

# THE CATALYST

Q4 2019



# JOIFF

WWW.JOIFF.COM

## THE INTERNATIONAL ORGANISATION FOR INDUSTRIAL EMERGENCY SERVICES MANAGEMENT



### PERSONAL PROTECTIVE EQUIPMENT (PPE) FEATURE

LET'S TALK COMPETENCE, CRISIS MANAGEMENT, REMOTE CONTROL  
MONITORS, SPRINKLER SYSTEMS, ENSURING FIRE SAFETY,  
JOIFF REGULARS, PLUS MUCH MORE

# M1

## YOUR SCBA PLATFORM FOR THE FUTURE

The new M1 is MSA's most advanced,  
ergonomic and modular SCBA.

Designed with you in mind, the M1 brings you:

- ✓ Greater modularity
- ✓ Future-ready field upgrade
- ✓ Enhanced hygiene
- ✓ Improved ergonomics and comfort
- ✓ Reduced cost-of-ownership
- ✓ State-of-the-art communication

**INTERESTED IN A DEMO?**

Visit [MSAsafety.com/M1](https://MSAsafety.com/M1)

Connect with us on [linkedin.com/company/msa-the-safety-company/](https://linkedin.com/company/msa-the-safety-company/)  
to always be informed about our latest product news.

**TOGETHER AS ONE**



# IN THIS EDITION OF THE CATALYST

## REGULARS

- 04 About JOIFF / About The Catalyst
- 04 New Members
- 07 Shared Learning Incidents for the previous quarter
- 20, 33 News from JOIFF Member Organisations
- 37 News from JOIFF Accredited Training Providers
- 38 Training Calendar
- 39 JOIFF Roll of Honour
- 40 Diary of Events

## PERSONAL PROTECTIVE EQUIPMENT (PPE) FEATURE

- 13 A History of PPE
- 15 Selection of Personal Protective Equipment (PPE)
- 16 Standardisation of PPE for Firefighting, by Siegfried Assman
- 19 Firefighting Protective Ensembles Selection, by Chief Lonnie Roy Mullen, CFO, MFIREE, MJOIFF, CFEI

## FEATURED ARTICLES

- 08 Let's talk Competence, by Daryl Bean MJOIFF
- 24 Remote-Controlled Monitors for Fixed Firefighting Systems By Fritz Zimmerman
- 29 Foam Sprinkler Systems: The Most Important Considerations for the Installation of Foam Discharge Sprinkler Systems By John Olav Ottesen
- 30 Crisis Management is Maturing, by Tim Bird
- 32 Ensuring Industrial Fire Safety at Neste Oil Refinery, by Bronto SkyLift
- 34 JOIFF Aviation Working Group, by Mark Buckingham  
Cert.Ed, MifL, Grad.JOIFF Tech.IOSH, Tech.IFE

## ABOUT JOIFF

**Full Members** of JOIFF are organisations which are high hazard industries and/or have nominated personnel as emergency responders/hazard management team members who provide cover to such organisations.

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

JOIFF's purpose is to prevent and/or mitigate hazardous incidents in Industry through its 4 pillars:

**Shared Learning** – improving risk awareness amongst our members

**Accredited Training** – enhancing operational preparedness in emergency response and crisis management.

**Technical Advisory Group** – raising the quality of safety standards in the working environment of High Hazard Industry

**Professional affiliation** - networking and access to professionals who have similar challenges in their work; prestige of being a member of a globally recognised organisation of emergency response.

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

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

## ABOUT THE CATALYST

The Catalyst is the official emagazine of JOIFF, the International Organisation for Industrial Emergency Services Management. Our policy is to bring you articles on relevant technical issues, current and new developments and other happenings in the area of Fire and Explosion Hazard Management Planning (FEHMP). The Catalyst is published quarterly - in January, April, July and October each year.

Readers are encouraged to circulate The Catalyst amongst their colleagues and interested parties. The Editors welcome any comments – please send to [joiff@fulcrum-consultants.com](mailto:joiff@fulcrum-consultants.com)

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

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



# JOIFF

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

### JOIFF Secretariat:



Fulcrum Consultants ~ in Partnership with JOIFF  
P.O. Box 10346, Dublin 14, Ireland  
Email: [joiff@fulcrum-consultants.com](mailto:joiff@fulcrum-consultants.com)  
Website: [www.fulcrum-consultants.com](http://www.fulcrum-consultants.com)

Catalyst published by ABCOM  
[www.abcom.ie](http://www.abcom.ie)



THE CATALYST



## NEW MEMBERS

During July, August and September 2019, the JOIFF Board of Directors were pleased to welcome the following new Members:

### MEMBER ORGANISATIONS:

**CF Fertilisers UK Limited, Chester, United Kingdom** represented by Anthony Hogan, Security and Emergency Response Supervisor and Jo-Anne Davies, Learning & Talent Development Specialist. CF Fertilisers is the UK's premier fertiliser manufacturer making 40% of the UK fertiliser needs as well as other chemicals. The emphasis of CF Industries is dedicated support of local markets, while utilising their global strengths and expertise to meet the specific needs of farmers across the World. CF Fertilisers, Chester is protected by its full time emergency response team.

**Falckon Egitim Hizmetleri Ltd.Sti., Istanbul, Turkey**, represented by Anil Yamaner, Cornelis Jan Kallemein and Omer Akgun, Board members. Falckon Fire Academy is a training company specializing on firefighting training for the industries. The headquarters of the operation is in Istanbul/Turkey and the training facility is in Izmir/Turkey located within the petrochemical refinery premises of SOCAR. Training is delivered to National and International clients located in Turkey and the Middle East for first responders, field operators, firefighters, team leaders, fire chiefs and crisis management teams categorized in 4 different levels which are later divided into sub-categories for specializations such as hazmat, tank fires, ammonia, rescue from heights, jetty and etc.

**KEPCO E&C, Gyeongsangbuk, Republic of Korea**, represented by Kim Kwangcheol and Kim Jungman, General Managers. KEPCO E & C was established in 1975 with the goal of independence of domestic energy technology through two oil crisis in the 1970s. In the thermal power generation sector, KEPCO E & C are now leading the design technology of clean coal-fired power plants. In 2009, KEPCO E & C participated in the order for Barakah nuclear power plant in UAE, the first overseas export of Korean nuclear power plants, to carry out comprehensive design and reactor system design. Since 2016, they have been participating in the design for the export of smart nuclear power plants, small and medium-sized nuclear power plants, to Saudi Arabia and by expanding into the EPC (design, procurement, and construction) business in the overseas power plant field, they successfully completed the 'Ghana and Ivory Coast Power Plant EPC Business' in Africa.

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

# BRISTOL

## High Flow Industrial Firefighting Truck



Remote Controlled Monitor  
"Ambassador" up to 6000 GPM

Hydraulic Hose Recovery

Two TFT 2000 GPM  
Remote Controlled Monitors

500lbs Williams  
Hydro-Chem

## EN 1789 Certified Ambulance



## Six Way Manifold Hydrant

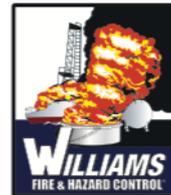


# OIL & GAS FIRE PROTECTION SPECIALIST

[www.bristol-fire.com](http://www.bristol-fire.com)

P.O.Box: 74582 Dubai, UAE  
Tel: +971 4 3472426 Fax: +971 4 3472363  
Email: [sales@bristol-fire.com](mailto:sales@bristol-fire.com)

P.O.Box: 2617 Abu Dhabi, UAE  
Tel: +971 2 5575551 Fax: +971 2 5575550  
Email: [vehicles@bristol-fire.com](mailto:vehicles@bristol-fire.com)



# High Value Assets High Performance Foam

THUNDERSTORM W813A 1x3 AR-AFFF concentrate delivers exceptional firefighting performance against today's toughest flammable liquid fires. Oil refineries, storage tank farms, and off-shore drilling operations around the globe demand superior fire and vapor suppression to help safeguard their people and property. That call is answered with this environmentally-mindful, C6 foam concentrate that continues the high level of performance and tradition of excellence which the Industry has come to expect from the name ...THUNDERSTORM.



For high performance solutions,  
visit <http://williamsfire.com>



## SOME OF THE INDUSTRIAL INCIDENTS THAT TOOK PLACE DURING THE SECOND QUARTER OF 2019

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

**Turkey** - 1 Dead, 16 Injured in Izmir Port LPG Vessel incident

**Congo** - Fuel Tanker Tragedy Reaches 230 Deaths

**Nigeria** - Pipeline Explosion Kills 2, Cause Identified

**China** - 6 Killed in Biotech Plant Explosion

**South Africa** - LPG Tanker Explosion

**Russia** - 1 Dead, 13 injured in Severnaya Power Plant fire

**China** - 15 Die in Gas Plant explosion

**Indonesia** - 3 Die in Fuel Truck Incident

### *Note from the Editor.*

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



# LET'S TALK COMPETENCE

BY DARYL BEAN MJOIFF

## Competency/Competence

Competency/competence may be looked at as a finite position - is or is not. How the "is or is not" will be established and the real-world application may identify conflicting viewpoints which offer a chance for exploration of the term and value to emergency responders.

Competency/competence is one of the first words spoken of and qualities examined when performance is questioned, or training delivery is discussed. In fact, it is so commonly used that it may become a catchall phrase like "safety," the interpretation of which is more complex than how it is expressed in many circumstances.

For start let's list definitions of "competence/competency":

1. "The ability to do something successfully or efficiently."  
<https://www.bing.com>
2. "Having suitable or sufficient skill, knowledge, experience, etc., for some purpose: properly qualified"  
<http://www.dictionary.com>
3. "Competence can be described as the combination of training, skills, experience and knowledge that a person has and their ability to apply them to perform a task safely."  
<http://www.hse.gov.uk/competence/what-is-competence.htm>
4. "Possessing knowledge, skills, and judgment needed to perform indicated objectives." NFPA 472 (2018)
5. "The ability to apply knowledge, understanding and skills in performing to the standards required in employment. This includes problems and meeting changing demands." UK CAP 699 (2017)
6. An OSHA "competent person" is defined as "one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them" [[29 CFR 1926.32\(f\)](https://www.ecfr.gov/current/title-29/chapter-I/subchapter-B/part-1926/subpart-F/section-1926.32(f))]. By way of training and/or experience, a competent person is knowledgeable of applicable standards, is capable of identifying workplace hazards relating to the specific operation, and has the authority to correct them. Some standards add additional specific requirements which must be met by the competent person". <https://www.osha.gov/SLTC/competentperson/index.html> (2019)
7. "A person shall be deemed to be competent where, having regard to the task that s/he is required to perform and taking account of the size and/or hazards of the undertaking or establishment in which s/he undertakes work, s/he possesses sufficient training, experience and knowledge appropriate to the nature of the work to be undertaken" <http://joiff.com/training/training-standard/>(2017)

Looking at training/learning outcomes through various positions of emergency response one sees many performance examples which, based around the achievement a knowledge or skill element question the competence the performance.



### Example A

During a search, rescue and firefighting evolution involving multiple persons reported missing and multiple detectors activated. The team leader delivered a well-structured, easily understandable brief, all delegated tasks verified by responders. The initial BA team cleared almost one half of the targeted search area, extinguished a small fire, recovered one casualty to fresh air, conferred with the team leader and continued with the brief. To this point observations indicated assured, correct actions by an experienced team. During a lull in communications the author asked the team leader to indicate when the BA team were going to turnaround. The team leader stated that it hadn't really been discussed and was up to the BA team. The BA team reported discovering and extinguishing a second fire. Upon working their way back towards the entry point low pressure warning whistles activated with just a couple metres of travel left before exiting the unit and a few short steps to the entry control board. On initial questioning the exit was determined to be based more on chance than definitive and planned.

During the debrief an open and participative discussion about turnaround times and assisting with/controlling the BA team revealed differing opinion regarding who is responsible, leading to further discussions about competencies expected of the BA team members, BA Entry Control Officer and the team leader (incident commander) in controlling operations on the incident scene.





### Example B

Conducting a course for senior fire officers on leadership and command, the practical training outcomes were based on leadership and command skills during responses to a diversified set of emergencies. This followed discussions and presentations on incident command and leadership through which the officers displayed an understanding of the incident command system and beneficial leadership qualities. One could ask how competence could be established? An interesting observation was made when the group was tasked with devising a response plan following pre-incident planning of a particular risk. No examples were given on what the response plan should look like; however, it would be reviewed by the instructors for suitability (more from a safety standpoint) prior to application.

The officers were left for twenty minutes to construct their plan. On review of their response plan the officers created a response plan using an incident command organization structure with more than acceptable branches, command team, span of control, functional sectorization and communication plan. The structure contained branches which were beyond the physical capability of performing during the practical evolution but were consistent with an actual response to the risks presented. Team members were assigned to tasks according to the incident command structure. The evolution mirrored the response plan with the incident command structure visibly in operation. The

incident command structure utilized provided the framework for the exercise debrief which was controlled, participative and constructive.

This process was followed for all subsequent exercises. The instinctive construction and application of a response plan using an incident command structure like the observation presented is rare in similar occurrences; however, displays a level of competence with the team by definition. Or does it? The assessment of the competent use of the incident command system could only be undertaken by an authority with the knowledge and ability to make an accurate assessment decision; i.e. a “competent” authority.

There is no doubt to the reader of regulatory standards that the development, review and adoption is thorough and not without dedicated discourse by professional (read knowledgeable) bodies. Emergency responders who present with certification of training to an accepted standard are expected to exhibit performance relative to that standard, taking into consideration site specific operations.

Looking at the standards of competence from a different perspective, incorporating some of the ideals presented in the definitions of competence listed above;

What do “their ability to apply them to perform a task safely”, “judgment needed”, “problems and meeting changing demands” and “having regard to the task that s/he is required to perform and taking account of the size and/or hazards of the undertaking or establishment in which s/he undertakes work” mean? How are they transitioned into the training event and evaluated?

Reece and Walker provide guidance for competences through an overall method statement followed by further defining the specific parts; “In order to receive a qualification, candidates need to accumulate the units of the competence which makes up the qualification. Each unit is usefully subdivided into appropriate elements.

### Checklist for Units of Competence

Is each Unit:

- Expressed in a language which is precise, and is an acceptable and distinct work role, within the industry or occupation?
- Composed of elements, performance criteria and range statements which have a coherent relationship with each other, and which describe outcomes, achievements, or results of activity?
- Of sufficient size and scope to be recognized as a credible achievement in its own right?

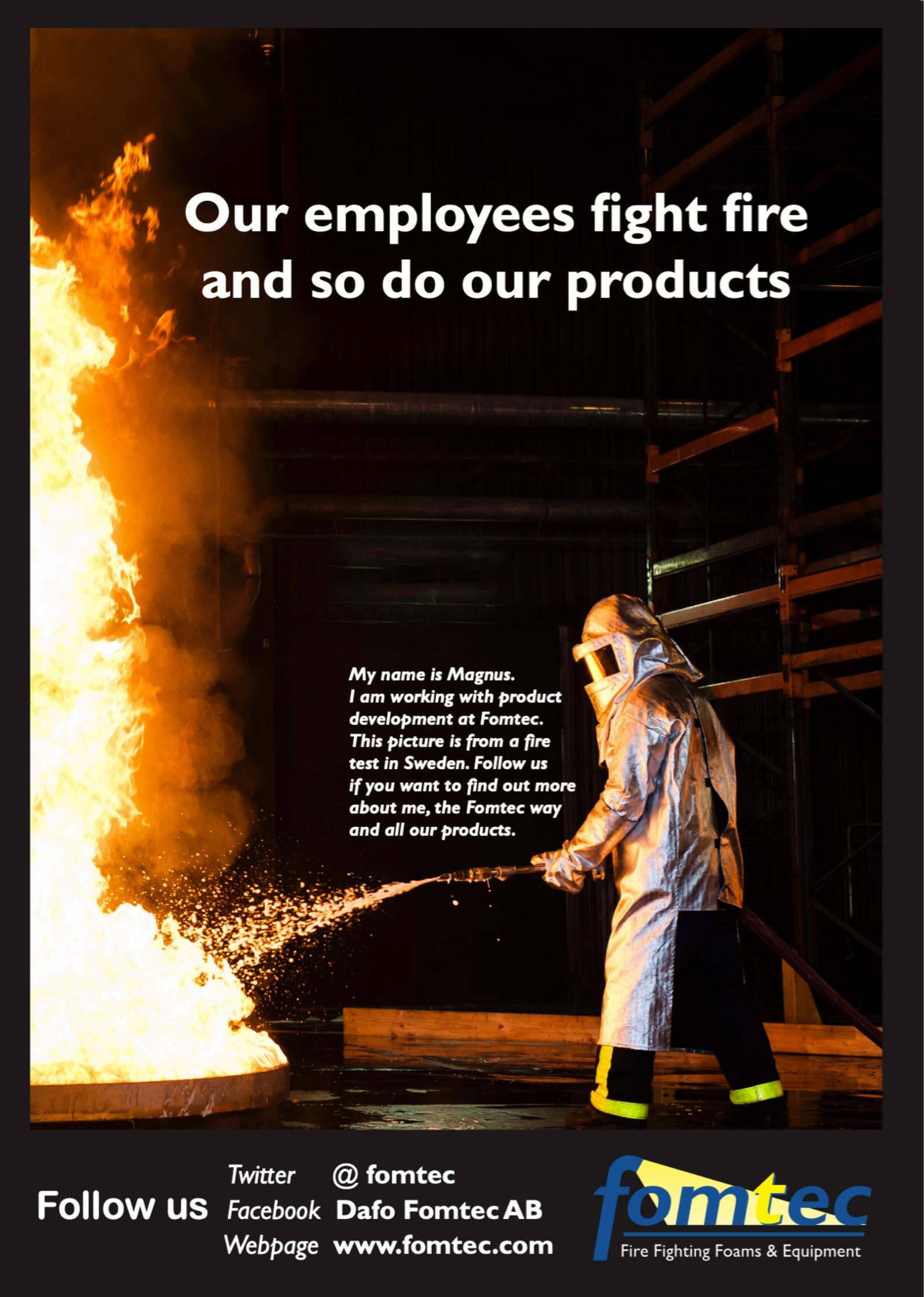
Do the Units taken as a whole:

- Identify all the work roles within the occupational sector?
- Identify emerging as well as current work roles?

Elements of competence make the units manageable for the purposes of assessment and learning design. The element title should be a precise description of what somebody should be able to do, but still phrased as an outcome rather than a specific task or activity.” (Ian Reece and Stephen Walker, 2003, pp. 222, 223).

Training plans focus more on the accomplishment of tasks that training outcomes are heavily geared to “do” than produce





# Our employees fight fire and so do our products

*My name is Magnus.  
I am working with product  
development at Fomtec.  
This picture is from a fire  
test in Sweden. Follow us  
if you want to find out more  
about me, the Fomtec way  
and all our products.*

**Follow us**

Twitter @fomtec  
Facebook Dafo Fomtec AB  
Webpage [www.fomtec.com](http://www.fomtec.com)

**fomtec**  
Fire Fighting Foams & Equipment



situations of which the end result is to produce a “do not”, i.e. activation of the right factors to reach an opposite decision. Of course, there is sense to this as the goal for attending training (paying for training) is to use developed skills and equipment and see positive conclusions. Indeed, a comment made during training exercises on occasion is “If this was the real thing, I would do something different, but because this is training, I wanted the guys (sic) to get experience using the equipment (or doing the task).”

One can argue that further experience will create more exposure for the responder to make accurate decisions; however, can one deduce by the statement given that it's accurate and not a coverup for an incorrect decision. Furthermore, how can the decision made be assessed as competent, when, even if the reasoning was factually accurate, the resulting actions during the exercise were less than optimum or worse?

Reese and Walker discuss this and provide evidence to support learning in this capacity by applying Kolb's Four Stage Model of Learning in which the expansion of Concrete Experience is “Including work based learning where you design, implement and evaluate aspects of your work in order to gain competence. This includes the gaining and recording of evidence in your portfolio.” (Ian Reece and Stephen Walker, 2003, pp. 406, 407).

The gravity of ensuring “competence” is highlighted by the forensic investigation of incidents involving loss of life, especially those of the emergency responder when response and command actions are heavily scrutinized. Such is the case in the court actions following the 2007 Atherstone warehouse fire deaths (UK) and the 2002 Pompey Hill basement fire deaths (US) where “training” deficiencies were identified in both. Although not a forum to debate the court case or the result, the inference from both cases places an emphasis on quantifying assurance where the answer “this is a judgement call based on my experience and training” simply won't do. It is that judgement call and foundation behind it which is in question.

How then do we create the environment which exposes the learner to effective decision making? How would we know that or assess it if we don't see it in action? Do the standards our training is measured against lead to an over preponderance of one type of decision making? Are we developing the emergency responder to feel confident enough in challenging a situation using effective decision making to not only recommend but put into place a “do not”, thus providing more evidence of competent

behaviour? Again, debate and participation in standards setting can assist in addressing identified shortfalls.

A training event designed to produce the type of judgement decision where the decision is to not proceed, needs to be managed carefully to ensure the observations/assessments are in line with well-developed and researched learning outcomes and not biased by unfounded opinion by the instructors or a “get out of jail free” clause for the decision maker. It is agreed that any training like this has to be carefully constructed and managed otherwise the result will be quite negative, confusion, loss of confidence in the

responder, lack of respect to the instructor and training in general. The “Checklist for Units of Competence “set the tone for this.

The use of buzz words or more modern trends may excite the end user or decision maker that the process adopted or reviewed for adoption meets what is required; however, this may be a mask to the actual level of competence delivered. This is a challenge statement of course as it questions trust in the provider or seller of the product and the inference that even within this industry we may be subject to “snake oil” salesmen. Trial and error, reactions to events industrywide all have an impact on mechanisms to ensure losses are prevented going forward and accredited training must address issues to reduce risk to response personnel. Incorporating the statement “competence” opens a wide spectrum of understanding, the review of which is not confined to industry or an industry definition alone. What is necessary is a thorough examination of any process as assurance of the ability to attain a level of understanding that a person given the same situation and same level of training will react similarly to the same stimulus, in this case a hazard with associated risk.

#### References:

*BBC. (2012, May 30). Fire officers cleared over Atherstone warehouse deaths. Retrieved from BBC News: <https://www.bbc.co.uk/news/uk-england-coventry-warwickshire-18251348>*

*Ian Reece and Stephen Walker. (2003). Teaching, Training and Learning a practical guide incorporating FENTO standards 5th edition. Sunderland: Business Education Publishers Limited.*

*Naum, C. (2011, January 6). Fire Department Officers Liable in Double Firefighter LODD. Retrieved from Fire EMS: <http://thecompanyofficer.com/2011/01/06/fire-department-officers-liable-in-double-firefighter-lodd/>*

*Editors note: Daryl Bean MJOIFF is the Offshore/Industrial Curriculum Manager at the Serco International Fire Training Centre, Darlington, UK and manages the delivery of regulated or accredited and bespoke training specifically for the offshore, industrial and maritime environments, including theory and/or practical based content and consultation. Daryl's career spans many disciplines including aviation, structural, HAZMAT, EMS and he maintains membership in the NFPA. For more information contact Daryl at [dbean@iftc.co.uk](mailto:dbean@iftc.co.uk), or by telephone + 44 1325 333317. For more information on the Serco International Fire Training Centre visit [www.iftcentre.co.uk](http://www.iftcentre.co.uk).*





**Dr. STHAMER HAMBURG**

# FOAM FIGHTS FIRE



**We offer a full range of Internationally Approved, High Performance, Environmentally Compatible Fire Fighting Foams.**



All **STHAMEX® AFFF** and **MOUSSOL® APS AR-AFFF**, have been re-formulated with latest Generation C6 based Fluorosurfactants.



**24h Emergency Service +49 40 7361680**

**[www.sthamer.com](http://www.sthamer.com)**



[www.facebook.com/Dr.Sthamer](https://www.facebook.com/Dr.Sthamer)

## A HISTORY OF PPE

Personal protective equipment (PPE) is used to allow person to work safely in environments where without it, they could not work safely. PPE to protect the body is provided by helmets (head), visors (face), spectacles (eyes), earplugs, ear muffs, headphones (ears and hearing), breathing apparatus (respiratory system), protective clothing and gloves (torso, arms including hands and legs including feet).

The history of personal protective equipment dates as far back as ancient times, when soldiers wore protective headgear, face gear and body armour in order to fight their enemies without being killed themselves. In non-military settings, people have used personal protective equipment from at least as far back as the Middle Ages when blacksmiths wore protective hand gear and aprons or shields to keep from being burned by the molten metal they were working with. Head gear such as hard hats protected some factory workers, miners and construction workers from objects falling on an individual's head.

The introduction of legislation covering workplace safety e.g. Occupational Safety and Health Act (OSHA), Personal Protective Equipment at Work Acts, EU Directive on Personal Protective Equipment etc. placed responsibility on employers and on workers to protect workers from injury in their workplace. As time has passed and more and more workers were injured and killed in their workplaces legislation and regulation has become more stringent and manufacturers of PPE and Test Houses which certify the performance of the equipment have made major advances in the design and use of PPE to allow Users have equipment that will allow increased safety in the workplace. Today, these legislative tools can be summarised by saying

that they require that every worker is entitled to a safe place of work and to achieve this goal, PPE is an important mandatory requirement in many workplaces.

In firefighting conditions, as early as the 1600s, firefighters dealt with the heat, fire and smoke without the use of modern technology. Structures often burned to the ground because firefighters couldn't enter a structure in the everyday clothing they wore. Probably the first item of PPE specifically developed for firefighters was a leather firefighter's helmet developed in the 18<sup>th</sup> Century. At around the same time, persons who engaged in firefighting started to wear woollen or cotton shirts for thermal protection and leather boots. The combination of helmet and shirt prevented some injury from falling debris and heat. Eventually, rubber became more common in use in PPE for body protection and firefighters protected themselves with rubber coats or capes and rubber boots, which kept the firefighter dry from the water being poured on the fire and from weather conditions.

Respiratory protection was minimal until the nineteenth century. Stories are told of firefighters growing long beards and then flipping them up after soaking them with water and the firefighter bit on the beard to protect his nose from soot and smoke. The first self-contained breathing apparatus was designed in 1863 and it involved putting two canvas bags together which were lined with rubber. The airtight sack was worn on the firefighters back and two rubber hoses were connected to a mouthpiece where the firefighter could breathe in fresh air. Firefighters of the day also wore goggles, a leather hood, a nose clamp and a whistle. The PPE was called "bunker gear" or "turn out gear" indicating the bunks the firefighters "turned out" of when the

fire alarm was called.

During and after first and second World Wars steady progress was made in the development of firefighter's PPE when firefighters often wore long rubber boots, often above the level of the firefighter's knees, long rubber trench coats and the traditional firefighting helmet.

After World War 2, as regulations and legislation on safety of workers in their workplace started to be introduced, Countries began to develop standards for PPE including firefighters PPE and this process continues today. These standards primarily include test methods to establish performance parameters of the material used in each item of PPE but standards-makers have struggled to relate test parameters to practical conditions of use of the full PPE ensemble used by firefighters. Some would say that the current rate of standards development has accelerated way beyond practical needs and the ability of Users' ability to pay for and understand them.

With the development of synthetic materials for use in PPE, today PPE provides much greater protection, is lighter and more comfortable to wear and wearing the correct type of PPE allows persons to work in or in proximity of extreme life-threatening conditions. However it is essential that working in these conditions safely requires more than just providing the correct type of PPE following a PPE Risk Assessment, it requires training in its use and in understanding the strengths and weaknesses of the PPE, knowledge of the workplace and when working in conditions hazardous to life and health, a Safety Management System that includes personnel and procedures to remove the wearer if things go wrong.



# ALWIT offers protective clothes and more



[www.alwit.de](http://www.alwit.de)



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

Customised advice and  
quality since 1954.

**alwit**

... mit Sicherheit Ihr Partner



## SELECTION OF PERSONAL PROTECTIVE EQUIPMENT (PPE)

The person who makes the Purchasing Decision for PPE is the person who sets the Organisation's parameters for protection of the persons who have to wear it. Therefore the decision-maker should have knowledge of the risks against which the PPE is supposed to protect and it is advisable that those who make the purchasing decision should receive training prior to purchasing, in order to ensure that an informed decision on purchase is reached. Before selecting PPE, a Risk Assessment of the workplace should be carried out to:

- identify the hazards,
- assess the risk and
- eliminate, remove or reduce the hazard.

Where a hazard cannot be eliminated, removed or reduced to an acceptable level, it is necessary to introduce controls to ensure the safety of personnel. If the safety of personnel still cannot be sufficiently ensured having done all that, only then should it be necessary to introduce PPE.

The employer has the ultimate responsibility for providing PPE that is fit for purpose and protects personnel whilst allowing them to carry out the work required in their workplace without unduly increasing the risk by the use of such PPE. The employer must balance issues such as safety, suitability, cost, goods and services expected from the supplier of the PPE and all other relevant factors before deciding on PPE that is suitable for their purpose whilst never forgetting that the decision being taken is to provide adequate and suitable protection for their employees whilst they are carrying out duties in their workplace.

Specifically with regard to PPE for firefighters, which falls into the category of PPE to protect against mortal danger, it is very important that the risk assessment ensures that selected PPE matches the tactics being used. This is particularly important when there is a change in style or design of PPE as happens for example when new PPE is purchased. Firefighters may believe that the new PPE will perform in the same manner as the PPE being replaced, which may not be the case taking into account the on-going developments in performance levels of materials and of techniques of design and construction of PPE in the market today. The PPE must always match the type of tactics being used by the firefighter and the command and control procedures in place.

It is vitally important that if an organisation wishes to make changes in their general tactics e.g. adopting a more aggressive firefighting strategy, they should always determine the changes in risk of injury and its impact on the protection provided by the

organisation's PPE. This should be done by revisiting the organisation's risk assessment and changing procedures of training, tactics, command and control as appropriate.

### The Selection Process

Amongst the matters that should be taken into account in the Selection Process for PPE are

- Risk Assessment - Have you identified the activities to be undertaken by the person(s) wearing the PPE, the likely duration of each activity and the working environments in which they will be exposed etc.?
- Level of Protection required - Have you determined the level and extent of protection required from the PPE?
- Standards and Certification - Are there any legal or procedural requirements in your Country and/ or Organisation that PPE must be certified to any particular standards ?
- Conspicuity/Identification - Does the PPE you will purchase require any special features for high visibility and/or identification e.g. reflective material, badging, rank markings etc.?
- Wearer trials - For the PPE being trialled, have you considered the compatibility with each of the other items of PPE that you are considering purchasing?
- Care and Maintenance - Have you been made aware of requirements for cleaning, decontamination and disinfection of the PPE to be purchased ?
- Lifetime of the PPE - With regard to the expected lifetime of the PPE to be purchased, have you been made aware of the parameters whereby the PPE continues to be safe to use ?

In working in hazardous environments, PPE can make the difference between life and death therefore it is critical that there is a detailed and comprehensive selection process before the PPE is purchased and when put into use, that there are robust policies and procedures for training in the use of the PPE, actual use of the PPE in working conditions, care, maintenance, repair, operational rules for evaluating the on-going levels of protection as the PPE is worn and disposal of the PPE at the end of its lifetime.

*Editor's note: The above detail is an extract from the JOIFF PPE Handbook to protect against heat and flame which was published in 2007 and is available for free download from the JOIFF website at [www.joiff.com](http://www.joiff.com)*

# STANDARDISATION OF PPE FOR FIREFIGHTING

BY SIEGFRIED ASSMANN

In order to avoid unnecessary and confusing standards, the Standardization Authorities CEN and ISO have preferred for a long time to implement standardization under the so-called Vienna Agreement. This means that the result of such standardization is an EN ISO standard that is valid both in Europe and worldwide.

Unfortunately, this only works to a limited extent because there is a different approach to standardization. Although the requirements of a standard in both ISO and EN are based on a risk assessment, Regulation 2016-425 EC in its Annex II prescribes the basic health and safety requirements for PPE. An EN or EN ISO standard can only be recognised as a harmonised standard and published in the Official Journal of the EU if it proves in Annex ZA that it meets the essential requirements of the Regulation.

In the case of standards for protective clothing against heat and flames for industrial use, standardization under the Vienna Agreement has largely and satisfactorily been achieved (see EN ISO 11611, EN ISO 11612, EN ISO 14116)

However, standards for protective clothing for firefighters are different. Here there is still a confusing and partly overlapping range of standards. There are various reasons for this:

- At ISO, a separate subcommittee was set up for PPE for the firefighter (ISO TC 94 SC 14).
- With EN, all PPE against heat and flame - whether for industry or the municipal fire brigade - are established in one body (CEN TC 162 WG2).
- The aim of ISO is to standardise ensembles, i.e. to include all PPE from head to toe in a single standard (see ISO 11999 Part 1-9; ISO 16073 Part 1-9; ISO 18639 Part 1-9).
- With EN, the individual components of the complete equipment are recorded in individual standards (see EN 469, EN 15614, EN 16689, EN 13911).

So why doesn't Europe follow the same path as ISO?

The most important reason is certainly that an ensemble cannot be tested

according to uniform criteria. For many of the individual parts, their position results in a different risk assessment, so that not all requirements need to be met for all parts.

But also different tactics can lead to divergences. For example, a firefighter may carry out injections (medical) in the USA, but not in Europe; this leads to other requirements, e.g. for the moisture barrier.

In addition, the shape and also the materials of certain individual parts are completely unsuitable for a uniform test method. A helmet, boots, hearing and eye protection and breathing apparatus cannot be tested with the same test equipment as a suit, gloves and hood.

Concerns existed and still exist that the standards for ensembles are very wide-ranging. In the author's opinion, there is also a lack of consistency; not all ISO TC 94 SC 14 standards concern ensembles; there are also individual standards (see ISO 16073-3 and ISO 15384), which does not contribute to clarity.

Since 1990, many certified testing institutes in Europe have participated in the development of the technical requirements and test criteria with a large number of round robin tests. This has resulted in differences to the test methods and requirements determined in the USA, some of which will be explained here:

In round robin tests by European test houses it was found that:

- Surface ignition is sufficient to differentiate the flame propagation (EN ISO 15025) and therefore the edge ignition can be avoided, where the determination of the destroyed length is not so easily reproducible.
- A measurement of thermal resistance (EN ISO 17493) at 180°C instead of 260°C is sufficient to exclude critical products;
- The heat transfer is measured in two stages: Radiant heat (ISO 6942) and convection heat (ISO 9151) and not in the combined measurement (ISO 17492), because the calibration of the measuring instrument according to ISO 17492 has turned out to be unreliable.



## TABLE OF STANDARDS FOR FIRE FIGHTERS' PPE

EN Standards based on EC Regulation 2016-425 (Annex II)		ISO Standards ISO TC 94 SC 14 prefers standards of ensembles		
Standard Number	Title	Standard Number	Title	Basic difference
EN 469	Protective clothing for firefighters — Performance requirements for protective clothing for firefighting activities	ISO/DIS 11613	Protective clothing for firefighters who are engaged in support activities associated with fighting fires occurring in structures — Laboratory test methods and performance requirements	comparable to lower level 1 of EN 469
		ISO 11999-3	PPE for firefighters — test methods and requirements for PPE used by firefighters who are at risk of exposure to high levels of heat and/or flame while fighting fires occurring in structures – Part 3 Clothing	Level A1 is comparable with EN 469 Level 2
EN 659	Protective clothing for firefighters - Protective gloves for firefighters	ISO 15383	Protective gloves for firefighters — Laboratory test methods and performance requirements	
EN 1486	Protective clothing for firefighters- Test methods and requirements for reflective clothing for specialised fire-fighting	ISO 15538	Protective clothing for firefighters - Laboratory test methods and performance requirements for protective clothing with a reflective outer surface	
EN 13911	Protective clothing for firefighters - Requirements and test methods for fire hoods for firefighters	ISO 11999-9	PPE for firefighters — Test methods and requirements for PPE used by firefighters who are at risk of exposure to high levels of heat and/or flame while fighting fires occurring in structures	Part of ensemble ISO 11999
EN 15614	Protective clothing for firefighters - Laboratory test methods and performance requirements for wildland clothing	ISO 15384	Protective clothing for firefighters - Laboratory test methods and performance requirements for wildland firefighting clothing	WD EN ISO 15384 to replace both standards
		ISO 16073-3	Wildland firefighting personal protective equipment - Requirements and test methods - Part 3: Clothing	part of ensemble ISO 16073
EN 16689	Protective clothing for firefighters - Performance requirements for protective clothing for technical rescue	ISO/CD 18639-3	PPE ensembles for firefighters undertaking specialist rescue activities - Part: 3	Part of ensemble ISO 18639
		ISO/DIS 21942	Station uniform for firefighters	no EN standard up to now

It should be noted, however, that the superiority of EN is not to be indicated here in any form whatever; it only shows that compromises must also be made in standardization and that these naturally assume a greater extent in ISO standardization than in CEN.

As desirable as it may be to have PPE

tested and certified worldwide according to the same criteria and standards, it must be stated that the ISO standards for PPE for the fire brigade currently receive little or no attention.

*Editor's note: This article is written by the managing director of ALWIT GmbH who for*

*more than 25 years, has been a member of the team of experts who voluntarily develop standards for PPE against heat and flames. You can contact them via ALWIT GmbH Tel: +49 2828-91 46 0 Fax: +49 2828-91 46 46 Email: info@alwit*





## 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.



## FIREFIGHTING PROTECTIVE ENSEMBLES SELECTION

BY CHIEF LONNIE ROY MULLEN, CFO, MFIREE, MJOIFF, CFEI

### Breaking Tradition

When I first start working with a new fire department, my goal is to always find out why they operate and use the equipment they are currently using. I often ask the question, "Why is a particular style of firefighter ensemble being used?" Often the answer is, "This is what we have always used". Very few times has there been any other answer. This is a critical flaw. As an organization and as fire chiefs we need to have a full understanding of the reasons behind why we are using the equipment and PPE we are using.

One of the areas I see where the most resistance in changing is fire helmets. When it comes to fire helmets many fire departments here in the United States are still using the "Traditional" style fire helmet with the tall crown and large rear bill. Even though this style is heavier and bulkier, and is just not ergonomically efficient, it still is being widely used in the fire service here in the United States. Why? Because of tradition, this style of helmet is what many imagine a firefighter should be wearing.

Tradition, while a wonderful thing, can often lead us down a path that is not the most efficient or safest for our firefighters. The selection of proper PPE is one of those areas where tradition may be getting in the way of putting our people in the right gear.

Over the next few articles I will cover various components of the fire fighter ensemble. In this article however I will discuss some general considerations regarding the used and selection of firefighting ensembles.

### Stressors of PPE

Weight, fit, movability, and breathability of a garment are essential factors when considering PPE for firefighters. To have a well-balanced garment or helmet that considers these 3 factors can greatly aid in the performance of your firefighting staff. Firefighters need gear that is not cumbersome, meaning they need to be able to move freely in it. If the gear is too heavy, or doesn't fit or isn't flexible, these factors will increase the physical stressors on the firefighter.

Fire fighters are like athletes. The gear firefighters wear can greatly reduce their abilities to properly function or for their bodies to cool properly. Like any athlete as the body goes under load the heart rate, breathing and body temperature will increase. The body will try and cool itself by sweating. If the gear they are wearing is too insulated, the firefighter's body cannot cool effectively. Potentially causing a heat emergency for the user. When selecting PPE for firefighting operations the Total Heat Loss (THL) or breathability of the garment should also be considered.

The THL of a firefighting ensemble varies from manufacturer to manufacturer it is important not to just understand how the garments Thermal Protection Performance (TPP) rating is, but also the THL. How effectively is this garment allowing my firefighters to sluff off heat?

Helmets are another item that can greatly increase the stress on firefighters. A heavy, poorly balanced helmet can cause neck strain during longer duration fires. The larger rear bills on helmets potentially change the balance point on the helmet to more the rear of the helmet. In addition, the larger bills can prevent looking upward when wearing an SCBA.

Good fitting boots is another essential component of a firefighter's gear. There is an old saying amongst Farriers, "No foot, No horse". This saying holds true for firefighters. A poor fitting, stiff pair of boots can affect a firefighter's movement and positive foot placement, while also causing rub and pressure points resulting in painful movement.

The point I'm making here is that every piece of PPE (gloves, helmets, bunker gear, flash hoods, eye protection, communication devices, boots) selected either enhances or inhibits your firefighter's performance. While I have used helmets and boots as examples in this article, I will delve deeper into these topics as I develop this PPE topic series.

### Building Your Technical Specifications

# FIRE PROTECTION FOR PETROLEUM, OIL AND GAS INDUSTRIES



Solberg knows the real-world challenges. C<sub>6</sub> based, PFOS-free ARCTIC™ AFFF/ATC™ and RE-HEALING™ authentic fluoro-free firefighting foam concentrates are optimized to fit the individual needs of each customer. You can count on Solberg to work with you and deliver products that perform as needed, when you need them.

**Looking for global foam solutions to your high-hazard, high-risk assets? Give us a call and experience the Solberg difference.**

## Foam Applications

- Chemical Carriers
- Dike Areas
- Docks / Jetties
- Drilling & Production Platforms
- Flammable Liquid Spills
- Floating Production, Storage & Offtake
- Hazardous Material Spill Control
- Heliports & Helidecks
- LNG Carriers & Terminals
- Loading Racks
- Pumping Stations
- Refineries
- Tank Storage
- Vapor Suppression
- Warehouse



**THE SOLBERG COMPANY**  
1520 Brookfield Avenue  
Green Bay, WI 54313  
USA  
Tel: +1 920 593 9445

**SOLBERG SCANDINAVIAN AS**  
Radøyvegen 721 - Olsvollstranda  
N-5938 Sæbøvågen  
Norway  
Tel: +47 56 34 97 00

**SOLBERG ASIA PACIFIC PTY LTD**  
3 Charles Street  
St. Marys NSW 2760  
Australia  
Tel: +61 2 9673 5300

[SOLBERGFOAM.COM](http://SOLBERGFOAM.COM)

Standards such as NFPA 1971 (USA), EN 469 (EU) AS/NZS 4821 (Australia/New Zealand) are a good start to review for the various terminology and technical information regarding firefighter PPE. It is important to understand the terminology and intent of the various standards and this may require you to get technical clarification from the standards entity. As an American, I must reference NFPA 1971 and it is important for you to understand which standard your jurisdiction is using to stay compliant. While the standards are essential, in my mind, doing a risk assessment to understand the type of protection your firefighters need is just as critical to putting them in the correct gear. Without an understanding of how they need to be protected will result in a garment that will potentially not meet the needs of the response template.

Once an understanding of how the firefighters need to be protected through your risk assessment, an understanding of how firefighting ensembles are tested and rated would be the next step. Understanding Thermal Protective Performance, Flame Resistance, Tear Strength, Tensile Strength, Water Absorption, Cleaning Shrinkage, Fuel Penetration Resistance, Viral Penetration, Total Heat Loss are critical in ensuring that your firefighters are in the proper gear for the hazards they are expected to be exposed to and the gear has all like specifications. It does no good to have one piece of the ensemble to have a high TPP and another part to have a very low TPP.

### Field Test

Once you have set your technical specifications and you have selected manufacturers that meet your specifications, it is important to get samples to be able to field test the gear. While some gear will perform higher in some areas, it may perform lower in others. The best way to really tell is by wearing and testing the gear in environments where it will be used. The ideal is to select

gear that is balanced and performs well across all spectrums. Remember, not all firefighting ensembles are alike or will perform the same even if they are meeting the same standard. It takes field testing to see if the gear will work for your organization.

### Food for Thought

Below are photos of 4 different styles of firefighting helmets. Which would you choose and why?



If you answered, I don't know, this is what we have always used, or tradition. My suggestion would be to do some research and determine if what you are using is the best solution for your firefighters.

In future articles I will cover how I conduct a risk assessment and in subsequent articles discuss developing my technical specifications and selection of each component of the firefighting ensemble.

*Editor's note: Lonnie Roy Mullen is currently the Emergency Response Coordinator/Fire Chief for the CHS McPherson Refinery in McPherson, Kansas, USA and can be contacted at [Lonnie.Mullen3@chsinc.com](mailto:Lonnie.Mullen3@chsinc.com).*

## END OF PERSONAL PROTECTIVE EQUIPMENT (PPE) - A CATALYST FEATURE

# NEWS FROM JOIFF MEMBER ORGANISATIONS.

## DAFO FOMTEC – THE INDEPENDENT ALTERNATIVE



Dafo Fomtec AB is a privately owned company with head office in Sockholm Tyresö Sweden and manufacturing in Helsingborg in the south of Sweden.

Helsingborg city is a perfect location both for production and Global shipment by road, air and sea Our commitment to provide high quality and innovative products to the professional fire protection market, is demonstrated by our constant focus on product development and quality assurance.

Through our worldwide dealer network we offer a full range of high quality fire fighting foams of both synthetic and protein base including AFFF, AFFF-ARC, SYNTHETIC MULTI – PURPOSE, FLOURINE FREE, CLASS A, FFFP, P&FP, TRAINING & COMMISSIONING FOAM PRODUCTS.

We also offer a wide range of dry chemical fire extinguishing powders suitable for fighting fires of class A, B, C and D

Fomtec has a wide range of foam equipment for fire fighting professionals of municipal fire brigades, petrochemical, pharmaceutical, chemical Industries, oil & gas, marine and aviation.

We supply a varied selection of water and foam equipment such as foam chambers, foam makers, proportioning skids, bladder tanks, fast response fire fighting trailers as well as water and foam hydrants, pressure regulating valves, post indicator valve assemblies (PIVA), proportioner's, monitors, hoses, & cabinets. These products have proven reliability and have been tested under the most extreme conditions foam equipment for fire fighting professionals of municipal fire brigades, petrochemical, pharmaceutical, chemical Industries, oil & gas, marine and aviation.

Our customers around the world enjoy our strong customer focus and we set our pride in being both price competitive and sharp on delivery times.

For more information go to the Dafo Fomtec website - [www.fomtec.com](http://www.fomtec.com) or contact us directly

Dafo Fomtec AB Vindkraftsvägen 8 SE-135 70 Stockholm, Sweden

Tel: +46 8 506 405 66 Fax: +46 8 506 405 29

E-mail: [info@fomtec.com](mailto:info@fomtec.com)





# JOIFF FOAM SUMMIT 2020

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

**RADISSON EDWARDIAN HOTEL AT HEATHROW AIRPORT,  
LONDON, UNITED KINGDOM**

**DATE: 10 FEBRUARY 2020**

The International Organisation for Industrial Emergency Response & Fire Hazard Management - will host the JOIFF Foam Summit at the Edwardian Radisson Hotel at Heathrow Airport, London, UK

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

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

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

The JOIFF Foam Summit is part of the JOIFF commitment to provide and disseminate independent and unbiased information to JOIFF members and the wider High Hazard Fire Industry. You are invited to register your attendance by [clicking on this link](#). Please note that places are limited and offered on a "first come first served basis"

The JOIFF Foam Summit delegate place is free of charge to JOIFF Members. Non JOIFF Members £125:00 per person and includes morning and afternoon refreshments and lunch.

For further information on the JOIFF Foam Summit and/or the limited Exhibition space availability please contact: Paul Budgen, JOIFF Event Coordinator. [pbudgen@edicogroup](mailto:pbudgen@edicogroup) or Tel: + 44 (0) 77 88 281 357

# Experience TEEX...

## The Best Training at the Largest Live Fire Facility

Recognized as an  
International Training Leader

Hands-on Training  
conducted at Brayton  
Fire Training Field in  
College Station, Texas



### Quality Training that Makes a Difference.

- TEEX offers extensive hands-on activities and applied practical training directed toward enhancing your technical knowledge and skills
- Courses can be tailored or custom built to meet your exact needs in a variety of areas
- Most training can be conducted at Brayton Fire Training Field or at your location
- Several certificate programs are available such as the Industrial Emergency Response Specialist

### Choose courses from these types of training areas

- Firefighting
- Fire Investigator
- Fire Officer / Instructor
- Hazardous Materials Response
- Rescue / Urban Search & Rescue
- Industrial Emergency Response
- LNG Emergency Response
- Marine Firefighting
- Oil Spill Response
- Emergency Management
- Leadership Development

Learn more online

**TEEX.ORG/FIRE**

#### EMERGENCY SERVICES TRAINING INSTITUTE

College Station, Texas 77842 USA | [esti@teex.tamu.edu](mailto:esti@teex.tamu.edu)

866-878-8900 | 979-845-7641

TEXAS A&M ENGINEERING



EXTENSION SERVICE

# REMOTE-CONTROLLED MONITORS FOR FIXED FIREFIGHTING SYSTEMS

BY FRITZ ZIMMERMAN



The requirement for automated firefighting is continuously increasing. Remote-controlled monitors, especially in combination with automated fire detection, allow a targeted but flexible firefighting operation in limited areas. The technical development in the field of drive engineering, sensor technology and control technology offers some great future potential.

## **Advantages of automated firefighting systems with remote-controlled monitors**

Automated firefighting systems are well known as sprinkler systems and also spray nozzles. But for several years automated firefighting systems with remote-controlled monitors are used for fire protection of:

- Tank farms
- Petroleum loading terminals
- Aircraft hangars
- Thermal power plants
- Production facilities
- Recycling plants
- Waste incineration plants

The big range of monitors and the possibility to select from a variety of mountable nozzles provide flexibility and

enhance performance to achieve effective fire protection for high risk areas. Remote-controlled monitors allow a targeted firefighting operation in confined spaces and can be used for extinguishing agents like water, low-expansion foam and, if required, even powder. The nozzles are fine-tuned to suit the type of extinguishing agent, allowing extended reach. Combined with a suitable fire detection and control, effective fire protection can be guaranteed while requiring just a minimum number of firefighting personnel. To fully utilize the range of potential offered by remote-controlled monitors for firefighting, introducing a programmable (PLC) control system with state of the art communication facilities is mandatory. This allows the connection with automatic fire detection systems and fire alarm control panels also for very large and complex facilities. The response times are as fast as known from present automatic firefighting systems.

## **Requirements to remote-controlled monitors for use in automated firefighting systems**

When using remote-controlled monitors in automated firefighting systems, this requires a consideration of some

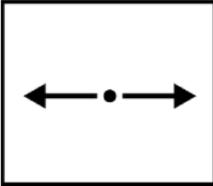
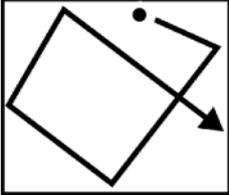
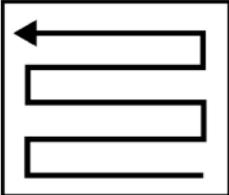
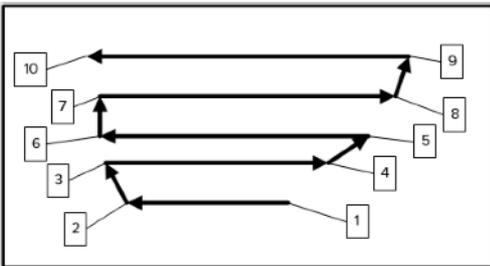
function-relevant parameters with regard to design and construction of the monitors. In order to achieve the requirements of repetition accuracy for pre-programmed extinguishing operations, zero-clearance bearings are necessary to effectively prevent any tilting of the pivot mounting. In addition a design aimed at reducing the repulsion of the water jet and decreasing the power needed to swivel the monitor, such as the optimized FireDos octagonal 'Oval Flat Design', is essential. This also includes suitable, contact-free and thus wear-free absolute encoders in order to implement a high repetition accuracy and precise nozzle direction in the case of automated firefighting systems. It is vital to use such sensors which can monitor and save movements and positions even when electricity is shut off. In case of manual manipulation of the monitor by the use of the fitted hand wheels, i.e. during maintenance or commissioning, this ensures that no reference adjustment is necessary for recalibration of the programmed automated swivelling movements. In addition the drives which regulate the spray pattern must be able to be fitted with absolute encoders. Beside the right / left and up /down movements, this provides a third parameter which allows influencing the shape and range of the spray target area. Furthermore, a larger spraying angle also reduces the impact forces of the extinguishing agent jet and thus prevents a fire of bulk materials from spreading.

To achieve the necessary degree of freedom, remote-controlled monitors should allow wide swivelling ranges.



*Monitor in Hangar Application*



Oscillating mode	Description	Graphical representation
Horizontal	Monitor oscillates horizontally around the current point. Nozzle is not adjusted automatically. Manual alignment to starting point is necessary.	
End-to-end	Monitor oscillates horizontally and vertically to limits within the defined window. Nozzle is automatically adjusted to specified spray angle when oscillating mode starts.	
Guided	Monitor oscillates horizontally from limits within the defined window. After each horizontal travel, the process is carried out vertically in small steps. Nozzle is automatically adjusted to specified spray angle when oscillating mode starts.	
Step sequence	Monitor oscillates within window defined by single points. Number of points can be adapted to demands of installation. Adjustment of spray angle of nozzle can be specified at each point to specific value.	

*The most common four oscillating modes*

Preferably, the horizontal swivelling range is 360° and the vertical swivelling range reaches from +90° to -90°. Both swivelling axes should have self-locking worm gears to prevent the monitor from an unintended adjustment by an external force. Additionally self-locking gears help to stop remote-controlled monitors at the desired position without requiring additional brakes.

In order to achieve the corrosion resistance required for a long-term use of the monitor, components made of seawater-resistant cast aluminium along with additional special hard anodized coating are used and have proven themselves for many years. Using only cast parts to build monitors eliminates the risk of stress corrosion cracking, which occasionally appears in welded parts. Further the development process of monitors using cast parts increases the design flexibility and optimization process significantly. The components can be flow-optimised by the use of CFD

(Computational Fluid Dynamics) simulation software. Low pressure loss figures can be achieved even with comparatively compact dimensions. This reduction in pressure loss indicates that the extinguishing water turbulence on the way through the monitor is reduced to a



*Monitor for High Flow Application*

minimum. Flow-optimisation however does not end with the so-called pivot mounting, i.e. the body of the monitor, but also includes the nozzle. A sufficiently long nozzle design reduces the turbulences from the pivot mounting

effectively and creates the basis for the long reach of CFD flow-optimised nozzles. As it has already been practised with manual controlled monitors for a long time even nozzles for remote-controlled monitors can optionally be fitted with regulators for the extinguishing agent flow-rate. FireDos monitors offer this option to take place remote-controlled



*Monitor for High Flow Application*

during operation. The flow can thus be adapted to the actual requirements of firefighting.

### Features of control systems for automated fixed firefighting systems with monitors

The range of electric control systems for remote-controlled monitors reaches from standalone control systems to control one single monitor to complex systems with multiple monitors where decentral individual controls are connected with a central control unit via a fibre optic network. Dependant on the requirement, compact PLC systems or systems consisting of several interconnected assemblies make up the control system. Where high functional safety is required, redundant CPUs can be installed or, alternatively, PLC control systems in accordance with the required safety level (SIL). A daily automatic self-test is one standard feature of today's control systems. During this process, the functionality of all drives and sensors fitted on the remote-controlled monitors is tested. If a fault is found at one of the components, a corresponding error message is sent to the supervising body. This ensures that possibly occurring failures are reported immediately and can be eliminated before a malfunction during operation happens. This significantly increases the reliability and availability of the automated firefighting system, compared with such systems which are tested for functionality in more or less long and possibly irregular intervals. For





# PROBAN<sup>®</sup>

Performance is our promise

## FLAME RESISTANT WORKWEAR



**Performance**  
Serving the safety industry for over 60 years with workwear offering multi-risk protection.



**Comfort**  
Soft feel, light, ergonomic and breathable flame resistant protective clothing based on natural fiber technology.



**Durability**  
Excellent color and tear strength retention after exposure to outdoor working conditions.



**SOLVAY**

easier commissioning, the automated control systems are fitted with an HMI (Human-Machine Interface) option. Thereby, during commissioning or a change in program, all threshold values which must not be exceeded by the remote-controlled monitors can be adjusted in the control cabinet without having to make any settings directly at the remote-controlled monitors. In the case of very large systems, this is an invaluable gain of time during commissioning, service and use.

But not only thresholds and rest positions can be programmed via a display. Also the best oscillation mode for the respective system can be individually selected and programmed for the single or multiple monitors. Currently, four different oscillating modes are generally used which allow adapting to the various requirements in different applications. This allows the hazardous areas within these applications to be separated into individual zones where one or even several monitors will apply their extinguishing agent in case of an alarm. The following four oscillating modes are shown in the table on the previous page. If control systems for remote-controlled monitors are interconnected with fire detection systems (i.e. on the basis of IR cameras), pre-selection of individual zones can be skipped. The monitor will then swivel to an area identified by the fire detection system and will start the extinguishing operation directly at the source of the fire. In case of locally confined initial fires, this results in maximum

firefighting success while consuming just a minimum amount of extinguishing agent and affecting only a limited area.

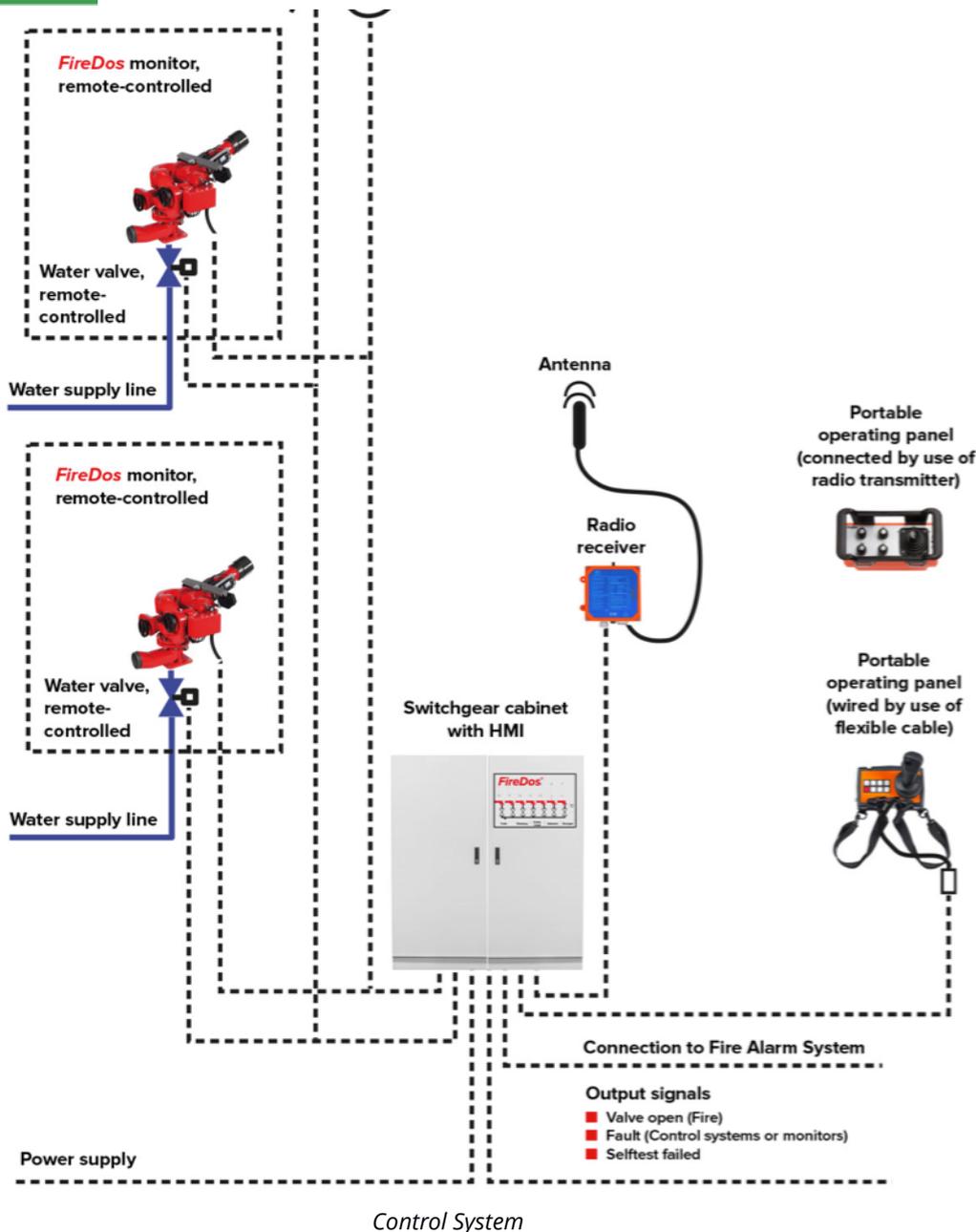
**Outlook and conclusion**

The technical development in the field of drive engineering, sensor technology and control technology offers some great future potential to detect fires in their initial phase as well as to fight fires in a localized and resource-conserving manner by use of monitors. In addition, a focus must be placed on what firefighters around the world use to fight fires. In live operations, the extinguishing agent flow is adapted to the requirements set by the fire incident. The availability of remote-controlled monitors and nozzles where the extinguishing agent flow rate can be adjusted by remote-control without interruption of the operation makes it possible to apply this procedure also to automated firefighting systems. If it is therefore successful to apply experience and procedures from

practical firefighting to automated firefighting systems, the seeming paradox of "less extinguishing agent leads to a higher level of fire protection" can become reality.

**Author note:** PLC - Programmable Logic Controller, CFD - Computational Fluid Dynamics, CPU - Central Processing Unit  
 SIL - Safety Integrity Level, HMI - Human-Machine Interface  
 IR - Infrared. Initially published in the INTERNATIONAL FIRE FIGHTER SEPTEMBER 2019.

**Editors note:** Fritz Zimmermann was hired by FireDos as head of the engineering department in 2012. He is in charge of foam-proportioner and fire-monitor design and development. Previously he worked for Alco for over 28 years in the design and development of fire-monitors and project development for automated extinguishing systems and tank fire-fighting equipment.

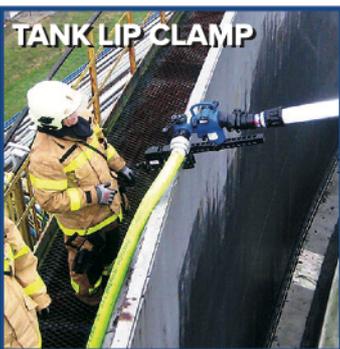


# TFT'S HEMISPHERE CLAMPS ANYWHERE!

## CLAMP IT... CHARGE IT... FLOW IT

A mounting block and a variety of brackets allow the monitor to quickly establish water flow up to 2000 l/min (500 gpm) in locations that ground monitors cannot.

Attachment of the HEMISPHERE is as easy as sliding the socket at the base of the monitor onto a quick attach mount. It can swivel 360°, and its attack range includes an entire “Hemisphere” of Up, Down, Left, Right — or anywhere in between!



### ON AN I-BEAM

Use any I-Beam's strength to attack a fire from ANY ANGLE! One person can quickly attach the HEMISPHERE without any tools.

### ON A TANK LIP

A single brigade member can clamp a tank lip from the gauging platform. The HEMISPHERE's integrated safety feature locks the monitor to the base when it's flowing.

### ON SCAFFOLDING

Staircase? No problem! With the HEMISPHERE, you're set up and ready on safety rated scaffolding or handrails to flow 2000 l/min (500gpm).

### ON A BUMPER

Mount the HEMISPHERE to your trailer hitch. Water pressurized pins prevent the monitor from rotating or releasing while flowing.

### ON A POLE

Clamp to objects from 76 mm (3 in) to 0.6 meters (2 ft) in diameter.



A rotation release lever (separate from the release pin) allows the monitor to be rotated 360° without being released from its mount.



For more info on the items on this page, go to [tft.com](http://tft.com)



# FOAM SPRINKLER SYSTEMS: THE MOST IMPORTANT CONSIDERATIONS FOR THE INSTALLATION OF FOAM DISCHARGE SPRINKLER SYSTEMS

BY JOHN OLAV OTTESEN

The use of a specially formulated foam that has been tested with the sprinkler system under consideration is among the key factors that will determine fire-fighting effectiveness.

During the past century, automatic sprinkler systems have been used with huge success for protection of all kinds of applications.

Sprinkler systems are unique in the sense that they detect and fight the fire where it starts, and can scale up the fire-fighting automatically based on the size of the fire. The use of foam in sprinkler systems is an efficient way to protect against the hazards of fires in flammable liquids, but it requires a special kind of foam, developed and intended for use with sprinklers.

The effectiveness of the foam that fights the fire is a combination of the foam concentrate properties and the properties of the discharge device; these properties are highly relevant and have a significant impact on fire extinguishing performance.

Standard sprinkler nozzles are not very efficient as a foaming device. Sprinkler nozzles generate low-expansion foam, with a typical expansion ratio of less than 5:1 and with a very short drainage time. Foam concentrates used with sprinklers must therefore be able to fight fires under these conditions.

As each sprinkler nozzle has different foaming characteristics and spray patterns, the only way to establish the effectiveness of a foam sprinkler system is to test each individual foam concentrate together with the specific sprinkler in question.

## Standards

Testing the foam concentrate together with the equipment is the idea behind test standards such as UL 162 and FM 5130.

Using foam tested with normal foam branch pipe, such as described in EN 1568, does not provide evidence that it will work in a sprinkler system because the foaming properties of sprinkler systems are totally different.

When tested on hydrocarbon fires, UL 162 and FM 5130 require that the foam blanket shall be deluged with water for five minutes before the burnback test is conducted, to establish the strength of the foam blanket. This aspect is not considered in standards such as EN 1568 or ISO 7203.

Another aspect covered by the FM 5130 standard is the influence of the height of the system on its firefighting capability. Extensive testing shows that the effectiveness of foam sprinkler systems changes with installation height; FM 5130 requires

testing of foam with sprinklers at minimum and maximum heights.

Design standards such as NFPA establish minimum application rates for foam sprinkler systems.

These application rates are based on the requirement that the foam can function as intended when used with the selected discharge device.

The only way to safeguard this is to test and document the effectiveness of the foam concentrate with the discharge device through approvals such as UL 162 or FM 5130.

## Choosing the right foam for the discharge device

Currently the most effective foams for sprinkler systems are AFFF and AFFF AR foams, due to their oleophobic properties and the film formation that is unique to film-forming foams. High-quality film-forming foams are less affected by low expansion and do not lose their fire-fighting properties under such conditions. In addition, film-forming foams are less sensitive to the unique properties of different flammable liquids.

In view of the above considerations Dafo Fomtec has spent years developing and testing special foams intended for use in sprinkler systems. New products have been brought to the market, including Fomtec Enviro USP is fluorine free alternative also tested and approved for use with sprinklers according to UL 162. And also Fomtec AFFF 1% Ultra LT, Fomtec AFFF 3% S, Fomtec ARC 3x3 S and Fomtec AFFF 3% M .

## Conclusion

When protecting high-risk applications where foam sprinklers are the selected system, the need for specifically formulated sprinkler foam is apparent. Using foam concentrates that are neither tested nor approved with sprinklers can compromise the effectiveness of the system. Where the protection of life, property and the environment against the hazards of fire is necessary, proper design, based on real test data, quality products and a sustainable philosophy, is a must.

The logical conclusion is to specify approved systems, using foams tested and approved with sprinklers, and to include containment of firewater run-off to ensure an environmentally sustainable system.

*Editor's note: John Olav Otteson is Managing Director of Dafo Fomtec, Stockholm, Sweden Tel: +46 8 506 405 66 Fax: +46 8 506 405 29 E-mail: info@fomtec.com*





## CRISIS MANAGEMENT IS MATURING

BY TIM BIRD

There is an assurance problem we've been helping clients with for the last couple of years. We'd like to tell you how we are helping them and the difference it makes. Clients tell us they have difficulty knowing whether their organisation is genuinely crisis-ready. The organisation needs a defensible position – that it has a reasonable, proportionate approach to crisis readiness – but they can't benchmark their position against standards or peer organisations.

Standards do not hold the answer: The British (BS1 1200) and European (PD CEN/TS 17091) crisis management standards give some high-level principles, but they don't tell each organisation the appropriate level of readiness for them. Major Incident Management (ISO/IEC 20000) and Business Continuity (ISO 22301) standards confuse the issue by mixing in different disciplines.

There are two common approaches we see, which both make it hard for clients to assess readiness. The first approach assumes that all stakeholders are competent in crisis management, so therefore ready to undergo a full-scale annual test exercise.

We've been asked to observe a few of these over the years and we notice these exercises tend to polarize results into either a) embarrassing discoveries around competence, or b) faking a successful conclusion.

The second approach assumes that having a plan, then training people how to use the plan, will result in competence. This approach is a bit like handing seventeen year-old a copy of the Highway Code and the keys to a Ferrari.

### What this looks like

What both these approaches miss is the reality that all crisis

teams exist somewhere on a maturity scale. They can move up and down this scale, although the general idea is to develop and maintain at a chosen level of maturity. When our clients look at this way, it becomes much easier to determine current reality and a desired state of readiness . . . and then plot a path to get there. The maturity model uses five indicators for each element of crisis readiness, corresponding to five stages of maturity: Pathological, Reactive, Calculative, Proactive and Generative. This crisis maturity scale is aligned with Hudson's scale, widely used in measuring safety culture, so the terms are usually recognised elsewhere in the organisation.

Subject matter is based on relevant sections of the Crisis Management Standard (BS1 1200 and PD CEN/TS 17091), Major Business Continuity Standard (BS/ISO 22301, 2012); and Resilience Standard (BS 65000, 2014). It covers forty elements under ten headings, including: Accountability; Structure; Process; Planning; Stakeholder Engagement; Training; and Root Cause Analysis.

### Real competence development

The maturity scale, with current and desired states marked on it, provides a defensible position for auditors, owners, investors, regulators, supply chain partners, customers and, of course the risk committee. It allows the manager responsible for crisis management to demonstrate progress towards the standards set by the company itself, based on its own risk tolerance.

*Editor's note: Tim Bird is Managing Director of Eddystone Consulting Ltd. UK. Tel: +44 1433 659 800 Email:*

*[opportunities@eddistone.com](mailto:opportunities@eddistone.com) Website: [www.eddistone.com](http://www.eddistone.com)*





Accredited by

**JOIFF**

## 5-day training Advanced Industrial Firefighting

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

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

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

### Practical Information

**Course duration:** 5 days (Mon to Fri)  
**Location:** The Netherlands  
**Requirements:** Basic understanding on industrial firefighting

More information on the training program and actual courses can be obtained by contacting H2K.

### Course Topics:

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



## ENSURING INDUSTRIAL FIRE SAFETY AT NESTE OIL REFINERY



### BRONTO SKYLIFT

The Kilpilahti industrial area is the home to the biggest oil and chemical industry hub in the Nordic countries. This impressive 13 square kilometre area houses nine different companies that form a unified production chain from crude oil to plastics and directly employ over 3500 people. The Neste refinery in Kilpilahti includes four production lines and over 40 process units, as well as a wide tank area and the biggest harbour in Finland in terms of volume. Safety precautions in this kind of complex need to be very strict and preparedness is everything. The refinery's industrial fire brigade is constantly planning, practising and preparing for anything that could happen in the area.

It was recently the time for the old Bronto 23-2T1WT to end its 30-year career at the refinery and for a replacement to step in. The old Bronto was from 1987 and its reach and capabilities were insufficient for the modern refinery. The process started with wide investigations about the current suppliers and the available firefighting equipment. After all, this kind of safety investments are not to be taken lightly. The specific needs in the industrial area, quality requirements and the specifications needed from the equipment

finally led Neste back to Bronto Skylift after competitive bidding.

"The price-quality ratio was clearly in favour of Bronto Skylift. They are a well-known brand and I have a lot of experience of their high quality from my previous career in a municipal fire brigade. For us also domestic service is a must and Bronto Skylift has a local partner nearby," says Jommi Hyttinen, Industrial Fire Officer, Neste Oyj.

#### **Tailor made for industrial needs**

The refinery needed a firefighting unit that would be tailored to industrial needs. It had to have a very high water and foam capacity as well as an advanced foam-mixing system. The vertical and horizontal reach needed to cover most of the process area. The area has structures over 100 meter high, but the majority is between 30 to 50 meters, so that was the target height. And lastly, the unit needed to be compact enough to drive around and set up at the process area that has tight twists and turns. After comprehensive studies, they chose the Bronto Skylift F56WFT, a 56-meter water and foam tower.

"The process was very thorough. Other possible solutions were evaluated as well, but finally the F56WFT was the most

suitable one to satisfy the customer's needs," Jussi Alenius, Sales Manager, Bronto Skylift

The WFT-products are unique in Bronto Skylift's product portfolio, as they are not equipped with a rescue cage, but a high-capacity water monitor(s) instead. They are especially designed for industrial firefighting where water and foam capacity is the key. Water way capacity is 6 000 litres / minute as a standard. Neste defined the minimum requirement for the fire pump to be 10 000 l/m at 10 bar to ensure adequate water supply. The unit is equipped with two water monitors; one at the end of the boom and one on the decking. The combined maximum water flow is well over 10 000 l/m.

A special, very precise direct injection foam mixing system allows them to adjust the foam percentage according to the nature of the fire. Foam percentage can be from 0,5 to 3% and the foam monitor capacity is 360 l/min. This adds up to 12 000 l of foam solution per minute. As there are several scenarios with different types of fire, the unit also has a dry chemical powder line. The additional water outlet in the water monitor at the boom can also serve as a feeding line for a separate hose, so the unit can serve

# PERIMETER SOLUTIONS INNOVATES FIRST EVER FLUORINE FREE DUAL-PURPOSE FIREFIGHTING FOAM

PHOS-CHEK® CLASS A/B FOAM DELIVERS EFFECTIVE AND ENVIRONMENTALLY  
FRIENDLY TECHNOLOGY

even as a 56-meter feeding line.

"We have several fire suppression plans in place and we used these as a guideline to define the specifications for the equipment. The F56WFT is ideal if we have a combustible leakage up high in the structures or if we need to cool down the structures from the top to bottom. In fact, the unit was intended to serve mainly in the process facilities, but it turned out to be so good and versatile that it serves us in all areas, also at the tank area and the harbour," Mr. Hyttinen states.

## Optional equipment for added safety

The optional equipment was also carefully chosen. Mr. Hyttinen says the most important ones in addition to the water/foam/powder system are the radio remote control, a thermal imaging camera and a Bronto Loadman. The radio remote control is a work safety matter for the firefighters, as it allows operation from a safe distance. It also improves visibility when you can move around the perimeter while operating. The thermal imaging camera gives vital information of the situation inside the structures and the Loadman helps to make sure the ground is solid enough to set up the unit.

"We have used the radio remote control and the Loadman quite a lot in our training. Especially the Loadman has helped us to pre-check certain critical spots and plan ahead where the unit could be positioned. All this helps to save time if we encounter a real fire situation," says Mr. Hyttinen.

Up to now, there has not been an actual fire situation inside the refinery, but the brigade has supported a few close-by municipal missions. Mr. Hyttinen has almost 20 years of experience in the municipal side and has now been at Neste for 6 years. Even though the requirements for the equipment are different and the nature of the area and firefighting is very different, daily life at the brigade is quite similar.

"There are less real fires in the industrial side and less variety of missions, but all in all it's quite similar. We practice a lot and are very familiar with our equipment and the area. The new Bronto is well liked and considered to be easy to use. It is an undeniable improvement to our tool box," says Mr. Hyttinen.

*Editors note: You can read the original article here: <https://brontoskylift.com/ensuring-industrial-fire-safety-at-neste-oil-refinery/>*



ST. LOUIS, MO – Perimeter Solutions, the global leader in the production of fire retardants, foams, and water enhancing gels, along with a wide range of services for managing wildland, industrial, municipal, and military fires, today announced the commercialization of PHOS-CHEK® Class A/B foam concentrate, a new fluorine free firefighting foam capable of extinguishing Class A and B fuel fires with a single product.

Structural and industrial fires demand swift action and suppression. Too much is at stake with uncontrolled fires involving Class A and B fuels. Only the best, most innovative foam technology can be trusted to prevail in such fire situations.

PHOS-CHEK Class A/B foam concentrate is the first UL 162/ULC S564 listed fluorine-free synthetic foam concentrate specifically designed to rapidly control and effectively extinguish fires involving either Class A or B fuels. This firefighting foam is both flexible and environmentally responsible, capable of delivering high quality foam performance without any PFAS ingredients commonly found in Class B fluorinated products.

PHOS-CHEK A/B firefighting foam is user friendly and effective for use in a variety of applications including structural and residential fires, general facilities protection, Class A hazards (ordinary combustible materials such as wood, cloth, paper, rubber, and many plastics), Class B hazards (non-fuel-in-depth, e.g. vehicle

fires), and foam training exercises.

Designed for use on Class B hydrocarbon fuel fires at 1% proportioning, PHOS-CHEK A/B foam concentrate is not intended for use on Class B polar solvents or water miscible fuels. The foam concentrate is a superior wetting agent for use on Class A fires in accordance with ANSI/NFPA 18.

When used as a wetting agent, PHOS-CHEK A/B foam concentrate is UL/ULC Classified 0.1% proportioning for Class A fires and 0.25% proportioning for Class B Non-Water Miscible Fires.

PHOS-CHEK A/B fluorine free foam concentrate is a highly flexible product, compatible with conventional firefighting equipment such as low expansion non-air aspirating and air aspirating nozzles, monitors, medium expansion foam devices and Compressed Air Foam Systems (CAFS). With ever-increasing global environmental awareness on PFAS containing Class B foam discharge solutions, PHOS-CHEK A/B fluorine free foam is an environmentally responsible next generation product and fire service solution to the growing review by regulators who look to restrict PFAS containing foam from being used for firefighting and training or prohibit its sale or distribution.

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





## JOIFF AVIATION WORKING GROUP

UPDATE BY MARK BUCKINGHAM CERT.ED, MIFL, GRAD.JOIFF TECH.IOSH, TECH.IFE

In 2018, colleagues within JOIFF from across a range of industries proposed to the board of directors that there would be great value in forming a JOIFF Aviation working group. This was due to the acknowledgement that there are some shared interests across industry, around bulk fuel storage, hazardous materials, diversity of firefighting techniques required, and a range of other issues worth exploring.

The aviation fire industry tends to be focussed (naturally) on dealing with an aircraft fire, with some exceptions also dealing with the domestic aspects of airports. The driving thought, however, was around bulk fuel storage; or 'fuel farms'. Aviation fire fighting focusses on having a quantity of firefighting media available for immediate discharge, and then returning to a central location to 'top up' and return to the scene. This of course is contrary to the needs around a fuel farm – where continuous application of media until the fire is extinguished is a critical tactic.

So acknowledging the above, the Board agreed and following the generation of terms of reference, reached out to a group of people within JOIFF, and formed and ratified the group at the 2018 JOIFF conference in Malta.

The working group consists of:

*Mark Buckingham (Birmingham Airport, UK) – Chair, John Trew (Falck UK) – Vice Chair, Dave Cook (independent), David O'Neill (Fire Training Group UK), Daryl Bean (IFTC UK), John Olsen and Scot Yound (Strategic Fire Solutions, Germany), Ian Webb (Bae Systems UK)*

Some email traffic constituted early exchanges within the group, and a

conference call was held to agree next steps. What was agreed unanimously, is that other than in one or two notable exceptions, the preparedness around the worst case scenarios at airport fuel farms had significant gaps. Airports don't tend to understand the volume of media that would be required, nor indeed how to apply it. The support by municipal fire services would be variable, but generally speaking, municipal fire services do not 'skill up', nor have the equipment, to deal with such incidents. The result was the decision to construct a questionnaire, designed to reach out across the global aviation industry, to, in the first instance, understand the nature of the issue around fuel farms; was our assumption correct, and to what degree are the airports of the world aware of the gaps.

The questionnaire took some time to construct, due to the need to consider commercial sensitivities, but ultimately the work was complete and ready to share. In the meantime, John Olsen visited an event in Linz, Austria – a joint conference between AFOA (Airport Fire Officers Association (predominantly UK)) and ARFF (Aviation Rescue and Fire Fighting (predominantly US)). To summarise the conversations that he had on the topic, it was clear that the story was the same across the board, broadly based on the fact that the regulations to which airports must comply just do not fully consider risks such as fuel farms. An early thought from this event was that a good output for this group would be to provide:

- Guidance to airports to enable them to carry out risk assessments around fuel farms, and guidance around equipment and media

- Guidance to regulators to prompt them to re consider the amount of onus it places on airports to provide a commensurate amount of planning around the risk

Around the middle of 2019, a further organisation, IAFFA (International Airport Fire Prevention Association) offered JOIFF an opportunity to speak and present its work on this topic to its joint conference with ARFF, in Honolulu, Hawaii. It was an opportunity to speak to a new community not only about this specific project, but also to introduce them to JOIFF. Both organisations have a similar ethos around shared learning; but also JOIFF's ability to offer accredited training in topics other than aircraft incidents offers a dimension which is becoming more routinely sought after in the industry.

After great consideration, JOIFF agreed to fund 2/3 of the trip to the event, for myself to attend and extol the virtues of our organisation, introduce the project, including the questionnaire.

For me it was of course a great honour to be able to travel such a distance and represent JOIFF; I was confident of a great reception for the material, and the strengths of JOIFF, as I am well aware of the challenges within aviation.

The programme was pretty stellar to be honest.

### CONFERENCE PROGRAMME

- 11:15 Comparison on FAA, ICAO & NFPA Standards
  - Mr Edward Conley, NFPA Division Director
- 11:45 Training Accreditation
  - Mr Fred Piechofa, Pro Board Executive Director
- 13:30 Beyond the Procedure: Train For The Unexpected
  - Dr Katherine Lamb
- 14:30 Overview of Multi-Agency Emergency Response
  - Mr Darren McQuade, Director of Operations for the NW Metro Region Melbourne Met Fire Brigade
- 15:00 **BREAK**
- 15:15 Presentation by Oskhosh Fire & Rescue
- 15:35 Learning & Sharing of Critical Incidents (Case Study on Grenfell Tower Fire)
  - Sir Ken Knight, Former UK Government's Chief Fire and Rescue Adviser
- 16:05 Compressed Air Foam Systems
  - Graeme Day, RFSS Compliance Manager, London Heathrow Airport
- 16:35 Evolution in Testing Emergency Exercising
  - Gilles Crichton, Group Head of Assurance, AGS Airport Group
- 17:15 Panel Discussion and Summary
- 18:00 End of Day 1
- 18:15 Appreciation & Recognition Reception (Alohilani Ballroom)

### 06 SEP 2019, FRIDAY

- 08:30 Registration
- 08:45 Active Shooter
  - LA Airport Emergency Management Division
- 09:30 CDC Presentation
- 10:30 **BREAK**
- 10:45 Dealing with the Challenge of Adequate Use of Resources in Airport Emergencies
  - Marcus Almeida, Rio De Janeiro Airport, Emergency Planning Specialist
- 11:10 Business Continuity Planning: Airport Fuel Farm Incidents
  - Mark Buckingham, Head of Fire and Emergency Planning, Birmingham Airport, UK
- 11:40 Presentation by Rosenbauer International
- 12:00 **LUNCH & NETWORKING**
- 13:00 Incident Command
  - Chris Schulte, Ex-Fire Chief for the City of Connell (Retired March 2019)
- 13:30 Overcoming Resistance: Strategies for Implementing Organizational Change
  - Brian Brauer, Chairman Council on Accreditation, The Pro Board
- 14:00 **BREAK**
- 14:30 Panel Discussion and Presentation
- 16:00 Closing & Summary (Q & A)



What was particularly interesting were the presentations which dealt with thinking outside of long since 'set in stone' paradigms within aviation: Gillies Crichton and Graeme Day both presenting on successful challenges to regulators to allow more flexibility in exercising and firefighting media respectively; and Dr Katherine Lamb presenting her thoughts and evidence of the need to train fire commanders to think 'out of the box' around established plans, and the dangers of expecting finite 'hard' plans to be the answer to an infinite range of possible incident outcomes – all of these presentations set the scene perfectly for me to offer another thought provoking challenge – that we are just not prepared for fuel farm incidents.

I took as a set of credible scenarios from an existing current MAH (Major Accident Hazards) report for a fuel farm, and gave evidence that not only do these incidents occur; but they have all occurred relatively recently: also presenting, in parallel, typical media requirements for such incidents:

**Typical Scenarios (ref xxx fuel farm MAH\* report)**

Tanker import (loading island, 'very large pool fire')



Miami Airport  
Miami, FL  
March 23, 2011  
Leak from a filter, overtopping bund

\* MAH – Major Accident Hazard



**Typical Scenarios (ref. xxx fuel farm MAH\* report)**

Tanker import (loading island, 'very large pool fire')



Kinder Morgan Terminal  
Carson, CA  
3<sup>rd</sup> June 2019  
Jet A1 loading onto a truck

\* MAH – Major Accident Hazard



**Very large pool fire – foam and water requirements**

**UK/US guidelines:**

Recommended minimum application rate	1.05 g/pm x 15 min
Maximum pool extent fire	2000m <sup>2</sup>
Application rate of finished foam	1.05 g/pm x 2000m <sup>2</sup> x 15 min = 31700 g finished foam

3% foam concentrate inducted at a rate of 3% to water

<b>Total Foam Concentrate</b>	<b>951 gallons</b>	<b>Total Water</b>	<b>30749 gallons</b>
-------------------------------	--------------------	--------------------	----------------------



**Typical Scenarios (ref. BHX fuel farm MAH\* report)**

Catastrophic Tank Failure with bund overtop



Denver Stapleton Airport  
Denver, Co.  
November 25, 1990  
Fault: in pump, created friction, igniting a spray  
Outside assistance eventually extinguished the fire in 30 minutes, after 52 hours



Miami Airport  
Miami, FL  
March 23, 2011  
Leak from a filter, overtopping bund



**Catastrophic Tank Failure and bund overtop – foam and water requirements**

**UK/US guidelines:**

Recommended minimum application rate	1.05 g/pm x 60 min
Maximum pool extent fire	6000m <sup>2</sup>
Application rate of finished foam	1.05 g/pm x 6000m <sup>2</sup> x 60 min = 380407 g finished foam

3% foam concentrate inducted at a rate of 3% to water

<b>Total Foam Concentrate</b>	<b>11412 gallons</b>	<b>Total Water</b>	<b>368995 gallons</b>
-------------------------------	----------------------	--------------------	-----------------------



Certainly, the figures stated here, caught the attention of the audience. An airport fire service must have available 200% of its requirements for its worst case aircraft fire; these volumes are specified exactly in the various regulatory documentation, and are the same world wide – and typically, they don't carry a great deal more – given cost and environmental considerations. It is easy to focus here purely on foam, but in reality, being able to obtain such volumes of water is also extremely challenging; let alone the technical skills to apply it in an effective way.

The next part spoke about the rates of application, the 'don't start till you've got enough', and the skills themselves. The following slides showed the sort of application rates required, against the capabilities of aviation fire trucks (and their industrial compatriots),

**.....so in order to achieve (if we have managed to amass enough foam and water).....**

For the worst case scenario

**Required Application Rate:**

1.05 g/pm x 6000m<sup>2</sup> x 60 mins  
= 6300 g/pm for 60 mins



**A number of issues - equipment**

- ARFF trucks are not designed to produce the amount of media per minute that may be needed for a worst case scenario

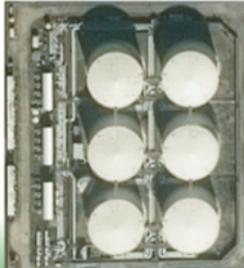
Example



<b>Oshkosh Striker</b> 1585 GPM from bumper, or, 2377 GPM from HRET, down to 790 when extended	<b>E-One custom</b> 3500 GPM from Fixed Top Gun (Williams Hydrochem)	<b>Ferrara Inverter Super Pumper</b> 5500 GPM from 85ft fully extended HRET
---	---	--



**Tactics and Techniques**



- Cannot start applying media until we have enough to extinguish the fire
- Treat the source of the fire
- Create and maintain a sealed blanket of foam
- How many trucks? How many monitors? How close?



It is not common to see the fixed installations and other automated systems that we are used to seeing across the majority of our storage facilities in the JOIFF community (again, there are exceptions); so at this point, the delegates were presented with evidence that the 'sleeping giant' that they knew existed, was well worth giving some attention to. The final slides showed a link to the questionnaire, and some information of the upcoming Foam Summit in London in 2020.

Following my presentation, I was very overwhelmed at the response that I received. It is no exaggeration to say that I had a queue of people that wanted to pay complements on the presentation (which is always nice), and to ask further questions and pledge further contact and involvement.

- Air Services Australia (largest Airport Fire Service in the world, 900+ operational firefighters) – further discussion around JOIFF and tactics around fuel farms. Also shared some other work that he is doing on a related, but different topic
- Changi Airport Group (Singapore) – already in a fairly strong position, but interested in accredited training from an Academy and operational perspective
- Super Umbrella Technology (Beijing) China's sole accredited aviation fire training organisation, same interest as Changi
- New Zealand Air Force – tactical understanding around fuel farms; direct application of learning, and accredited training
- Oshkosh Airport Products – tactics and techniques, with regard to product development
- Rosenbauer Singapore and US – same interest as Oshkosh



**HFS****Hytrans Fire System**

mobile water supply

**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**

T: +31 514 60 89 96 // E: sales.hfs@hytrans.com // W: Hytrans.com

At time of going to press, one airport in Hawaii has sought to join JOIFF, but further work to do to complete the application. Shortly, the slide decks will be shared with the delegates – at present there has not been a large uptake to the questionnaire – but the feedback being given across all conversations is consistent with the belief of the group, and certainly it feels as if the thoughts brought back from John Olsen when he went to Linz are an excellent idea. There are further opportunities to promote the questionnaire: I am speaking to the AOA RFFS working group in October (UK Airports industry body, fire service group), who have already received a briefing – and want to hear more of JOIFF and what it can offer them by way of involvement – and a proposal has been made to JOIFF board around using professional social media to further share the message, and grow the presence of JOIFF in the aviation industry.

*Editor's note:*

*Mark Buckingham is Head of Fire and Emergency Planning in Birmingham Airport, United Kingdom. Previous to being appointed to that position, Mark held key posts in a number of other organisations including Instructor, Deputy Senior Airport Fire Officer, Fire Training Manager, Emergency Response Manager, Business Development Manager, Operations Manager and Crisis and Continuity Advisor. Mark is Chairman of the JOIFF Aviation Working Group. Contact Mark at email: [mark.buckingham@birmingh](mailto:mark.buckingham@birmingh)*

# NEWS FROM JOIFF ACCREDITED TRAINING PROVIDERS

## THE INTERNATIONAL TRAINING CENTRE , SFAX, TUNISIA

The International Training Centre, Tunisia is proud to announce that following an audit, from 20 August 2019, ITC is officially a JOIFF accredited Training Centre.

Instructors and Administrative Staff at The International Training Centre with Gerry Johnson JOIFF Director of Standards of Training and Competence at the presentation of the JOIFF Certificate of Accreditation following the JOIFF accreditation audit. Gerry is holding the certificate, on his right Yosri Ben Amar, Training Manager, on his left Ezzeddine Kacem Centre Manager.

ITC Tunisia is the leading provider of International standard offshore safety training courses working in the Offshore and Onshore Oil & Gas industry in Tunisia. ITC is accredited by International organizations such as OPITO, JOIFF, RoSPA & EFR, and approved by Tunisian Flag Authority to deliver STCW training courses.

ITC Training Centre in Sfax is a world class training facility which includes 4 classroom, HUET simulator, heli-winch, TEMPSC, lifeboats,



3m deep training pool, 600 m² fire-ground, Scaffold platform, changing room & shower, restaurant.

ITC Tunisia conducts all of its operations in line with an approved Quality Management System ensuring the highest quality and standard of operations to ensure compliance with international standards.

To contact ITC please address your email to the Training Centre Manager: Ezzeddine Kacem

Email: [Ezzeddine.kacem@itc-tunisia.net](mailto:Ezzeddine.kacem@itc-tunisia.net) Tel: +21697037456 Fax: +21671656170

## LUKOIL CORPORATIVE TRAINING CENTRE, ASTRAKAHN, RUSSIAN FEDERATION



*Image Caption: Following the JOIFF accreditation audit, Gerry Johnson, JOIFF Director of Standards of Training and Competence (middle) presenting of the JOIFF Certificate of Accreditation to Ekaterina Khapugina, Deputy Director Lukoil Corporate Training Centre. On her right is Vitaly Baranov AMJOIFF*

LUKOIL is one of the largest oil and gas vertical integrated companies in the world. Lukoil Corporative Training Centre in Astrakhan, Russia is a JOIFF Member Organisation and a JOIFF accredited Training Establishment for emergency responders. During September 2019, following an audit, the award of JOIFF accreditation to Lukoil Corporative Training Centre was renewed.

## ARC FIRE TRAINING SERVICES LTD. UNITED KINGDOM

Eric Dempsey (middle) Director Arc Fire Training Services Ltd. with attendees at Arc Fire's JOIFF accredited Crisis Management & Emergency Response Seminar held in Dubai, United Arab Emirates.





# JOIFF ACCREDITED TRAINING CALENDAR 2019

*"Train as if your life depends on it - because someday it will"*



## ARC FIRE TRAINING SERVICES LTD.

**United Kingdom**

Courses on your site subject to risk assessment & facilities.

### **Available Site Specific Courses**

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

### **Crisis Management & Emergency Response Seminar**

Dubai: 24 - 28 Nov 2019

[www.arcfiretraining@ntlworld.com](http://www.arcfiretraining@ntlworld.com)

Email: [arcfiretraining@ntlworld.com](mailto:arcfiretraining@ntlworld.com)



## YASSINE MARINE SERVICES

**Tunisia**

All Courses throughout the year on request

Foundation Course 4 Day  
Fire Team Member 3 Day  
Fire Team Leader 3 Day  
Helicopter Firefighting and Rescue 1 Day  
H2S Awareness 1 Day

[www.y-marineservices.com](http://www.y-marineservices.com)

Email: [yms.training@y.marineservices.com](mailto:yms.training@y.marineservices.com)

Tel : +216 36 408 290



## INTERNATIONAL SAFETY TRAINING COLLEGE

**Malta**

Firefighting Foundation 10 Day:	13-24 April
Fire Team Member 3 Day:	9-11 March, 1-3 June
Fire Team Leader 5 Day:	9-13 March, 1-5 June
BAI Breathing Apparatus Instructor 10 Day:	11-22 Nov
LNG Awareness 5 Day:	7-11 Oct
Road Traffic Collision Technician 5 Day:	4-8 May

[www.istcollege.com.mt](http://www.istcollege.com.mt)

Email: [enquiries@istcollege.com.mt](mailto:enquiries@istcollege.com.mt)

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



## EDDISTONE CONSULTING LTD INCORPORATING THE RESPONSE ACADEMY

**United Kingdom**

All courses available on request on your own site,  
OR at Eddystone Training Suite.

Site Forward Controller (SFC) 1 Day:	30 Jan
Site Incident Controller (SIC) 2 Day:	27-28 Feb
Site Main Controller (SMC) 3 Day:	4-6 March
Crisis Leadership 1 Day:	23 April
Crisis Risk Radar 1 Day:	4 Feb
Crisis Spokesperson 2 Day:	12 March
Silver (TGC) COMAH Representative 2 Day:	28-29 April

[www.Eddystone.com](http://www.Eddystone.com) / [www.responseacademy.co.uk](http://www.responseacademy.co.uk)

Email: [opportunities@eddistone.com](mailto:opportunities@eddistone.com)

Tel: +44 1433 659 800

019/2020

y, it might!"



**H2K**

**The Netherlands**

*Annual International courses*

Foam School 5 Day

Advanced Industrial Firefighting 5 Day

Tank and Bund Fires 3 Day

Integrated fire safety of IBC tanks and tank containers 3 Day

Website: [www.h2k.nl](http://www.h2k.nl) Email: [info@h2k.nl](mailto:info@h2k.nl)

Tel: +31 174 414 872



## SERCO INTERNATIONAL FIRE TRAINING CENTRE

**United Kingdom**

JOIFF Occupational Firefighter 3 Day: 6-8 April, 14-16 Sept

JOIFF FireFighter Refresher 2 Day: 25-26 March, 1-2 Oct

JOIFF Team Leader 5 Day: 12-16 Oct

Website: [www.iftcentre.com](http://www.iftcentre.com) Email: [bookings@iftc.co.uk](mailto:bookings@iftc.co.uk)

Tel: + 44 (0) 1325 333 317

**RelyOn Nutec**  
Fire Academy

## RELYON NUTEC FIRE ACADEMY

**The Netherlands**

Industrial Fire Brigade Incident

Commander Course (IFBIC) 5 Day: 11-15 Nov

Industrial Fire Team Leader

(IFTL) 10 Day: 18-29 Nov

Industrial Fire Team Leader

Remain Qualified (IFTL RQ) 3 Day: 3-5 Dec

Tel. +31 181 376 600

Email: [bookings@nl.relyonnutec.com](mailto:bookings@nl.relyonnutec.com)



## JOIFF ROLL OF HONOUR

During Q3 of 2019, the following people were awarded JOIFF Qualifications:

### JOIFF DIPLOMA

**Salem Rashed Al Nuaimi Dip.JOIFF**

Officer, Fire Services, ADNOC, Fujairah Terminal Division,  
Abu Dhabi, United Arab Emirates.

### JOIFF LEADERSHIP 2 (OFFICER)

Location:

**LUKOIL Mid-East Ltd. West Qurna 2 Project, Basra, Iraq**

The following Officers successfully completed the JOIFF Leadership 2 (Officer) programme:

**Abdullah Al Rashid Dip.JOIFF.**

**Ibrahim Al Sameri Dip.JOIFF.**

**Kareem Al Battat Dip.JOIFF.**

**Mustafa Al Ameri Dip.JOIFF.**

**Mustafa Sameer Saddam Al-Gharbawi Dip.JOIFF.**

**Phil Petersen Dip.JOIFF.**

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

been provided by JOIFF accredited training providers.  
ng provider directly - contact information provided.

# DIARY OF EVENTS 2020

## January

19-20 Intersec 2020, Dubai, U.A.E.

## February

10 JOIFF Foam Technical Summit, London, U.K.

## April

20-25 FDIC International, Indianapolis, USA

## May

19-21 Firex 2020, London, U.K.

## June

15 - 18 NFPA Conference and Expo, Orlando, USA

15 - 20 Interschutz 2020, Hanover, Germany

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

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

### JOIFF Secretariat:

Fulcrum Consultants

Email: [joiff@fulcrum-consultants.com](mailto:joiff@fulcrum-consultants.com)

Website: [www.fulcrum-consultants.com](http://www.fulcrum-consultants.com)