

THE CATALYST

Q2 2023



JOIFF

The International Organisation For Industrial
Emergency Services Management

JOIFF Rotterdam 2023

More than 100 people attended the JOIFF/RelyOn
Nutech Industrial Emergency Services Conference
2023

New Members

During January, February and March 2023, the JOIFF
Board of Directors were pleased to welcome Kiwi
Resource Protection Co. Ltd., NMCI Services and
VITAL Fire Solutions as new Members.

JOIFF Announce Digital Foam Summit 2023

The one-day JOIFF Digital Foam Summit on June 14th, 2023, will
cover all aspects of the firefighting foam transition from AFFF to
SFFF.

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DON'T GIVE CANCER A CHANCE!

FIREFIGHTING and CANCER

U.S. Chemical Safety Board Releases Final Report into 2020 Toxic Gas Release

JOIFF announce the DIGITAL Foam Summit 2023!

Remembering the Deepwater Horizon 13 Years Later

RelyOn Nutech
Fire Academy

Fomtec Enviro ARK and Enviro USP

FM approved and UL listed Fluorine Free Foams with sprinklers for hydrocarbon and polar solvent fuel fires.



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Message from The Chairman

Dear JOIFF Members and Catalyst friends,

I would to start off by expressing my appreciation of all parties that were responsible for the very successful JOIFF Conference and Exhibition in Rotterdam on 6-7 March 2023. In partnership with RelyOnNutech this event exceeded all expectations, to the point where the JOIFF Board made the decision to start working on JOIFF's next "face-to-face" event in which will take place in 2024.

This edition of the Catalyst is dedicated to holistic "health and safety of emergency responders" and in today's world, the pressure upon leadership in the emergency services to comply with all the requirements, rules, legislation and demands from environmental organisations is immense.

Let me take a stroll down memory lane – I started in the emergency services directly after leaving high school at the tender age on 17 years old. When I passed the initial selection process, I was issued with two one-piece boilersuits, a pair of gumboots, an MSA (plastic) helmet and a pair of builders gloves – that was my PPE for the first six months until graduating from the initial recruitment school.

Starting my career as a fulltime firefighter, the initial issue of PPE was taken back and I was issued with my first set of step-out uniform (for parade and other formal functions), a proper fire jacket from pure wool, two pairs of boilersuit trousers, a proper pair of firefighting boots and still my MSA fire helmet. I was now fully prepared to combat any emergency that could come my way.

I must admit that this situation did change in the early eighties and serious progression in PPE was observed and implemented. Was it 100 % compliance – not at all!

In today's fire protection world, PPE has become a science on it own and the fact that I still receive information from emergency services that do not comply with the minimum requirements regarding protecting their emergency responders, is just unbelievable.

I would like to refer to a very special colleague of mine who was in charge of the Occupational Health department and who, in my mind was far ahead of his time in this very important subject of "protecting employees against the adverse effects of working is a high hazard industry". This person was Dr Willie Labuschagne, the department head of Occupational Health Department as mentioned.

In my novice understanding what Dr Willie brought to the company was regular health observation for specific categories of employees – employees working in the plant received observation six-monthly/yearly/two-yearly, depending on each employees job description. The main purpose, as explained to me by Dr Willie, was to identify health deviations before it becomes actual ill health problems.



I experienced this first hand when Dr Willie came to me after one of the observations sessions with the Fire Department and where he saw deviations in some firefighters. On further investigation it was found that all but one of the affected persons worked on the same shift – the other one person was from the EM training academy. It was then found, after looking at the incidents this specific shift responded to during the past six months, included a fire at a plant where phenols are produced – the one product that could contribute to the deviations in liver enzymes found.

The outcome of the investigation, after discussing the incident with the affected persons, was that they all admitted to removing their SCBA sets when the fire was extinguished and thus inhaled combustion gases in the process.

Again, deviations were identified before it turned into health challenges and operational instruction were revised to address the root cause of the deviation also – removing SCBA's whilst still in the hot zone area of an incident.

I trust that you will enjoy this edition of the Catalyst and that you will always accept the fact that your health is your responsibility also – be safe!

I salute all the members of the High Hazard Industrial Fire Services for your dedication and willingness to be there for others when the need arises!

Stay safe

Regards,

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Please visit www.joiff.com for more information.

ABOUT JOIFF

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

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

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

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

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ABOUT THE CATALYST

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More than 100 people attended the JOIFF/RelyOn Nutec Industrial Emergency Services Conference 2023 which was held in the Hilton hotel Rotterdam, The Netherlands on 5th and 6th March 2023.

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

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

WHY TRAIN AT RELYON NUTEC FIRE ACADEMY?

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

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11-15 SEPTEMBER 2023 | 16-20 OCTOBER 2023
20-24 NOVEMBER 2023

Training centre accredited by:



JOIFF

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RelyOn Nutec
Fire Academy

NEW MEMBERS

During January, February and March 2023, the JOIFF Board of Directors were pleased to welcome the following new Members.

Kiwi Resource Protection Co. Ltd.

Kiwi Resource Protection Co. Ltd., Rayong, Thailand, represented by Steve Fraser, Managing Director, Sakda (Bright) Raemwainth, Service Manager and Kriangsak (Belle) Khongsat, Operations Team Lead/ER Instructor. Kiwi Resource Protection are a risk management company specializing in consultancy, inspection & maintenance services, emergency management & response training and emergency response services to the high hazards industries throughout South East Asia.

Kiwi have full time and part time emergency response teams on refineries, chemicals facilities and a plastics manufacturing facility. Additionally Kiwi deliver training for Industrial firefighting, high angle and confined space rescue, inert atmosphere rescue, wind turbine rescue, underground mines rescue, USAR, Hazardous Materials, decontamination, medical, oil spill, emergency management in both English and Thai language. Kiwi's staff are advisors to the Mahidol University in Thailand who are the organization that are advising on the Class B foam management for Thailand.



WWW.KIWIIRP.COM

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

NMCI Services

NMCI Services, Ringaskiddy, Cork, Ireland represented by Ray Johnston, Operations Manager. NMCI Services (NMCIS) is the commercial division of the National Maritime College of Ireland, Europe's leading third-level Maritime College. We are the leading provider of professional Maritime Training & Consultancy. NMCI's goal is to achieve and deliver excellence to existing and future customer base offering a wide range of professional short courses ranging from the full STCW suite, STCW Refresher, OPITO, GWO, Irish Sailing, Irish Water Safety, Bridge and Engine Simulation Courses, Emergency Response, and Port Sector Training.



VITAL Fire Solutions

VITAL Fire Solutions, County Durham and Darlington Fire and Rescue Service, United Kingdom, represented by Paul Burlison, Operations Manager. Vital Fire Solutions is the commercial trading arm of County Durham and Darlington Fire and Rescue Service. Vital provide high-quality training solutions to various industries and are accredited to deliver Skills for Justice and OPITO qualifications. The Fire and Rescue Service has provided training to external customers through an Industrial Training Unit (ITU), which primarily provides health and safety related training to local businesses in County Durham and Darlington.



JOIFF Industrial Emergency Services Management Conference 2023 | Rotterdam

More than 100 people attended the JOIFF/RelyOn Nutec Industrial Emergency Services Conference 2023 which was held in the Hilton hotel Rotterdam, The Netherlands on 5th and 6th March 2023.

DAY 1. 5th March 2023 Morning

The Conference was opened by host, JOIFF Vice Chairman Kevin Deveson who welcomed those attending. He thanked the Sponsors without whom the event could not take place and he extended a particular thanks to the Primary Sponsor, RelyOn Nutec, for their support and introduced RelyOn Nutec Managing Director Peter Van Cauwenbergh.

Peter said that RelyOn Nutec, headquartered in Copenhagen, is a Global Business helping customers to make a safer environment. The Fire Academy was established in 1985 as Risc, to offer training courses to local industry. In later years the name was changed to Falck Fire Academy and is now the RelyOn Nutec Fire Academy.

He said that the changing World has forced major change in Business Continuity Planning and brings a lot of new challenges. Despite all the challenges, even today some firefighters have little or no training and fire equipment is not maintained. He asked is there a need for Global competence in emergency response and can JOIFF be the organisation to achieve this?

Arie Kleijwegt, Head of Operations of the Unified Fire Industry and Harbour Fire Services (Gezamenlijke Brandweer) Port of Rotterdam was the next Speaker. Arie said that because of the production of oil, coupled with the introduction of container shipping in the 1970s Rotterdam is the biggest port in Western Europe, with 4 large oil refineries, 45 chemical industries and independent tank terminals, all providing 174,000 jobs. This is a very challenging environment for firefighters. He explained that in the Netherlands, the State has the authority to appoint a Fire Brigade on a site, prescribing the number of firefighters, fire trucks, training etc. Some years ago there were 30 to 40 organisations with Fire Brigades each working independently. It was proposed to have one full-time and one part-time fire brigade for the entire Port to respond to industrial

incidents. Unified Fire Industry and Harbour Fire Services now has in the region of 300 employees in 9 Fire Stations each with at least 1 fire truck, an industrial fire truck and a container vehicle with Foam.

Raymond Bras, Unified Fire Industry and Harbour Fire Services, spoke of "Tank and Tank Bund fire fighting". It is expensive to fit fixed systems to bunds, so the Unified Fire Service have chosen to use mobile systems for bund fires. The target is 6 minutes turnout for an industrial fire truck with mobile equipment. One of the Unified Fire Service scenarios is a fire in a tank bund as a result of an outflow of the entire tank content and the aim is to extinguish the bund fire and 1 tank fire in 4 hours with their mobile system.

Rory O'Connor, Chief Information Security Officer, Erasmus University, Rotterdam, spoke on Cyber Security. He said that the first ever cyber attack was in Turkey on a gas line when Russia invaded Georgia. He listed the 5 types of hacker – "Cyber-criminal", "Organised criminal", both of whom hack to seek funds illegally, "Hacktivists" who want to make the World a better place for themselves but usually not for anyone else, "State sponsored hacking", Countries supporting a war entry and "Insider hacking" by disgruntled employees, which is very prevalent and results in a lot of threats in Companies.

He listed some facts – it is estimated that cyber attack costs € 123 billion per annum; 90 days is the average time it takes to identify a hacker breach; 42% of soft-wear illegally downloaded has hacking content; in the Oil and Gas Industry, 38% of computers are cyber attacked and Worldwide, Energy is the number 1 target. Cyber attack is not widely known because the target usually tries to keep it secret when it happens. Public wifi connections are primary routes for hackers. To see if you have been hacked, go to www.haveibeenpwned.com

David Burnham of CAVU International.

Leadership Training spoke on Safety and Leadership. He said that the 3 sides of the triangle for Operational Excellence are Human performance (on the base of the triangle), Equipment and Technical Skill. Remove one of the sides and the performance starts to fail. Re-active differentiation results in near misses, confusion and complacency, pro-active differentiation causes planning, action and debriefing and this route provides continuous improvement.

Niall Ramsden gave an update on LASTFIRE saying that the priority now is to update training techniques using real equipment on realistic scenarios and real application techniques and testing is being carried out on GESIP/LASTFIRE jointly owned pits. Tests have shown that there are more obvious differences in foam stability during and after extinguishment of ethanol fires and fluorine free foams can work on hydrocarbons and polar solvents at standard application rates.

DAY 1. Afternoon.

Participants were bussed to the RelyOn Nutec Training Academy where, with the involvement of the Fire Services from Unified Harbour, Schipol Airport and Shell Moerdijk, they were treated to practical demonstrations of the various fire scenarios in the Academy – using monitors and high capacity pumps; storage tank firefighting techniques on a scale model; gas behaviour; LNG characteristics; crash tender use on a large surface pool fire and simulated training exercises in a simulator.

RelyOn Nutec and the supporting Fire Brigades were thanked and congratulated on an excellent and very interesting afternoon.



DAY 2 6th March 2023

Dr. Ian Ross presented a paper on “PFAS Decontamination”. He gave an overview of PFAS, its history and mass production and listed the main characteristics of PFAS – extreme persistence; mobility in the environment; bioaccumulation; toxicity and interfaces with surfactants. PFAS is now found in the bloodstream of children and adults due to its presence in groundwater and milk. The EU has implemented strong regulations on C9-C14 PFCA, prohibiting manufacture or placing on the market by 23rd February 2023 and from 4th July 2025, it shall not be allowed for firefighting and/or training. Ian concluded his presentation by discussing the difficulties and expense of destroying foam concentrates with PFAS content.

Thierry Moinet, Williams Fire and Hazard Control followed, to present “Tank fire testing with Non-Fluorinated Foam”. He said that the key phases for tank firefighting using non-fluorinated foam are:

1. Get to 90% control.
2. Develop tactics to achieve fire extinguishment.
3. Deal with post suppression needs.

He listed a number of fuel comparative fire tests that Williams FHC had carried out including spill delivery devices and proportioning equipment

and discussed the methods of extinguishment used.

Gaspar Bizjak, EU Resilience Advisors Network/responsible for Fire Service Digital Transformation in Slovenia, talked about 4 EU projects relating to Social Media and Crowdsourcing for Disaster Risk Management. He said that 50% of the Global population, 4.8 billion people, are using Social Media and he discussed how Social Media can be effectively used for Industrial Emergency Services Management by Crowd-sourcing. This allows behaviour information or opinions of a large group of people who submit their data via internet social media and apps and can lead to interaction with citizens at local level, raising awareness about potential risks in the area, reassuring citizens, crowd movement analysis, event development analysis etc. In the event of an emergency, Social Media can provide instant dissemination of critical information on how to act, taking measures according to gather social media informing citizens about the event in order to avoid spreading unnecessary panic. After an incident. Social Media can be used to inform citizens about the status of the event, potential environment hazards removal, reassuring and trust regain.

See <https://links.communitycenter.eu/>

John Olav Ottesen of Dafo Fomtec opened his presentation by saying that major transactions

are being made in the Industry and it is his belief that decisions should be made on Data rather than on Opinion. Data is critical for the customers seeking information on the suitability of foam. Fomtec has carried out extensive testing of foam with real-World foam qualities and real-World hardware on different fuels and under different conditions.

What fights the fire is the foam generated by a system, it is not the concentrate alone and it is very obvious that transitioning away from PFAS is not all about changing a concentrate, it must be about a change of system. Application procedures are important for extinguishment. This is especially true for fixed systems because of the type and way that fixed nozzles have been placed and foam quality changes with pressures and flow. The final type of system chosen is a variable that needs to be covered due to physical properties i.e. flashpoint, surface tension, vapour pressure etc. This data driven approach is a commitment and a responsibility and it must challenge old truths to work in the real world.

Per Aredal International Sales Director of FIREMIKS discussed FIREMIKS water driven volumetric foam proportioners for firefighting. He explained the operation of the proportioners and that the water motor functions both as a drive to the dosing pump and as a volumetric device, dosing remains within approved

tolerances regardless of variations in the water flow. Correct proportioning is made automatic and the proportioner adjust itself for changes in a wide flow- and pressure range. There is no need for pressure balancing or calibration.

Dr. Thomas Leonhardt, on behalf of EuroFeu, talked on "Europe's take on Firefighting Foams". Europe is building legislation dealing with firefighting agents with the Green Deal as the over-arching strategy to put Europe into a Zero Pollution Continent. The Green Deal is that Europe is aiming to be climate neutral by 2050, boosting the economy through green technology, creating sustainable industry and transport, cutting pollution. The European chemical strategy is to have safe and sustainable chemicals to encourage the protection for human health and the environment against hazardous chemicals.

Whilst EUROFEU welcomes a general restriction for all PFAS in firefighting foam agents, there are problems at the moment with regard to the restrictions being introduced. Derogations have been proposed by EUROFEU.

Andre Tomlinson Special Risk Technical Advisor, Bristol Fire UAE. Spoke on "Strategies and Tactics for Storage Tank Fires". On a Global scale, large full surface fires are becoming a regular occurrence. Sometimes, the reality is that such fires come as more than 1 fire – a fire in a tank will probably also have a fire in a bund and possibly also, the fire will extend outside the bund and fence-line. Fixed systems on tanks are usually a failure as they can be put out of action by so many causes.

The Gold standard for extinguishing full surface fires is the footprint methodology – concentrate all the streams to the centre to 12.00 position of the tank taking account of wind direction. For such fires, supply chain management is critical – the foam and water need to be of the right quality and pressure for foam management. There needs to be enough foam on site to cover the initial attack plus post ignition to prevent re-ignition. The application rate cannot be the bare minimum, for example, it may have to be changed to obtain reach and/or because of the value of the product and of the tank, it may be necessary to speed up application.

Dr. Karina Almeida of GEXCON, discussed hydrogen. Hydrogen is 14 times lighter than air, is odourless and non-toxic and has a wide flammability range from 4 to 75%. Hydrogen has a much larger flammable envelope than other fuels, is more difficult to inert and is more likely to form explosive atmospheres. She said that for the purpose of emergency response, it is necessary to consider the possibility of a

hydrogen fire being hard to see. She discussed hydrogen consequence analysis and safety studies and hydrogen risk identification and analysis. Advanced consequence modelling tools can help understand the hazards posed by unintended hydrogen releases and evaluate different mitigation measures.

Ben Windey, Network Coordinator, Port of Antwerp Bruges, discussed "Strengths of public-private based fire service network to prepare for industrial incident management". The port of Antwerp Bruges has around 90 Seveso Companies, 1 Nuclear Power plant and major Industrial maritime risks and so there is a need for overarching operational policies regarding fire fighting and emergency response.

In the Port, private Fire Services are organised on site level, going from small task forces to large and fully equipped departments. The Port Authority is bringing all parties together as Public-Private Mutual Aid, for the main purpose of Business Continuity. They are doing this by knowledge, training, exercises and joint purchasing exploration to create an operational fire service network for operational collaboration in the case of incidents occurring.

Mohammed Awad, Director of JOIFF gave a short presentation of a possible chemical means of destroying PFAS and requested feedback from the audience as to their thoughts on the possibilities.

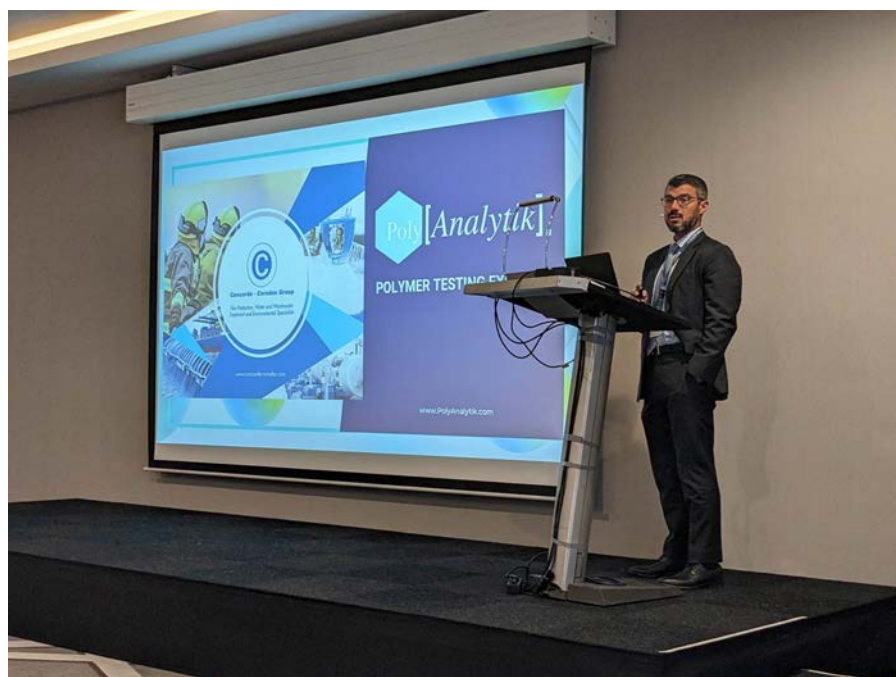
Jan Meinster, Specialist industrial safety, representing LEC IV, National Expertise Center for Industrial Safety, discussed the Management of Change (MOC) Handbook for firefighting foam

transition recently produced. LEC IV is a joint project between the Safety Region Rotterdam-Rijnmond and the Netherlands Institute for Public Safety with the aim of supporting the Safety Regions in their Industrial Safety tasks by supervision of company fire brigades and Seveso companies, regulation of company fire brigade requirements and regulations, advice to the competent authority for the environment regarding fire safety, representing the interests of the Safety Regions and developing and sharing knowledge and expertise. The MOC Handbook for foam transition is a step-by-step plan that can be used by specialists in industrial safety and companies using foam, for drawing up and testing a MOC procedure in the context of the transition to fluorine- free extinguishing foam. More information from www.leciv.nl

Chris Butcher, Shirley BTTG, gave an update of firefighter clothing standards Worldwide. He discussed the current standards for Firefighter clothing in the EU, the United Kingdom and ISO, the International Standards Organisation. He outlined the issues with 2 levels of protection in the standards EN 469, ISO 11613, ISO 11999-3 and the use of the standard EN 469 in the United Kingdom. He also discussed concerns about protection of firefighters when dealing with fires in batteries and the increasing risk due to smoke and fire debris encountered during firefighting operations.

In conclusion: Before leaving for home, many participants complimented JOIFF and RelyOn Nutec on an excellent event.

The Conference presentations are now available for review by JOIFF members in the Members Area of the JOIFF website.



BRISTOL

INNOVATIVE
FIREFIGHTING
SOLUTIONS
SINCE 1974



CONTAINERIZED PUMP



ATTACK TRAILER



HIGH-FLOW INDUSTRIAL PUMPER



FOAM TOTE TRAILER



EN 1789 CERTIFIED AMBULANCE

FIRE EXTINGUISHER



HIGH-FLOW FIRE HYDRANT



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INDUSTRIAL DISASTERS

Can They Be Prevented?



Image Source: Florida Times-Union

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 1st quarter of a year past.

3rd February 1971: Thiokol Chemical Plant Explosion, Georgia U.S.A.

Background:

The Thiokol Chemical Plant was established in 1963 to manufacture, test and deliver rocket engines to Cape Canaveral. Despite its success, rocket motor production stopped due to curtailment of the space programme budget. With the war in Vietnam, there was a need for plenty of munitions and Thiokol bid for and won a munitions manufacturing contract with the US Army and began to manufacture trip flares in 1970. A trip flare was ignited when a soldier activated a trip wire, allowing the opposing force to determine the position and open

fire. The trip flares were also used for rescue retrieval.

The Incident:

A fire originated at the work-station where an ignition chemical was manually added to other chemicals prior to forming ignition pellets. The fire jumped to the material on the conveyor belt and spread up and down the production line, setting fire to ignition and illuminant pellets stored in containers near the line before reaching the "cure" room and a storage room, which contained nearly five tons of processed material, pellets, and 56,322 assembled flares. The explosion detonated when large quantities of flares and their components were ignited by the fire.

During the minutes after the fire began, all workers were able to exit the building, but all did not leave the area because they were unaware of a potential explosion. The survivors were those who exited as they recalled two minor explosions followed by an enormous explosion and a huge fireball in a previous incident.

Emergency Response:

At the time of the fire and explosion, the only emergency capability available was a volunteer fire department 12 miles southwest of the plant. Their fire chief felt the ground shake from the explosion and the Sheriff's department dispatcher directed him to Thiokol. When the fire crew arrived on the scene, they were confronted with over 200 acres of burning forest, munitions and chemicals in barrels exploding and a towering smoke plume that could be seen for miles. The fire chief immediately requested ambulances and equipment from all the surrounding counties. There were not enough ambulances to deal with the injured and members of the community transported injured persons in their private vehicles to local and nearby hospitals. All surrounding Counties responded to the emergency and fourteen hospitals provided medical care for the injured.

Assistance was requested from the U.S. Navy, and four helicopters flew the most critically injured to Duval Medical, the largest hospital in Jacksonville. Others of those injured were transported by private planes from the Thiokol landing strip to other hospitals.

The Georgia Division of Forestry was notified, and workers arrived with bulldozers and ploughed a firebreak to contain the forest fire.

The Casualties:

The explosion and fire killed, dismembered or injured dozens of employees. Bodies were hurled from the building, which was levelled. Three other nearby buildings were severely damaged, and the fire engulfed nearby pine trees, which started the forest fire that eventually scorched 200 acres. Windows were shattered 11 miles from the site and the explosion was heard for 50 miles around.[

24 people were killed in the blast or died soon after. 5 others later died from their injuries, primarily burns, for a total of 29 deaths. At least 50 individuals suffered debilitating injuries, including burns and limbs severed by the explosion.



Image Source: Wikipedia

The Cause:

- The improper classification of the flare components which were identified as a class 2 hazard yet had inherent explosive potential and should have been class 7.
- Material in the production building was stored all along the production line, creating a fuse leading to the cure room.
- The building's internal fire protection system was inadequate.

The Lessons Learnt:

Before the explosion, local funeral homes provided ambulance services based on race – a white ambulance service if you were white, a black ambulance service if you were black. Hospitals provided segregated services. After the explosion, the impact of the loss and lessons learnt because of the tragedy, resulted in city and county jurisdictions providing ambulance services with accompanying emergency medical technicians on board, Nationwide and Camden county built a new hospital that provided integrated services to its patients.

Following the tragedy, the Thiokol Chemical Plant workers cleaned up the damage and continued to manufacture the munitions in other buildings within the complex. However they did not return to producing trip flares.

27th March 1977 The Tenerife airport disaster – the worst aviation disaster in history

Background:

A bomb set off by the Canary Islands Independence Movement at Gran Canaria Airport on the island of Gran Canaria caused

many flights to be diverted to Los Rodeos Airport on the island of Tenerife. Amongst the flights diverted were the two aircraft which would be involved in the incident - PanAm flight 1736, a Boeing 747 from JFK airport USA with 16 crew members and 380 passengers on board and KLM flight 4806 with 14 crew members and 234 passengers on board. Los Rodeos airport is a much smaller airport than Gran Canaria airport, which at that time had only 1 runway, 1 parallel taxiway and limited aircraft parking. The aircraft diverted from Gran Canaria Airport were forced to park on the main taxiway, which meant that departing aircraft had to taxi into position using the runway.

Los Rodeos airport is at an altitude of around 2,000 feet and is frequently subject to heavy clouds and foggy conditions. This was the case on the day of the accident with drifting clouds greatly reducing the visibility at the airport.

The Incident:

The tower could not see the runway because of the intense and flowing fog. The airport was not equipped with ground radar and the radio was of poor quality - when 2 messages were transmitted at the same time, serious interference occurred. The planes collided on the runway in Los Rodeos after the departing KLM aircraft started its take-off run before the taxiing Pan Am aircraft had vacated the runway.

Both planes completed fuelling and were ready for take-off at roughly the same time. and the air traffic controller gave the KLM aircraft clearance to taxi the length of the runway and then line up for take-off at the other end.

Six minutes later, the tower gave the PanAm aircraft instructions to start its taxi along the runway and to vacate at the third exit. The PanAm aircraft did not take the third exit as this would have required 2 x 148 degree turns to meet the main taxiway which would have been a very difficult, if not impossible manoeuvre for such a large aircraft, so it continued along the runway towards the 4th exit. Before the PanAm captain could radio the controller asking to confirm what exit he should take to turn off the main runway, the tower gave departure and routing instructions to the KLM aircraft - but not take-off clearance. This message was possibly unheard clearly by the KLM captain due to radio interference and he assumed that he had been given clearance for take-off, so he released the brakes and applied power.

At the same time the Pan Am captain radioed that they were still taxiing down the runway but due to radio interference the KLM crew did not hear this message and due to the fog the two aircraft could not see each other.

The KLM aircraft accelerated down the runway towards the Pan Am flight which was approaching the 4th taxiway exit. The Pan Am captain was first to see the other plane and immediately went to full thrust and tried to turn the plane off the runway onto the grass and away from the oncoming 747, but as the aircraft weighed over 300 tonnes, it could not accelerate quickly. The KLM pilot saw the PanAm 747 in front of him and reacted by pulling his yoke all the way to the back causing the aircraft to get momentarily airborne just before the collision

The no. 4 jet on the right hand wing of the KLM jet sliced into the upper part of the bulge of the PanAm jet, the main landing gear tore into the body of the PanAm jet and the left wing tore off the fin of the PanAm jet causing severe destruction. The KLM jet continued to fly for another 150 mtrs. or so before sinking back onto the runway and continuing to slide for another 100 mtrs., until it becomes stationary and all 248 passengers and crew on board were lost in the inferno. In the PanAm aircraft, all 3 officers in the cockpit managed to survive the impact and most of the 61 persons who survived, managed to get out through the holes in the body of the aircraft.

Emergency Response:

The aircraft controller had no idea that this tragic event was happening because the airport was not equipped with ground radar and the visibility during this event was so poor that there was no chance for him to see from the tower what happened. One of the aircraft on the taxiway reported that they had seen flames on the runway and the controller then set off the alarm which sent the rescue team out on the runway. Because of the extreme fog, the firefighters had to drive slowly to make sure that they didn't run over anyone on the runway. When the firefighters got to the scene they saw another fire down the runway and so they split their forces. They managed through the use

of extensive water and foam to secure a large quantity of aviation fuel that had gotten out on the runway and kept it from igniting which likely saved a lot of the people now evacuating from the PanAm jet.

The Casualties:

583 lives were lost including all passengers and crew on the KLM flight. 61 persons including the flight deck crew escaped from the Pan AM plane and survived

The Blame:

Fortunately they could get the voice and flight data recorder from both aircraft relatively quickly. The Spanish Investigation Commission determined that the main cause of the disaster was with the KLM crew because they took off without Air Traffic Control clearance. Cloud fog and various visibility conditions were also recognised as contributing factors to the disaster as was radio interference and difficulty in hearing 2 simultaneous messages. The Dutch final report was slightly different. They didn't question the cause of the accident which was clearly that the KLM crew, had taken off without clearance, but they delved deeper into why this happened. They looked into the sub-optimal teamwork between the cockpit crews in both aircraft. They looked at the difficulties of Air Traffic Control, possibly due to language

barriers and the use of non-standard phrases by both KLM crews and Air Traffic Control. They considered whether or not the air traffic controller had been slightly distracted as there was a noise indicated on the air traffic controller tapes that the Controller might have been potentially looking at a football game at the same time as instructing the aircraft on departure.

The Lessons Learnt:

- The regulations on standard radio communications were strengthened
- The necessity of effective crew resource management and the importance of intra-cockpit discussion was emphasised.
- Very clear and unambiguous phraseology between Air Traffic Control and pilots was put in place.
- Rules about the need for very clear taxiway markings so that the flight crew could easily find them even in low visibility were implemented.
- The importance of using ground radar wherever possible was emphasised.

WHEN WILL THEY EVER LEARN ?

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



Dr. STHAMER

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Utilising local talent to execute Risk-Based Gas Mapping studies

Operators of hazardous installations in South Africa are obligated to ensure that the risk associated with their facilities are As Low As Reasonably Practicable (ALARP). Fire and Gas detection is a commonly utilised mitigation measure to ensure early detection of loss of containment.

The efficacy of the solution is heavily reliant on the accurate layout and placement of detectors. Prescriptive, geographic-based detector placement methodologies are often employed as they require less engineering effort upfront.

The drawback is that these methods result in a higher detector count of questionable contribution. These methodologies yield limited power to evaluate the performance of the design.

In contrast to the blunt approaches that ignore knowledge of physical and chemical conditions, Proconics completed a facility-wide, Risk-Based Mapping (RBM) for a refinery in South Africa. Utilising comprehensive modelling techniques and engineering tools within the iIn:flux platform, enabled a least-cost, performance-based solution in a brownfields environment.



Twenty-six processing units and two tank farms, comprising of 1400 pieces of equipment were assessed and gas detectors were placed to reduce the risk of undetected gas by 80 to 90%.

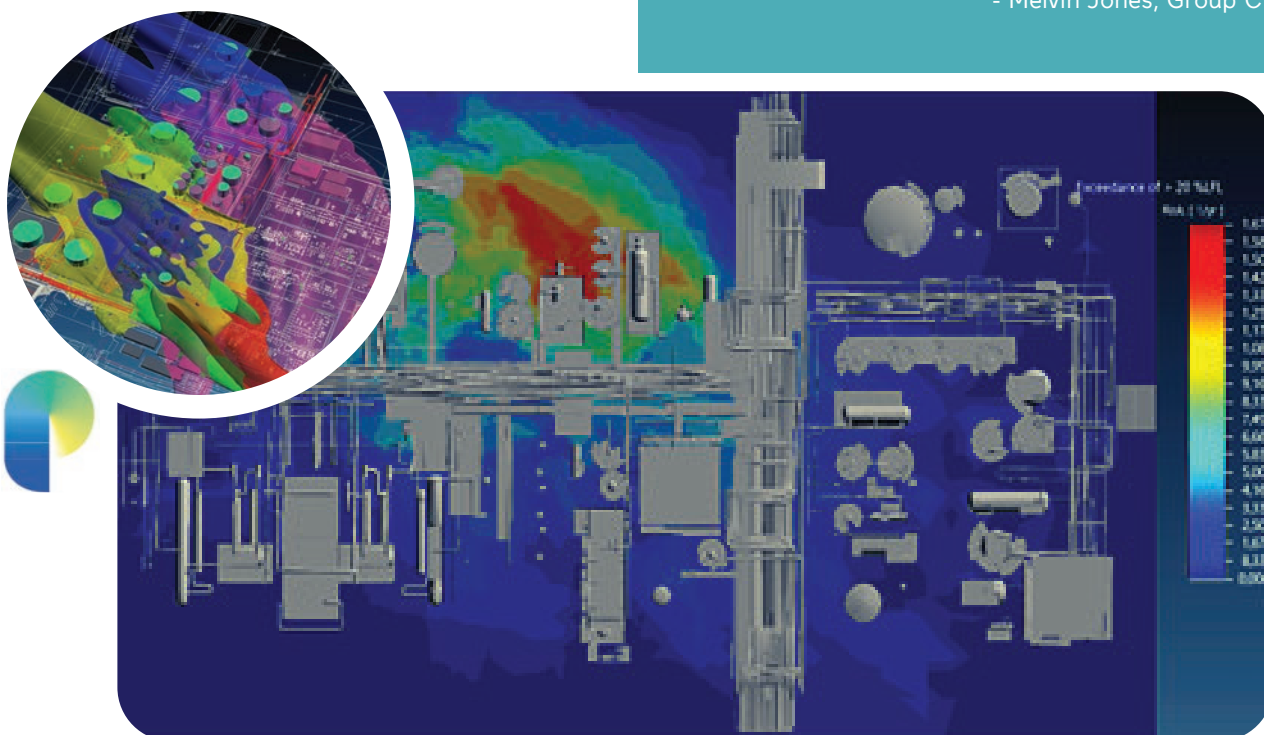
Comprehensive simulation and modelling incorporated detailed 3D models. Within this 3D model multiple leak and composition combinations were contemplated.

"Combining the skill sets across multiple disciplines, from the operator to the engineering firm to the software developer, we innovated together to push the limits for the safety industry. It was an exciting experience working with Proconics on this project and seeing the results produced for site-wide assessments. This is where the industry is going and Proconics is leading the way."

- Oliver Heynes, PHD, Insight Numerics CEO

These leak scenarios were assigned leak frequencies, and based on the comprehensive simulations, dispersion models were developed.

Each simulation considered the site-specific meteorological data to account for the impact of ventilation (both natural and forced) as well as ambient temperatures.



A major differentiator between RBM and other methodologies is that RBM considers both likelihood and consequence.

With dispersion models of gas clouds available, it is possible to determine the size of the resultant clouds. A consequence weighting is assigned to each leak, based on the severity of the vent / explosion, taking into account the size of the gas cloud. This approach ensures that gas detectors are placed to enable early detection, maximising the opportunity for intervention.

"When my team started sharing the details of this project – the suppressed engineer hiding deep in my soul forced his way out. What the team has achieved in completing a risk-based mapping of an entire refinery is astounding. It demands that we sit up and take note. We have pushed the boundaries of best engineering practice, right here in South Africa. Local talent, solving local problems.

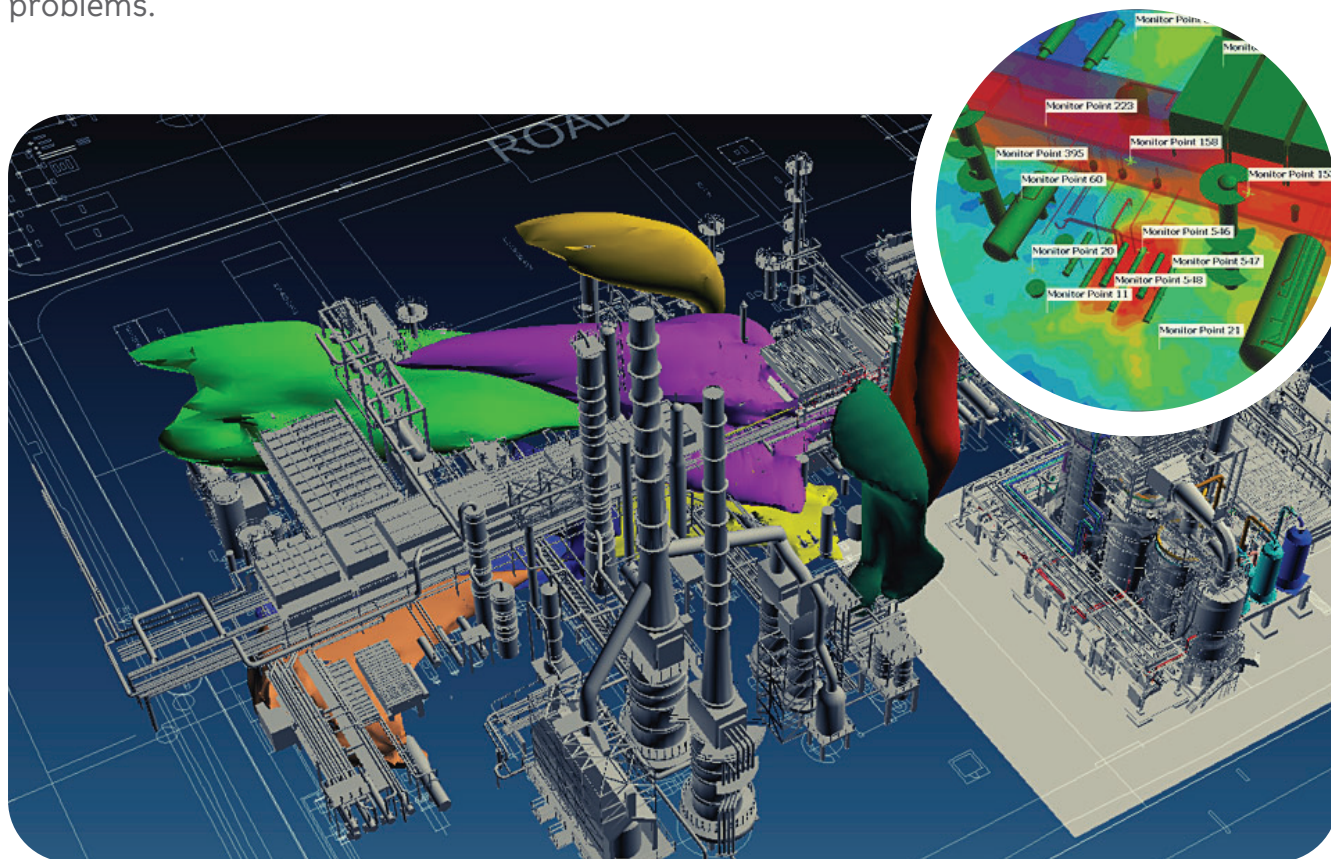
This approach is truly disruptive - we blended multiple technologies in a unique way, protecting our clients' assets better with significantly lower capital investment and lower cost of ownership. Brilliance excites me!"

- Melvin Jones, Group CEO

The ability to assess multiple leak scenarios simultaneously prevents blind spots and reduces superfluous detectors. This positions a single detector to detect leaks from several leak sources. Detectors are optimally placed by considering both the likelihood and consequence of each of the thousands of scenarios.

Over the life of the facility, this approach achieves significant cost savings avoiding over capitalisation, reducing operational expenditure and most importantly preventing life-threatening incidents.

Proconics used experienced South African talent and applied cutting edge modelling techniques within a specialised modern simulation package. This new approach builds on international best practice. Our engineers worked in close collaboration with the simulation platform developer, expanding and improving the capability to solve bespoke problems.



Key references:

ISA-TR84.00.07-2018 – Guidance on the Evaluation of Fire, Combustible Gas, and Toxic Gas System Effectiveness – August 2018

BS 60080 2020 – Explosive and toxic atmospheres - Hazard detection mapping - Guidance on the placement of permanently installed flame and gas detection devices using software tools and other techniques

SANS 60079-29-2 – Explosive atmospheres Part 29-2: Gas detectors - Selection, installation, use and maintenance of detectors for flammable gases and oxygen.

For more information feel free to contact:

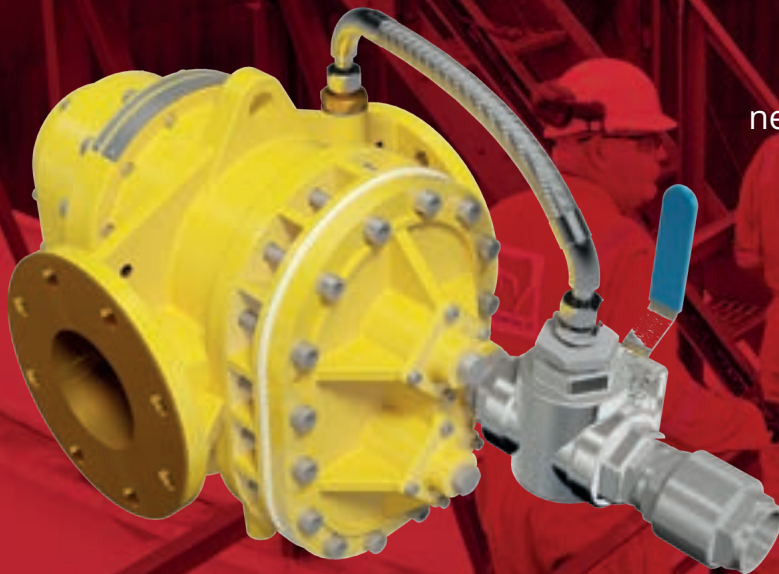
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Fire Services network in the Antwerp port area to increase industrial emergency preparation & response

By Ben Windey - network coordinator – Brandweernetwerk Zeehaven-Schelde, and Gaby van Melick – consultant – Kappetijn Safety Specialists

Industries and public authorities in the Antwerp port area are joining forces to improve industrial incident response. In order to do so they are setting up the public-private firefighting network

“Brandweernetwerk Zeehaven-Schelde” (BZS). A network that will facilitate the provision of effective mutual aid in case of specialized, large and/or long-term incidents, and will stimulate overall preparation for incidents whilst increasing efficiency.

“The BZS-network’s primary added value will be organizing more against equal or lower joint cost and realizing a higher level of expertise and operational readiness.”

The BZS has started off as a collaboration between the 2 public emergency services that are active within the Antwerp port area, the port authority and 5 major companies that have fully fledged fire brigades. Those companies being BASF, Covestro, Evonik, Total Energies

and Engie (exploiting the nuclear power plant in Doel). A shared desire to organize better industrial firefighting services in the industrial areas on both banks of the river Scheldt has united these partners. A desire that resonates within many other port companies, as proven by the large interest to join in.

Context & drivers

The port of Antwerp-Bruges is one of Europe’s mainports, and the Antwerp port area contains the largest cluster of chemical industries and SEVESO/COMAH companies in Belgium. To illustrate, the port contains around 90 Seveso companies as well as 1 nuclear power plant. Being of vital interest to Belgium’s economy, ensuring business continuity of all companies within the port and the port as a whole is thus of the utmost importance. Hence the need for robust collaboration between companies and companies and public fire services regarding industrial firefighting and emergency response.

In no way is meant to diminish the often quite impressive emergency response capacities that are already present within the port area. Several companies have private firefighting services, varying from large companies with professional fire brigades to small companies with smaller emergency response teams. Such services may however operate somewhat like ‘small severely impact your operations. And the nature of the port activities means incidents may be exceed the scope any one party is prepared for on their own. Thus, as for any place that clusters so many high risk activities, safety gains can be achieved by intensifying collaboration.

Another factor both driving the need for collaboration and complicating successful execution thus far, is the - complex - geopolitical reality of the Antwerp port area. The port area covers 115 km², borders the Netherlands and is spread out over 2 river banks, 2 provinces and 3 municipalities with public emergency response provided by 2 different “emergency response zones”. The port originated on the Right Bank in





the municipality and province of Antwerp, with emergency response provided by the 'Brandweerzone Antwerpen'. The port then expanded to the Scheldt's Left Bank involving the municipalities Zwijndrecht and Beveren, the province East Flanders and the emergency response organization 'Hulpverleningszone Waasland'. Resulting in a playing field strife with political sensitivities. Add in a rather congested transportation network, that moreover includes a multitude of locks and tunnels and it is easy to see how small disruptions can have large impacts, whilst providing optimal emergency response can be challenging. By default, in Antwerp's port area many parties are involved in emergency preparedness and response. However, there is no overarching framework for emergency response throughout the port to facilitate effective and easy collaboration, with Seveso legislation being implemented at a provincial level and public emergency planning at a municipal level. So while collaboration may be unavoidable, effectively working together during incidents will require thorough preparation and alignment. And that is where BZS comes in.

Set-up

Emergency response collaborations, ad hoc or more or less institutionalized, are nothing new. Models near and far have been reviewed to

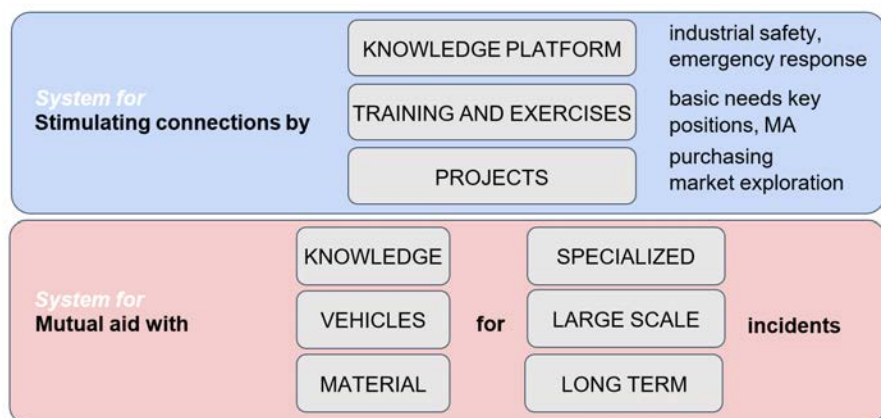
develop a set-up that fits the port of Antwerp. From the onset it has been clear it is not desired to establish a unified fire brigade, like in Rotterdam or Amsterdam, Netherlands. Rather the BZS network aims to retain the existing capacities within individual partners, and to add value by facilitating close operational collaboration during and in preparation for incidents. A model somewhat like CIMA in Houston, Texas comes to mind, that aims to facilitate exchange of knowledge, expertise and operational clout.

The BZS-network will take shape as a not-for-profit association with a Board of Directors. To represent the network's dual public-private nature the six board seats are divided equally between the public and private partners. Through the General (Members) Meeting all BZS-members can influence strategic decision making, while equal representation of the public and private parties is ensured in the voting mechanism. A small permanent staff led by the network coordinator is foreseen to prepare and facilitate activities of the network, with members forming work groups where needed. The network does not intend to own any assets or staff. Arrangements with its members are made with regard to staffing, housing and use of facilities. In principle, ownership and maintenance of emergency response equipment remains with the individual members. Financially

the public parties are the major contributors. A logical result, as their budgets include money raised through the Seveso taxes paid by the companies. Contribution amounts by the private members are divided into 3 categories depending on the operational capabilities that can be offered to provide Mutual Aid with. Companies with large professional fire brigades that can provide complete units of high-capacity vehicles/equipment with crew pay less than companies who have only knowledge or individual pieces of equipment to offer.

Goals and activities

Goals of the network are visualized in the picture below. The network aims to simultaneously achieve an increase in performance as well as economies of scale. Working together during incidents offers access to enhanced operational clout and expertise. By preparing properly for joint operations through i.e. development of MA procedures, joint exercises and efforts to ensure assets are mutually deployable high performance is assured. Shared learning and development of knowledge further enhance performance. Organizing training of key personnel collectively ensures greater opportunities and flexibility, whilst simultaneously facilitating exchange of experiences. Through i.e. the collective purchase of vehicles/equipment/foam economies of scale are achieved.



being integrated into the network activities, such as a seminar to exchange best practices and knowledge on the Foam Transition and develop an approach regarding outstanding questions. Last but not least, the JOIFF Industrial Emergency Services Management Conference 2023 has provided a great platform to introduce the BZS-network to the world and start building meaningful relationships. The only thing left to say: when can we meet again and help each other make our worlds a safer place?

Ensuring continuing relevance

Having a robust set-up that is sustainable with long term goals has been deemed key by the BZS-network. Therefore rather than having a 'simple' Mutual Aid Agreement is chosen to establish an independent legal entity, with facilities to stimulate long term memberships. Robustness is also provided through the strategic allocation of a board seat to essenscia. As a nationally recognized association advocating the interest of the chemical sector and life sciences the involvement and support by essenscia has been indispensable. Ambitious yearly plans that affect long-term planning matched by a significant yearly budget to facilitate operations gives the network further credence. Lastly, to retain relevance over time a key goal of the network is the development of (international) relations and knowledge exchange.

Way forward

These are exiting times for the BZS-network. Up until 2023 the network was in a preliminary phase. A thorough process was executed to i.e. explore different organizational, governance

and financial models, align goals and ensure commitment while building trust and relations. Last December marked a major milestone. During a grand reception the mayors and chairpersons of the main stakeholders publicly declared their commitment and support to the BZS-initiative. A significant moment in a politically divided country. As a result 2023 is all about implementing the BZS-network. Over the next few weeks the legal construct "BZS" with bylaws and a board is being established. On the practical side a home base, a website, a bank account and all other critical infrastructure that allows BZS to function are being realized. Simultaneously work is well under way towards achieving the network goals. A Vehicle & Equipment Catalogue provides insight in all available assets of the primary members. Next step is operationalizing the catalogue to facilitate MA during incidents and developing i.e. alarm procedures. Work is done to align long term investment plans and achieve cost-efficiency. A first joint training opportunity on management of complex/large scale hazardous materials incidents is being organized. New and potential members are

Ben Windey is Incident Management Officer at Port of Antwerp-Bruges. As of January 2023, Ben is the Network Coordinator for BZS and leads the implementation process. More information: www.bzs.be

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Gaby van Melick is a consultant in the field of emergency and crisis management at Kappetijn Safety Specialists, a company specialized at helping public and private organizations (jointly) prepare for larger incidents and crises in industrial or nuclear environments.

More information: www.kappetijn.eu

Contact: g.vanmelick@kappetijn.eu





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Live Demonstrations for the JOIFF 2023 Conference

RelyOn Nutec
Fire Academy

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Since the COVID pandemic travel and face to face contact was severely restricted, so was it a breath of fresh air to see everyone again. The last conference was 2019 so it was great to finally shake someone's hand, catch up on developments or just have a good old natter! The positive vibe from the two days was palpable.

Over the two days many relevant topics were discussed from cyber security to Fluorine free foam transition. An ideal setting to share our experiences through expert speakers, stimulating further thoughts.

For our part as the main sponsor RelyOn Nutec Fire Academy could finally show our wears to a wider audience. We had just moved a year before the pandemic struck to a new training centre location. During much of the COVID period, we were fortunate that we could train our customers on a limited basis but only to the Dutch market. Overseas training saw a major dip for obvious reasons.

So the stage was set on the afternoon on the first day of the conference. Transport was

arranged and the 100 or so international guests would arrive at our facility based in the heart of the Rotterdam industrial harbour.

We wanted to show not only the training centre to its full potential, but also give a flavour regarding blended learning for the future. The afternoon was divided into 6 demonstrations. RelyOn Nutec wishes to thank our partners namely the Harbour Fire Brigade (Gezamenlijke Brandweer) and Schiphol Airport for their fantastic efforts giving an insight to their capabilities.

The first demonstration was by the Gezamenlijke Brandweer, where they showcased their new tank and Tank bund firefighting equipment together with the operational Drome team. Their tank firefighting systems is twofold. For a full surface tank fire where a mobile attack is required, the hydraulic Hi-Trans foam systems and high capacity foam monitors were on display and secondly the mobile firefighting robots were actively used to extinguish a large surface bund fire. The robots have the capability to move closer to the hot zone without exposing

the operators from high heat stress. The whole demonstration was witnessed by the delegates from a safe distance or from the ariel drone onboard camera, stream back to the ground. Drones are being used more in an official capacity to feedback vital information to the command about incidents.

The second and third demonstrations where table size demonstrations often employed by RelyOn Nutec Fire Academy on many courses as part of its blended learning strategy to link the theory to the practicalities of a response with very small scale simulators. The idea is visualise tactical responses where the delegates can safely see at close quarters the effects without excessive use of fuels, polluting the air or exposure to heat. There were two tables demonstrated, gas behaviour table and a tank storage farm storage.

The gas behaviour table explores how the gas, liquid propane in this case migrates, flashes back once ignited in open air or creates overpressures in congested and confined environments. With the aid of overhead camera

and large screens the spectators were treated to a series of demonstrations with explanations culminating in a confined vapour cloud explosion. This visual awareness strengthens understanding about gas releases and ways to disperse hazardous gas clouds.

The tank table using a 1:100 scale model tank farm with miniature foam making equipment gives a bird's eye view of storage tank fires, starting with how fixed systems work on full surface tank fires and the strategy of an over the top full surface foam attack with mobile ground monitors. An explanation was given supporting real time demonstration such as effectiveness of foam blankets from fixed and mobile systems, cooling strategies on tank fires to prevent escalation, logistics behind a major tank fire and positioning of ground resources. Again this was made visual on our large display screens.

We were keen to demonstrate one of our major investments to support Liquefied Natural Gas awareness for emergency responders. From a safe distance the spectators witnessed a large release of LNG (1500 litre) into a pit, the effects of this cryogenic substance on the ground and

ultimately difference between good and ill-advised response tactics. What happens when water is softly applied to the unignited and ignited LNG pool, culminating in what happens when water is indiscriminately added to a -161°C cryogenic pool. The Rapid Phase Transition, a rapid vaporisation of liquefied gas was clear to see resulting in a spectacular explosion.

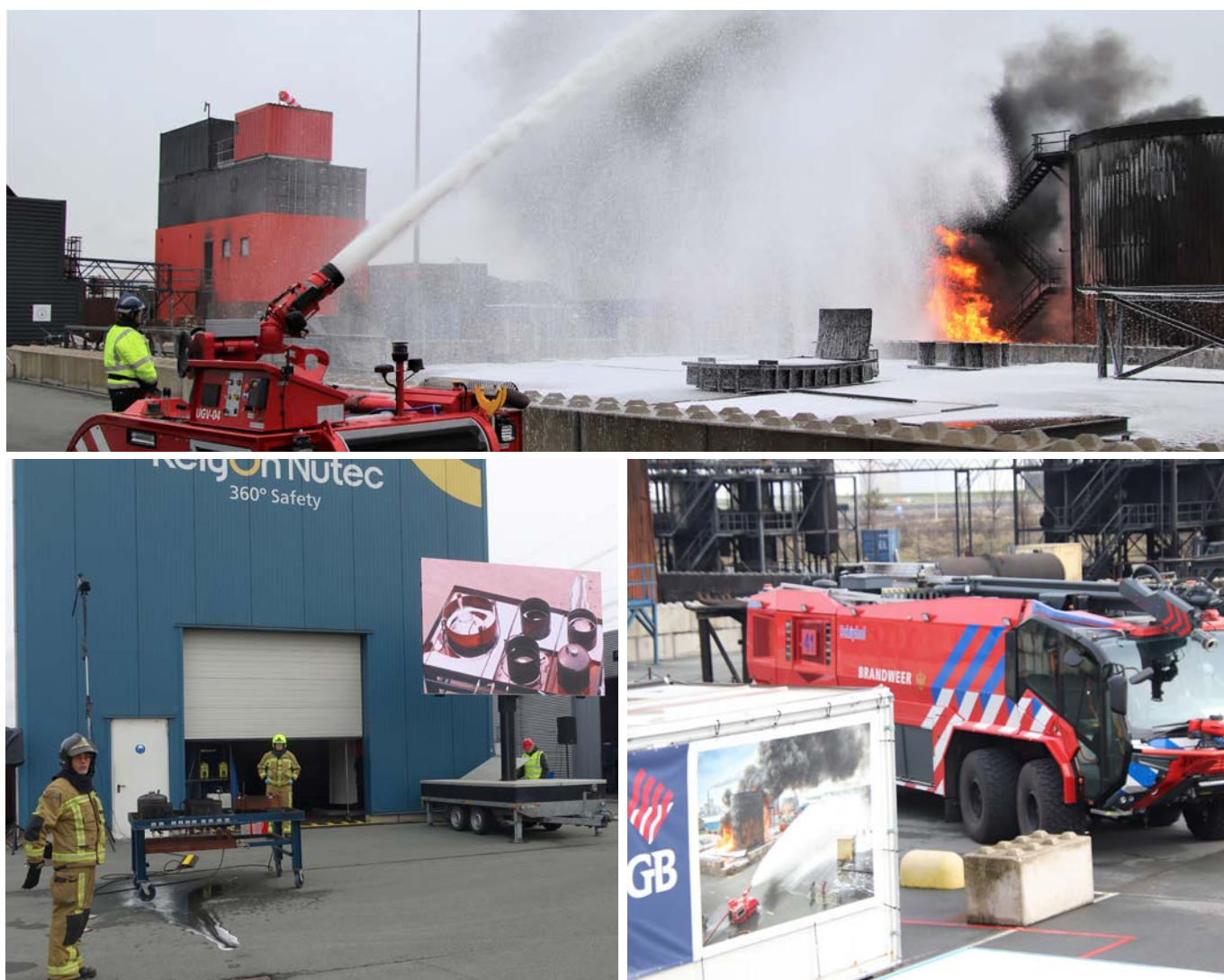
Everyone at some point travels by air, so it was great to see Schiphol Amsterdam Airport show off their new crash tender. Securing the knowledge that they can handle effectively an aircraft fuel spill fire, a 120 m² surface area was ignited and the resulting massive smoke plume was quickly quenched when the crash tender whilst still rolling deploying a foam stream onto the target area. Within a few minutes the fire was extinguished.

The finale to close the afternoon was an industrial scenario on two of our 7 process simulators. Each simulator has 30 possible liquid or gas releases configured in a process unit having an actual process schematic flow such as a distillation unit.

We cannot only challenge the command skills directing the fire teams, the handling skills of the fireteams, also one thing that is often not trained in live fire evolutions is the communication between control rooms and the response teams. The Fire Academy sees operational process control as a very important link in incident management and consequently is trained here extensively. The scenario was staged with a power failure and subsequent trips in the process flow, resulting in sudden ignition of multiply unexpected releases. After initial fire response from process operators, the Fire Brigade established a command post and began to mitigate the releases with the help of process control and a defined defensive cooling strategies.

A great day with much positive feedback from the delegates and JOIFF combined.

Should you require any further information of our standard training or bespoke training capabilities, please contact our customer services on fireacademy@nl.relyonnutec.com or +31(0)181 376 666.





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DON'T GIVE CANCER A CHANCE!

This message was written by an American firefighter to other firefighters some months before he died from cancer following years of a brave fight against the cancer that he contracted as a result of exposures to carcinogens whilst leading a team in tackling a severe fire. He used to say that he was "last man standing" of his team, all of whom succumbed to cancer suspected to have been contracted at that incident.

The safety and health of firefighters should be a daily focus and a daily consideration and perhaps it would be useful to blend safety and health together and call it "Quality of Life".

For firefighters, everyday should be a "Quality of Life" awareness day! Each day, we need to be aware of the preciousness and fragility of our life and act accordingly to protect it. Every day, we should strive to reduce the dangers we face; cancer for example: Don't Give Cancer a Chance!

Cancer is being acquired by firefighters at an alarming rate, well beyond the level experienced in the civilian population. This is not because of what we do, but because of what we do not do! An effective offense combined with a strong defence is not only the winning combination of football teams and armies but also holds true in the avoidance of cancer.

Don't Give Cancer a Chance - Remove the Carcinogens – Clean your gear!

The crud, dirt, soot and products of combustion on your Personal Protective Equipment (PPE) are the not-so-secret agents of cancer. Left alone, they will enter your body covertly and contaminate it. The best defence is to attack these agents before they can infiltrate! Clean your gear and kill the agents of cancer before they can kill you!

Don't Give Cancer a Chance – Keep the carcinogens out – Respiratory protection:

The products of combustion are a veritable cornucopia of bad things to breathe. Some of them are identifiable and get a lot of attention such as carbon monoxide, phosgene and hydrogen cyanide. The ones I am more concerned with, are the ones that are new and unique to each fire. These mutants, spawned by the burning interaction of the chemicals and petroleum based contents of a fire are unknown and inherently bad news. They invade our body via the respiratory system, an entrance that many times, is left unguarded. The best defence is to protect your respiratory system by wearing your SCBA during suppression and overhaul (post fire operations) while attacking and dispersing the invaders with aggressive ventilation. Remember, our gas monitors tell you what we already know is there but they will not detect the mutants.



Don't Give Cancer a Chance – Fit, Rested and in Good Health – Strengthen body defenses!

There are 3 conditions that together, can keep us at our peak - well rested, mentally and physically fit and in good health. Just as a roof or floor truss, this defensive triangle is only as strong as its weakest link. While it is never you, you know or have heard stories of other firefighters that come to work to "rest up" after a rough couple days off. Then there is the firefighter that shows up for work but in less than stellar health who would rather work than take sick time. A weakness in any of the three conditions, directly affects the ability of your immune system to resist attack. With your immune system compromised, you are at the mercy of whatever you might come upon.

Don't Give Cancer a Chance – Early Detection – Regular check-ups:

The danger to the security of your body or a house is the lack of threat assessment or awareness of danger. Cancer in the body is very similar to termites in a house. They enter unseen, establish themselves secretly and do extensive damage before their presence is realized. In

many instances, when they finally do make themselves known, the structure they now live in (house or body) is not salvageable. Our best defense is to be aware and have regular check-ups in accordance with the recommendations of your doctor. If an invasion or infiltration is detected early, it can be stopped without long term damage to you...or your house.

Don't Give Cancer a Chance – What if – Resources for those combating cancer:

If you are diagnosed with cancer, it is not the end and you are not alone! Each of us has been faced with adversity to one degree or another and while cancer is one of the more egregious adversities, it is just that. There are weapons at your disposal to fight and overcome cancer. They are as powerful as you make them and when used together in a combined arms assault, are invincible!

•Attitude – Eradicate despair, hunt down and kill melancholy, live each day with vitality, a positive attitude and positive energy.

•Your support group – Friends, family, the Firefighter Cancer Support Network www.firefightercancersupport.org nationally and/or local support groups.

•Traditional and non- traditional medicine – Seek out sound medical counsel/advice. Question everything and do not hesitate to get a second opinion. Once a course of treatment(s) is decided, embrace it and surround it with an attitude and aura of success.

•Faith – The old adage is that there are no atheists in fox holes, nor are there many undergoing cancer treatment. Regardless of your belief system, whatever gives you comfort and solace, embrace it and use it.

It is my fervent wish that cancer will never be at your doorstep, but it something that you must take an active part in preventing. Live long and prosper, experience all that a full life as to offer.

**Don't Give
Cancer a
Chance!**

Smoke alarm

25%-30%

of people get cancer
before the age of 75

3x

Increased risk
to firefighters

Source: Professor Anna Stec
University of Central Lancashire





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FIREFIGHTING and CANCER

Because of the nature of uncontrolled fires and of the Personal Protective Equipment (PPE) with which firefighters are issued, firefighting can have a number of serious consequences for the wearer – rise in body temperature; dehydration; physiological stress; psychological stress etc. The potential health effects to firefighters can produce muscle damage, dehydration related cognitive illnesses, damage to muscles and organs due to overexertion etc.

One of the two major risks to firefighters when firefighting is sudden cardiac events – heart attack or total heart failure - due to heat and over-exertion and on many occasions due to lack of firefighter fitness and/or competence. The other major risk to firefighters is cancer and other serious illnesses.

There is a large and growing volume of evidence that fire ground contaminants are dangerous and cancer is the most dangerous under-recognised threat to the health and safety of firefighters and the top cause of firefighter deaths in duty - and many die from cancer shortly after retirement. Some cancer studies are also noting that firefighters are developing far more aggressive types of cancers, such as brain cancers, at a younger age than the general population, which provides further indications that the cancer could be a result of firefighting.

Whilst cancer and other illnesses can be contracted for many reasons and from many sources, a huge amount of research that is being carried out shows that there is compelling evidence that there is a strong link between firefighting and cancer and other serious illnesses. Multiple studies have repeatedly demonstrated credible evidence and biologic credibility for statistically higher rates of multiple types of cancers in firefighters compared to the general population. Toxins that a firefighter will come into contact with are found in soot and trapped within the fibres of soiled ensembles and ensemble elements or absorbed into the materials themselves. Clothing attenuates exposures to some contaminants but some substances still get through. The signs of firefighters' exposure to carcinogens are everywhere:

- Photos appear every day of firefighters working in active and overhaul (post fire activities) fire environments with SCBA on their backs but not masks on their faces.

- Firefighters “proudly” wear dirty and contaminated intervention (turnout) clothing and helmets.

- Many firefighters only have one set of intervention PPE which means they are continually re-contaminated from previous fires.

- Diesel exhaust, a recognised carcinogen, contaminates many fire stations apparatus bays as well as living, sleeping and eating quarters.

- Intervention PPE is stored in apparatus bays where it is bathed in diesel exhaust and it goes unwashed for months at a time, even after significant fires.

- Firefighters carry their contaminated gear in their personal vehicles resulting in off-gassing of contaminants into the passenger compartment and sometimes even into their homes.

- Firefighters put their contaminated gear into the cabs of their apparatus both before and after fires.

- Some firefighters still take their contaminated intervention clothing and boots into sleeping quarters.

- The interiors of apparatus cabs are rarely decontaminated.

- Cab seat belts are seldom if ever decontaminated.

In the early days of smoking, consumers did not know that smoking could kill them. How many people died because of ignorance of this fact? Then many years ago, it was proven that smoking does kill, yet then and so many years later, even today, many continue to smoke and many continue to contract long term illnesses and many die as a direct result of their smoking habit.

Unfortunately, there is no immediate visible impact of carcinogenic exposure, since the time between exposure to carcinogens and the appearance of malignancies can be 20 years or longer, known as the latency period. There is currently a large body of opinion within the firefighting community that refuses to accept that fighting fires greatly increases the risk of contracting cancer and other serious illnesses.

If you are one who has this opinion and you still don't believe that cancer is a particularly serious risk to firefighters, check how many current and retired members of your emergency response team have contracted a cancer or another serious illness – and how many have died long before their time.

Use this message to remind yourself to protect yourself from cancer:

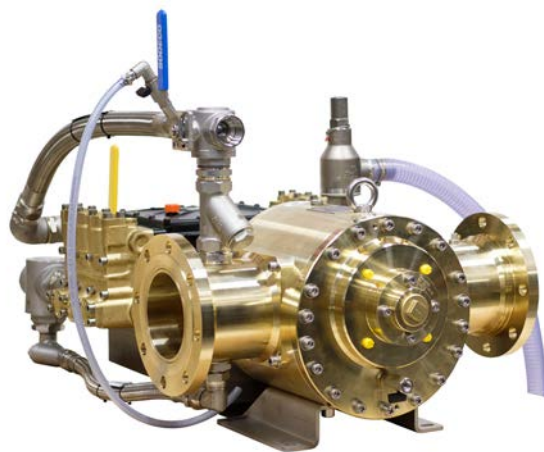
Clean or change out of your PPE after every working fire
After every fire, take a shower and change your clothes as soon as possible.
Never wear or place dirty PPE in living areas including your car.
Consider sunscreen and wear a hat while working in the sun
Exhaust is deadly, be sure to use your station's exhaust systems
Remember to get annual physicals including cancer screenings.
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U.S. Chemical Safety Board Releases Final Report into 2020 Toxic Gas Release



Image Source: The Weather Channel

U.S. Chemical Safety Board Releases Final Report into 2020 Toxic Gas Release and Chemical Fire at Bio-Lab Facility in Westlake, LA

Washington D.C. April 24, 2023 – Today, the U.S. Chemical Safety and Hazard Investigation Board (CSB) released its final investigation report into a chemical fire and toxic gas release at the Bio-Lab facility in Westlake, Louisiana, in August 2020 following extreme weather during Hurricane Laura. In addition to recommending steps that the company and Louisiana state officials should take to prevent chemical releases during future hurricanes, the CSB's report calls on federal regulators to increase their oversight of hazards associated with reactive chemicals.

CSB Chairperson Steve Owens said, "The CSB has investigated several incidents related to hurricanes and other extreme weather events. With powerful storms and other extreme weather occurring more frequently, companies and regulators must take action to prevent weather-related releases of hazardous chemicals that can cause substantial damage

to facilities and threaten surrounding communities."

The Bio-Lab facility (referred to as the "Bio-Lab Lake Charles" facility) manufactures and supplies pool and spa chemicals containing trichloroisocyanuric acid (TCCA). TCCA is used throughout the country in pool care and, when put in large bodies of water such as a pool, breaks down slowly, releasing chlorine in the water. However, when TCCA comes into contact with small amounts of water and does not dissolve, it can undergo a chemical reaction that generates heat, causing the decomposition of TCCA, which produces toxic chlorine gas.

On the day of the incident, August 27, 2020, over 1 million pounds of TCCA were on-site at the Bio-Lab Lake Charles facility. As the Category 4 Hurricane Laura made landfall, its strong winds damaged buildings at the facility, including tearing off roofs. Rainwater from the storm contacted the TCCA stored inside the buildings, initiating a chemical reaction and subsequent decomposition. The heat initiated a fire. A large plume of hazardous gases, including

toxic chlorine, traveled from the facility. A portion of nearby Interstate 10 was closed for over 28 hours, and local officials issued a shelter-in-place order for the surrounding community due to the release of hazardous gases.

As a result of its investigation into the incident, the CSB's final report identifies five safety issues:

1. Extreme Weather Preparation: Bio-Lab did not learn the importance of preparing for extreme weather after the 2017 Arkema incident in Crosby, TX, which also occurred following a Category 4 hurricane. Bio-Lab did not implement industry guidance for extreme weather preparation that was updated and published after the Arkema incident.

2. Process Hazard Analyses Implementation: TCCA is not covered by the Occupational Safety and Health Administration's (OSHA) Process Safety Management (PSM) standard. Bio-Lab voluntarily implemented some elements of the PSM standard and

even conducted a 2010 Process Hazard Analysis (PHA) but did not implement a PHA recommendation to determine whether buildings at the facility (including their roofs) could withstand damage from hurricane-strength winds.

3. **Emergency Preparedness and Response:** Bio-Lab experienced an approximately five-and-a-half-hour delay in responding to the event, which likely increased the severity of the event.

4. **Adherence to Applicable Hazardous Materials Codes:** The Lake Charles plant did not adhere to the existing National Fire Protection Association's codes for high-hazard industry occupancies, which include safety precautions such as automatic extinguishing systems or other protections to minimize danger to occupants before they have time to evacuate.

5. **Regulatory Coverage of Reactive Chemical Hazards:** TCCA is not covered by OSHA's PSM standard or the Environmental Protection Agency's (EPA) Risk Management Program Rule. Consequently, the facility was not required to implement baseline process safety management elements of its TCCA-related operations under these regulations.

The CSB is issuing several recommendations to Bio-Lab Lake Charles, including constructing new buildings -- and maintaining existing buildings and structures -- to withstand hurricane winds and flooding; implementing safeguards and processes to ensure that hazardous chemicals are not released during extreme weather events; improving its Process Hazard Analysis (PHA) action item management system; performing process hazard analyses (PHAs) on all buildings and units processing

or storing TCCA; and improving its emergency response capabilities. Board Member Sylvia Johnson said, "as severe hurricanes and other weather-related events continue to happen, the CSB calls on industry, state and federal officials, and corporations do their part in developing ways to address these events before they occur. When workplaces are destroyed, that has a direct negative impact on workers' physical health as well as their ability to earn a living."

The CSB is also reiterating two recommendations related to reactive chemicals that it previously has made to OSHA and EPA. The CSB is calling on OSHA to amend its PSM regulation to achieve more comprehensive control of reactive hazards, such as TCCA, that could have catastrophic consequences and is calling on EPA to revise its Accidental Release Prevention Requirements to cover additional reactive hazards that have the potential to seriously impact the public.

Board Member Catherine Sandoval said, "The CSB's recommendations should serve as a road map for companies, regulators, and industry. The CSB has seen these types of events before, and companies must be prepared for the hazards that extreme weather can present at their facilities utilizing industry resources. Had Bio-Lab followed the available guidance, the incident could have been prevented."

Additionally, the CSB is recommending that Louisiana officials require chemical facility operators to evaluate the hazards from hurricanes and accompanying wind, rainwater, floodwater, or storm surge forces and implement safeguards against those hazards. The CSB also is urging EPA to implement recommendations made by the U.S. Government Accountability Office to address risks to chemical facilities presented by natural hazards and climate change.

An Appendix to the CSB's report also includes a summary of two additional incidents at another Bio-Lab facility in Conyers, GA. On September 14, 2020, a TCCA reaction and decomposition resulted in the release of a plume of hazardous chemicals, exposing Bio-Lab Conyers personnel and nine firefighters to dangerous fumes, and caused a portion of Interstate 20 near the facility to be closed for approximately six hours. Surrounding businesses in the area were evacuated. Four days later, on September 18, 2020, a second decomposition involving TCCA occurred with no reported injuries.

The CSB is an independent federal agency charged with investigating incidents and hazards that result, or may result, in the catastrophic release of extremely hazardous substances. The agency's core mission activities include conducting incident investigations; formulating preventive or mitigative recommendations based on investigation findings and advocating for their implementation; issuing reports containing the findings, conclusions, and recommendations arising from incident investigations; and conducting studies on chemical hazards.

The agency's board members are appointed by the president subject to Senate confirmation. The Board does not issue citations or fines but makes safety recommendations to companies, industry organizations, labor groups, and regulatory agencies such as OSHA and EPA.

Please visit our website, www.csb.gov.
For more information



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The live chat feature enables visitors to communicate with exhibitors in real-time, directly on their virtual booth. If needed, attendees can follow up with a live video call for further discussions. So why not take advantage of this convenient and accessible way to gather information and connect with industry professionals during the event? Simply

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We will also be taking advantage of our in-built ZOOM feature and running LIVE Q&A panels. This is the perfect time to ask the experts your most burning questions.

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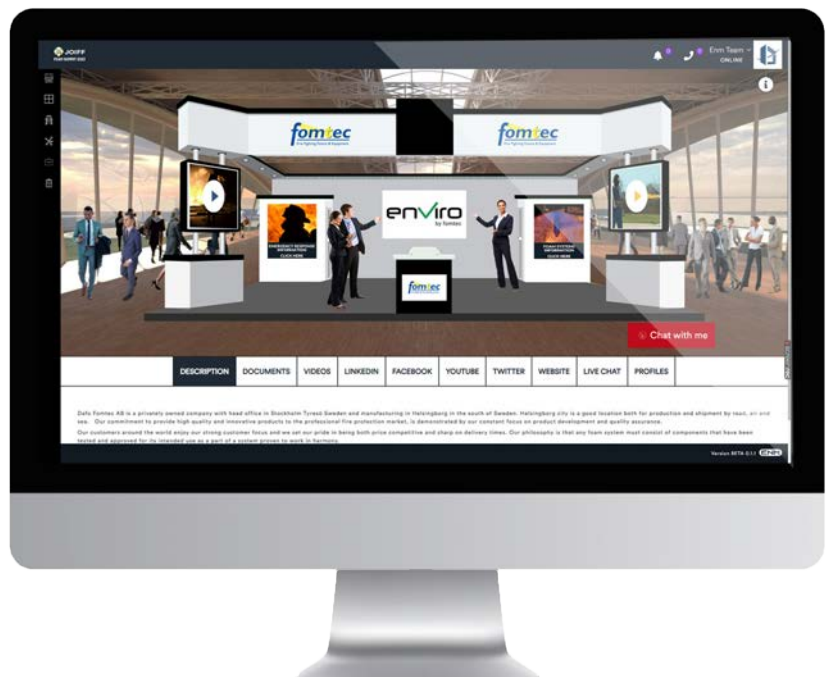
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Remembering the Deepwater Horizon

13 Years Later: Progress and Lessons Learned



Image Source: Encyclopedia Britannica

On April 20, 2010, the Deepwater Horizon oil rig, located in the Gulf of Mexico, experienced a catastrophic explosion that killed 11 workers and resulted in the largest marine oil spill in history. The disaster caused immense environmental and economic damage, and its impact is still being felt today. As we mark the 13th anniversary of this tragedy, it is important to reflect on the progress that has been made since and the lessons learned.

The Deepwater Horizon disaster was caused by a combination of factors, including poor safety culture, inadequate regulatory oversight, and flawed engineering decisions. The explosion caused millions of barrels of oil to spill into the Gulf of Mexico, harming marine life and the livelihoods of those who depend on the Gulf's ecosystem. The oil spill caused significant harm to the Gulf's fisheries, which are an important source of food and income for many people in the region. The spill also damaged the Gulf's wetlands, which provide important habitat for

wildlife and help protect against storm surges. The economic impact of the spill was significant, with losses estimated at \$17.2 billion.

In the aftermath of the disaster, there was a widespread call for accountability and reform. The oil and gas industry faced greater scrutiny from regulators, and safety standards were raised. The US government also created the Gulf Coast Ecosystem Restoration Council to oversee the long-term restoration of the Gulf ecosystem, and BP, the company responsible for the spill, was required to pay billions of dollars in damages and fines. BP paid \$20 billion to the US government to settle civil claims related to the spill, and it also agreed to pay billions of dollars in compensation to businesses and individuals affected by the spill.

Despite these efforts, the Gulf of Mexico is still feeling the effects of the Deepwater Horizon disaster. According to a study published in 2020, the spill caused a significant decline

in the populations of some species of fish and invertebrates, including red snapper and blue crabs. The study also found that the spill had long-term impacts on the Gulf's food web, affecting the relationships between different species of marine life. The Gulf's wetlands, which are critical for protecting against storms and supporting wildlife, have also been damaged by the spill. The wetlands provide habitat for numerous species of birds and other wildlife, and they also help to absorb carbon dioxide from the atmosphere, helping to mitigate climate change.

However, there have been some positive developments in the years since the disaster. One major achievement has been the establishment of the Gulf Coast Ecosystem Restoration Council, which has been working to restore the Gulf's natural resources and address the long-term impacts of the spill. The council has funded a number of restoration projects, including the creation of new wetlands, the

removal of invasive species, and the monitoring of wildlife populations. The council has also worked to improve the resilience of the Gulf ecosystem to future disasters, by focusing on the restoration of key habitats and the development of early warning systems.

The oil and gas industry has also taken steps to improve safety and prevent future disasters. The industry has adopted new technologies and procedures to reduce the risk of accidents, and companies have invested in safety training and equipment. The US government has also strengthened regulations and oversight of the industry, and established a new agency, the Bureau of Safety and Environmental Enforcement, to oversee drilling operations on the Outer Continental Shelf.

One of the key lessons learned from the Deepwater Horizon disaster is the importance of transparency and accountability. The disaster was caused in part by a lack of transparency and communication between BP and its contractors, as well as between the company and regulators.

The US government has since implemented new regulations requiring companies to provide more detailed

In the wake of the disaster, the oil and gas industry has made significant changes to improve safety and prevent future accidents. These changes include:

Improved Safety Technology: The industry has invested heavily in developing new safety technologies that can help prevent blow-outs and other types of accidents. For example, companies have developed advanced blow-out

preventers that are designed to be more reliable and easier to control in emergency situations. They have also improved the design and construction of offshore drilling rigs, and implemented new systems to monitor the performance of critical equipment.

Enhanced Safety Training: To prevent accidents, the industry has also increased its focus on safety training for workers. This includes training programs that cover a range of topics, such as the proper use of safety equipment, emergency response procedures, and hazard identification and mitigation.

Increased Transparency: One of the key lessons learned from the Deepwater Horizon disaster is the importance of transparency and accountability. To improve transparency, the industry has implemented new reporting requirements and regulations that require companies to share more information about their operations with regulators and the public. For example, the US government now requires companies to disclose more information about their drilling plans, emergency response procedures, and safety records.

Stronger Regulatory Oversight: The US government has also increased regulatory oversight of the oil and gas industry in the wake of the Deepwater Horizon disaster. In 2010, the US government established the Bureau of Safety and Environmental Enforcement (BSEE) to oversee offshore drilling operations and enforce safety regulations. The BSEE has since implemented a range of new regulations and guidelines to improve safety, prevent accidents, and protect the environment.

Improved Industry Standards: The oil and gas industry has also worked to improve its own standards and best practices. The American Petroleum Institute (API), for example, has developed a series of new industry standards and recommended practices that cover a range of topics, from well design and construction to blow-out prevention and emergency response.

Overall, the Deepwater Horizon disaster was a wake-up call for the oil and gas industry. In response, the industry has made significant changes to improve safety, prevent accidents, and protect the environment. While there is still much work to be done, these changes represent an important step forward in ensuring the safety and sustainability of offshore drilling operations.

It is clear that the oil and gas industry has made significant progress in improving safety and preventing accidents since the Deepwater Horizon disaster.

The industry has invested heavily in developing new safety technologies, enhancing safety training for workers, increasing transparency, strengthening regulatory oversight, and improving industry standards. These changes have helped to prevent future accidents and protect the environment.

However, it's important to note that there is still work to be done. Accidents and spills can still occur, and the industry must continue to work towards improving safety, reducing the risk of accidents, and minimizing the environmental impact of its operations.

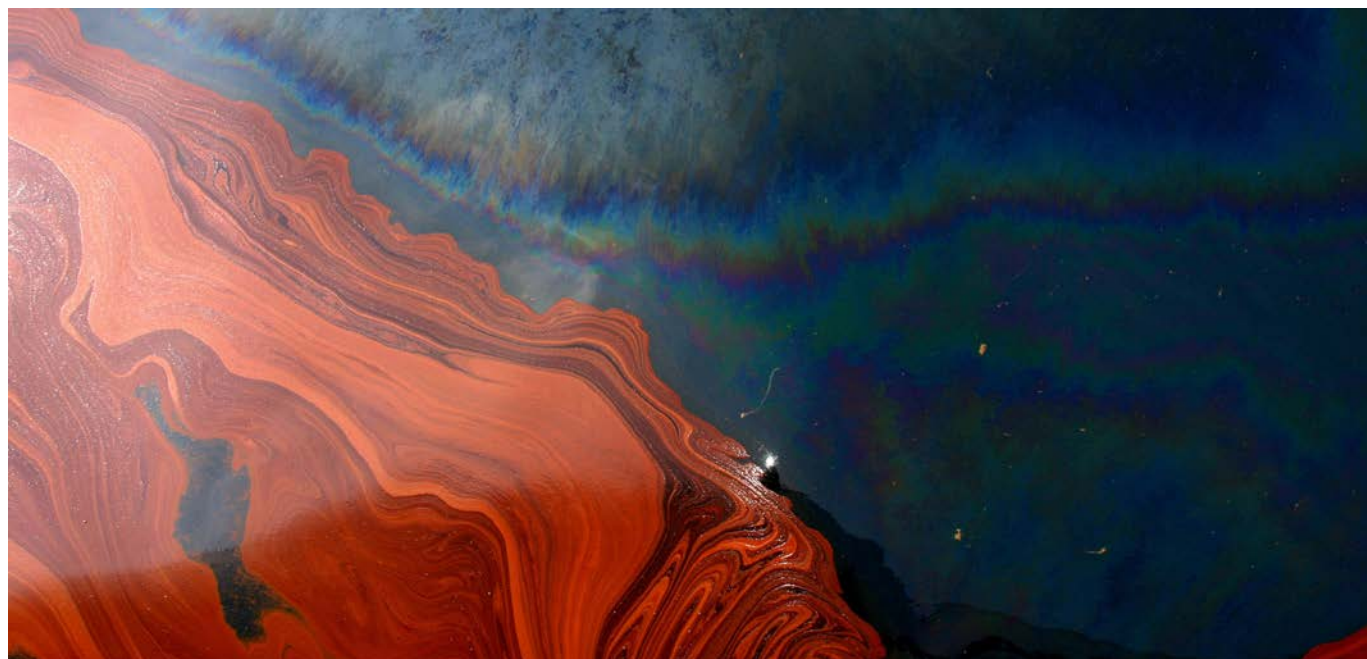


Image Source: Hakai Magazine



Evaluation of the fire protection effectiveness of fluorine free firefighting foams

FINAL REPORT BY:

Gerard G. Back
JENSEN HUGHES
Baltimore Maryland, USA

John P. Farley
NAVAL RESEARCH LABORATORY
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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