

THE CATALYST

Q3 2022



JOIFF

The International Organisation For Industrial
Emergency Services Management

New Vice-Chairman Announced

The Board of Directors have appointed Mr. Kevin Deveson as Vice Chairman of JOIFF.

JOIFF Role of Honour

A list of JOIFF qualifications that have been awarded during April, May and June 2022.

News from Accredited Training Providers

Highlighting successful audits that took place during Q3 2022.

PPE & FIREFIGHTER WELFARE

Time, Distance, Shielding: A Training Response to COVID-19
Impact of Firefighting on the Long-Term Health of Responders
MSA Safety Unveils New Line of Firefighter Protective Clothing
In action and at the station, we're always on duty...
What is the right PPE for Industrial and Airport fire brigades?

RelyOn Nutec
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ABOUT JOIFF

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

The 4 pillars of JOIFF aiming to support its Membership in preventing and/or mitigating hazardous incidents in Industry are: Shared Learning – improving risk awareness amongst JOIFF Members; Accredited Training – enhancing operational preparedness in emergency response and crisis management; Technical Advisory Group – raising the quality of safety standards in the working environment of High Hazard Industry and Professional Affiliation - networking and access to professionals who have similar challenges in their work through Conferences and other events and the prestige of being a member of a globally recognised organisation of emergency response.

Full Members of JOIFF are organisations which are high hazard industries and/or have nominated personnel as emergency responders/hazard management team members who provide cover to such organisations. Commercial Members of JOIFF are organisations that provide goods and services to organisations in the High Hazard Industry.

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

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

JOIFF is the registered Business Name of JOIFF CLG.

ABOUT THE CATALYST

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

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Message from the Chairman

Dear JOIFF Members and Catalyst readers,

JOIFF is up and running strongly still. I am proud to announce that we will hold the JOIFF Africa Summit in South Africa on 14-15th November 2022. This will be the first JOIFF meeting that people can attend since the COVID pandemic hit. The proceedings of the Summit will be available as a virtual event also for people who cannot attend. This event will be followed by a similar event in Dubai in January 2023 and then, in association with RelyOn Nutech, we will hold the JOIFF Industrial Emergency Services Management conference 2023 in Rotterdam in March 2023.

It is also my pleasure to inform readers that the JOIFF Board of Directors has appointed Kevin Deveson, who is one of the current JOIFF Directors, as Vice Chairman to ensure continuity in managing JOIFF in the future. Welcome in your new position, Kevin!

The theme for this edition of the Catalyst is one that I feel is as important as any other topic that one can list. Emergency Responder Wellness combined with ensuring that the correct PPE is always available and properly used during emergency incidents cannot be stressed enough.

Let me share with you an incident that happened very recently during the major flooding in the Durban region in South Africa. In total nearly 500 persons were killed during these floods and helicopters were used to transport the deceased to mortuaries. In one incident a paramedic was instructed to accompany a helicopter and her main task was to prevent bodies falling out of the helicopter whilst being transported – what a gross instruction!!

A reporter spoke to the paramedic afterwards and wanted to know if her employer has any program in place to assist the emergency responders in coping with all the death and destruction they encounter daily – the answer was “What is that?” A major Emergency Response agency that cares little for the wellbeing of their personnel.

During my time as Chief Fire Officer at Sasol, I embarked on a program, lead by a very good industrial psychologist, to do regular “Total Wellness Evaluation” with my personnel and looking back today, I am of the opinion that even that was not sufficient. If I can go back in time, I would have made sure that this was the number one priority for me, - managing my troops.

The same goes for PPE and then especially bunker gear – yes, it is very expensive and to convince the “bosses” to supply the funds is not easy, but again, thinking back of one incident in 2003 where I lost two Fire Officers in a wildland fire because they did not dress up in their bunker gear when they approached the fire, is still haunting me.

Afterwards, the one officer, whilst in ICU burn unit and able to talk, told me that he saw an opportunity where this runaway fire could have been stopped. He instructed his colleague to drive the fire appliance into the unburned area to set up an attack. A sudden change in wind direction caught them off guard. The vehicle stalled and they decided to jump out and run. They tried to outrun the fire, but the fire caught up with them and both were severely burned. One officer died two days later and the other one two weeks later – that was the worst time in my career in the fire service.

I can only wish that you will never have to deal with an incident where the lack of proper use of PPE causes you to have to go and present a fire helmet to the spouses of fallen emergency responders.

How often do I hear the phrase: - “The probability does not justify the expense to plan for the consequence “ when one presents an operational budget to “management”, but failing to plan and execute the plan to address the consequence will haunt you when the event does happen! Beware of risk analysis that stops at probability because it is very low on the risk matrix – insist that all consequences must also be rated (and not only the monetary values!)

Enjoy this edition of the Catalyst and may you always be safe and happy and I hope to see some of you soon at the JOIFF Conferences coming up!

Regards,

Pine Pienaar FIFireE; FJOIFF; FSAESI

Chairman & Director: JOIFF

Email: pine.pienaar2@outlook.com

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for more information visit:
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The Catalyst

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JOIFF

RelyOn Nutec
Fire Academy

JOIFF

INDUSTRIAL EMERGENCY SERVICES MANAGEMENT CONFERENCE 2023

6 & 7 MARCH 2023



JOIFF In association with RelyOn Nutec are pleased to announce The JOIFF Industrial Emergency Service Management Conference 2023 will take place on March 6th & 7th 2023 at the Hilton Hotel - Rotterdam - The Netherlands.

World Class Presentations, Unique Face To Face Networking, Direct Contact With Suppliers & Industry Specialists, Live Fire Demonstrations

As part of the ongoing Shared Learning commitment to the high hazard industry JOIFF are pleased to announce that we will be hosting the JOIFF Industrial Emergency Management Conference 2023 in Rotterdam, The Netherlands 6th & 7th March 2023.

This will be both a live in person event and also a hybrid/virtual event with global subject matter experts from around the world presenting on the subjects that matter most to the Industrial Emergency Services Management Specialist.

Plus live demonstrations at the RelyOn Nutec Fire Academy.

To ensure that this unique Shared Learning is available to everyone JOIFF will not be charging delegates a registration fee to attend this Conference.

(Does not apply to travel, accommodation or refreshments outside of the Scheduled Conference)

World class presentations, unique face to face networking, direct contact with suppliers and industry specialists.

International speakers covering the full range of Industrial Emergency Management topics over the 2 day Conference, latest technical advances, case studies, technical presentations, live demonstrations, suppliers presentations & supplier exhibition.

Who Should attend:

Fire Engineers - Fire Safety Consultants - Fire Risk Consultants - Occupational Safety Managers
Process Safety Managers - Safety & HSE Managers - Emergency Services Personnel - HSEQ Managers
Risk Managers - Emergency Response Personnel - Security Managers - Operations Managers
Industrial Safety Managers - Inspection & Training Managers

FOR DELEGATE REGISTRATION PLEASE GO TO WWW.JOIFFCONFERENCES.COM

If you would like further information on how you can promote your company at this unique event please contact the Event Director - Paul Budgen
Tel: +44 (0) 1 305 831 768 or email: pbudgen@edicogroup.net

If you would like to submit a presentation for consideration please contact Conference Coordinator Lora Lammiman email:
lora.lammiman@edicogroup.net

JOIFF NEWS

The Board of Directors have appointed Mr. Kevin Deveson as Vice Chairman of JOIFF.

Kevin was a manager in Pfizer (Sandwich) Kent, UK's Emergency Response Service when Pfizer became a JOIFF member organisation in 2003. In 2005 he assisted JOIFF in incorporating the United Kingdom National Vocational Qualifications for Emergency Fire Services into the training competences of the Pfizer Fire Brigade and for a number of years he represented JOIFF/Industrial Fire Departments at United Kingdom National Occupational Standards committee meetings.

In 2016 he was responsible for introducing Pfizer (Sandwich) site First Responder Teams (FRT) replacing the previous Safety Squad Personnel and in 2017, the FRT training programme achieved JOIFF accreditation, incorporating core skills including SCBA, Incipient Fire Responders, First Person on Scene Medical Responder, Hazardous Materials Response. Since 2018 he has held the role of Operations Director for Pfizer sites in UK and Belgium.

Kevin has spent many years representing and promoting JOIFF within the Pharmaceutical and wider industry, and he is a member of the team of auditors for JOIFF Accreditation of training. Kevin joined the JOIFF Board of Directors in 2021 and has been involved in the ongoing development of JOIFF since then.



NEW MEMBERS

During April, May and June 2022, the JOIFF Board of Directors were pleased to welcome the following new Members.

Newcastle International Airport Training Academy represented by Gary Wright, Fire Manager and Victoria Woodhouse, Commercial Training Executive. Newcastle International Airport is located on the outskirts of Newcastle-upon-Tyne in North East England. The airport is the home to the Newcastle International Airport Training Academy which was established in 1994. The Training Academy provides a range of bespoke safety related training courses to customers from around the globe. The Academy has World class learning facilities, highly qualified experienced instructors to meet customers' needs.

Orion Fire Engineering, New South Wales, Australia, represented by David Meyer, Managing Director. Orion Fire Engineering specialises in the manufacture of high performance fire protection equipment, to fight fires in high hazard areas involving chemicals and petroleum products. Orion provides some of the most advanced remote controlled monitors, featuring long throws, low power, best movement options and corrosion resistance – all of which results in low total cost of ownership and the best product availability. Orion also make some of the worlds most efficient foam proportioners and foam application devices.

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

JOIFF Guideline on Foam Concentrate – Croatian edition

JOIFF is indebted once again to Aleksandar Regent AMJOIFF who has translated the 2018 edition of the Foam Guideline on Foam Concentrate into the Croatian language.

Aleksandar Regent AMJOIFF is a Dr. Sc. in Environmental Engineering, Dipl. Ing. in Mechanical Engineering, and was a Senior Lecturer at the Department of Occupational Safety, Polytechnics of Rijeka where he taught courses on Personal Protective Equipment, Environmental Management, Physical Agents (protection from noise, vibration, lighting, ionising radiation, thermal environment factors) and Firefighting Equipment from 2006 till 2016.

This is the 4th JOIFF Guideline that Aleksandar has translated into the Croatian language having already translated The JOIFF Standard Handbook on Personal Protective Equipment (PPE) to protect against Heat and Flame, the JOIFF Guideline on Foam 2010

– now superseded by the 2018 Guideline - and the JOIFF Guideline on Emergency Response to incidents involving vehicles powered by Alternative Fuels.

Thanks to his efforts, the JOIFF Guidelines can be read by persons whose natural language is Croatian. Standard Croatian is the official language of the Republic of Croatia and, along with Standard Bosnian and Standard Serbian, one of three official languages of Bosnia and Herzegovina. It is also official in the regions of Burgenland (Austria), Molise (Italy) and Vojvodina (Serbia).

The Croatian versions are available for download to all JOIFF members from the Members' Area of the JOIFF website. Non-members of JOIFF in the Croatian language Regions, can get copies on application to the Secretariat.

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Accredited Training Providers

NEWS FROM JOIFF ACCREDITED TRAINING PROVIDERS
 During Q2 2022, the following accreditation audits were carried out



**FER TÚZOLTÓSÁG Kft.
Hungary**

FER Tűzoltóság Kft. team, presented with their JOIFF certificate of accreditation.

Back row from left to right.

Péter Halmos, Leader of firefighting & rescue; Zoltán Mészáros, senior advisor; Zoltán Dósa, Deputy fire-chief in Százhalombatta; Lajos Torma, Leader of technician.

Front row from left to right

László Pimper PhD, CEO; Gerry Johnson JOIFF auditor; András Polka Special Chief officer of firefighting & rescue;



**HHSL SAFETY SYSTEMS LIMITED
Trinidad**

HHSL Safety Systems Ltd. team presented with their JOIFF certificate of accreditation.

From Left to Right

Tasha Lawrence, HSEQ Co-Ordinator; Holly Ann Duncan, Emergency Response Coordinator; Gerry Johnson, JOIFF auditor; Claire Agna Da Costa Vieira, Director Administration; Sue-Anna Seetal, Quality and Compliance Coordinator; Kevin Deveson, JOIFF Auditor; Satesh Ramjass, General Manager



**BRENDAN KAVANAGH, CHARTERED SAFETY PRACTITIONER
Ireland**

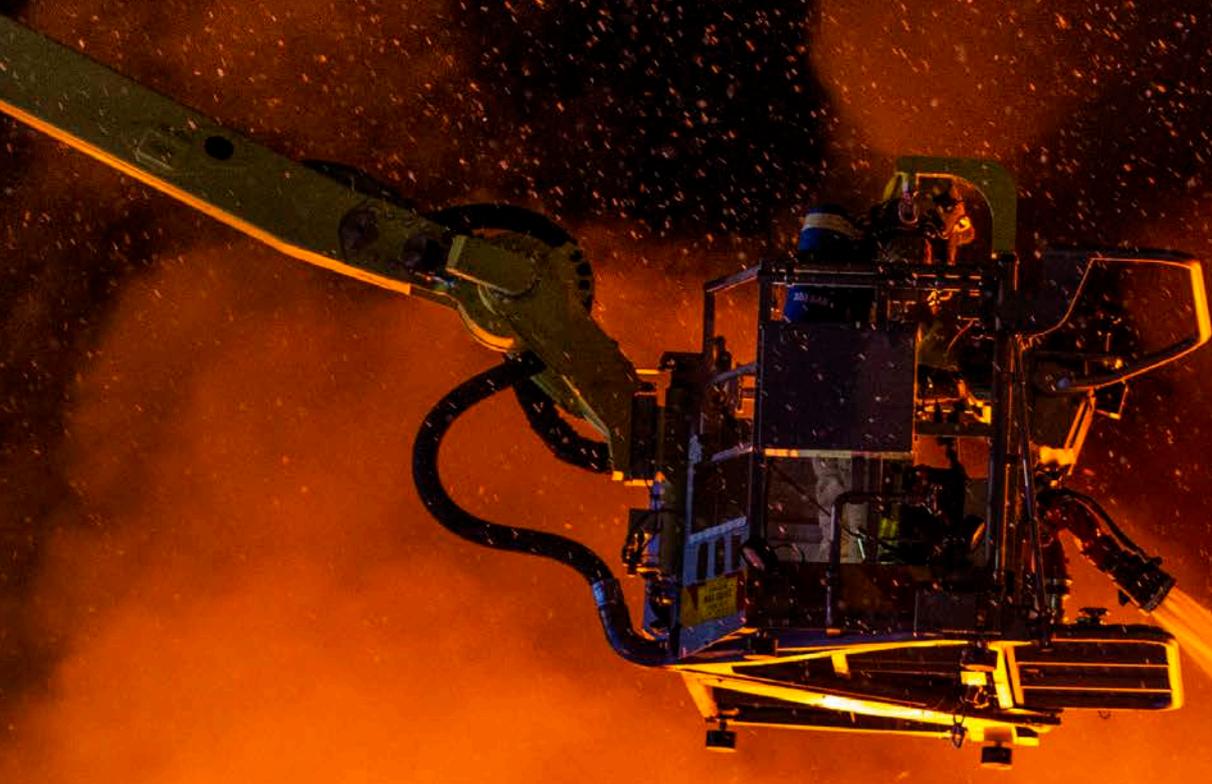
Brendan Kavanagh proudly displays his current JOIFF Certificate of Accreditation during one of his training courses



**Phoenix Fire, Explosion Investigation, Training & Consultancy (PFEITC)
Trinidad**

PFEITC presented with the JOIFF certificate of accreditation.

Kevin Deveson JOIFF Auditor; Krishendath Bharath Managing Director PFEITC



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ROLL OF HONOUR

During April, May and June 2022, the following persons were awarded JOIFF qualifications:

JOIFF TECHNICIAN

**Bob Birtles Tech.JOIFF
Greater Manchester Fire and
Rescue Service
United Kingdom**

Bob Birtle Tech.JOIFF, joined Greater Manchester Fire and Rescue Service in January 1997 and served in a number of roles including Leading Firefighter, Crew Commander and Watch Manager. In 2011 he transferred to the fire protection department as an inspection and enforcement officer and in April 2013 he was seconded to the fire engineering department primarily responding to complex consultations as part of the U.K. building regulations process.

To further his knowledge of Industrial Emergency Response, Bob registered for the JOIFF Diploma programme which he successfully completed in 2021 and he followed this success by registering for the JOIFF Technician programme which he has now successfully completed.



**Mat Rooney Tech.JOIFF
Greater Manchester Fire and
Rescue Service
United Kingdom**

Mat Rooney Tech.JOIFF, has more than 20 years' service with Greater Manchester Fire and Rescue Service and has held a number of job roles in the Brigade during that period. To further his knowledge of Industrial Emergency Response, Mat registered for the JOIFF Diploma programme which he successfully completed in 2021 and he followed this success by registering for the JOIFF Technician programme which he has now successfully completed.



The Catalyst and the Directors of JOIFF extend congratulations to all those mentioned.

MEMBER OF JOIFF

Howard Carr MJOIFF began his career in 1979 in the Royal Navy where he attained the rank of Chief Petty Officer. He moved to Sembcorp Utilities, in 2003. Sembcorp provided Asset Protection Services across several COMAH sites on Teesside, an area around the River Tees in the north of England and he worked his way up to the rank of Station Commander. In 2012, Howard diversified into Safety, performing the duties of Surface Safety Officer at ICL's Boulby Mine in the County of Cleveland UK, which supplies potash products, mined and refined on site. In 2015, he moved to Falck Fire Services UK Ltd, as Shift Station Commander where he is today.

Howard has been a strong supporter of JOIFF over the past twenty years and he has promoted JOIFF and in particular JOIFF Accredited training not only to his company but to other sites where he has carried out training. Over the years, he successfully defended the need for accredited training in the face of severe cuts to budgets.

On receiving the award of MJOIFF, Howard said "I will use the post nominal MJOIFF with pride".

Howard Carr MJOIFF
Station Commander
Falck Fire Services UK Ltd.
Wilton International
Redcar
United Kingdom



Kevin Deveson MJOIFF
Operations Director,
Pfizer R&D Ltd.
United Kingdom.

Kevin Deveson joined Kent Fire Brigade as an operational firefighter (retained) in 1980 and served in many capacities in the Brigade until he retired in 2022 after 42 years' service. In 1998, Kevin joined Pfizer Pharmaceuticals (Sandwich) UK Industrial Fire Department Service as a Shift Manager and he was promoted to Fire Department Manager in 2000. At that time, Pfizer (Sandwich) was a COMAH site with a population of 5,000 people, and Kevin was the Responsible Person for writing site emergency plans in accordance with COMAH regulations. During the following 13 years, Kevin held numerous job roles including Fire Department Manager in charge of 5 watches, tasked with training and development, emergency planning and response within a high risk environment.

In 2001, Kevin represented Pfizer UK within a global team in rewriting Pfizer Global Fire Safety and Loss Prevention Standards. In 2010 he was promoted to Insurance and Risk Manager for Pfizer UK, and in 2011 he successfully completed a Diploma in Emergency Planning in Coventry University. In 2013, following the disbandment of the site Fire Department, Kevin was responsible for introducing a Shift Loss Prevention Team (LPT) incorporating Security, Fire Safety, & Emergency Response Duties. Kevin is currently Operations Director for Pfizer sites in the UK and Belgium.

During his career Craig Kelsall has shown significant professional attainment in a wide range of Industrial Emergency Services Management activities. Craig joined Merseyside Fire and Rescue Service (FRS) in 1991 as a Firefighter. He was promoted to Leading Firefighter (1994) and Operational Sub Officer, (1998) and in 2002, he transferred to Merseyside's Training and Development Academy where he developed the training programme to take Merseyside FRS from Phase 1 (Post fire) tactical ventilation to Phase 3 (Offensive Operations) tactical ventilation. In 2004, Craig was seconded to the Fire Service College where he had specialist roles in a number of Fire Service functions. Craig was appointed expert advisor to Police and HSE investigation into the Atherstone on Stour fire (2007) during which year he also received the Networking Women in the Fire Service (NWFS) Silver Award. In 2010, Craig transferred to East Sussex Fire and Rescue Service as Station Manager.

During his Fire Service career, Craig has qualified in numerous training competences and he successfully completed a certificate in Teaching in the life long learning sector (CTLTS) at Warwick University and obtained a Diploma in Hazardous Material Operations, Coventry University.

Craig Kelsall MJOIFF
UK Business Resilience Manager,
Pfizer Ltd.
United Kingdom.



JOIFF and Shared Learning

One of the benefits of JOIFF membership is that JOIFF regularly circulates information on incidents that occur in high hazard industry to its membership. This is part of JOIFF's Shared Learning programme and it is aimed at raising awareness so that members can consider errors that caused the misfortunes of some, to educate against the same mistakes being repeated in their own location.

These are just a few of the incidents that JOIFF reported on during the first 6 months 2022.

- Russia** - Fire at The Antipinsky Oil refinery.
- Kuwait** - 10 injured in Kuwait refinery fire.
- Canada** - Explosion at tanker facility kills 6, injures 2.
- Nigeria** - FPSO Capable of carrying 2 million barrels explodes off coast.
- Mexico** - Fire breaks out on offshore platform.
- South Korea** - Petrochemical plant explosion kills four, injures four.
- DR of Congo** - Fire breaks out on Perenco platform.
- USA** - Marathon refinery explosion fire injures six
- Kuwait** - 10 injured in refinery fire at Kuwait National Petroleum Company
- Canada** - Suncor Refinery fire put out, one injured.
- Mexico** - Pemex refinery fire at Salina Cruz burns for nearly 24 hours.
- South Korea** - Refinery explosion and fire.
- Spain** - Explosion at a biodiesel plant.
- Bangladesh**: 40 dead in massive chemical blast.
- China** - Fire at Sinopec Petrochem complex.
- Jordan** - Toxic gas leak kills 13, injures 260

JOIFF would like to include in its mailings on such incidents the causes of any incidents and actions taken as a result, but this information is not readily available at the time of the incident being reported. When the reports of incidents are eventually completed, they tend to have restricted or abridged circulation rather than being made available to those in similar organisations with similar risks. Is this why we are we still seeing incidents causing a



major loss of life and property and damage to the environment when the hazards and risks are known?

Quite apart from the human tragedies of injuries, deaths, homelessness and environmental destruction caused by these events, in many cases, these may have been unnecessary losses due to the experience and information that is available to prevent these incidents

There is no such thing as “no risk” and a great deal of Emergency Services Management is built around reducing residual risk. For effective reduction of residual risk, the prime requirement is information – and what better information can there be than that from an organisation that has suffered from an incident in the type of risk that others need to reduce?

Can disasters caused by Industry be prevented? Of course they can, if information is made more freely available to allow management to learn from and act on the mistakes of others who have had the experience of similar previous disasters. Industry, Insurance and Risk Management Companies all need to ask themselves if they are doing enough to educate Industry on lessons learnt.

Action from lessons learnt can unquestionably reduce the number of repeat incidents and when they do occur, with knowledge gained,

those attending can more effectively and competently deal with them to reduce potential loss.

Those who fail to learn from history are condemned to repeat it.

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-  FIRE SPRINKLERS
-  FIRE TRUCKS
-  SUPPRESSION SYSTEMS
-  FIRE VALVES
-  FIRE ALARMS
-  FIRE HYDRANTS

JOIFF AT INTER



Over 85,000 visitors from 61 nations came to HannoverENM Media, the commercial partner of JOIFF was at this years Interschutz meeting with as many JOIFF members as

Paul Budgen CEO of Interschutz gives us the opportunity to meet up with large numbers of JOIFF members in 1 place. It was a real pleasure to be able to meet up with so many JOIFF members to discuss the encouragement, support, and enthusiasm from the JOIFF members with regards to what we are working towards. After a couple of postponements, it was important

RSCHUTZ 2022



they could to hand out the JOIFF Membership brochures and to discuss the new and upcoming developments that are happening at JOIFF over the coming months and years.

of ENM Media said

discuss what JOIFF are up to and to have the opportunity to listen to the members and also to discuss the plans that JOIFF are putting in place both in the short and medium term. ... at JOIFF & the plans we have for the organisation both in place, in process & moving forward was great to hear. ... it for the fire industry to have a focal point again."

to 6 June 2026 and we look forward to seeing you all there...!

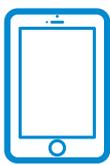


Dr. STHAMER HAMBURG



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on crude oil, gasoline E10, Ethanol, jet fuel, acetone, IPA and more

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FIGHTS
FIRE**



FLUORINEFREE
foams for the future

Industrial Disasters

Can they be prevented?



Image source: *The New Yorker*

The primary aim of JOIFF since it was established, is Shared Learning to drive inherent safety, continuous risk reduction and safe management of residual risk. JOIFF's Shared Learning provides information on incidents in high hazard industry that we hope will allow Members to benefit from the misfortunes of some to educate against the same mistakes being repeated by themselves. Supporting this aspect, The Catalyst researches and provides reports on some of the major industrial incidents that have taken place in each quarter of past years in the hope that this may stir people to action so that future incidents and subsequent unnecessary losses can be prevented.

Incidents that occurred during the 2nd quarter of a year.

20th April 2010 DEEPWATER HORIZON

The Incident:

The Deepwater Horizon was a semi-submersible, mobile, floating, dynamically positioned drilling rig that could operate in waters up to 10,000ft (3,000m) deep. This rig was rented to BP for drilling a deep exploratory well, 18,360 ft (5,600 m) below sea level, in approximately 5,100 ft (1,600 m) of water. The well is situated in the Macondo Well in Mississippi Canyon Block 253 of the Gulf of Mexico in the United States exclusive economic zone, roughly 41 mi (66 km) off the Louisiana coast. Part of the drilling process is the transfer of "mud",

a man-made drilling fluid to suppress oil and gas, keeping the well under control. On the day of the disaster, at approximately 7:45 pm, the mud was seen to be falling through the centre of the rig, coming out of the top of the derrick and falling through the roof. The crew struggled to seal the well, a series of combustible gas alarms went off, one of the engines on the rig started to rev and was steadily rising way above normal operating RPM, the lights went out, power went out, the engine at very high revs stopped spinning and a huge explosion took place. Other explosions followed as the rig had a massive blow-out. What had happened was that high-pressure methane gas from the well expanded into the marine riser and rose into the drilling rig, where it ignited and exploded, engulfing the platform.

The Evacuation:

The general alarm was sounded, a mayday call was issued, and an announcement was made to abandon the rig and for all persons to report to emergency stations and lifeboats. The environment was full of smoke, flames and methane gas, the derrick was solid flames and persons attempting to evacuate through the back of the rig were prevented from doing so because the walkway, handrails and stairwells were completely blown off by the explosions. Some people jumped off the rig into the water, others managed to make their way through the flames, smoke and debris to the lifeboats

which were released to the sea, leaving others with limited means to abandon the rig. Some started to prepare a life raft and were trying to get in through the small opening and there was so much intense heat around the life raft and it looked like it would burn and those inside would be incinerated, but they managed to launch it. When it landed on the sea, they discovered that there were no paddles and so it could not be propelled to safety away from the burning rig. Some jumped out of the life raft into the water, grabbed hold of the ropes around the raft and started swimming trying to pull the life raft to safety away from the rig.

By this time, the surface of the sea around the rig was burning with oil, hydraulic fluid, gasoline, diesel and all sorts of debris floating on the water, and some of those who escaped by jumping into the water started to burn.

Support boats launched fast rescue craft to pick up those in the water and other vessels who answered the mayday call started to recover those in the water and at 11.22 pm, 97 minutes after the blowout, Coastguard helicopters started to arrive at the Deepwater Horizon. Supply boats continued to battle the fire.

The Casualties:

At 11.00 pm, 75 minutes after the blowout, a muster (head count) was taken and it was found that 11 people were missing. 94 crew members

were rescued by lifeboat or helicopter, 17 of whom were treated for injuries. The 11 missing never had a chance and were killed in the explosion and their bodies were never recovered.

The Deepwater Horizon sank on the morning of 22 April 2010.

The Environmental damage:

On the afternoon of 22 April 2010 a large oil slick began to spread at the former rig site and it flowed for 87 days after the explosion. The spill directly affected 70,000 sq mi (180,000 km²) of ocean, which is comparable to the size of Oklahoma. As of July 2011, about 491 mi (790 km) of coastline in Louisiana, Mississippi, Alabama and Florida were contaminated by oil and a total of 1,074 mi (1,728 km) had been oiled since the spill began. The reported 3.19 million barrels of spilled oil was not the only effect of this disaster which also caused the release of thousands of tons of hydrocarbon gases into the atmosphere.

The Blame:

The U.S. Coast Guard and Bureau of Ocean Energy Management, Regulation and Enforcement investigated the incident and completed a joint report. They found

1. While the Operator’s contractor companies fell significantly short on safety and diligence, the main blame under the Bureau of Safety and Environmental Enforcement regulations was on the Operator, who was ultimately responsible for conducting operations in a way that ensured safety and protection of personnel, equipment, and natural resources, and the environment.
2. The central cause of the blowout was the failure of a cement barrier at the bottom of the 18,000 foot-deep well casing/pipe. Though the precise reasons for the cement failure could not be determined, the Operator’s cost or time saving decisions without considering contingencies and mitigation were contributing causes of the blowout.
3. There was no evidence that a formal risk assessment of critical operational decisions was made in the days leading up to the blowout. The Operator’s failure to fully assess the risks and a series of decisions that increased risk and failed to fully consider or mitigate those risks was a contributing cause of the Macondo blowout and a core factor leading to the disaster.
4. Cost or time-saving decisions made by the

Operator without considering contingencies and mitigation contributed to the disaster.

5. Communications failures and an “overall complacency” aboard the rig that may have contributed to crew members failing to either recognise the scope of the crisis or to shut down operations as it unfolded contributed to the disaster.

The lessons learnt:

In the wake of the Deepwater Horizon tragedy, the US Federal Government imposed new regulations designed to prevent future loss of life. In 2018, most of the rules were weakened or eliminated by the Trump Administration.

13th May 2000 ENSCHEDE FIREWORKS DISASTER

The Incident:

S.E. Fireworks in Enschede, The Netherlands, was a major supplier of fireworks to pop concerts and major festive events. On 13th May 2000, a fire is believed to have started in the work area of the central building where some 900 kg (2,000 lb) of fireworks were stored. It then spread outside the building to full shipping containers that were being used to illegally store more display incendiaries. A number of catastrophic fireworks explosions then began, the first of which had a strength in the order of 800 kg TNT equivalence, while the strength of the final explosion was within the range of 4,000–5,000 kg TNT. The biggest blast was felt up to 30 kilometres (19 mi) away.

Fire crews were called in from across the border in Germany to help battle the blaze. By the time the Fire Service arrived, the blaze was already well established. Noting that there were explosives on site, they set up a cordon, but it was a cordon based on an incorrect assessment of how much explosive material was present. They had no idea as to the extensive degree that SE Fireworks had been overfilling their available storage space.

The Casualties:

23 people were killed including four firefighters, and nearly 1,000 people were injured.

The Damage:

A total of 400 homes were destroyed and 1,500 buildings damaged. Thousands were left without homes.

The Cause:

The site, which was surrounded by residential neighbourhoods, was packed with explosives, much more that it had been designed for. Fireworks were stored in workshops, concrete bunkers and numerous shipping containers. When residents complained about the danger present, the City Council said that the location was zoned for industrial use and as far as they were concerned, the fact that the zoning was technically correct, so there was no issue to be addressed.

The definitive cause of the fire has never been determined but it may have been as a result of a short circuit or electrical fault in a piece of equipment in a workshop. Because it was Saturday the workshop should have been empty

Image source: Pinterest



and clean, but it wasn't, it was packed with hundreds of fireworks, loose and in open containers. The fire ignited the fireworks causing them to shoot off from the burning building and set fire to other structures. The internal fire doors in the central complex and the doors of shipping containers were left open, unapproved fireworks had been stored on site, no separation distance had been maintained.

The Blame:

An arrest warrant was issued by the Dutch authorities for the two Chairmen of SE Fireworks at the time. Initially, they were accused of involuntary manslaughter, involuntary arson, violation of environmental and safety regulations, and dealing in illegal fireworks. They were acquitted from the charge of involuntary manslaughter and involuntary arson and convicted of violation of environmental and safety regulations as well as dealing in illegal fireworks. They were initially sentenced to six months in prison, of which 3 months on probation, and they both received a €2,250 euro fine. As they had already spent 3 months in remand, they were freed after the decision. Upon appeal the chairmen were convicted of violation of environmental and safety regulations, dealing in illegal fireworks, as well as involuntary detonation leading to death and were sentenced to 12 months in prison.

Lessons learnt:

The Dutch Government undertook a huge programme focussed on the handling of fireworks. A National catalogue of every warehouse storing fireworks was created, regulations were introduced so that any installation holding fireworks for sale must be at least a certain distance away from any other building or significant structure. These steps resulted in many businesses dealing with fireworks closing down or moving.

1st June 1974 FLIXBOROUGH DISASTER

The Incident

At the Nypro (UK) site, a chemical plant near the village of Flixborough, North Yorkshire, England, caprolactam, an intermediate product in the production of nylon, was being manufactured by oxidation of cyclohexane with air in a series of inter-connected reactors. On Saturday 1st June 1974, a 20 inch bypass system ruptured and resulted in the escape of a large quantity of cyclohexane. The cyclohexane formed a flammable mixture which subsequently found a source of ignition causing a massive vapour cloud explosion which https://en.wikipedia.org/wiki/Flixborough_disaster virtually demolished the site. The fires burned for several days.

The Casualties:

Twenty-eight workers were killed, and a further 36 suffered injuries. None of the 18 occupants of the plant control room survived, nor did any records of plant readings. Offsite consequences resulted in 53 reported injuries and about 2,000 properties in the surrounding area were damaged to varying degrees.

The Cause:

A temporary 20 inch NS (DN 500) bypass pipe assembly incorporating expansion joints called bellows units, had been installed around one of the reactors to enable it to be taken off line to repair a large crack. On the day of the incident while the plant was on hot circulation pending re-start, the by-pass line ruptured releasing 30 tonnes of cyclohexane.

The Blame:

Amongst the issues contributing to the disaster were a lack of hazard awareness, inadequate design of the by-pass piping assembly, inadequate risk assessment, inadequate quality assurance, inappropriate plant layout – the

control room was too close to the plant – inadequate emergency response planning

The Works Engineer post at the plant was vacant, consequently the temporary by-pass pipe assembly was designed by unqualified staff without reference to design standards or bellows unit manufacturer. The by-pass pipe assembly was not properly supported and was exposed to transverse loads due to inadequate support.

The lessons learnt:

All plant modifications should undergo a rigorous safety engineering and technical review. The positioning and structural design of occupied buildings and control rooms close to process plant requires careful consideration. Management should provide role clarity and training for staff to avoid unconscious incompetence.

As a result of the Flixborough Disaster, new legislation was developed including the UK Health and Safety at Work Act, UK Pressure Systems Regulations etc.

Could any these disasters have been prevented? What do you think?

"The major problem with the chemical industry and indeed other agencies is the way accidents are investigated, reports written, read and filed away and then forgotten and then ten years later, even in the same Company, the accident happens again. Organisations have no memory, only people have memory and once they leave the plant, the accident that occurred there is forgotten about."

Trevor Kletz OBE, FEng, FRSC, FICChemE, a prolific author on the topic of chemical engineering safety.



Image source: Hull Daily Mail

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Time, Distance, Shielding; A Training Response to COVID-19

PPE
FEATURE

The 2020 Covid-19 pandemic caused a rethink of virtually every aspect of what was considered normal living and interaction, which to date still has not reached a conclusive state, as organisations work to recoup training which was missed and keep up forecasted schedules and evaluate response arrangements adjusted during times of Covid restrictions. Within a short period of time, as countries grasped the reins of trying to understand what was happening and putting measures in place to hopefully arrest the effects on communities, many mechanisms of daily life ground to a halt amidst the institution of lockdowns designed to minimize personal contact in hopes of reducing the infection rate and lessening the increasing burdens on the health care service. Daily life continued in a reactive condition, responding to State legislation designed to mitigate the outbreak. What was later realized was the impact of the lockdowns and on the ability of essential services to maintain either personnel levels or personnel levels of “qualified” operators, those whose current level of performance was deemed to be acceptable to an agreed set of measurable criteria. This point is expanded as a segue to the following excerpt as the question of certification arises.

Arguments:

As reported by Jesse Norman in the May/June 2020 NFPA Journal in explaining changes to limitation burdens placed onto fire departments, “These changes are meant to stretch the limited capability as far as possible, said Aaron Burnett, Minnesota’s state EMS director.” Some of the regulations that are suspended are things that are almost considered sacrosanct – like requiring an individual on an ambulance to have a certification – but this is designed to allow us to be very nimble” Burnett explained on a recent webinar hosted by the EMS office of the National Highway Traffic Safety Administration. “If

regulations aren’t able to adapt to the changing situation on the streets, those regulations can start to become a barrier to effective patient care and can actually get in the way of providing and protecting the health and safety of the citizens.”

Certainly, this raises many questions countering the establishment of certification guidelines and regulations put in place as an assurance of quality of care, with evidence to protect the giver and receiver of emergency service as best as possible from questionable if not life-threatening practices. Some regulators within our industry recognized the conundrum of national Covid-19 precautions prohibiting intermingling and affecting the ability of certificate holders to “remain certified” and thus “qualified practitioners” to the extent that it affected their job security. Creating solutions to providing the legal (at least) coverage of an in-date certificate of competency whilst adjusting to the inconsistency of Covid-19 precautions over time had to account for the ability of the training institutions to deliver the required learning outcomes.

This importance was recognized in the UK with industries and operations critical to maintaining quality of life allocated “key worker” status. This included those functions like training centres, which enabled the industries and operations to meet the level of service expected. With that understanding the priority on providing training safely changed priority to proving the ability to, as a minimum, apply the government’s Covid-19 precautions, while still being able to provide the training to meet the defined learning outcomes. Over time, as no end of the restrictive guidelines for minimizing the spread of Covid was seen, some regulators were very thoughtful addressing certification of competence by designing guidelines to encourage the

continuation of measurable training by identifying means of achieving theoretical learning outcomes separately and via video streaming thus reducing the physical gathering of delegates to practical delivery and assessments. The applicability and benefits of this process may lead to further discussion; however, this provided a positive means for maintaining credible training for some disciplines. Certification periods were expanded, with grace periods added on to certificate expiration dates to adjust to the reduction of training centres open, who could meet the training objectives and government guidelines for Covid-19. With amended regulatory guidance coupled against the government’s Covid 19 precautions, a picture was created which allowed able training providers to determine the ability to and subsequently conduct training.

Considerations to training

Of particular interest in addressing any directive is the interpretation of terms within the directive. Governments looked to a common terminology for universal use and over time have looked to expand on their methodology in defining the terms to meet changing strategies of coping with the prolonged period and spread of the coronavirus. One term, the correct interpretation of which is necessary with the conduct of training in-person, is “bubble.”

What constitutes a bubble in regards of in-person training?

Do the trainers now form part of the bubble and if not, how do they manage with Covid precautions?

How are the trainees affected regarding interpreting a “bubble” as defined under the government’s definition for Covid precautions?

The UK Government in the establishment of its Coronavirus (Covid 19) guidance defined two types of “bubbles,” household and support, neither of which ideally pertains directly to the groups we encounter: however, taking into consideration other guidance like Coronavirus (Covid 19): jobs that qualify for travel exemptions, one can presume the identification of “working bubbles” of which our trainees fall under.

The recognition of groups who by the nature of their work create identifiable communities maintaining definitive precautions assist greatly in understanding how to apply the general instructions of the guidance documents, for example a specific shift from an emergency response service to a group of essential oil and gas workers from different offshore platforms who travel on the same helicopter. If we examine the contact of an oil and gas emergency response member to attend landside training though, how far will that bubble extend? Let’s look at some obvious contacts of Person A, who requires emergency response training, and decides to attend training after his working cycle, before heading home:

- Co-workers on the installation
- Helicopter crew
- Heliport staff
- Transportation personnel
- Accommodation (Hospitality) staff
- Training centre staff
- Other emergency response members on course

With the government’s coronavirus prevention strategies finalized and promulgated, the tasking to create a suitable training environment could proceed, meeting targets such as:

- Requests from clients on Covid precautions procedures and risk assessments
- Proof on cleaning program for delegate equipment (fire kit, breathing apparatus, vehicles, classrooms)
- Social distancing covers all aspects, classroom, locker room, transportation, moving around on the training ground during multiple courses

Course sizes adjusted to fit social distancing logistics while still enabling the course outcomes to be met Whilst this is a simple example, it demonstrates the complexity of the “bubble” concept which may in fact be a compounding series of interacting bubble communities exceeding the objectives of the concept. This observation was also included in determining the functionality of the training centre, from essential to non-essential personnel, moving around the training centre from reception to dispersal and control of all physical resources used.

Meeting the changing environment

The benchmark for addressing the outbreak is meeting the government’s current strategy. The difficulty with containment attempts caused the government to produce different strategies for the community as indicated below:

UK government Covid guidance strategies

First:

- Wash hands: keep washing hands regularly
- Cover face: Wear a face covering in enclosed spaces
- Make space: Stay at least 2 metres apart – or 1 metre with a face covering or other precautions

Next:

- Stay Alert
- Control the Virus
- Save Lives

Third:

- Stay Home
- Protect the NHS
- Save Lives

Whilst the phraseology captures the government’s continued official process(es) on maintaining the safest possible culture in hopes of reducing the spread of the virus, it is interesting from an emergency services training provider the real-world condition to which we prepare our charges and how we provide instruction which can automatically applied. In this case the basic three-point process for operations within the hot zone of a hazardous materials incident (specifically relating to radioactive materials but generally applicable): Time, Distance and Shielding:

- Time: Spend the least amount of time near the product to reduce exposure time.
- Distance: Work as far away from the product as possible, including the use of tools or implements.
- Shielding: Use a physical barrier to prevent contamination. This includes personal protective clothing and equipment.

The use of this process is automatically adaptable as it can be applied to the release of the coronavirus by considering exposure and contamination i.e:

- Exposure: Within the area or zone which could be affected by the hazardous material released
- Contamination: The physical transfer by mixture or contact of particles from one surface to another resulting in a condition of impurity

Whilst the first triplet in the government’s strategy was a “how” directive, the second two

are more a “what” meaning local procedures for the how. It is likely that will be the case going forward and any subsequent “what” guidance can still be met by Time, Distance and Shielding for any operating service or business. Applying the UK government guidance became an exercise in applying the process of managing hot-zone or inner cordon operations over an extensive area. From a training centre perspective, this extensive area involves all areas where there are:

- Interactions between centre staff
- Interactions between centre staff and trainees
- Interactions between centre staff and transient services
- Interactions between transient staff and trainees

This reflection assisted greatly in setting the objectives to meet the logistical arrangements of day-to-day operations as well as promote confidence with the staff, trainees, and transients. It also served as a basis to develop the centre’s Risk Assessment for training during Covid 19 restrictions.

It was an interesting observation when discussing this with industrial response teams; how their training and in some case process controls in their environments (hazardous materials transportation, storage and use) already have led them to have great understanding in what the government was trying to achieve. Including in this is their expectations of us as a training centre in promoting safety in regard to prevention of disease transmission.

Clean Technique

Clean technique refers to the use of routine hand washing, hand drying and wearing of non-sterile gloves. Using clean technique minimizes the transmission of microscopic organisms such as bacteria and viruses. It effectively prevents most cross contamination that can occur when performing non-invasive medical procedures or when preparing food. “Clean technique” is used medically when taking blood pressures, examining patients and feeding patients, for example. Frequent, thorough cleaning of surfaces is one way to cut down on food-borne illness in homes and restaurants. Disinfecting cutting, serving and preparation implements using soap and hot water also helps prevent cross contamination (Smith, 2017).

It is with reference to applying “clean technique” in addition to “social distancing” and mask

wearing that the training centre was scrutinized over by regulators and clients prior to allowing attendance for training. Even here, as an emergency responder and even more so regarding an industrial emergency responder, where exposure to chemical of various degrees of health hazards, the importance of having a high regard to the reduction of transmission of contaminants must become a natural part of training centre operations and over the years, responding to the results of regulatory audits, customer feedback and staff observations, processes and procedures were introduced which implemented aspects of “clean technique” making it easier to apply specific recommendations in respect to Covid-19. The use of non-sterile gloves, commonplace to staff in the centre prior to the pandemic increased and now included distribution to students. Specific cleaning regimes for classrooms, changing rooms and vehicles transporting and used by trainees all were subjected to assurance.

Prior to the Covid pandemic, regulators from various training organisations required training centres to address and demonstrate the assurances such as ensuring sufficient inventory PPE for each student, segregation and cleaning fire-fighting PPE, and disinfecting breathing apparatus masks. Questions asked now centred on an assurance of what was in place rather than was there anything in place. The developed Occupational Health and Safety – Risk Assessment: Firefighting training delivery during the CV-19 Pandemic distributed,

reviewed and queried by stakeholders contained measures prescribed above, with operations aligned to government directives.

Summary

The training centre’s response to maintaining operations during the Covid-19 pandemic revealed certain fundamentals of safety practices surrounding hazardous materials which would seem to be natural for emergency responders. These safety practices aligned with government guidelines gave industrial responders and trainers a unique perspective on interpretation of introduced policies and practical application in continuance of operations. Interestingly enough, control policies at industrial facilities and emergency response training centres included practices already equal to or exceeding some guidelines governments were recommending. Confirmation of practices through distribution and acceptance of developed risk assessments provided assurance for trainers and trainees of the elements within their control for delivery of necessary training. The fullness of time will present a myriad of case studies on management of this infectious disease, transport sample listed as UN3373, Biological Substance Category B.

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Source: NHS UK



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Impact of Firefighting

on the Long-Term Health of Responders

PPE
FEATURE



Image: Carbonaceous Fire Training

Hazards

The issue of contamination and occupational exposure has existed in many workplaces since the industrial revolution. As our understanding of health, safety and risk management changed so did regulation and legislation to ensure employers were maintaining a safe environment for employees to work in.

It shouldn't come as any surprise that smoke is dangerous, this is very reason why responders wear protective clothing and respiratory protection. We may have taken this level of protection for granted, and failed to continue to research and develop our understanding of the environment that we work in.

In many ways we are all guilty of not seeing the hazardous materials risk at fires, after all its just smoke; but what's smoke? What's it made of? What additional hazards are present?

The broad reality is this; that every fire we attend is a hazardous materials incident and should be treated as such.

If we were to place UN Hazard Placards or even GHS (Globally Harmonised Systems) labelling on the front door at a domestic or industrial building fire, we would likely see the risk differently.

But when we attend fires, we don't see the same risk. Our perception therefore altered because the dangers are not completely visible.

The modern-day fabric of new building materials and the furnishings placed inside them present a significant long term health risk to firefighters and to other responders that attend the scene. This is in contrast the materials used in construction and furnishing 40 or more years ago.

It is these syntactic materials and the chemicals that they contain, can create a toxic cocktail of chemicals during a fire, when temperature and pressure impact on the way these chemicals interact with each other.

The list of materials is extensive so let's consider the ones that we will find at every type of fire involving any form of synthetic or organic material.

- Hydrogen Cyanide and Carbon Monoxide commonly referred to as the "Toxic Twins" due to the dual impact on the body
- Polycyclic Aromatic Hydrocarbons (PAH's) and, in particular, Benzo(a)pyrene (BaP)

It is chronic exposure to these materials over the career of a firefighter than can significantly impact on their long-term health in later life, for some the health effects could impact on them during their career rather than in retirement.

Gas Monitors

Provision of gas monitoring to responders is key to ensuring a safe approach during and after an incident, will ensure that occupational exposure limits are maintained, and that appropriate respiratory protection is utilised. Without a gas monitor we have no idea that these gases might be present.



Image: Gas Monitor reading Carbon Monoxide outside a domestic fire

PPE FEATURE

Health and Hygiene

It is widely accepted that responders, and in particular Firefighters, have higher rates of cancers and respiratory illness when compared to the natural population. It is not uncommon now to find retired firefighters suffering from COPD and Asthma, as well cancers.

The image of a dirty firefighter covered in soot needs to change to one of clean firefighters, with clean PPE (personal protective equipment) and RPE (respiratory protective equipment). But in many cases, we still glamorise the role with images of dirty, sooty firefighters as a “badge of honour”

In many ways responders and their employers need to understand that we can never remove the risk that materials involved in combustion present to us, what we can do is manage it with the practical and proportionate system of work.

- Education through Knowledge and Understanding
- Investment if good quality PPE and RPE
- Process and Procedures
- Practical Application
- Appropriate Supervision

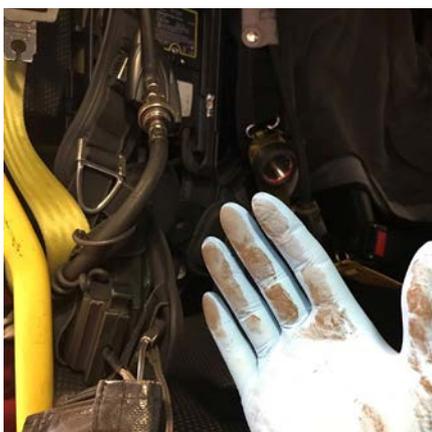


Image: Equipment cleanliness must form part of the very basics of contamination control

While respiratory protection in the form of breathing apparatus has been around for many years, it is only recently have we seen a dramatic shift in the frequency of use especially during the decay



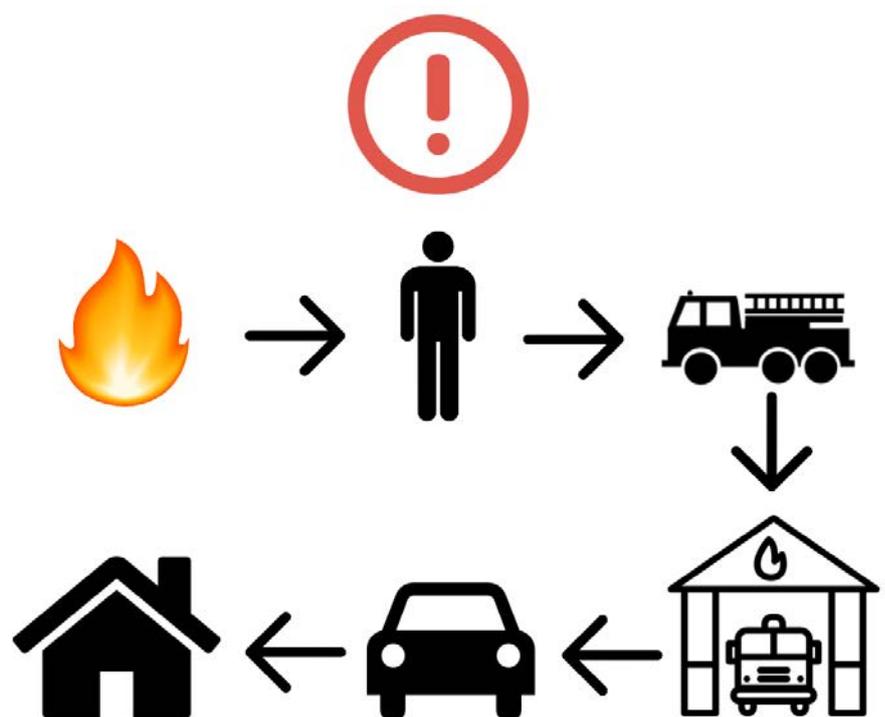
Image: Structural PPE that is clearly dirty and requires laundry

stage of a fire and when further activity takes place in the risk area, such as fire investigation, overhaul, damping down and turning over. These are all high-risk activities, and often when RPE and PPE is reduced.

Management of these toxic materials, both particulate and gases, requires careful but proportionate management of people and equipment before, during and after training and incidents or other emergencies.

The importance of selecting the right PPE, RPE and Safe Systems of Work has become more important.

The challenge of protecting responders and in particular firefighters require a careful balance of protection but also providing the user with the flexibility needed to maintain breathability, waterproofing, and the individuals' senses and dexterity.



Tertiary movement of contamination; people and equipment acting as a fomite in the transportation of material from one location to another

PPE FEATURE



Image: Example of a particulate protection flash/fire hood, not the additional protection at the front

In nearly all cases the Firefighting Hood (worn over the head and neck) is the weak link in allowing toxic material to contact with the skin, and we know that as skin temperature increases so does skin absorption. (400 times for each degree centigrade change in skin temperature) This impacts on the soft tissue areas the most across both sexes, as such the areas at most risk are the head to the top of the chest. But we shouldn't rule out other areas where contamination can occur.

Particulate barrier/protection fire hoods have been an important development. While we shouldn't rule out providing an equal level of protection to all firefighters, the use of specific fire hoods is particularly important for those whose frequency of exposure to these toxic materials is far higher than that of an operational front-line firefighter. As such consideration must be given to the use of differing types of PPE for those that work in a training environment where exposure can occur on an almost daily basis, such as Breathing Apparatus Instructors, Fire Behaviour and Tactical Ventilation Instructors, any activity where the frequency of exposure to fire soot is increased.

Two-piece PPE has been widely used for years, both as a Tunic and Leggings, combined with a high degree of chemical and particulate resistance affords the user with a sound level of protection.

As technology and manufacturing process in PPE develops, further protection may be assisted by new style barriers within the fabric or by utilising a much denser weave within the facing fabric material, to provide a tight barrier that would resist particulate penetration. While PPE can provide a sound level of protection this

must be combined with additional hygiene activity by the person wearing it. This additional, on scene, hygiene activity must take place as soon as possible following leaving the risk area, this should be further supplemented with a shower when soap can be used to remove any further surface contamination.

Risk Management

Considerations need to be given to:

- Utilising lighter coloured PPE to ensure contamination is visible
- The hygiene processes that can be utilised by the responders at scene
- The management of PPE on the scene
- The robust management of cross contamination
- Following up any on-scene hygiene activity with soap and a shower ideally within an hour of exposure
- Appropriate management of contaminated PPE in both storing, transporting, handling, and laundering processes
- Systems to ensure the cleaning of contaminated RPE

Provision of "Hygiene Packs" to responders, these packs can contain skin wipes that have been specially developed to remove fire effluent from soft tissue areas, industrial wipes to clean equipment, and systems to secure any contaminated PPE for safe storage and transport to an appropriate laundering facility. In many ways soap and water is the preferred decontamination method, but this is not always practical or available.

In all cases, PPE is only as good as the care that is given to it following use, in the UK we have seen a dramatic increase in the frequency at which PPE is being laundered, and this can be seen a big positive change in culture and awareness.

These small but significant changes will help manage the risk today to ensure that the long-term impact on responders is kept as low as possible, after all we still need to fight fires, we are still going to be exposed to materials that can cause harm, all we need to do is take a sensible approach to how we manage it.

The key system of management of this risk is simple, keeping clean will keep us safe robust management of cross contamination,

management of PPE and RPE as well as personal hygiene are key to ensuring that the risk is kept to as low as responsibly practicable.

While the risk is heavily weighted towards Firefighters, we must also consider the wider impact on other responders, such as Police and Ambulance services, and other specialists such as Fire Investigation or other forensic teams that may attend incidents after any fire has been extinguished.

Fire is Hazmat; and the same systems of work need to be employed to maintain good management of risks.

Links:

Medical Article from the Lancet Medical Journal

[https://www.thelancet.com/journals/lanonc/article/PIIS1470-2045\(22\)00390-4/fulltext](https://www.thelancet.com/journals/lanonc/article/PIIS1470-2045(22)00390-4/fulltext)

International Agency for Research on Cancer – Occupational Exposure as a Firefighter

<https://www.iarc.who.int/news-events/iarc-monographs-evaluate-the-carcinogenicity-of-occupational-exposure-as-a-firefighter/>

Underwriter Laboratories Legacy Fire Video

https://www.youtube.com/watch?v=IEOmSN2LRq0&ab_channel=StreamwoodFD

Watch Commander Jim Grove

West Midlands Fire Service, UK

Hazardous Materials and CBRN(e) Tactical Advisor



I have 27 years' service in a large metropolitan fire service in the UK where I have worked as a responder and trainer. My work involves, teaching and developing ways to ensure responders can meet the demands placed on them at a wide variety of incidents involving hazardous materials.

I am passionate about responder safety and the impact on the long-term health and wellbeing of firefighters is something close to my heart.

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MSA Safety

Unveils New Line of Firefighter Protective Clothing

MSA Safety Unveils New Line of Firefighter Protective Clothing at Interschutz

The MSA Bristol X4 line is designed specifically for firefighters in Europe, offering superior comfort and compatibility with MSA's advanced safety equipment and solutions.

MSA Safety a global leader in firefighter safety equipment and technology, today marked the opening of Interschutz 2022 with the unveiling of a new line of firefighter protective clothing (FPC) that is specifically designed to meet the needs of firefighters in Germany, the Netherlands and across continental Europe, offering enhanced comfort and compatibility with MSA's advanced safety equipment and solutions.

Called the MSA® Bristol X4, the new line of FPC integrates MSA Bristol's expertise in creating high-performance protective clothing with MSA's market-leading experience in firefighting technologies and connected solutions. The result is a range of new FPC options that provide enhanced comfort, ergonomics and full compatibility with MSA's suite of state-of-the-art firefighter equipment, from helmets and self-contained breathing apparatus (SCBA), to the very latest in monitoring accountability and communication devices.

"The development of the MSA® Bristol X4 line represents a great new addition to the MSA portfolio of innovative safety solutions for firefighters," said Bob Leenen, President of MSA's International Business Segment. "We're excited to be back at Interschutz because we will be able to demonstrate how the new X4 line of FPC integrates with other MSA products to provide additional capabilities for use in extreme environments."

Working seamlessly with the company's iconic Gallet FIXF structural helmet and the industry-leading M1 SCBA, both of which are widely used among fire services across continental Europe, the MSA Bristol X4 has been created with input



MSA Bristol x4 Jacket

from hundreds of firefighters in Germany and the Netherlands to deliver a solution designed for these specific markets. As an example, the German fire service market requires an Integrated Harness System and Drag Rescue Device. To meet this need, the X4's Integrated Harness System offers added safety when working at heights. The X4 jacket features an integral belt, lanyard and carabiner that can be easily accessed via a pocket and flap. The Drag Rescue Device, accessed from the upper back of the jacket and via a pocket near the knee, can be used to carry or pull a downed firefighter to safety in an emergency.

In the Netherlands, firefighters expressed the need for stronger kneepads for comfort when crawling or operating in confined spaces, and special reflective elements for additional visibility. To address this customer preference,

MSA Bristol designers incorporated ergonomic shaping and a streamlined fit, reducing bulk and weight, all while maintaining full range of motion.

Jason Traynor, General Manager of MSA's Global Fire Service Products, noted that with the launch of the new X4 line, MSA is now able to provide a full line of fire service products to firefighters Germany, the Netherlands and throughout continental Europe. "We will continue to listen to the needs of our customers and develop the innovative products and solutions they want – and need, he said."

The X4 line is manufactured with the latest high quality fabric combinations from leading fiber and fabric manufacturers, including WL Gore,

PPE FEATURE



MSA Bristol x4 Jacket

PBI Performance Products and Hainsworth. The line has been designed to meet the requirements of CEN standard EN469 Level 2, is available in a wide range of color combinations to suit regional preferences, and can be customized with a selection of optional pockets and loops to accommodate specific equipment.

As a global leader in innovative firefighter safety equipment and technology, MSA Safety will also showcase its Connected Firefighter Platform – a suite of advanced safety technologies that work in concert to significantly improve firefighter monitoring, accountability and communication. Two key components of the Connected Firefighter Platform are the LUNAR® Connected Device and MSA's FireGrid® software services.

A multifunctional handheld device, LUNAR provides personal thermal imaging and several other innovative features that are designed to enhance firefighter safety and accountability. These innovations include MSA's proprietary Firefighting Assisting Search Technology (F.A.S.T.) network, which alerts and guides teammates to downed team members. In addition, cloud connectivity provides incident command with an overview of on-scene operations by aggregating data from other MSA

devices, such as the M1 breathing apparatus. In use, it can transmit key self-contained breathing apparatus (SCBA) information such as cylinder air pressure, battery status and various alarm indicators. FireGrid gives incident commanders the ability to evaluate and manage multiple situations in real time and from any location.

At this year's show, MSA previewed several enhancements to these leading-edge technologies, including:

- **M1 Control Module – LUNAR Compatibility:** Leveraging the integrated Bluetooth capabilities of the M1 Control Module, cylinder air pressure and other alarm indicators can be aggregated by LUNAR and transmitted to FireGrid to provide incident commanders with real time fireground information. Additionally, incoming alerts from incident command (such as evacuation requests) can be relayed through LUNAR to the M1 Control Module to alert firefighters to immediately exit the structure. The M1 Control Module and LUNAR® devices are designed to work together as one system – when paired, LUNAR's motion alarm capabilities will default to the M1 Control Module to not distract firefighters with have to managing two motion sensing devices.

- **FireGrid® Map View:** Leveraging the GPS capability in devices such as LUNAR, incident commanders will now be able to

monitor their crew's location in the FireGrid application.

- **Fotokite Partnership:** Tethered drone technology from Fotokite will be on display, featuring its aerial video capabilities that will be integrated into MSA's Connected Firefighter Platform through future development projects to help increase situational awareness.

"Firefighting is a challenging profession, requiring courage and composure in the face of highly dangerous situations," Mr. Traynor said. "To operate effectively, firefighters must have confidence in themselves, in their crew and in their safety equipment. At MSA we pride ourselves on listening to the needs of firefighters on the ground, and providing them with innovative solutions and technologies, so that when they arrive at an incident they know we have them covered."

To stay up to date with the latest news from MSA

Visit: www.MSAafety.com/



MSA Bristol x4 Trousers



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Viking EMEA is pleased to introduce the first FM Approved fluorine free fixed foam system for Hydrocarbon and Polar Solvent applications. This system approval is initially focused at non-aspirated sprinkler discharge devices for use in closed or open head installations such as warehouses, chemical manufacturing areas, loading racks or aircraft hangars for example.

Viking and its partners have worked hard to develop a range of SFFF foam concentrates and compatible hardware for use in fire protection systems. It is important to note that SFFF foams are not always a drop in replacement for existing AFFF or AR-AFFF systems. This is why Viking worked with international approval and certification bodies, carrying out extensive fire and performance tests to recognised test standards, demonstrating real life performance of the complete system.

Visit <https://www.viking-emea.com/Fluorine-Free-Foam-Sprinkler-Systems/> or **contact us** for more information.

SFFF Compatible Products



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VFT Bladder Tanks



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VIKING

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PPE FEATURE



From the Triangle Shirtwaist Factory fire of 1911 to the Heyope Tyre Fire (which burned for an astonishing 15 years), the industrial world has seen some truly devastating conflagrations. We trust our firefighters to protect us at times like these – and they look to us to protect them.

At Coats, we are proud to play our part. With homes in 50 countries across six continents, and a 17,000-strong workforce, we are world leaders in developing innovative products for firefighter turnout gear – from molten metal splash protective fabric to phosphorescent technology that enhances visibility.

Of course, when we create our threads, yarns and fabrics for firefighter clothing, we put protection from heat and flame at the heart. After all, fire will always seek out the weakest points in a garment, so it is essential that every stitch, seam and scrap of material is protected. But protection is only part of the story.

Ready for anything

Thankfully, firefighters don't spend all their time fighting fires – although when they do, their work saves lives.

When it comes to station wear, wildland uniforms turnout gears, they deserve nothing but the best. That's why many manufacturers choose **Coats FlamePro Firestrong** and **FlamePro Ultrastrong**.

Both provide superior strength and durability, along with exceptional flame protection and excellent contact/radiant heat resistance. FlamePro Ultrastrong allows the production of finer yarns and lighter fabrics with better strength and durability.

FlamePro Firestrong is designed to stay strong after repeated washings, maintaining its colour and integrity even after several cycles in industrial machines, so fire services uniforms won't fade or lose their bold colours over time.

Firefighters eat, sleep, live and work when in the station during their shifts – that's a long time to be wearing workwear. And whether they're carrying out maintenance, promoting fire safety in schools – or just relaxing during their break times – Coats believes they should be as comfortable as possible.

Protection that helps look after the planet.

Coats FlamePro High Visibility fabric ensures better visibility in low light and risky conditions, and offers exceptional flame protection along with contact and radiant heat resistance too. It also makes a visible difference to your sustainability targets, as it includes renewable fibres and needs no dyeing – which makes it more sustainable than any comparable product on the market.

It's one of the lightest fabrics of its kind, too – and its innovative construction allows for improved comfort. Of course, while that's

important, it's still vital that this doesn't compromise on what it was designed to do – help keep firefighters safe and seen.

Innovation that makes a visible difference

Talking of high visibility protection, our innovative Signal Lucence PRO range of high-performance tapes can make sure firefighters are visible even when there is no light. It works without batteries or cables– which is energy efficient too.

Signal Lucence PRO offers the option to combine three technologies – retro-reflectivity, fluorescence and phosphorescence – in a single material to meet the requirements of the hi-vis workwear and firefighter markets. It consists of segmented retro-reflective and fluorescent material combined with phosphorescent backing material, which is derived from a patent pending formulation of strontium nitrate photoluminescent pigments applied on meta-aramid fabric.

So how does it work? Well, the Photoluminescent material absorbs both natural and artificial UV light through electron excitation which it then emits as an afterglow in low light or zero light. Each time Signal Lucence PRO material is exposed to UV light it will recharge.

This can take as little as five minutes in direct sunlight, or 10 minutes if it's exposed to overhead fluorescent light. There's a long afterglow which lasts over 8 hours, with the first hour being the brightest – so firefighters can stay more visible for longer.

So if you're firefighter clothing manufacturer, get in touch with Coats – and get ready for action.



Consistent quality, all over world

FlamePro Firestrong	Meets EN 469:2020, EN ISO 11612, EN 13034, EN 11495, NFPA 2112, NFPA 70e, NFPA 1971 norms
FlamePro Ultrastrong	Meets EN 469:2020, EN ISO 11612, EN ISO 11611, EN 13034, EN 11495, and NFPA 2112, NFPA 70e norms
FlamePro High Visibility	Suitable for ISO 11612 and ISO 20471 high visibility clothing
Signal Lucence PRO	Complies with all standards for high-visibility and firefighter garments Certified according to STANDARD 100 by OEKO-TEX®

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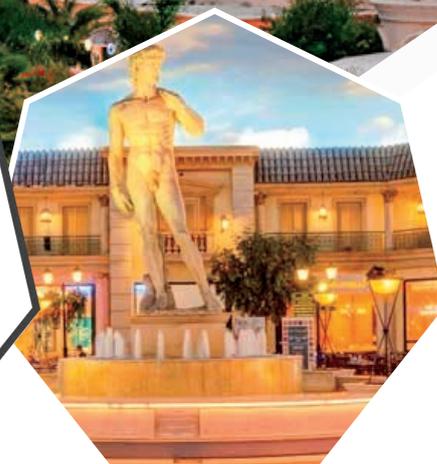




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What is the right PPE for Industrial and Airport fire brigades?

What is the right PPE for Industrial and Airport fire brigades? PPE for firefighting is often referred to as structural firefighting PPE. Standards globally are based around the concept of fighting fires primarily with structures in mind and an emergency scenario of full engulfment of flame as in a flashover situation. In the European EN469:2020 standard the preamble clearly states the 2 levels of minimum protection that is required.

Level 1: specifies the minimum requirements for firefighting clothing involving work associated with outdoor firefighting and their support activities, considering the environments and conditions of the expected operational scenarios of such firefighting activities. The level 1 is not applicable for protection against risks encountered in fighting fires or rescue from fire activities in structures, unless combined to a level 2 or other specialized PPE. -

Level 2: specifies the minimum requirements for firefighting clothing for risks encountered in fighting fires and rescue from fire in structures. The distinction between Level 1 and Level 2 clothing is restricted to the requirements for heat and flame (X1 or X2 - Heat and Flame). These levels of protection can be reached by a single garment or a combination of separate garments. Additional marking provides two grades of protection for Y (protection against water penetration) and Z (water vapour resistance). It is essential that these performance grades are indicated on the marking of the clothing and explained in the instructions for use.

This document does not cover protective clothing for wildland firefighting, specialized firefighting in a high amount of radiant heat where reflective clothing is required and/or advanced technical rescue operations dealing with hazardous chemicals, working with chainsaws and water and rope rescue. This document does not cover protection for the

against other hazards e.g., chemical, biological, radiological, and electrical hazards. These aspects may be covered in other European Standards.

Clearly the focus is primarily the built environment for this standard. Many industrial and airport fire services use the EN469 standard or similar when deciding the basis for procuring suitable fire kit. This is entirely reasonable as it is a minimum standard and underpins the basis for duty of care.

In industrial and Airport firefighting there is a clear focus on the firefighting risk and activity unlike municipal fire and rescue services where approximately 94% of the time is spent on activities other than structural firefighting (assets.publishing.service.gov.uk)

In England the incidence of all fire related callouts and injury has decreased dramatically over the last 20 years while non-fire related incidents have increased significantly in the fire and rescue service. This trend is seen all throughout western Europe. There has also been a significant decline in direct fire related injuries and fatalities in the UK. Over 40 years fatalities per million have dropped from 17 per million in 1981 to 5 per million in 2021. ([Fire0501, assets.publishing.service.gov.uk](https://assets.publishing.service.gov.uk))

Fatalities within the fire service have also significantly declined however there has been an increase in non-fire related injury the majority being minor injuries. ([Fire 0508a, assets.publishing.service.gov.uk](https://assets.publishing.service.gov.uk))

The focus of the Fire and rescue service is shifting from structural fire to various rescue functions which include motor incidents, flood response, medical emergencies, terror related incidents, animal assistance and collaboration incidents.

As a result, the types of injury not related to burns have increased.

Therefore, the risk assessment is in dynamic change and the requirements of the basic PPE issued has changed. The pressure to change and amend the current EN469 standard is coming from industry and the fire services to recognize this shift in risk.

So, what are the current key changes in the EN469 standard as reflected in the 2020 iteration?

Key changes in BS EN469 2020

The changes in the updated standard can be found in the summary of Annex F and the details in Annex G

Key changes are:

- Reinforcement materials must comply with flame spread and heat resistance testing
- Anti-wicking barrier will have size limitations to improve breathability
- Drain mesh will have size limitations
- Hardware will be tested for heat resistance
- Any label (> 10cm²), badges and retro reflective materials must be tested for flame spread as part of the whole garment
- Minimum tensile strength of structural seams increase from 225N to 300N
- Minimum tear strength increases from 25N to 30N
- Visibility; Outer shell using retroreflective or fluorescent materials must comply with all heat testing performance in clause 6 of the standard
- The pre-treatment and conditioning of samples will be done after initial thermal testing giving results of the product "as received" and then after 5 washes

- Sewing threads must now be tested to 260C

There are other changes in the new EN469:2020 standard which focus on the design and the improvement of the testing methods. Thus, giving a better minimum standard and assurance to the end-users. The requirement to test garments as received ensures that thermal protection is compliant with the minimum set values. Washing increases the bulking of woven fibres which improves the performance of thermal insulation. Basically, most garments will improve their thermal performance after washing several times.

The previous standard stated garments had to meet the requirements after being laundered five times, it was technically possible that a brand-new garment only met the standard after washing 5 times.

The emphasis in the risk assessment for Industrial and Airport firefighters is on radiant heat. The minimum RHTI in the new standard is:
≥ RHTI24 18.0
≥ RHTI24-12 4.0

Changes to chemical repellence testing BS EN 469:2020

Firefighters' protective clothing needs to provide a level of protection against chemicals by repelling them to stop them soaking into the garments and potentially getting on to firefighters' skin.

BS EN469:2020 changes the requirement of the number of chemicals needed to test a garment's ability to repel chemicals. Only two test chemicals are now required for the outer fabrics– H2SO4 and C8H10 (O-xylene). There is now a requirement for testing the deterioration of a garment's ability to repel chemicals due to cleaning.

This poses questions for Industrial and airport firefighters as they have a very singular risk that is directly related to a certain type of fire. In most cases they will be using foams such as AFFF and be exposed to fuels and a variety of chemical exposures and liquids. Unlike municipal and regular fire and rescue services their firefighting role is not changing. They have a constant focus on a specific risk. Key elements of risk but not exclusively are radiant heat, chemical contamination, toxic/carcinogenic smoke, and particulates.

Summary

The current data on Fire and Rescue services in England clearly show that their level of protection for heat/burn related injury has

declined. In conjunction with more modern PPE, better standards, and better SOPs that risk is being managed in the right direction. The challenge for Industrial and Airport fire services is to ensure that the current EN469 standard is sufficient for their risk needs. This may mean that they collaborate better with manufacturers and the standards committee to ensure that their specific needs are being met by the current innovations in PPE.

Regular Fire and Rescue services in past years across Europe have been emphasising "lighter" and more breathable garments with less focus on high thermal protection. They also are looking at ergonomic performance and operational versatility. This has been in response to the change in risk they have to operate with. Heat stress is a key issue for them. The other theme that is being explored and developed is the protection against carcinogenic particulates/smoke. There is a global awareness on this topic and is being driven by new and developing research.

Industrial and Airport Fire Brigades focus is still on the thermal risk. The need for firefighting PPE to perform against potentially very hot and long fire incidents is important. Minimum protection in most cases is not enough. While the need for comfortable and breathable PPE is there, it is paramount that the radiant thermal protection is robust for the specific risks.

The other key protection required for Industrial, and Airport Fire PPE is good liquid proof garment construction. This aids in the protection against harmful chemicals and contaminants. The chemical repellence treatment needs to be always effective against a wide variety of potential contaminants. The closures, membrane, wicking barriers, and openings need particular attention.

The industry should look to more representation on the standards committees and firefighting forums so that the specific need of Industrial firefighting is met.

About the Author

Tim Wight has worked in the fire industry for over 30 years in fire chemistry related businesses and, with textile/PPE producers for firefighters. Tim specialises in structural, wildland and industrial firefighting as well as foams and retardants.

From 1989 -2001 he worked with Monsanto/Solutia and managed international sales for phosphate chemicals and retardants with a focus on wildland firefighting. From 2002-2016 he worked with W.L. Gore and Associates specialising in firefighting PPE (EN469). Since 2017 he has worked with the PPE manufacturer Texport based in Austria.

He is currently a member of the FRES group of the FIA and sits on the BSI committee of standards for firefighter PPE PH/14. He has degree in Materials technology from Deakin University and has many broad academic interests.



Fire Industry Association





Evaluation of the fire protection effectiveness of fluorine free firefighting foams

FINAL REPORT BY:

Gerard G. Back **John P. Farley**
JENSEN HUGHES NAVAL RESEARCH LABORATORY
Baltimore Maryland, USA Washington, DC, USA
January 2020

NFPA RF Report 2020

165 UL Fire tests show Fluorine-Free Foams need higher rates:

- 2 – 4 times AR-AFFF rates for IPA Fires (Gentle Application)
- 3 – 4 times AR-AFFF rates for Mil Spec Gasoline (Forceful Application)
- 6 – 7 times AR-AFFF rates for E10 Gasoline (Forceful Application)



NFPA RF
Final Report

FAA Part 139 Cert Alert No 21-05 2021



Safety concerns of Fluorine-Free Foams identified:

- Notable increase in extinguishment time;
- Issues with fire reigniting (failure to maintain fire suppression); and
- Possible incompatibility with other firefighting agents, existing firefighting equipment, and aircraft rescue training and firefighting strategy that exist today at Part 139 air carrier airports.



FAA Cert Alert

US FAA Part 139 Cert Alert No 21-05 issued October 4, 2021

“While FAA and DoD testing continues, interim research has already identified safety concerns with candidate fluorine-free products that must be fully evaluated, mitigated, and/or improved before FAA can adopt an alternative foam that adequately protects the flying public.”

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8 ways to improve your emergency response

Introduction

Sigteq have been experts in the emergency and incident response sector for decades and have created solutions for all types of high risk and high hazard environments. Here are a few tips we've put together based on the most common and effective ways industries level up their emergency response.

1. Paging - Oldie but a goodie

Pagers may be seen as outdated, but they remain a tried and trusted tool for communication for a number of reasons. Other than being lightweight and cost effective they are commonly used by emergency response teams to notify different groups of people at the one time. Pagers facilitate fast, dynamic notification and with each charge lasting 3-4 weeks, they outlast radios and phones.



Automation

Our experience has taught us that automated notification is one of the most powerful tools in managing an emergency response and general onsite communication. This is our area of expertise, so below we're going to share some of the most popular and effective automations we've been asked to build into our AlertNet systems.

2. Secure Digital Radio - make the change



More and more sites are making the change over from analogue to digital radio. With the addition of speech encryption, all communication is kept secure, mitigating the prospect of any unwanted eavesdropping during critical times. Going digital also gives you the option of using GPS location, Man-down alarm, panic/SOS buttons and text messaging. Furthermore, with digital radio, you have the added security of remote system management, diagnostics and testing, which is not available to analog systems.



3. Call in Technical/medical/specialists

Sending a text, page message, public address or radio announcement at the touch of a button to key staff is a simple but effective method of deploying key operators. It also offers the useful functionality of tracking the progression of a response through notification logs. The most common uses we have worked on are maintenance technician and medical staff call ins.

4. Automate system tests

Routine testing is a key part of any crisis management strategy, and you'd be surprised how much of it can be securely and reliably automated. At the press of a button or on a preset schedule, automate a full alarm system test as well as notifying staff and key stakeholders to the impending (or concluded) alarm test. In the same fashion, you can also automate the testing of your communications equipment.



5. Localise control with remote action triggers

Time is of the essence during an incident, and reducing time spent on foot rushing to manually activate can save valuable minutes. Remotely trigger key operational tasks such as fire-pump and flood-light activation, gate/turnstile opening and traffic management at the push of a button, all from one dashboard console in your security or ERT room. This has proven especially popular for large or busy sites where there is a lot of ground to cover, or high volumes of people in transit.

6. Announce Specialist Visitors or Authorities Onsite

For large, high populace sites, being able to notify all staff members via SMS to the presence of special visitors or authorities at the push of a button can be a useful way of quickly and succinctly spreading important updates. This action can also be extended to distribute a more specific message to certain key site stakeholders and operational groups.

7. Unify your critical alarm systems monitoring

If you have more than one critical alarm on site (e.g. fire, gas, temperature, pressure etc), it can be beneficial to unify all alarms into one alarm management system. This way you can monitor and manage multiple critical systems from one central hub, aiding in streamlining your emergency response.

8. Mass SMS notification

Communicating with responders is one thing, but trying to manage an evacuation and staff communication during an incident is a whole different ball game. An increasingly popular strategy we're seeing is the use of automated

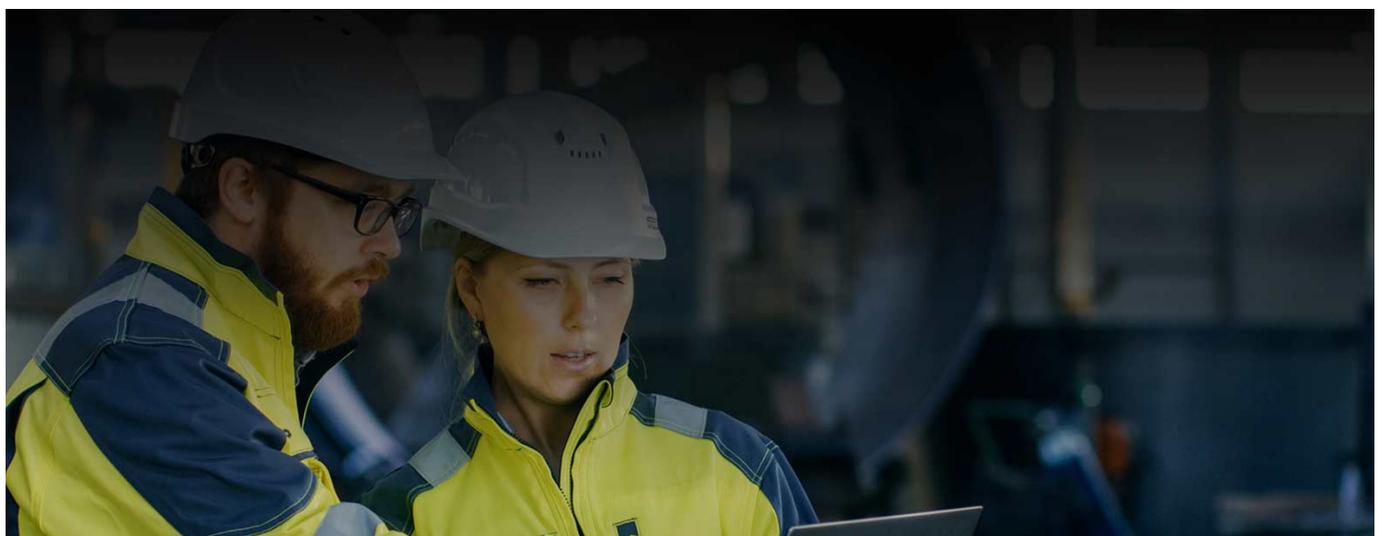
bulk SMS messaging, whereby staff can sign up to the company's emergency SMS bureau (by simply sending 1 opt-in text) which automatically signs them up to receive emergency alerts for that site. Messages can be typed manually, or automatically issued to everyone at the push of a button. This is particularly beneficial for sites with high visitor/contractor traffic as it gets key information across to **everybody** quickly and effectively, giving clear direction to those who might not be familiar with site emergency processes just yet.

Interested in learning more? Have a chat with our experts

We really view ourselves as 'nerds' for technology and innovation, and emergency response is our passion. So if you'd like to have a chat with our experts, feel free to drop us a message or check us out online!

A little about us:

At Sigteq, we have proudly designed and built intelligent automated solutions for use in a large variety of industries including Oil & Gas, Tunnels & Ports, Hospitals, Universities, Manufacturing, the Armed Forces and more for over 20 years. We are passionate about what we do, and we really view ourselves as 'nerds' for technology and innovation. We're looking forward to sharing more of these key tips with you in the next edition, but if you want to learn a little more about us in the meantime feel free to drop us a message or check us out online!





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BRISTOL

Introducing the 'Kobra' Attack Trailer

The 'Kobra' is a modular, scalable industrial appliance that can be customized to Fire Services' specific operational needs. Featuring most of the same components that make up an industrial firefighting pumper, attack trailers provide economical solutions for facilities that have good water supplies but face budget constraints. The modular design concept allows end-users to choose between tag-along trailers or goosenecks and configure the above-deck components out of a wide selection of modules including master streams, cross-lay or hose-reel handlines, bulk foam supplies, dry powder skids, hose and equipment storage as well as utilities like area illumination, working lights and battery pack power banks. Fire Services can also select between flowing water, foam, dry chemical or Hydro-Chem™.



SPECIALIST FIREFIGHTING AND EMERGENCY APPLIANCE, AND AMBULANCE MANUFACTURER



The "Kobra" can be deployed in up to 20 different configurations:

- » A fixed Master Stream capable of flowing 5,678 l/min (1,500 gpm) water/foam and 3,785 l/min (1,000 gpm) water/foam/Hydro-chem™.
- » Two semi-fixed Daspit Tools Master Stream capable of flowing 5,678 l/min (1,500 gpm) water/foam and 3,785 l/min (1,000 gpm) water/foam/Hydro-chem™. The Daspit Tools can be removed to act as ground monitors.
- » Two 60-meter 38 mm (1½") water/foam double-jacket cross-lays
- » One 60-meter 38 mm (1½") water/foam/Hydro-chem™ double-jacket cross-lay
- » One 60-meter 64 mm (2½") rich foam solution double-jacket supply line for Daspit Tool Master streams
- » Two 60-metre 152 mm (6") double-jacket supply lines
- » Around-the-Pump (WATP) jet ratio controller for remote foam proportioning
- » Foam Wand
- » Equipment storage compartments
- » Telescopic mast lights
- » Battery pack
- » Self-defence system



For further information please contact: vehicles@bristol-fire.com

A Hydrogen Future.

Are you prepared for the transition?



Image Source: EEIP Energy Efficiency

The energy transition away from hydro carbon fossil fuels is in full swing. There are many initiatives and investments to go totally green or adopt a carbon neutral strategy. Wind and solar are the main focus areas, but this cannot give all of our needs particularly for our heavy industries. Wind and solar are not guaranteed sources and furthermore any surplus energy generated when the sun shines or the wind blows needs to be stored. Hydrogen generation is seen as a viable alternative to storing the surplus energy in batteries.

Hydrogen is becoming more important to replace natural gas either for direct combustion means or generating electricity in fuel cells.

Hydrogen needs to be manufactured as it does not exist naturally by itself on earth. Large investment are now being considered to produce hydrogen from electrolysis wind or solar technologies, termed green hydrogen or from hydrocarbon gases (natural gas through steam reformation) and capturing the carbon elements and storing them in the ground. This

is termed blue hydrogen.

Once manufactured whether that's blue or green means is needs to be stored or transported. At normal temperatures and pressures hydrogen is a colourless, odourless gas that can be compressed into storage vessels or transported in pipelines. For markets where hydrogen has to be transported over long distances then Hydrogen can also be liquefied at temperature -253°C , stored in cryogenic vacuum insulated tanks and transported via specially designed ships similar to LNG carriers.

Alternatives which are now being pursued is to transport Hydrogen as liquid ammonia (NH_3) and then recovered the hydrogen at the desired destination through a reaction process. Hazards here are now not only from highly flammable hydrogen, but also a toxic product of ammonia.

Hydrogen and ammonia are not new technologies. They have been around since the industrialisation in one form or another. High

risk industries are used to handling, storing and dealing with these substances. However these products will become more widespread and integrated into the public sectors.

Lesson learned and experienced from the high risk industrials regarding Hydrogen / Ammonia need to disseminate down to the operators and public protection operators, to give awareness and new protocols as to the hazards and risks posed. There are many studies conducted on Hydrogen to help further development of systems to be used in the energy transition.

Characteristics of Hydrogen

Hydrogen is very different in its physics properties than hydrocarbon gases such as LPG and although on the surface they have similar properties to natural gas (methane), hydrogen needs special attention due to some nuances in its behaviour.

Significant differences have to be taken into account when dealing with hydrogen releases.

The areas of concern are how to detect hydrogen releases, the ease to which hydrogen gas could be released and ignite, and finally the different strategies needed when dealing with a release or fire.

Hydrogen is not detectable by nose as its odourless and any odourising agents that are normally added to gases do not work with Hydrogen. These additives are heavier than hydrogen molecules and cannot migrate the same path with hydrogen. Furthermore many fuel cells demand very high purity of hydrogen. Any contaminants can render the fuel cell inoperable.

Hydrogen is the lightest element in the periodic table. The size of the hydrogen atom may lead to increased risk of release as the molecule can diffuse through certain materials, even materials considered air tight, because hydrogen is smaller than oxygen and nitrogen molecules. Utilising existing infrastructure i.e. natural gases network needs to be scrutinised, pipelines, valves and other ancillary equipment has to be suitable to carry hydrogen and also resistance to another phenomenon called Hydrogen Embrittlement, which will cause certain materials to become drastically weakened.

Should it be released it will quickly disperse upwards into the atmosphere, being 14 times lighter than air. Its buoyancy means that flammable mixtures are unlikely to collect at distances from the release unlike heavier

hydrocarbon gases even through the flammable range of hydrogen is one of the widest of all the gases.

Like all gases there are 3 phases to a gas release: the initial kinetic energy, the transition phase where the flow slows and the ambient condition take effect and finally the buoyancy of the gas take full effect. The outflow will depend on the pressure, size of release hole and the consequent flow rates. Horizontal high pressure high output outflows can be the worst case situation, as the gas clouds could exist within the flammable range many metres from the source until the buoyancy phase takes effect. Another phenomenon which is peculiar to hydrogen is a warming of the gas as it exits the release point and expands during the transition from high to low pressure. Hydrocarbon gases have the reverse effect, they cool down, which cause the gases to remain heavy and stay close

to the ground for longer. This Joule-Thompson effect could cause gas temperature to rise by more than 40K. This is not a major issue as the gas will dissipate upwards quicker however should the gas already be at an elevated temperature then further increases could bring the gas into its self-ignition range of 560°C.

Hydrogen as a very low ignition energy value, 0.017mJ which is 14 times smaller than natural gas. Bonding and earthing is even more important to prevent even inductive discharges igniting a release. Maintenance and services of hydrogen systems need very tight controls.

Liquid hydrogen has other risks compared to the compressed form. Due to its very low temperature, liquid releases can cause the oxygen in the air to condense or even solidify. The implication here than pure oxygen coming into contact with carbonaceous materials may cause spontaneous combustion and the worst case if liquid hydrogen comes into contact with pure oxygen then there is a detonation risk. There are new challenges in the future to understand the hazards and risks during the energy transition. RelyOn Nutec are committed to help its customers understand the differences and build a safe procedures in dealing with incidents. This has until now manifested in a small hydrogen awareness table, which demonstrates the some of these characteristics. In order to align with current developments and market needs, our Product Development team has joined various Hydrogen working groups and organisations to expand our Hydrogen training offerings in the near future.

Should you require any further information regarding our Hydrogen training, please contact our Business Support department:

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