONAL SAFETY TRAINING COLLEGE
MALTA**
Patrick Abela Sales Manager
Tel: + 356 2165 8282
Email: sales@istcollege.com.mt
Website: www.istcollege.com.mt



BRISTOL

LEADING **FIREFIGHTING SOLUTIONS** PROVIDER
FOR MORE THAN FOUR DECADES

EN 1789 CERTIFIED AMBULANCE



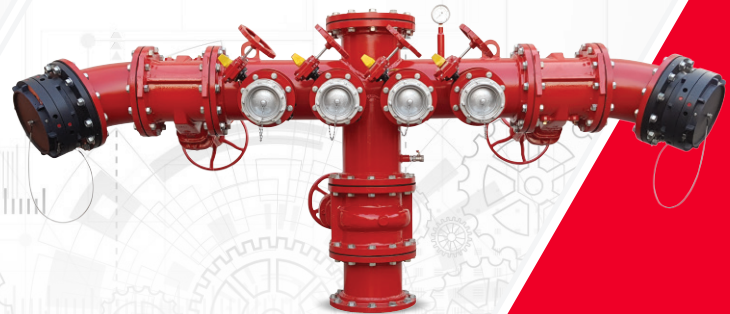
HIGH FLOW INDUSTRIAL FIREFIGHTING TRUCK



DIESEL SPLIT CASE FIRE PUMP



HIGH FLOW FIRE HYDRANT



OIL & GAS FIRE PROTECTION SPECIALIST

www.bristol-fire.com

P.O.Box 74582 Dubai, UAE

+ 971 4 3472426

+ 971 4 3472363

sales@bristol-fire.com

P.O.Box 2617 Abu Dhabi, UAE

+ 971 2 5575551

+ 971 2 5575550

vehicules@bristol-fire.com

Member of



Since 1974

Concorde - Corodex Group

