THE CATALYST

Q4 2017

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IN THIS EDITION OF THE CATALYST

REGULARS

JOIFF NEWS

FEATURES

ABOUT JOIFF

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

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

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

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

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

ABOUT THE CATALYST

The Catalyst is the official emagazine of JOIFF, the International Organisation for Industrial Emergency Response and Fire Hazard Management. Our policy is to bring you articles on relevant technical issues, current and new developments and other happenings in the area of Fire and Explosion Hazard Management Planning (FEHMP). The Catalyst is published quarterly - Q1 in January, Q2 in April, Q3 in July and Q4 in October each year.
Readers are encouraged to circulate The Catalyst amongst their colleagues and interested parties. The Editors welcome any comments – contact them at 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.

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

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MESSAGE FROM THE CHAIRMAN

JOIFF members and guests,

JOIFF continues to grow and expand in our ability to make a difference in our profession. This is a direct reflection of the quality of our membership. As a learning organization, we have hardly arrived, but we continue to work to find ways to add value to our members and the communities we serve. You all are a part of that. The conferences we hold have become a critical component of how we work, and participation in others' activities is the way our members make their presence as JOIFF members known. I encourage you to display the JOIFF logo whenever you have the opportunity, either at conferences or in your daily interactions. It is a clear way to demonstrate commitment to elevating our profession beyond the limitation of our specific interests.

On another note, we recently accepted an invitation from a JOIFF member organization for JOIFF to have a presence at Intersec, a major International exhibition and conference held in Dubai in January each year. Intersec is one of the world's largest trade and networking event for security, safety and fire protection and the 2018 event will be the 20th consecutive Intersec and will feature more than 1,300 exhibitors from 58 countries, while over 31,000 visitors from 128 countries are expected to attend.

We have taken advantage of the generous offer of this member, with the aim of expanding our presence as described above in a very important area of the World where there is a very large amount of High Hazard Industry and where effective and competent emergency response is a critical resource.

JOIFF is a not for profit organization. We work to keep our operating costs low, while at the same time, actively participating in the communities we serve. It is a challenging and worthy balance, and we rely primarily on our membership dues, which we work to keep affordable across the spectrum of our global response communities. We also rely on sponsorships to hold our conferences and summits, publish the catalyst, provide the shared learnings, and continue to expand our training and competence components. Sponsorship does not indicate our endorsement of an organization or product over another, it provides funding to allow us carry out our objectives, whilst providing the sponsor with an opportunity to promote goods and services provided.

JOIFF's impartiality amongst our membership and our profession is something we guard very carefully. It is part of what makes JOIFFs voice of value in a very complex and competitive environment. We commit to you the due diligence for objectivity that you have learned to expect from JOIFF.

Please be aware that we will continue to be sensitive to keeping an unbiased perspective both in actuality and in perception. We work to be technically sound, and professionally objective. We definitely enter into the discussions on the controversial issues of our profession. Legislation and standards, Foam, Competence, technical specifications, practical application are among the arenas where there is room for disagreement and challenge.

We trust our voice provides a solid and objective perspective that helps you negotiate amongst the opinions. As we like to say "We do not want to confuse opinions with facts, nor facts with opinions. There is room for both." For that, we need your continued support as members.

Enjoy this edition of The Catalyst, and thanks for taking the time to read this message. I trust it was worth the effort,

In your service and with highest regards,

Randal S. Fletcher (Randy)




SOME INDUSTRIAL INCIDENTS THAT TOOK PLACE DURING THE THIRD QUARTER OF 2017

NORWAY - BARRIER MANAGEMENT AUDIT FINDS FIRE PROTECTION SAFETY SYSTEM FLAWS ON OFFSHORE PLATFORM

USA - POWER CUTS AFFECT 140,000 IN LOS ANGELES AFTER FIRE AT STORAGE PLANT

TRINIDAD - GAS LEAK AT ATLANTIC LNG'S PT FORTIN PLANT

US – AFTER TWO SPILLS SHELL TO REPLACE MILES OF PROBLEM PIPELINE

GERMANY – FIVE PEOPLE INJURED IN EXPLOSION AT CHEMICAL FACILITY

SOUTH KOREA – REFINERY SHUTS HEAVY OIL UNIT AFTER FIRE

CHINA – HUNDREDS OF FIRE-FIGHTERS TACKLE PETROCHINA REFINERY BLAZE IN DALIAN

MEXICO - PIPELINE BLAST KILLS 5

USA - TWO WORKERS KILLED IN INCIDENT AT POWER PLANT

Note from the Editor.

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

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

Dr. STHAMER HAMBURG

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NEW MEMBERS

During July, August and September 2017, the JOIFF Board of Directors were pleased to welcome the following new Members.

FULL MEMBERS:

Falck Fire Services S.R.L., Ploiesti, Romania, represented by Bianca Chicin, HSEQ Manager. Falck Fire Service SRL Romania, part of the Falck Group, was established in Romania in 2008 and today the company has more than 300 employees. Falck Fire Services S.R.L. delivers the full range of fire service solutions including fire brigade management, prevention and maintenance services as well as fire consulting and training covering all industrial sectors including airports, nuclear, oil and gas, petrochemical, steel, automotive and other high-risk industries. Falck Fire Services Romania operates a JOIFF accredited training centre in Romania.

CORPORATE MEMBERS:

Minimax, Bad Oldesloe, Germany, represented by Marcel Ruesink, Director Business Development & Global Accounts. For more than 110 years, Minimax has been one of the leading brands in fire protection. Minimax provides tailored fire protection solutions and has widespread fire detection, fire suppression and fire protection experience on industrial applications, including but not limited to oil and gas facilities, jetties, loading manifolds, compressors, machinery rooms, biomass like waste to energy, steam and gas turbine driven power plants. Minimax has a great track record in the chemical industry and are active in the marine business protecting vessels and offshore fire risks. Minimax has the competence on both land-based and marine projects and the experience to integrate them. Minimax is a recognised service provider with their own product portfolio developed in various R&D research fire test centres.

Vanguard Fire & Safety (Pty) Ltd. Briardene, South Africa represented by John Buchan, Managing Director and Stuart Wood, Marketing Director. Vanguard Fire & Safety, founded in 1992 is an importer and supplier of safety and specialised fire and emergency products to the fire and safety industries in South Africa including the petrochemical, municipal and military sectors and truck builders. Their fire related product portfolio includes a wide range of fire-fighting and water delivery equipment including branches, monitors, hardware and foam equipment, positive pressure ventilators, fire-fighting hose and a full range of personal protective equipment.

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

BEWARE OF BOGUS CERTIFICATION

In the field of training, there is generally 3 types of certification – certificate of attendance, certificate of qualification and certificate of competence.

A certificate of attendance indicates that a person has attended a training course, a certificate of qualification results from a person learning about and being examined as successful in a particular subject or group of subjects, and a certificate of competence results from a person being assessed as competent in a particular skill or set of skills.

A JOIFF accredited certificate indicates that the student has been assessed and has successfully demonstrated competence in knowledge, skills and understanding as a result of participating in a JOIFF accredited training course. Only approved JOIFF accredited Training Providers are authorised to issue JOIFF accredited certification.

JOIFF has recently been shown a training certificate issued to a student that claims that the course attended by the student has been ".....designed to satisfy the standards set by JOIFF...." The Company that issued this certificate is not a JOIFF accredited Training Provider and this statement is not true and it is deliberately misleading.

JOIFF accreditation is a system of quality control aimed at providing on an on-going basis, a minimum standard of Industrial emergency response training which is benchmarked by audit against recognised health and safety and good industry practice.

To obtain JOIFF accreditation a Training Provider must meet the criteria set down by JOIFF for the three pillars that make up effective provision of training:

- establishment/organisation (including facilities, safety management systems and procedures)
- instruction
- courses/programmes.

Accreditation is for a given period and is renewable subject to review. Organisations who are seeking JOIFF accredited training for their emergency response personnel should check the claims of Companies offering training that is JOIFF accredited.

The list of JOIFF accredited Training Providers is on the JOIFF website at www.joiff.com and/or they should contact the JOIFF secretariat at joiff@fulcrum-consultants.com if they have any doubts as to the authenticity of the claims being made by organisations offering training.

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REPLACING FLOURINATED FIRE-FIGHTING FOAM

BY DR. JEANNE VAN BURREN

Note from Author:

The Catalyst Issue 03/2017 contained two articles on foam, one by Jan-Erik Jönsson & John-Olav Ottesen and one written by myself. These two articles complemented each other which is good as many readers of the Catalyst will be confronted with a globally implemented restriction of the use of PFOA in fire-fighting foam. Unfortunately not everyone is aware of the forgiving nature of AFFF fire fighting foam concentrate. Without the availability of AFFF based foam concentrate, industry may be confronted with some serious challenges which they were not aware of. Due to the required introduction of new foam concentrates, the percentage of foam concentrate in the premix, application rates, application methods, application equipment and capacity of containment provisions may have to be reconsidered in the Management of Change process which operators have to go through to secure the required availability and reliability of this last line of defence between a controlled fire scenario and a major incident.

Introduction

On 13 June 2017 the European Union (EU) published amendment of Annex XVII to Regulation (EC) No 1907/2006 concerning the Restriction of Chemicals (REACH) with regards to the use of perfluorooctanoic acid (PFOA), its salts and PFOA-related substances[1]. PFOA is a performance enhancing component present in fluorinated fire-fighting foams.

REACH is implemented in EU legislation, but many countries outside the EU have similar legislation which, in some states and countries, can be stricter or less strict than the EU legislation. The articles in this amendment which are relevant for fire-fighting foam state:

POFA Molecule

Article1:
[PFOA and its salts] Shall not be manufactured, or placed on the market as substances on their own from 4 July 2020.

Article 2:
Shall not, from 4 July 2020, be used in the production of, or placed on the market in:

(a) another substance, as a constituent;
(b) *a mixture;*
(c) an article, in a concentration equal to or above 25 ppb of PFOA including its salts or 1000 ppb of one or a combination of PFOA-related substances.

Article 4:
Point 1 and 2 shall not apply to any of the following:

(e) concentrated fire-fighting foam mixtures that were placed on the market before 4 July 2020 and are to be used, or are used in the production of other fire-fighting foam mixtures

Article 5:
Point 2(b) shall not apply to fire-fighting foam mixtures which were:

(a) placed on the market before 4 July 2020; or
(b) produced in accordance with point 4(e), provided that, where they are used for training purposes, emissions to the environment are minimised and effluents collected are safely disposed of.

Similar text was used when the Globally Harmonised System (GHS) and the system of Classification, Labelling and Packaging (CLP) of chemical substances and mixtures became mandatory. The text "placed on the market" resulted in long discussions and court cases, but in the end companies had to comply with the requirements of this legislation.

With this in mind one knows that you have to choose your battles wisely because time and money can only be spent once.

Also the remediation costs can be considered for removing for instance PFOA pollutants from the soil and groundwater. The other day I watched a webinar by SERDP and ESTCP, illustrating the work and costs on the clean-up work for the DOD in the USA as a result of the use of fire-fighting foam. This webinar and the slides will be available on demand by the end of September 2017[2].

Strategy

Companies have several options to comply with this PFOA-ban. Identifying the options starts with answering

1. Does the fire-fighting foam used for incidents on our site contain PFOA of other fluorinated[3] substances YES/NO
   Continue with remaining questions when answer is YES
2. Groups of flammable products present onsite
   - Hydrocarbons
   - Cyclic hydrocarbons
   - Products (partly) miscible with water
     - Alcohols
     - TBA
     - Esters
     - Ethers
     - Organic Acids
     - PO
   - Other of flammable / combustible products:
     - Name product
     - Name product
     - Name product
     - Name product
3. Application method fire-fighting foam
   - Fully fixed systems where foam concentrate is stored in a tank on site and supplied to the fire-fighting installations
   - Semi fixed systems where fire department supplies the foam as premix or by using fixed monitors with foam present near the monitor
   - Use of fully mobile equipment
   - A combination of the above options
4. Who owns the foam concentrate and where is it foam stored
   - The foam is owned by and stored on the site where the foam is used
     - Is there a requirement for this foam concentrate to be compatible with off-site foam concentrate(s) YES/NO
   - The foam concentrate is stored off-site and owned by a mutual aid organisation in which the operator participates
   - A third party owns and stores the foam off-site
   - A combination of the above options
5. The applied fire-fighting foam:
   - Is fully contained during application and cannot cause soil and/or groundwater and/or surface water pollution or any other environmental pollution
   - Is contained on the location where the fire is extinguished, but is not contained during transfer from the foam head to the location where it is used due to the use of mobile equipment and/or fixed monitors located at a distance of the fire
   - Is not contained at all, for instance for fires on board of vessels at jetties
6. Technical life foam concentrate
   - Date foam concentrate was supplied : dd-mm-yyyy / unknown
   - Technical life of foam concentrate is xx years according to manufacturer
   - Has the foam concentrate entered a life extension program YES/NO
     When the answer is YES, date at which the life extension was granted and with how many years
7. Training
   - Do you use dedicated environmentally friendly foam concentrate for training purposes only YES/NO

The information gathered for these seven queries enables operators to:

- Review the various options for complying with the PFAO-ban
- Identify and prioritise actions (with associated costs) required to select and introduce a suitable new foam concentrate
  Removal and destruction of existing foam concentrates should be incorporated in this process as should costs for assessment of potentially polluted areas and clean-up costs. It is recommended to first check with the authorities what their policy is for contaminated areas
- Identify stakeholders involved in the above processes

It is difficult to give one single example that covers all the options for the process that follows as there are many variables for operators to consider. Each choice has benefits and disadvantages which operators should identify. Operators should be allowed to go through an informed based decision process based process to allow them to make the right future proof decision when replacing their foam concentrate. Operators should incorporate anticipated changes in products stored onsite as this can be relevant for selecting the most versatile fire-fighting foam.

ENDNOTES

1: http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R1000&from=EN
2: http://serdp-estcp.org/Tools-and-Training/Webinar-Series
3: It is relevant to know if the foam concentrate is fluorine free foam for potential future extension of the scope of the ban with other fluorinated substances

Editor's note: Dr Jeanne van Buren is a senior consultant with Marsh Risk Consulting, based in Rotterdam and consults on specific risks related to the power, energy and (petro-)chemical industry sectors. This includes identifying potential hazards, evaluating these hazards and quantifying the associated risks and counselling on risk mitigation and control measures. She also develops and provides training courses in Dutch and English.
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TRAINING FOR SUCCESS

BY DARYL BEAN, MJOIFF

The aim is to develop confident, capable, emergency response teams.

Training as it stands is a very broad term. While training is done to meet various requirements, does the training fundamentally meet the needs of developing the emergency response team to be successful? What does that mean? Are our actions efficient enough to limit loss to the maximum? Is there or will there be a reliance on "surround and drown," "throw everything at it and we're sure to get it" or "we'll do the best we can with the training and resources we have?" Have there been occasions when upon review of a case study questions are asked about the response decisions and discussions arise about applying different tactics to secure a more effective outcome? Do we use lessons learned we pick up from the occasional incident as the means to develop our proficiency?

Challenging statements certainly but not arbitrarily mentioned. Something I'm sure we'd consider saying our training has prepared us for such uncertainties. How would one characterise our training, reactive to schedules and requirements or proactive, reflecting a foresight to cover a need to succeed?

There are some excellent training schemes in place with well thought-out and executed training models as well as some which could be further advanced to maximize output. When looking at or developing an effective training model what do we look for? Here are some considerations;

- Progressive levels of applied knowledge.
- High retention of practical skills
- Understanding and functional capability in expected role(s)
- Adherence to company procedures (operational, safety)
- Inspired processes engaging the learner and creating environments for positive continued development

We could look outside our industry for other team oriented training models which lead to successful conclusions. Modular training, such as that employed by sports teams proves a consistent approach to overall team development by looking at all aspects of the "game." From film and playbook study to individual, group and unit sessions, walkthrough and full speed, no light and full contact drills to specific scenarios, the various focused sessions are designed for one purpose. To prepare the team for success. This concept of modular training can be adopted by emergency responders, especially at the Bronze or Operational level to develop efficient teams prepared for success.

The modular training model discussed further incorporates five stages:

- Procedures
- Hazard and risk familiarization
- Walk-through exercises
- Full speed evolutions
- Drills

Procedures

Responding to an emergency, while practical in nature is backed-up by defined parameters designed to protect primarily the assets of the "owner" whether governmental or private entity. The provisions and accepted processes are developed as a means of assurance to meet legislative requirements for mitigation. Their scope is relative to the complexities of their operations and as the results of the actions of responders will be judged against them, it is vital that responders know the basis for the actions they are asked to undertake. The relationship between the signed-offed procedures and operations cannot be understated enough as many factors affect the role and responsibilities of the responder; changes in installation ownership, changes in operations, down-manning, acquisition of new equipment, whether site operations or emergency, changes in the emergency response profile e.g. dedicated full-time response teams or secondary duty, mutual-aid or adding emergency responses such as EMS all have an effect and need to be promulgated to all members of the emergency response organisation. From an operational perspective, these may make the difference between immediate defensive or offensive strategies.

As training progresses to integrating the other stages of the modular training plan, referencing and incorporating the response procedures creates the synergy of understanding which will answer these questions:

- What are we training for?
- What are we training to?
- What are my (sic) responsibilities and those of my team?
- What are the roles of the relevant stakeholders in mitigation of the emergency?

Hazards and risk familiarization

From a critical thinking standpoint, cheating is essential for successful emergency response. Interestingly during a debrief when this was mentioned the author was "corrected" by an industrial officer who said that whilst he agreed with the notion fully, maybe the concept would be better phrased as "positive cheating" to drive home the point. The more we know about what we take mitigating actions against, the better we can be prepared. What are the hazards and risks? Where can control points be established? How can the responders manoeuvre around established sectors safely? What is their awareness of the safety within those sectors based on? At what point will certain actions be curtailed because of surrounding dangers?

During the response, the initial size-up and resulting action plan are expected to be conducted timely and accurate in implementation. Because of the vast amount of information which must be processed during size up many ways are taught to systematically address it; (Shackleford, 2009) and (Smith, 2008) encourage the use of the mnemonics, "COAL TWAS WEALTHS" and "WALLACE WAS HOT," table 1 overleaf.

SIZE-UP CRITERIA			
C	Construction type	W	Water
O	Occupancy or use	A	Area
A	Apparatus and staffing	L	Life hazard
L	Life hazard	L	Location, extent
		A	Apparatus/personnel
T	Terrain	C	Construction/collapse
W	Water supply	E	Exposures
A	Auxiliary appliances		
S	Street conditions	W	Weather
		A	Auxiliary appliances
W	Weather	S	Special matters
E	Exposures		
A	Area and height	H	Height
L	Location and extent (of fire)	O	Occupancy
T	Time	T	Time
H	Hazardous materials		
S	Special concerns		

Table 1.

Looking at the criteria in the above table there are elements that are known which could be addressed prior to any response. Pre-incident planning provides the knowledge and along with the procedures develops strategies and potential tactics for known hazards. The second stage of the training programme concentrates on:

- Identifying and taking the guess-work out of the hazards and potential risks encountered
- Measuring the emergency response procedures against the risks which may lead to required changes
- Highlighting response capabilities, nearest forward positions, water supplies (primary and secondary), equipment and other resources needed (combined with measurement of the procedures)
- Establishing targets for practical evolutions
- Generating discussions amongst the team in their roles, enhancing teamwork and proficiency

NFPA 1620 Standard for Pre-Incident Planning (2015 Edition), provides a means for capturing the information in a usable format for use as a response tool. Hazard and risk familiarization is an on-going process which will increase response capabilities, removes any ambiguity between descriptions and provides visibility to the "community" and confidence in the preparedness for managing an incident.

Walk-through exercises

With the knowledge of knowing why and against what our efforts will be concentrated against we now get to the how. The big picture of how the response should work starts with educated practice broken down to phases to best develop individual and team capability. This includes proficiency in using response equipment in general and application against the target risk specifically. The goal here is to expose the responders to the projected tasks in a format that allows for building performance levels which will be proven during the evolutions and drill. The walk-through exercises give a chance to practice the response at each phase to gain an understanding of how that phase develops based on the criteria driven by the procedures weighed up against the hazard and risk familiarisation(s) as well as opportunities to develop individual skills at as many operations as practicable for the role. It's highly recommended to practice at night as well, honing these skills under the artificial or limited lighting which brings its own set of challenges. There is enough evidence of incidents/ accidents occurring during night hours which make training at night essential.

Full speed evolutions

With the knowledge and the practical experience in preparing the team to optimize performance, this phase raises the bar and formulates measurement criteria for the response. The response is measured in its entirety and in distinct segments. The aim for the full speed evolutions is to combine all previous training into real-time operations which can be measured against defined criteria including the emergency response plan, national and/or international standards (as required). As responders should be well versed in operations and flexibility in skill sets, rotating personnel through positions within their operational role when conducting full speed evolutions will identify performance levels during certain configurations of response; for example, when personal are acting -up in role or during periods of reduced work when the response criteria may change.

What we're looking for here is to see the plan at work; determine the levels of

achievement and performance shortfalls and make any required adjustments. This phase also:

- Evaluates the response to highlight skill sets and areas for improvement which are then the subject for remediation
- Allows for responders to be placed in different positions during the "exercises" phase to develop and evaluate skill sets at different operations
- Incorporates the procedures and skill sets developed through the training process to drive for successful conclusions

Drill

Probably one of the most divisive if not feared phrases over the years is "This is a drill..." Experienced responders may easily expound on their experiences during drills; with enough less than enthusiastic tales which can ask the question "What is the purpose of a drill if the result is a lottery on achievement of the objectives?" In some circumstances, a drill is used as the "training;" a means to log that the responders have met a mandate. It's clear that a useful tool which can be great motivator for training and capability has a historical reputation for otherwise.

In the context of training for success, a drill is the final step of the process. It is used for assuredness; with the objective either achieved or not achieved. The drill in this context is not training; it is confirmation of the training process, an assessment of the responders' capabilities against a set emergency simulation, something that has been prepared for. This shouldn't lead the reader to interpret this as being an easy function. In fact, as the final phase in this process a lot of smart work has gone on prior to this. In the beginning of this discussion the "Training for Success" process was compared to a similar concept in professional sport. Taking that into consideration, the drill is the pre-season game. A sports team wouldn't be thrown blindly into competition. Neither should our emergency response teams be thrown blindly into a drill. If we haven't prepared for it the assessors shouldn't expect a good performance. As such here are a couple considerations;

- A drill must be honest and unambiguous; interpretations must be similar between drill coordinators and responders as an assurance of a true assessment of the emergency simulation
- Should the aim of the drill be a negative conclusion, this must be promulgated to the operators in advance or the end result will not be in the best interest of developing confidence within the emergency responders which is the total opposite of the aim of the training process.

Following the drill, the assessment result will be able to show objectively which phase(s) of the training process was/were more successful and which show room for improvement. The higher performing phases can be reviewed to understand the success factors. Further concentration on the less performing phase(s) can be programmed, even the training developed for that phase. It may not be the operators but the training aids themselves which may be faulty. The success factors from the higher performing phases may be able to boost those less performing. Subsequent effective use of the drill phase will lead to a more positive view as a growth point in the personal and team development.

A complete change in some of the historical opinions

Many ideas and methodologies exist and will continue to be produced to address the art of training. Short, medium and long-term training objectives all point towards preparation. Sometimes, to develop a training plan to optimize performance requires a paradigm shift, to look away from what is accepted and try something new; adopted from other successful enterprises, or merely to look at what is in place and possibly alter the operations. This discussion focused on a training plan using an idea from a high-performance industry but maintaining the same objective, to succeed. This is a long-term plan but the goal setting within the phases is down to the idiosyncrasies of the individual response criteria.

Knowing why we must respond, against what, developing how with full capability and finally quality verification of our expected operations we will fully engage our teams, provide the motivation for excellence and develop confidence with the stakeholders and within the community.

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Editor's note:
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GOAL ACHIEVED: CERTIFIED GAS-TIGHT CHEMICAL, DISPOSABLE, PROTECTIVE SUITS AVAILABLE

BY SIEGFRIED FIEDLER

Note: Siegfried Fiedler is Chairman of the working group "Respiratory protection, chemical protective clothing and measuring instruments" in the plant fire department association of Germany (WFV-D).

Background

The working group "Respiratory protection, chemical protective clothing and measuring instruments" has been working since 2012 on behalf of the Country manager of the WFV-De.V. Focal points are work safety, the exchange of information as well as further development in the named topical areas in order to bundle the interests of industry and fire departments (effectiveness and efficiency). The working group has a constant representative in ref. 8 of the German Fire Protection Association (GFPA) and a representative of the trade association in the working group.

History

In 2013, the working group initiated the project "Gas-tight chemical disposable protective suits type 1" with the aim to further the development status in collaboration with project partners (manufacturers) based on the needs of the users. To this end, the working group has formulated a requirements profile for gas-tight chemical disposable protective suits in terms of application, material and quality, wear comfort and acceptance as well as handling. In the years 2013 to 2105, three joint introduction and discussion rounds were held with the project partners. The project results were presented at the Interschutz, the International trade fair for fire rescue, 2015 by the WFV-D. This completed the project for the working group. The project partners were then required to subject the suits developed in the project to an EC type examination by certified testing authorities.

The DEKRA standard FRM 90.166.0 was created in collaboration with DEKRA EXAM GmbH. The standard defines minimum requirements for gas-tight chemical disposable protective suits. This step was necessary as gas-tight chemical disposable protective suits are not defined by a harmonized standard. The DEKRA standard FRM 90.166.0 is a summary of individual test stages from various harmonized standards. Gas-tightness against gases is based on the tightness test in accordance with ISO 17491-1:2012 Method 1.

Situation

The first gas-tight chemical disposable protective suits EC-type tested in accordance with the PSA guideline 89/686/EEC are now available:

- Type 1a – gas-tight chemical disposable protective suit with a self-contained respirator worn in the chemical disposable protective suit
- Type 1b – gas-tight chemical disposable protective suit with an external breathing air supply worn outside the chemical disposable protective suit
- Type 1c – gas-tight chemical disposable protective suit with a breathing air supply with overpressure, whereby the suit represents the breathing connection.

The available suit types were tested in accordance with the following standards:

- **DEKRA Standard FRM 90.166.0:** Performance specifications for chemical disposable protective suits (e.g. mechanical resistance suit system, resistance against penetration of liquids, electrostatic properties)
- **PPE regulation**: "Regulation **(EU) 2016/425** of the European Parliament and of the Council of 9 March 2016 on personal protection equipment and the repeal of guidelines 89/686/EEC".
- **EN 943:** Protective clothing against liquid and gaseous chemicals, including liquid aerosols and solid particles
- **EN 943-1:** Performance requirements for 'gas-tight' (Type 1) chemical protective suits; German version EN 943-1:2015
- **EN 943-2: 2002-04:** Performance requirements for 'gas-tight' (Type 1) chemical protective suits for emergency teams (ET); German version EN 943-2:2002
- **ISO 17491 – 1:2012-03:** Protective clothing - Test methods for chemical protective clothing - Part 1: Resistance against the leakage of gas (inner pressure test)

All available suit types are authorized for use in explosive environments and zones in accordance with Annex II of PPE guideline 89/686/EEC.

The suit types 1a, 1b and 1c have firmly flange-mounted gloves and footies and can be worn in combination with safety boots.

Requirements for the suit material

BASF We create chemistry

Requirements for the suit material:	EN 943-1 (Type 1a, 1b, 1c)	EN 943-2 (Type 1a-ET, 1b-ET for limited use)	EN 943-2 (Type 1a-ET, 1b-ET reusable)	DEKRA Standard FRM 90.166.0	Disposable CSA gas-tight, type-tested
Abrasion resistance	500 cycles	1,000 cycles/ class 4	2,000 cycles/ class 6	10 cycles	≥ 2,000 cycles/ class 6
Bend tear resistance	1,000 cycles	1,000 cycles/ class 1	15,000 cycles/ class 4	1,000 cycles	≥ 1,000 cycles/ class 1
Tear resistance	40 N	40 N / class 3	40 N / class 3	20 N	≥ 20 N/ Comment author: Class 3 achievable.
Tensile strength	100 N	250 N / class 4	1,000 N / class 6	30 N	≥ 130 N/ Comment author: Class 3 achievable
Puncture resistance	10 N	10 N / class 2	50 N / class 3	5 N (optional)	≥ 10 N/ Comment author: Class 3 achievable
Resistance against permeation	60 min. Chemicals freely selectable	30 min. or note every 15 chemicals	30 min. or note every 15 chemicals	10 min. Chemicals freely selectable	≥ 480 min. for sodium hydroxide 40%
Resistance against ignition	Without stop by flame	Without stop by flame	5s in flame	Without stop by flame	Without stop by flame

Requirements for components

BASF We create chemistry

Requirements for components:	EN 943-1 (Type 1a, 1b, 1c)	EN 943-2 (Type 1a-ET, 1b-ET)	DEKRA Standard FRM 90.166.0	Disposable CSA gas-tight, type-tested
Abrasion resistance (socks, integrated overshoes)	500 cycles	500 cycles	10 cycles	Same material as suit ≥ 2,000 cycles
Bending tear resistance (socks)	1,000 cycles	1,000 cycles	1,000 cycles	Same material as suit ≥ 1,000 cycles
Bending tear resistance (-30°C) (socks)	200 cycles	200 cycles	100 cycles (optional)	No inspected
Tear resistance (integrated overshoes)	40 N	40 N	10 N	83 N
Puncture resistance (sole of integrated overshoes)	EN ISO 20345	EN ISO 20345	EN ISO 20345	Suits with socks
Resistance against permeation (socks, integrated overshoes, boots, gloves, viewing pane, face cuff)	60 min. Chemicals freely selectable	30 min. or note every 15 chemicals	10 min. Chemicals freely selectable	≥ 480 min. for sodium hydroxide 40% for gloves and viewing pane
Mechanical resistances (gloves, viewing pane, fastening points, overpressure valves)	Gloves: EN 388 Viewing pane: Fall test stainless steel ball Overpressure valves: 150 N Fastening points: 1,000 N	Gloves: EN 388 Viewing pane: Fall test stainless steel ball Overpressure valves: 150 N Fastening points: 1,000 N	Gloves: EN 388 (optional) Viewing pane: Fall test stainless steel ball Overpressure valves: 150 N Fastening points: 250 N	No overgloves No fastening points Viewing pane: installed Overpressure valves: installed

Requirements for seams, connections and fastenings

BASF We create chemistry

Requirements for seams, connections and fastenings:	EN 943-1 (Type 1a, 1b, 1c)	EN 943-2 (Type 1a-ET, 1b-ET)	DEKRA Standard FRM 90.166.0	Disposable CSA gas-tight, type-tested
Resistance against permeation (seams, zipper, connections, fastenings)	60 Min. Chemicals freely selectable Zipper: min. 5 minutes < 60 min. with flap > 60 min. without flap	30 min. or note every 15 chemicals Zipper: min. 5 minutes < 60 min. with flap > 60 min. without flap	Seams: 10 Min. chemicals freely selectable	≥ 480 min. for sodium hydroxide 40%
Mechanical resistance (seams, zipper, connections)	Seams: 300 N Zipper: 75 N Glove-suit: 75 N Boot-suit: 125 N	Seams: 300 N Zipper: 75 N Glove-suit: 75 N Boot-suit: 125 N	Seams: 30 N Connections: 100 N	Seams: ≥ 230 N Connections: ≥ 130 N

Requirements for the protective suit

BASF We create chemistry

Requirements for the protective suit:	EN 943-1 (Type 1a, 1b, 1c)	EN 943-2 (Type 1a-ET, 1b-ET)	DEKRA Standard FRM 90.166.0	Disposable CSA gas-tight, type-tested
Meets the general requirements of EN ISO 13688	X	X	X	X
Compatible with other PPE	X	X	X	X
Conditioned in acc. with storage conditions	X	X	X	X
Tightness (pressure reduction in static condition)	Max. 300 Pa/6 min. at 1,650 Pa	Max. 300 Pa/6 min. at 1,650 Pa	Max. 200 Pa/6 min. at 1,000 Pa	Max. 200 Pa/6 min. at 1000 Pa Comment author: Max.300Pa/ 6min at 1650 achievable.
Internally directed leak with SF_6 or NaCl	Max. 0.05 % total leak	Max. 0.05 % total leak	Total leak ≤ 10.0 %	Total leak ≤ 10.0 % with NaCl
Spray test EN ISO 17491-4 1 min. 1.14 l/min. per 4 jets per 300 kPa on the entire moving body	–	–	X	X
Jet test EN ISO 17491-3 5 sec. 150 kPa stream directed at a certain position at standstill	for loose VM	for loose VM	X	X

Note

All suit types are designed as "disposable protective suits", also the air distributor system in suit type 1c. By definition, the disposable protective suite is disposed of after one-time use. It could be worn during a single deployment/shift several times by one person if no contamination from the outside has occurred.

The described gas-tight chemical disposable protective suits are not to be confused with "limited used suits" for limited use (EN 943-2). For these suits, which can be used several times but to a "limited" extent, verification of decontamination and reusability must be maintained. So, what is the advantage in comparison to the reusable suits in terms of handling?

The tables in this article depict the currently achievable values of the EC type-tested gas-tight chemical disposable protective suits in comparison to the requirements of EN 943-1:2015 (type 1) and EN 943-2:2002 (type 1-ET) as well as the DEKRA standard.

It must be noted that with the EC type-tested gas-tight chemical disposable protective suits, the suits defined in EN 943-1:2015 (type 1) and in EN 943-2:2002 (type 1-ET) are not questioned. For initial deployments and unknown conditions, chemical protective suits in accordance with EN 943-2:2002 (type 1-ET) must always be used.

The following depicts some properties and application examples of the EC type-tested gas-tight chemical disposable protective suits.

- 80% weight reduction (1800g in contrast to 8800g). This enormous savings in terms of weight is achieved through lighter materials and unburdens the person wearing the protective suit. Especially during high outside temperatures in summer this represents a step toward more work safety.
- The used suit materials have a lower mechanical resistance than classic type-1 suit materials. This however makes them more flexible and more comfortable to wear. The suits are simply designed and do not have fastening points or any other accessories.
- After performing a risk assessment – "What do I want to do?", "What can happen to me?" and "How can I protect myself" – EC type-tested gas-tight chemical disposable suits can be employed for hazard prevention as well as for services/work deployments in plant fire departments.

Areas of application for gas-tight chemical disposable protective clothing in accordance with the DEKRA Standard FRM-90.166.00

- Assessment of situation when handling hazardous materials
- Measuring tasks when handling hazardous materials
- Transferring and monitoring liquids when handling hazardous materials
- Inspection and sealing of flange connections, valves and pipelines
- Feeder activity in the hazard zone during hazardous material handling
- Cleaning and rinsing activities after handling hazardous materials
- Sampling when handling hazardous materials
- Deployment for radiation protection deployment and use in the case of biohazards

- The boot size always fits as the protective suit is worn with flange-mounted footies in the rubber boot.
- Measuring tasks when handling hazardous materials. The various tasks of the investigator to determine the situation and to define the isolation borders must be performed quickly and are frequently of a recurring nature.
- Transferring liquids from barrels, IBCs and 20ft tank containers as well as the constant control of the conveyor route. Deployment orders are time consuming and tie up plenty of human resources.
- Examination and sealing of flange connections, valves and pipelines in operations within the framework of the deployment of hazardous materials. These deployments often involve low degrees of product leakage (droplet leakage) but also involve plenty of human resources as a result of the deployment time of the compressed air apparatuses.
- Feeder activity in the hazard zone during hazardous material handling.
- Cleaning and rinsing work after handling of hazardous materials at the place of deployment or at the fire station
- Sampling when handling hazardous materials
- Activities of all types in radiation protection deployment and in deployment areas with biohazards.

What happens now?

In collaboration with Ref. 8 of the GFPA, the knowledge gained as well as the technical standard achieved will be translated in a technical specification. This technical specification will serve as the basis for a future GFPA guideline for "Gas-tight chemical disposable protective suits for fire-department use". The aim is to enforce this new guideline in the spring of 2018, following the approval by the Scientific Advisory Board.

Closing statement:

With the availability of the EC type-tested gas-tight chemical disposable protective suits, the goal defined by the work group in 2013 has now been achieved after 4 years. With protection against gases, the enormous savings in terms of weight and the simple and uncomplicated handling after use, these protective suits, always in connection with a risk assessment, offer an appealing alternative to reusable suits. In industrial practice, in the operation and plant fire departments, the EC type-tested gas-tight chemical disposable protective suits have already been put to successful use.

Editors note: Siegfried Fiedler is Chairman of the working group "Respiratory protection, chemical protective clothing and measuring instruments" in the plant fire department association of Germany (WFV-D). Siegfried Fiedler has been a fire safety engineer for BASF SE for the past 30years. He has over 25 years in leadership experience in hazardous material technologies, Emergency response related site services and global Crisis Management Organisation. Just recently he is responsible to set up a global Emergency Response Academy for BASF Group. Siegfried can be contacted at siegfried.fiedler@basf.com

JOIFF INTERNATIONAL FIRE & EXPLOSION HAZARD MANAGEMENT CONFERENCE 2018

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JOIFF International Fire & Explosion Hazard Management Conference 2018

Risk profiling, efficient and effective use of limited and diverse resources, time and training

will take place at the
Corinthia Hotel, St. George's Bay, Malta, 29th, 30th, 31st October 2018.

Over the coming months, further details on the Delegate Package, Conference Program, Speakers and Schedule will be published.

JOIFF hopes that you will able to plan for this very important event and that you will join us and hundreds of fellow High Hazard Fire & Safety Specialists from around the world at this unique event in 2018.

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Getting to the Core of Flame resistant (FR) Protection

Susan MacDonald, Sharan Monga, Gary Woodward, Stephanie Edmunds

INTRODUCTION: Solvay has over 140 industrial chemical sites in operation. High health and safety standards and their constant improvement are an integral part of Solvay's Code of Conduct. They are also part of the Corporate Social Responsibility (CSR) agreement with IndustriALL Global Union. At Solvay, we manage products and processes that could be harmful. We must therefore make sure that the way we handle these products is safe, and naturally our first priority is the safety of our people.

Correct use of protective clothing is an important aspect to provide our employees with protection in their working environments. This article summarises key options available for flame resistant protective clothing, the origin of their flame resistance and addresses the use of the word 'inherent'. The key issue discussed here is the potential ambiguity around this marketing concept and if it really helps in the selection of appropriate protective clothing.

WHAT ARE THE MAIN TYPES OF FR GARMENTS THAT EXIST IN THE CURRENT MARKET?

PROBAN® workwear: The PROBAN® polymer is created by an in-situ polymerisation within the cotton fibres to form a cotton-PROBAN® composite material at the fabric stage which is permanently bound to the core of the fabric without modifying the cotton structure.

Modacrylic FR workwear: A manufactured fibre in which the fibre-forming substance is any long chain synthetic polymer composed of less than 85% but at least 35% by weight of acrylonitrile units.[1] Flame resistant yarn will contain modacrylic fibre with an antimony compound (i.e. antimony trioxide) and a monomer of halogen containing vinylidene, and at least 50% of naturally derived fibre (eg cotton)[2].

Aramid workwear: Flame resistancy is derived from the polymerisation at the fibre stage. The fibre is formed from synthetic linear macromolecules made up of aromatic groups joined by amide or imide linkages, of which at least 85% are joined directly to two aromatic rings and with the number of imide linkages, if present, not exceeding the number of amide linkages[3].

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FLAME RESISTANT GARMENTS, THE INHERENT LABEL – WHAT IS IT GOOD FOR?

(i) Scientific interpretation:
The National Fire Protection Association (NFPA) defines inherent flame resistance as "flame resistance that is derived from the essential characteristics of the fibre or polymer"[4]. Based on a review of the main FR types described in the previous sections only aramid and PROBAN® fit this definition. Modacrylic gains its flame resistant property from the addition of antimony trioxide, an additive that is not present in the modacrylic fibre and the natural fibre it is usually spun with. Antimony trioxide is not embedded and does not polymerise within the molecular structure of modacrylic fibre.

(ii) Current interpretation in industry:
In everyday terminology, there is an over-simplification of the above definition to automatically classify all modifications made at fibre stage as "inherent". This includes aramid and modacrylic. Generally, the criteria "essential characteristics" and "polymer" are ignored. Moreover, if the technology that is currently applied at the fabric stage is applied at the fibre stage the resulting fibre would be classed as 'inherent'.

*As long as the garment does not have holes, rips etc., and full guidelines for maintenance of workwear have been followed the PROBAN® garment is fit for use.

This difference between scientific interpretation and current marketing practice lead to question the true relevance of the word 'inherent'. The marketing of 'inherent' focusses strongly on unquestionable FR protection. We will present the same for PROBAN®.

(iii) The evidence[5]

PROBAN® has delivered FR protection for over 60 years and meets all international standards for FR including, NFPA 2112; GOST; ISO 11612. In NFPA 2112 there are 5 key criteria for FR fabrics: Thermal shrinkage resistance; Heat transfer performance; Flame resistance of textiles; Manikin flash fire, heat resistance test. PROBAN® fabrics perform similarly or better versus aramid in all of the above tests.

PROBAN® is a molecularly designed composite material consisting of a natural fibre, cotton, which is intimately integrated with a manufactured polymer, PROBAN®. In practice, The PROBAN® monomer is supplied to Solvay licensed textile mills. The monomer is absorbed into the structure of the cotton fibre and polymerises using Solvay's patented process. This in-situ polymerisation within the cotton fibres forms a cotton-PROBAN® composite material at the fabric stage which is permanently bound to the core of the cotton to deliver FR protection for the lifetime of the garment. This PROBAN® polymer contains phosphorus, a well-known FR, and is by this NFPA definition inherent.

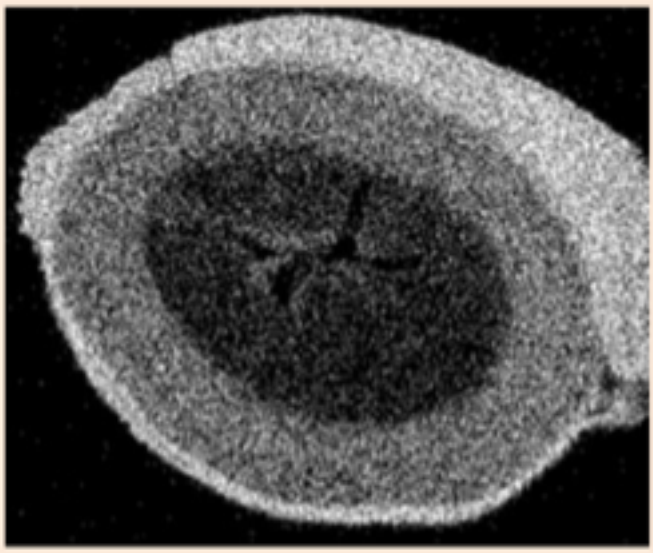
Scanning electron microscopy (SEM) equipped with Energy Dispersive Spectroscopy (EDS) was used to investigate the cross sectional structure of a PROBAN® cotton fibre. With consideration that the PROBAN® polymer contains phosphorus, a technique referred to as elemental dot mapping was used to show the distribution of phosphorus throughout the cotton fibre. In these tests the positive presence of phosphorus is depicted by the white dots.

Figures 1(a) and 1(b) demonstrate the complete distribution of phosphorus and consequently show that the PROBAN® polymer is present throughout the composite material.

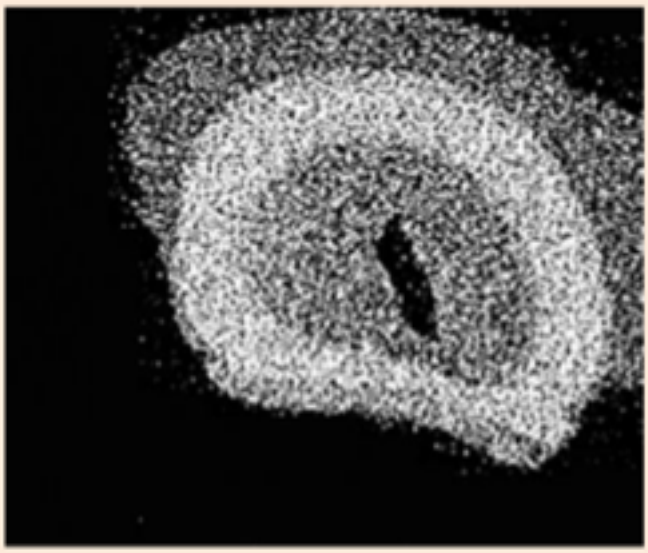
What is vital is that the composite material is tough enough to stand up to everyday wear and be unaffected by multiple washes throughout the lifetime of the garment*. Image 1(b) shows that even after 100 washes in an industrial wash-dry cycle according to ISO 15797, the structure of the composite material is stable and unaffected.

Furthermore, as a responsible care company, the flame resistancy of the PROBAN® composite material is systematically tested at an ISO 17025 accredited lab for every production batch following the industrial wash and dry procedures.

Figure 1: Scanning Electron Micrographs before and after industrial washing



1(a): phosphorus mapping on PROBAN® cotton fibre cross section before industrial washing



1(b): phosphorus mapping on PROBAN® cotton fibre cross section after 100 industrial washing and drying cycles as per ISO 15797

CARING FOR YOUR PPE IS ESSENTIAL.

No fabric is invincible

Washing and maintenance of FR workwear should always be carried out based on manufacturing instructions. No protective clothing should have holes, rips etc. Wash protocols designed for care and maintenance of all FR protective clothing prescribe no use of bleach (eg NFPA 2112 wash protocol[6], NFPA 2113[7], ASTM F2757-09(2016)[8].

Failure to protect aramid from UV may result in reduction of strength and loss of colour, due to chemical bond scissions via free radical generation[9-12].

CONCLUSION:

As an international chemical manufacturer with over 140 industrial sites, safety is our number 1 priority. The selection of the correct protective clothing for employees is a critical and complex procedure requiring consideration of many factors: risks; international standards; FR protection; comfort; garment design.

It has been demonstrated in the article that cotton-PROBAN® composite material is permanently bound to the core of the fabric giving flame resistant protection for the lifetime of the garment*. We are confident in the protection given by PROBAN® garments and use them to protect Solvay employees.

In recent years, in certain markets, FR fabric has been marketed as 'inherent' and 'non-inherent'. From science and evidence presented here we show there is a lot of ambiguity in this 'inherent' labelling. Consequently, we question whether an 'inherent' label brings any additional value to the person selecting or wearing the FR protective clothing. It is our opinion that regardless of the stage in the process where the fabric gained its flame resistancy, it is surely its performance which matters and selection on the basis of 'inherent' can be a costly exercise if options delivering proven protection for the lifetime of the garment* are disregarded.

For comfort, synthetic clothing like aramid can be less comfortable when compared with natural fibre based FR workwear like PROBAN®[13-17]. PROBAN® workwear has been providing proven protection for the lifetime of the garment* from risks of flash fire, molten metal splash, arc-flash for over 60 years.

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NEWS FROM JOIFF ACCREDITED TRAINING PROVIDERS

LUKOIL COPRORATIVE TRAINING CENTRE
ASTRAKHAN, RUSSIAN FEDERATION

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 2017, following an audit, the award of JOIFF accreditation to Lukoil Corporative Training Centre was renewed.

Left to right: Gerry Johnson, JOIFF Director of Standards of Training and Competence. Maria Sineva, Specialist (translator), Lukoil Corporative Training Centre, . Ekaterina Khapugina, Deputy Director Lukoil Corporative Training Centre Alec Feldman, Director JOIFF.

PUBLIC PRIVATE PARTNERSHIP GIVES MORE BODY TO INDUSTRIAL INCIDENT CONTROL
THE POWER OF MUTUAL AID

CONFERENCE REPORT BY PHILIP STOHR, CONSULTANT KAPPETIJN SAFETY SPECIALISTS

Mutual Aid through public private partnership is a fine option for the industry and the government to run a collective safety organization in an industrial hotspot. That is the core message of the conference on this topic that Kappetijn Safety Specialists organized in Rotterdam on the 29th of June 2017. Representatives of various stakeholders reflected on the subject of Mutual Aid. This conference is a spin-off of the Kappetijn Safety Specialists Research Project on the same subject in collaboration with JOIFF.

Mutual Aid organizations come in all shapes and sizes. Safety specialist Kees Kappetijn, organizer of the meeting, provided an overview. There are some strong arguments for a collective approach in the Netherlands: the government mandates companies of a certain category (often Seveso companies) with an above average risk level to keep up a corporate fire brigade. High demands are set to preparedness, effectiveness and provisions to prevent escalation of incidents. That requires quite some effort from the companies in terms of money, equipment, personnel and specialized education and training. If multiple high-risk companies are close together, then joining forces through Mutual Aid, whether or not in the form of a public private partnership, is a proven solution. The Netherlands already has many different models, but all of them aim for one goal: smartly organizing specialized fire and rescue services for industrial and municipal fires and hazards.

Around sixty representatives of firefighting brigades and the corporate life present at the conference discussed the question of how industry and government can join forces even more effectively. For fire scenarios that occur only rarely, but that do require heavy duty extinguishing equipment and trained specialists.

The importance of good stakeholder management

Jan Waals, director of the Unified Fire Brigade (UFB) in Rotterdam (a high quality large scale Mutual Aid Organization for over twenty years) emphasized the importance of good and continuous stakeholder management.

"It mostly comes down to decent stakeholder management", says Waals. The reason for this is that the management agreement is complex and both the companies and the government are keen to have their needs served equally in this joint organization. "Specifically for that, we even named a designated account manager. His most important job is to better the relationships for durable collaboration. Effective cooperation rests on mutual trust, shared responsibilities, joint supervision on the delivered performances, with money and leadership as the binding factors. The government and the companies put a joint 25 million into the management and upkeep of the organization each year, this means there is bound to be a regular discussion about the division of costs. The board spends a significant amount of time sharpening the agreements to make sure 'everyone stays on board'. In a collaborative construction with 67 connected companies and an involved government, there will always be something that needs to be 'fixed', but luckily we always succeed in doing so."

Tank Fire Fighting in Europoort, a Public Private Partnership (PPP) in a PPP.
Image above title: *Tank fire fighting with Amsterdam Mutual Aid System training*

Jan Waals does have one concern for the future. He observes that more and more companies choose to cover their normative fire scenarios with stationary extinguishing facilities. This gets them out from under the formal corporate fire service mandate, which means they do not have to contribute to the firefighting collective. If this causes the membership to dwindle and the incomes to plummet, the UFB will have to draft a new vision on safeguarding the quality of the fire care in the area and the contribution model to pay for it.

A stable and safe port, a high value for the Rotterdam Port Authority

The Rotterdam Port Authority was one of the co-initiators in for the establishment of the Unified Fire Brigade in 1998. Alan Dirks, program manager Policy & Development of the Port of Rotterdam, also puts a lot of value on intensive relationship management. In his eyes it is extremely important that all stakeholders try to imagine each other's positions and always remain on speaking terms. A tip for the governmental partners of the governmental fire brigade in Mutual Aid constructions still under development: "Step up to the plate and take the companies with you in the process. Do it with an open mind and leave your uniform at home. This relieves tensions with doubters of the Mutual Aid model and sets the tone for a fruitful collaboration."

A stable and safe area is a high value for the Rotterdam Port Authority "One of our main goals is managing and dealing out land to companies in name of the municipality, so that the port can make an economic profit. The Port of Rotterdam is the economic engine of the country, with a yearly contribution of 20 billion to the Gross Domestic Product. An important issue in attracting multinationals to the main port is that they are offered a stable settlement area. Not one large-scale company wants to settle in an area where the safety is sub-par and incidents are not adequately followed up. (...) And to my firm conviction, this model of collective fire care is much cheaper for the member companies than if they were to take individual measures to comply with their corporate fire brigade mandate."

Director Jan Waals speaking at the "Mutual Aid" conference

Mayor Theo Weterings, member of 3 large PPP-Mutual Aid set-ups

Industrial firefighting equipment in Rotterdam, available for all harbor-partners

The use of Mutual Aid in the Transportation sector

Nils Rosmuller, lector Transportation Safety at the Institute for Physical Safety argued that by the use of Mutual Aid in transportation related incidents there is a world to win. "Transport is, as opposed to industrial areas, not bound to one place and thus serious incidents with hazardous substances can happen practically anywhere in the Netherlands. And in my opinion, we need a good national cooperative structure just for that, because there are many authorities involved with transport incidents: the governmental Emergency Services, Rijkswaterstaat (Water and Infrastructure agency), the Inspection for Environment and Transport, ProRail for the railway and very presently also partners from the corporate life. Think of transporters, the industrial environmental clean-up crew, but also the manufacturers. Because who knows more about the transported hazardous substance than the producer? And who knows more about the trucks involved or the railcar than the transporter?"

The Swedish model

Both nationally and internationally, many places are investigating how the government and companies can fulfill specialized large-scale industrial fire care in a more effective way through cooperation. An interesting example of how that can be done was provided by Per Brännström, manager of the Swedish Slackmedelscentralen (SMC).

Brännström explains how it works: "The large industries finance and manage the materials and fund the necessary training and education, while the operational execution is placed with four selected large governmental fire brigades: Malmö, Göteborg, Stockholm and Sundsvall. From these four national anchor points we can be anywhere in Sweden within an hour and a half to four hours with specialized extinguishing equipment." The Swedish SMC-structure has a total of eight supportive modules, two per anchor point region. They each consist of a pump-unit with a capacity of 10.000 liters per minute, two 150mm hoses with a length of 800 meters and an extinguishing monitor with a capacity of 10.000 liters per minute. With two modules, Brännström says it is possible to fully control a storage tank fire effectively. Sweden is a large country with long travel distances, but there is a solution for that. With help of the Swedish Airforce, a module can be transported quickly across long distances via a Hercules transporter plane. Dependent on the availability of airplane and crew, of course. The SMC-system has been deployed successfully with various large-scale tank fires in

Sweden, and in 2014 components were even used to combat the largest forest fire in Sweden's history.

Involved in Mutual Aid as a policy maker

Theo Weterings, mayor of Haarlemmermeer, and chairman of the Kennemerland Safety Authority, is involved in no less than three large Mutual Aid constructions. The Kennemerland fire brigade provides assistance for Amsterdam-Ymond Mutual Aid (AMAS-AYMA), is connected with the incident management organization of the national Airport Schiphol and participates in a public private partnership for fire services at Tata Steel in Velsen.

"Kennemerland is a part of the Amsterdam metropolitan area, a very dynamic area where government and the corporate world really need each other to warrant the safety and effectively combat complex incidents. Mutual Aid is an agreement between the companies and the government, in which the interests of both parties have to be served. Chances to collaborate have to be utilized. I do not want to be told by lawyers what cannot be done through a public private partnership, I want to be told what can be done. And what can be done can be seen in the three large Mutual Aid constructs in Kennemerland."

Weterings described the agreements between the Safety Authority and Tata Steel that have resulted in an independent performance of the corporate fire brigade up to the level of a medium fire, and mutual assistance with large-scale incidents. The Tata Steel fire brigade has already assisted with large dune-fires in the region. At Schiphol, the airport fire brigade was exclusively responsible for aircraft firefighting until a few years ago, while the fire care in the terminal and other buildings on the extended terrain were the responsibility of the governmental fire brigade. An illogical situation, as observed by all the parties involved, so a three party discussion between Schiphol, Haarlemmermeer municipality and the Kennemerland Safety Authority gave way to a new, broader set of tasks for the airport fire brigade. Since then, the airport fire brigade carries out the building and other firefighting tasks in name of the municipality and the Safety Authority. And since a few years, this has also included the fire care for AFS and KLM through their industrial fire services mandates. Weterings: "In short, we have quite some experience with Mutual Aid and public private partnership constructions in our region. In varying shapes, because one all-inclusive format for Mutual Aid does not exist. It is good to learn from each other's experiences; my most important conclusion is that mutual trust between partners is the key to success."

The enthusiasm of the audience at this conference shows that Mutual Aid is a hot topic. Kappetijn Safety Specialists plans to organize an international conference in the upcoming year, when possible with JOIFF. As well JOIFF members will be updated when more information is available.

POSSIBILITIES AND LIMITATIONS FOR FLUORINE FREE FIREFIGHTING FOAMS IN FIXED SPRINKLER AND DELUGE INSTALLATIONS

BY JENS STUBENRAUCH

Firefighting foams offer a wide range of very unique extinguishing properties for special fire risks. A number of flammable materials can be extinguished efficiently and economically only by firefighting foam. How extinguishing systems have to be calculated and designed is set in a number of different standards and regulations. At the moment for most of fire risks a fluorine containing foam is set and as a planning basic is to consider the extinguishing performance ratings according the standard DIN EN 1568 -3 / 4. These ratings results from standard fire tests using Heptane, Isopropylene Alcohol and Acetone. The fluorine-containing foam agents were known to offer a relatively constant performance on different fuels. Thus, it had become common practice to apply the ratings determined on standard fuels to other fire risks as a general rule.

With today's knowledge about the environmental influences of fluorosurfactants, it is no longer tolerable to use the fluor-containing foam agents for fire risks, which could be protected similarly well with fluorine-free firefighting foams. For this reason, there is often the desire to use fixed extinguishing systems with a fuorine free firefighting foam instead of foam containing fluoro compounds. Often, the ratings determined according to DIN EN 1568-3 / 4 are simply compared. If the rating of the desired fluorine-free foam agent is equal to the fluorine-containing product used so far, a complete exchange is supposedly carried out.

However, numerous fire tests have clearly shown that this is merely a wishful presentation and a dangerous fallacy. Even if the extinguishing performance ratings according to DIN EN 1568-3 / 4 are the same or even better for the fluorine-free foam agents, there are in some cases significant differences in the extinguishing performance on different fuels, by different application types and much more. It is clear now that every fixed extinguishing system project has to be subjected to a case study, if the effectiveness of the installation is to be maintained unimpeded.

In order not to jeopardize the effectiveness of the extinguishing system, the following procedure is recommended:

- An inventory of the current extinguishing systems should be carried out. In particular, the design of the system (wet pipe / dry pipe system), the line design of foam concentrate leading pipes, the proportioner and the foam-generating components (sprinklers) are important.
- It should be checked if the foam agent storage tank and the piping isometry from the foam tank to the proportioner meet the requirements of the chemical-physical properties (e.g. viscosity) of the desired foam agent or whether modifications of the existing installations are necessary. For the design of the foam concentrate leading pipework and for the proportioner the viscosity values at the lowest application temperature and for pseudo-plastic products at a sher rate 0 (zero-viscosity) are indispensable calculation basics.
- If the data situation does not permit a robust evaluation if the existing system configuration can be used for the choosen fluorine free foam agent, tests must also be carried out, which also take account of all the parameters above carried out.
- The ratings according to DIN EN 1568 are not valid for an estimation of the extinguishing performance and the burn back resistance of the desired fluorine free foam agent. Fluorine free firefighting foams perform very differently
  - on different solvents,
  - with different water-qualities,
  - depending on the foam expansion rate,
  - depending on the application type.

In the table of extinguishing performance with sprinkler application, the fire tests

Solvent	Firefighting Foam						
	AFFF 3% (1A)	AFFF 3% (1B)	FF 3% (1A)	FF 3% (1A)	MBS 3% (3C)	FF-AR 3% (1A)	FF-AR 6% (3C)
Heptane	1:05 (5,0)	1:15 (5,0)	1:30 (3,2)	1:57 (4,4)	2:34 (5,5)	2:12 (3,8)	1:54 (7,1)
Gas (E5)	1:07 (5,0)	1:15 (5,0)	d.w.	d.w.	d.w.	4:00 (3,8)	3:30 (7,1)
Diesel	1:04 (5,0)	1:19 (5,0)	d.w.	4:40 (4,4)	4:53 (5,5)	d.w.	4:18 (7,1)
Acetone						4:36 (3,8)	1:55 (7,1)
Isopyl-Alcohol						d.w.	4:32 (7,1)
Ethanol						3:47 (3,8)	1:30 (7,1)

Table: Extinguishing performance with sprinkler application

were performed on basis to the FM 5130 test standard. For all tests, the same low expansion foam sprinklers were used and the usual ambient variables were respected. The application rate was set on 9 mm. The table is showing the extinguishing times and in brackets the archived foam expansion rates are written.

If the burn-back test is passed or not passed has been marked in colour - Green: Burn-back-test passed, Red: Burn-back-test not passed

The fire extinguishing performance ratings according to DIN EN 1568-3 / 4 are given in brackets behind the firefighting foam means with the respective admixing rates.

AFFF = fluorine containing, aqueous film forming foam concentrate (no PFOS, no PFOA)

FF = fluorine-free foam concentrate

MBS = multi-purpose firefighting foam

FF-AR = fluorine-free foam concentrate, alcohol resistant

The results in the table overleaf clearly show that, in particular, fluorine-free firefighting foam agents on different fuels show very different extinguishing efficiencies. It is also visible that for a sprinkler application the ratings according to DIN EN 1568-3 / 4 do not give a safe indication for the design of an extinguishing system.

In order to take account of environmental concerns however, individual case studies of fixed firefighting system projects have to be carried out. On the basis of this, it can be assessed to what extent a fluorine-free foam agent can actually be used as a substitute for fluorine-containing foam agent variants. It must be noted that the indications determined in these tests are only valid for the tested products and combinations. Generalizations would lead to mis-evaluations. According to current knowledge, the following procedure is recommended:

- It is recommended to determine the foam expansion rates of the existing foam-generating components (e.g., sprinklers) with the desired foam agent. It should be borne in mind that the tests must be performed with different pressures. At least the pressure from the hydraulically worst case as well as the hydraulically best case sprinkler of the system should be used for foam expansion tests.
- It is recommended to perform fire tests on basis of DIN EN 1568 - 3 / - 4, Attachment I (0.25 sqm) considering the following variables:
- Real fire risk solvents should be used.
- For representative results, the foaming numbers determined during the foaming tests must be used.
- For representative results, the actual application rate should be applied, minus a safety margin. Various fire tests have shown that reproducible and reliable results can be achieved with a safety margin of min. 30%.
- For representative results, the relevant application type must be applied (e.g., via miniature sprinklers).
- The tests should also be carried out with the fluorine-containing foam used so far, so that a comparative evaluation of the test results is possible.
- The results should be submitted to the insurer, so that a decision for the use of the firefighting foam can be made.

For an initial consultation and rough assessment of an existing extinguishing system with regard to a possible change to non-fluorinated foam agents the following are required:

- Fuel lists and material safety datasheets of the solvents
- SIN-numbers and datasheets of the sprinkler heads or other foam generating components
- Type designation and data sheets of the propotioner and possible foam concentrate pumps
- Data on the pipeline design from the foam tank to the proportioner
- Indication of the water quality used (for example, brackish or seawater)

- Information about the pressure at the hydraulically most favourable and most unfavourable sprinkler
- Indication of the application rate

When a fixed extinguishing system with foam is switched to non-fluorinated foam agents, components which have been in contact with fluorinated foam concentrate before have to be subjected to a technical cleaning. This can only be carried out reliably by appropriate specialist companies. Flushing the equipment is not sufficient to reliably remove the residues of fluorine-containing foam agents. It can be advantageous or even necessary to include the sprinkler pipeline network in these cleaning measures. Clarity is provided by analysis of the fluorines that can be provided by the cleaning companies or qualified laboratories.

The company Dr. Sthamer Hamburg offers competent and comprehensive advice and support for all the above mentioned services. On request, the services can be carried out and the necessary expertise can be drawn up. It is self-evident that this is closely cooperated with the competent authorities and insurers. This is the only way to ensure that the use of fluorine-free foam concentrates in fixed extinguishing systems offers a reliable and effective protection by the extinguishing systems.

Editor's note: Jens Stubenrach, is Area Sales Manager of Dr. Sthamer, Hamburg, specialist for fire fighting foams, foam nozzles, sprinkler systems and proportioners. He has been a volunteer firefighter for 35 years in his home town Jena in Thuringia, Germany and an executive of the firefighter association of Thuringia. Jens can be contacted at j.stubenrauch@sthamer.com

JOIFF ROLE OF HONOUR

JOIFF is delighted to congratulate the following people who were awarded JOIFF qualifications between July and September, 2017.

DIP JOIFF

Jabulani Myozi Dip.JOIFF

Al Hosn Gas, Abu Dhabi
United Arab Emirates

Jabulani Daniel Mzoyi has 12 years of experience within the Fire and Rescue (petrochemical and gas) Industry and was employed as a senior firefighter and learning practitioner for 6 years at Sasol Chemical Operation Fire Service in Secunda, one of the most forward thinking and largest petrochemical Fire Service in South Africa. He received first class training and knowledge in the field of firefighting, and gained vast experience working out of a busy fire station where he successfully completed numerous courses including Firefighter 1 and 2, HazMat technician, Fire Service instructor 1, Advance Petrochemical Firefighting instructor, Intermediate Life Support (ANA), Wildland firefighting, High Angle Rescue, Vehicle Extrication.

In 2013 Jabulani decided to gain international experience and enhance is career and he moved to Abu Dhabi, He is currently employed as a Watch Manager by Abu Dhabi Gas Development Company Ltd. (ADNOC) where he is leader of a multinational and highly skilled fire and emergency response team that provides safety cover at the Shah Gas field project. This current role has not only developed his firefighting skills but has also broadened his leadership qualities.

On successfully completing the JOIFF Diploma programme, Jabulani said “I am very proud of my career path and enjoy working within highly skilled teams. I am delighted to have achieved my goal in gaining the JOIFF Diploma.”

JOIFF TECHNICIAN

Stephen Thomas Tech.JOIFF

Cheshire, United Kingdom

Stephen Thomas was a professional footballer for 11 years, playing in the English league Division 1 for Wrexham and York City. He achieved International honours with Wales gaining caps at under 18 and under 21 levels and he was selected for the full Wales squad.

After retiring from pro football in 2007, Stephen became a firefighter with Cleveland Fire Brigade, England, a position that he held for 7 years. He then moved into industrial emergency response working for Falck Fire Services UK as a Site Protection Officer, on the top tier COMAH (Seveso) sites around Teesside, England for 4 years.

Stephen is currently employed by CF Fertilisers (another top tier COMAH site) in Chester where he plays an integral part of the on-site Emergency Response Team, as a firefighter.

He is am looking to make the step into Crew Management/Team Leadership in the very near future. On being advised that he had successfully completed the JOIFF Technician programme he said “That is great news, I'm absolutely delighted !!! “

JOIFF ROLE OF HONOUR

JOIFF MEMBER

Daryl Bean MJOIFF

Curriculum Manager, The International Fire Training Centre

Darlington, Co. Durham, England

Daryl Bean has been engaged with emergency service response for more than 35 years, entering the Fire Service and serving as a fire-fighter with the US Navy. He then moved to civilian and training in multiple disciplines including Fire, EMS and HazMat. Daryl was Senior Airport Fire Officer in Bermuda International Airport from November 1998 until October 2000 and since January 2001 he has worked as an Instructor at the International Fire Training Centre, (IFTC) Darlington, UK. He was promoted to Offshore/ Industrial Coordinator-Curriculum Manager in April 2013 and in this role, he develops, delivers and manages the delivery of competence based training to various industries in the onshore, petrochemical, offshore, maritime, aviation, nuclear and fire prevention environments. He is also responsible for maintaining training oversight at IFTC for regulatory authorities; JOIFF, OPITO, MCA (STCW), ICAO.

Daryl has an Associate Degree of Applied Science in Fire Science and his qualifications include NFPA Fire Officer, NFPA Fire Instructor, NFPA Fire Inspector, UK Senior Officer Command and Control, UK Crew Commander, US National Fire Academy Incident Command System, United States Office of Personnel Development; Applied Supervision, The Army Institute for Professional Development; Supervisor Development, Graduate of JOIFF.

Daryl has authored technical papers for CAA and is regularly published in the JOIFF quarterly eMagazine The Catalyst. Amongst other projects, he has participated in preparing a Government sponsored multi-agency action plan for emergency incidents, in upgrading site protection to International Code requirements including water flow calculations for hydrant systems, remote and proprietary fire alarm systems and was responsible for the installation of fire protection to a new hangar including foam deluge, sprinkler and alarm systems.

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

JOIFF QUALIFICATIONS

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

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

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

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

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

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

JOIFF TRAINING NOTES

"Train as if your life depends on it - because someday, it might!"

JOIFF accredited training is within a Competency Based Training framework and involves course content, instruction and the facilities of the training provider/training establishment.

All students who successfully complete a JOIFF accredited course/programme are issued with a JOIFF Certificate of Competence which has its own unique number.

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

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

TOMAS CHAMORRO-PREMUZIC, From the Harvard Business Review

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

JOIFF ACCREDITED COURSES

Course	Dates	Venue/Organiser
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)	As required.	**Arc Fire Training** United Kingdom On your own site. Subject to Risk Assessment & Facilities. arcfiretraining@ntlworld.com
Site Forward Controller (SFC) Site Incident Controller (SIC) Site Main Controller (SMC) Silver representative at Tactical Command Group (TCG) Crisis Leadership Crisis Risk Radar Crisis Spokesperson	As required.	**Eddistone Consulting** United Kingdom On your own site or at Eddistone Training Suite. opportunities@eddistone.com Tel: +44 1433 659 800
Industrial Fire Brigade Incident Commander Course (IFBIC) 5 days	13-17 Nov 11-15 Dec	**Falck Fire Academy,** Rotterdam, Netherlands fireacademy@falck.com Tel: +31 181 376 666
Industrial Fire Brigade Incident Commander Course (IFBIC) 5 Days	3-7 Sept 2018 19-23 Nov 2018 10-14 Dec 2018	
Pipeline Emergency Response Officer (PERO) Course 3 days	15-17 Nov	**Institute of Fire Safety & Disaster Management Studies** Vadodara, Gujarat, India Email : inquiry@ifdmindia.org / marketing@ifdmindia.org Tel: +91 98250 96033
Emergency Response Training for Lube plant personnel 2 days	20-21 Nov	
Integrated Fire Safety of Intermediate Bulk Containers (IBC's) and Intermodals 2 days	31 Oct - 2 Nov	**H2K Netherlands** p.deroos@h2k.nl Tel: + 31 174 414 872 +31 651 588 089
Industrial Safety and Emergency Response Course 2 days	15-17 Nov	
Foam School 2018 Vernon, France 5 Days	19-23 March 2018	

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DIARY OF EVENTS

October

28-3 Nov SAESI 2017, Johannesburg, South Africa

November

7 - 9 Firexpo East Africa, Nairobi, Kenya

2018

January

21 - 23 Intersec, Dubai, U.A.E

31 - 2 Feb SecureExpo, East Africa, Nairobi, Kenya

February

21 - 22 JOIFF AGM, Teeside, U.K.

March

20– 21 Securex West Africa , Lagos, Nigeria

June

4 -7 NFPA Conference and Expo, Las Vegas, U.S.A.

October

29-31 JOIFF International Fire &Explosion Hazard Management Conference, Malta

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

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

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