The Catalyst

July 2013

About JOIFF

Membership of JOIFF, the International Organisation for Industrial Hazard Management is open to any Organisation which is a high hazard industry and/or has nominated personnel as emergency responders/hazard management team members who provide cover to industrial/ commercial organisations.

Organisations which do not fully comply with these requirements are welcome to apply for Corporate Membership of JOIFF.

JOIFF provides a forum for discussion amongst peers, accredited training specifically developed for the sectors in which JOIFF members operate and technical advice through the JOIFF Standard and the JOIFF Shared Learning network. JOIFF welcomes enquiries for Membership - contact the JOIFF Secretariat

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The Catalyst is the official newsletter of JOIFF, the International Organisation for Industrial Hazard Management and is published quarterly - in January, April, July and October each year. Our policy is to bring you high quality articles on relevant technical issues and current and new developments and other happenings in the area of Emergency Services Management. In addition to The Catalyst, information relevant to Emergency Services Management is posted on the JOIFF website. Readers are encouraged to circulate The Catalyst amongst their colleagues and interested parties and the Editors welcome any comments.

Message from the JOIFF Chairman Randy Fletcher

Dear JOIFF Community,

As we all know, there are ALWAYS more useful and important things to do than time to do them. Even the best juggler can only keep so many balls in the air before they start dropping. The key is to not let the most important ones drop…. we have to pick and choose which ones to keep in the air.

I want to encourage you to make maintaining and increasing your understanding and knowledge of your chosen profession to be one of those balls you don't drop. It is easy to get so bogged down in the daily "fires" we have to put out, that we rely on our past training to get us through, but things fade and we can miss new ways to make things better unless we work hard to keep our mind sharp.

A dull knife may work, but it makes things much harder that they need to be. Make reading the Catalyst one of your priorities. Maybe not every article suits your needs, but we strive to include relevant topics that will enhance your ability to be effective in this business of Response Management. If you don't find something in here useful, let us know and recommend a topic, or better yet, submit an article for the editors consideration.

Studies show that professionals who take the time to read trade and technical/professional journals/publications on a regular basis, are more effective in their discipline and tend to rise to leadership levels in their chosen fields more often than those who neglect keeping their knowledge and awareness sharp. Take the time to give yourself an edge.

With Highest Regards,
Randal S. Fletcher, JOIFF Chairman

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

New Members

During April May and June 2013, the JOIFF Management Committee were pleased to welcome the following new Members:

Full Members

Bintulu Emergency and Safety Training Sdn Bhd (BEST), Bintulu, Malaysia, represented by Abdul Malik Arshad, Organisation CEO. BEST is a training provider for industrial ERT with clients including some of the largest High Hazard Industries in Malaysia. Training provided includes live fire fighting include refresher, HazMat - operations, and technician level, high angle and confined space rescue. BEST are also a distributor and authorised service centre for Scott UK /USA safety products.

BP Chemicals Cooper River, Wando, South Carolina. U.S.A., represented by Kenny Hoffa, Emergency Response Specialist (Chief), Kevin Thames, Assistant Chief and Martin Rose, Captain. The Cooper River plant produces BP Chemical's purified terephthalic acid (PTA), the preferred polymer that is used in the manufacture of polyester, one of the most versatile of man-made products. The Emergency Response Team comprises full time and part time personnel.

Kaygrill Services Nigeria Ltd., Port Harcourt, Nigeria, represented by Kaizer Ebiwari Grillo, Managing/Training Director, Samuel Banigo, Shift Supervisor and Dagogo Ken Banigo, Fire Technician. Kaygrill Services full time emergency response team provide fire and emergency services to Nigeria LNG as well as fire and rescue training services for the oil and gas industry, fire risk assessment for organisations, specialist training in Confined Space Entry, Breathing Apparatus and Gas testing and also Disaster and Emergency Management training.

Pearl Fire Pty Ltd., Victoria, Australia represented by Douglas Wulf, Director Australia, Asia Pacific. Pearl Fire Pty Ltd. are the Australian and Asia Pacific distributors for Williams Fire and supply equipment, services and support for large scale emergency response incidents and events. They also conduct audits and provide emergency tactical fire plans for facilities in the oil, gas and petrochemical industries.

Ronsafe Safety & Rescue Limited (RSRL), Marabella, Trinidad and Tobago represented by Ronnie Manwaring, Managing Director, Alberto Burrero, Training Consultant and Osei Alexander, Safety Manager. Ronsafe Safety and Rescue have a large team of full time and part time emergency responders and provide trained personnel in the field of rescue - low angle/high angle, confined space, collapse structure - water, hazardous material incidents, safety officers, confined space attendants and fire watch for the energy sector primarily.

Stirling Group, Dubai, U.A.E. represented by Kevan Whitehead, Head of Fire & Rescue Services and Andy Young, Director of Health & Safety. Stirling Group is a Division of Olive Group, a Group of Companies that facilitates business in difficult/ dangerous countries to work by its in-depth experience and expertise of security measures. Stirling Group, a subsidiary organisation within the parent group, specialises in Fire & Rescue activity as well as Health & Safety and Defensive Driving.

Corporate Members

Gold Eagle Industrial Co. Ltd., Beijing, China, represented by Graham Forbes, CEO and Dylan Forbes, Country Rep. Gold Eagle Industrial are exclusive agents of Hytrans Systems b.v. in Greater China.

Oshkosh Corporation, Wisconsin, USA, represented by Rami Dirbashi, International Sales Manager – Middle East, Salim Hawi, VP International Sales and Tom Quigley, VP Fire and Emergency Products Division. Oshkosh Corporation and its fully owned subsidiary Pierce Manufacturing build heavy duty industrial fire fighting trucks and aircraft rescue and fire fighting vehicles. More detail about Oshkosh is included in an article in this edition of The Catalyst

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

PIPER ALPHA - PART ONE

6th July 2013 is the 25th anniversary of the explosion and fire on the Piper Alpha, a North Sea oil production platform The Piper Alpha rig produced the equivalent of 300,000 barrels of oil a day.

The incident began at 21.45 BST with what was a routine problem with the condensate injection pump. This was a recurring problem which the control room had seen many times before. Then the gas alarms sounded. A gas pump which was being upgraded by the day shift had been activated in error by the nightshift. The pump leaked gas and the first explosion occurred.

The fire spread rapidly and rescue boats were launched to evacuate the rig. At that time, the fire was localised. At 20.20 BST there was a massive explosion. A major gas pipe from the nearby Tartan rig, which transported gas via Piper Alpha, melted, triggering a second explosion. Up to 30 tonnes of gas per second fed the fireball.

The explosion destroyed the lifeboats. Some on the platform tried to escape by jumping into the sea, the distance of a 30 or 40-storey block window. Many evacuated without lifejackets. Some survived and started swimming. The water was heating up and steam was rising off the water. The choice for those who survived the jump became to burn to death or be drowned. Some plunged under the water and tried to swim away from the heat.

At 22.50 BST, a second major pipeline exploded and 1,280 tonnes of gas ignited. About 187 men were still on the rig, although many were already dead. At 22.20 BST a gas pipeline connecting Piper Alpha to the Claymore platform exploded. At 23.50 BST the module, which included the fireproofed accommodation block, slipped into the sea, followed by the largest part of the platform. More than 80 men were trapped in the accommodation block.

Only 61 persons, many of them badly burned, survived the fire. 167 men were killed and an insured loss of over US$ 3.5 billion resulted. (Part 2 on p13)

Inerting the ullage space of storage tanks with nitrogen

By Jeanne van Buren

Introduction

Inerting ullage spaces of storage tanks containing hydrocarbons at petrochemical production sites and tank terminals using nitrogen can be an effective Line of Defence (LoD) for the prevention of deflagration vapours, that commonly cause tank fires. Besides nitrogen other materials can be used like Carbon dioxide and steam as listed in paragraph 7.3.2. of NFPA 69: Standard on Explosion Prevention Systems (2008 Ed.), these materials are not covered in this article.

There is much more to inerting storage tanks than just adding nitrogen to the vapour space of a storage tank. NFPA 69 distincts between performance-based (paragraph 4.3.2) and prescriptive based (paragraph 4.3.3) provisions for this LoD.

Operators that have to rely on a performance based designed system have to go through an extensive process. When installing prescriptive based Nitrogen provisions NFPA chapters 6 and 7 are applicable depending on the method used.

These chapters cover the following topics:

6. General Prescriptive Requirements: *Methods, Limitations, Factors to Be Considered, Plans, Acceptance Test, Inspection and Maintenance, Housekeeping*
7. Deflagration Prevention by Oxidant Reduction: *Application, Design and Operation Requirements, Purge Gas Sources, Purge Gas Conditioning, Piping Systems, Application of Purge Gas at Points of Use, Instrumentation*

Effectiveness Nitrogen blanketing

The Methods paragraph in chapter 6 describes that it is necessary to first of all consider the effectiveness of the anticipated method. Many aspects are relevant to determine the effectiveness of nitrogen blanketing for a product.

First of all the Lower (LEL) and Upper explosion limits (UEL) as % volume in air, have to be considered. The lower explosion limit of for instance ethylene oxide is 3% while the upper limit is 100%. The range over which ethylene oxide is explosive in air is so broad that it is impossible to use nitrogen as a secure LoD to prevent explosion. Fortunately other products have a more 'favourable' LEL-UEL range.

Another topic to be considered is the Limiting Oxygen Concentration (LOC) of a product which should not be confused with the LEL. In some publication Maximum Oxygen Concentration (MOC) is used to describe the same parameter.

LOC stands for: *The concentration of oxidant in a fuel-oxidant-diluent mixture below which deflagration cannot occur under specified conditions (NFPA 69: paragraph 3.3.25).*

For nitrogen blanketing this means the oxygen concentration at which deflagration will not occur. Inerting will de performed at a slightly lower concentration of approximately 2% below the LOC, to allow variations in the oxygen concentration. Inerting starts with the flushing of the ullage space of the tank until this oxygen concentration is reached. Due to breathing of the tank and manipulations with the contents nitrogen needs to be added to maintain the required oxygen concentration at all times.

NFPA 69 lists LOCs for flammable gasses and vapours using nitrogen and carbon dioxide in Table C.1(a). Please note that the LOC is specific for the medium used for inerting.

If the LOC is not listed it can be determined using suitable standards like ASTM E 2079-07: *Standard Test Methods for Limiting Oxygen (Oxidant) Concentration in Gases and Vapors.* There is also a 2003 Draft prEN 14756 with the same purpose.

A conservative method to estimate the LOC % from the stoichiometric oxygen required for complete combustion of a substance in combination with the LEL of the product can also be used too.

This starts by writing the balanced oxidation reaction of the product to CO_2 and H_2O. The number of oxygen molecules required in the stoichiometric reaction are than multiplied with the LEL value to get the LOC of the product, using nitrogen blanketing.

Example for Propane : $C_3H_8 + \underline{\mathbf{5}}O_2$ ® $3CO_2 + 4H_2O$

- LEL of propane = 2.2% in air
- LOC of Propane = 2.2 x 5 = 11.0%
- LOC for Propane found in the literature is 11.5 %

LOCs are provided for a specific pressure and temperature of at which the product is present.

If the product is stored at a different temperature the LOC has to be corrected for this process condition. Although the LOC at a different temperature should be determined as the temperature dependency is empirical, it can be estimated by using the following calculation if the given LOC is for 20°C at atmospheric pressure conditions:

$$LOC_{(t°C)} = LOC_{(20°C)} \times (1-0.0014(t-20)) \times 293/(273+t) \quad \text{(Pr EN 12753)}$$

Note that the use of nitrogen may also have an unwanted side-effect. The oxygen-deficient atmosphere can result in the formation of pyrophoric iron sulphides or other pyrophoric materials.

Designing Nitrogen blanketing system

Nitrogen blanketing usually requires the permanent

measurement of oxygen in the vapour space of the tank. Paragraph 7.7 of NFPA 69 provides information on the provisions. that should be met. The number and position of the sampling points fro measuring the oxygen concentration must be carefully chosen for result to be representative for the space that should be inerted.

A dedicated pre-alarm and alarm when the oxygen rises to a level which should be of concern and the critical oxygen level should be directed to a permanently occupied control room. These alarms should be set at a well founded value to enable operations to take corrective measures and other necessary actions when the oxygen threatens to reach a level where deflagration becomes may occur.

The Nitrogen supply must be guaranteed at al times to qualify a secure LoD (NFPA 69: 7.3.1). The complete system must be able to deliver the maximum required Nitrogen flow. It can be a challenge to determine the maximum required amount. API 200/ Std 2000/ISO 28300:2008: Venting Atmospheric and Low-Pressure Storage Tanks, can help you with this, as unloading product from a tank may not be the worst case scenario.

Sometimes tanks are individually protected, more often though a group of tanks in a bund are protect by the same system supplying the nitrogen. If these tanks have no cylinder and roof insulation they may be prone to cool down rapidly during a summer hail storm. Under these conditions all the tanks start to draw in nitrogen at the same time and the system must therefore be able to deliver this flow. This may the most critical scenario for designing the system.

The system must be designed to have an availability and reliability of at least 99%. The inspection, testing and maintenance regime must reflect this availability and reliability too.

Editor's note: Jeanne van Buren is a senior consultant with Marsh Risk Consulting, based in Rotterdam and consults on specific risks related to the power, energy and (petro)chemical industry sectors. This includes identifying potential hazards, evaluating these hazards and quantifying the associated risks and counselling on risk mitigation and control measures.

For more information contact Jeanne van Buren at Jeanne.vanburen@marsh.com tel. +31 10 406 0600

Job Vacancy

Abu Dhabi, UAE. Safety Officer

RESPONSIBILITIES:

- Daily site tour to the area to identify, workplace hazards (Substandard acts, condition) and to check compliance with HSE plans.
- Daily PTW audit
- Check if HSE precautions are implemented for routine jobs.
- Check if employees are wearing appropriate PPE.
- Random check on H2S precautions implementations in H2S classified areas including H2S training and validity of H2S cards.
- Random check on mobile equipment if they are meeting HSE requirement.
- Audit regularly lists of Fire Wardens and check regularly precautions in fire building.
- Inspect regularly Contractors work place to ensure safe systems of work are in place.
- Recording and reporting any deviation from the HSE practice.
- Participate in JSA.
- Audit safeguarding of machinery, hazardous substances, housekeeping.
- Maintain MSDS up to date.
- Prepare daily and monthly reports.
- Carrying out periodic inspections and prepare inspection reports.
- Taking part all Accident/Incident/HSE Observation investigations, introducing safety initiatives and awareness campaigns inspecting the site work on a daily basis.
- Checking that corrective measures are implemented.
- Assist line management in Toolbox Talks.
- Reporting HSE Observations.

REQUIREMENTS:

- Nebosh in occupational Heal & Safety.
- Minimum 5 years experience in Oil & Gas industry, experience in construction is an advantage.
- Age below 50 years.
- Sound language skills.
- Familiar with Office Software.
- U.A.E. driving license.

Contact: Sayed Shameem, HR Specialist, email: sayed.shameem@assetco.com

AssetCo

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Oshkosh Corporation

New JOIFF Member Organisation, **Oshkosh Corporation** is a leading manufacturer and marketer of access equipment, specialty vehicles and truck bodies for the primary markets of Defense, Commercial, Access Equipment, and Fire & Emergency. Founded in 1917, Oshkosh Corporation has manufacturing operations in 8 States in the United States of America and in Australia, Belgium, Canada, China, France, The Netherlands and Romania, and through investments in joint ventures in Mexico and Brazil. The company currently employs approximately 13,100 people worldwide.

Oshkosh Corporation Fire & Emergency Segment

The company's Fire and Emergency segment provides custom and commercial fire apparatus and emergency vehicles, including: pumpers, aerial and ladder trucks, tankers, rescue vehicles, wild land rough terrain response vehicles, mobile command and control centers, bomb squad vehicles, hazardous materials control vehicles, and other emergency response vehicles. This segment also offers snow removal vehicles in airports; broadcast and communication vehicles, including electronic field production trailers, satellite news gathering and electronic news gathering vehicles; command trucks; and military simulator shelters and trailers.

Pierce® brand

Under its Pierce® brand, Oshkosh is North America's top fire truck manufacturer. **Pierce Manufacturing** is an Appleton, Wisconsin based manufacturer of custom fire and rescue apparatus and a wholly owned subsidiary of Oshkosh Corporation. Pierce was acquired by Oshkosh in 1996. Pierce Manufacturing was originally founded in 1913 by Humphrey Pierce and his son Dudley as the Pierce Auto Body Works Inc., and concentrated on building custom truck bodies for the Ford Model T. In addition to the main facilities in Wisconsin, Pierce also has facilities in Bradenton, Florida. The Florida facility is a manufacturing site for the Contender and Responder line of apparatus, as well as a refurbishment center.

Pierce Milestones:

1913 Dudley and Humphrey Pierce open an auto and truck repair shop in Appleton, Wisconsin.

1917 Company is incorporated as Auto Body Works and moves to a plant on Story Street to meet expanding business needs. Truck and delivery bodies are built and were the main product well into the 1940 era.

1939 First fire truck bodies built. Duluth, Minnesota, is an early customer.

1948 Doug Ogilvie joins Auto Body Works as a sales engineer.

1956 Work begins with W.S. Darley Company to build firefighting trailers for Minneapolis, Minnesota.

1958 Request for articulating boom with hose strung marks the beginning of Snorkel. Pierce builds bodies for Snorkel.

1960 Doug Ogilvie is elected president. Sales top $1 million.

1970 Construction begins on a 52,000-square-foot manufacturing and offices facility.

1975 Saudi Arabia orders 700 fire apparatus units.

1979 Pierce introduces the Arrow all-aluminum custom cab.

1982 Ground-up production of Arrow cab and chassis makes Pierce a single-source custom fire apparatus manufacturer.

100 ft. Aerial Platform

Pump Test on and early Pierce Fire Truck

1996 Pierce is purchased by Oshkosh Corp.

2000 10,000th custom fire truck is produced.

2001 TAK-4 independent front suspension is introduced.

2006 Velocity cab and chassis introduced. Frontal air bags offered in custom fire apparatus. Increased cab space, storage, safety and visibility, custom designed seats, and ease of routine maintenance are advantages of the Velocity.

2007 Pierce introduces the PUC, eliminating the bulky pumphouse.

2010 First Pierce sales to China.

2011 Pierce introduces the Dash CF custom chassis. Pierce becomes the exclusive North American distributor for Bronto Skylift aerial platforms. China orders 100 Pierce trucks and Oshkosh airport vehicles. Ghana orders 104 custom fire trucks.

The JOIFF Roll of Honour

Pine Pienaar of JOIFF Member Organisation Sasol Shared Services, Secunda, South Africa, has been upgraded by the Institution of Fire Engineers (IFE) from Member of the Institution (MIFireE) to Fellow of the Institution (FIFireE).

Pine has had a distinguished career in the Fire and Emergency Management Sector in South Africa. As well being a Fellow of the IFE, he is a Fellow of JOIFF, a fellow and holder of a platinum member of the South African Emergency Services Institute SAESI, a member/Director of the JOIFF Management Committee and council member of International Fire Engineering South Africa (IFESA).

Pine started his career as a trainee fire fighter in Pretoria Fire Department, rising to station officer. He then moved to Klerksdorp Fire Department where he rose to the position of Assistant Chief Fire Officer – Admin and Fire Prevention. He moved from Municipal Brigades to Industry when he took up the position of Chief Fire Officer of Sasol One, Sasolburg and followed this by entering the commercial sector as Director: Technical and Marketing of the first South African company to introduce the Amerex range of portable and wheeled fire extinguishers as well as a total range of other related equipment into the Southern African market. After 2 years, Pine decided to return to fire protection in the petrochemical field and he took up the position of Chief Fire Officer of Engen Refinery, Durban leaving Engen ater 5 years to take up the position he currently holds, Chief Fire Officer/ Senior Manager: Emergency Management, Sasol Shared Services Secunda, South Africa.

Pine is responsible for the Fire Services of Sasol Secunda, comprising of 12 square kilometres primary petrochemical plant area and 250 square kilometres urban as well as above ground mining areas. The Sasol Secunda Fire Services also respond to transportation incidents on national routes to assist local authority Fire Services in this highly specialised activity of HAZMAT Response and Recovery.

Pine has been an ardent supporter of JOIFF since he first joined in 2002 and has played a major role in encouraging many of the current Full and Corporate JOIFF Member Organisations in South Africa to become members and to participate in the activities of JOIFF.

Congratulations to Pine on the award of FIFireE.

Industrial fire brigades: 'The Dutch approach'

By Kees Kappetijn,

In The Netherlands things are often done differently than elsewhere. For example industrial safety. Equally to other countries it is determined by law that industrial companies handling large amounts of chemicals and dangerous substances must have their own industrial fire brigade. Most certainly however The Netherlands is the only country in the world with government policy on formally appointing companies for such an obligation. Also the regional government determines standards for the dimensions of industrial fire brigades and response-requirements (number of personnel, equipment, vehicles, education & training, response time, procedures, capacity of firewater and foam).

Tank storage facility

Authorities maintain a strict inspection policy to check whether companies comply with fire safety rules. Structural shortcomings in safety level may result in severe corrective measures. In worst case situations (partial) shutdown of the company and individual liability of specific positions (like executive manager or safety -officer) is possible. By this policy the government is in the lead in minimising the risks that industrial companies cause for their surroundings.

The Dutch landscape is much more than water, windmills and tulip fields. Chemical industry, oil terminals and railroad yards are also very common in the little country on the North Sea shores. The geography of river deltas, mainports and modern infrastructure provide ideal conditions for large-scale industry, trade and international transport. Large seaports are in operation in Rotterdam (100+ companies COMAH/BRZO), Amsterdam (largest gasoline-hub in Europe), Terneuzen (Dow), Vlissingen (Total) and Delfzijl (Akzo).

Legislation: BRZO (COMAH) and ARIE

The combination of high-risk industry and a densely populated urban environment is quite a challenge for public safety. Therefore hundreds of companies under COMAH/BRZO-legislation are carefully checked on measures taken to manage safety risks and prevent casualties outside the company perimeter during incidents. COMAH/BRZO-policy applies on about 430 companies. Some 250 of those are high-tier COMAH-companies, while 180 are known as low-tier COMAH-sites. An additional 120 companies are under less stringent safety regulations, known as 'ARIE'. Not as high-risk as the COMAH-sites but yet a category that justifies the need for additional risk inventory & analysis. This ARIE-category includes 30 railroad yards and numerous container terminals in which large amounts of chemicals are handled and re-adressed. All these companies could be selected for an industrial fire brigade evaluation. Since the beginning of execution of this legislation in 1991 (former article 13 Fire act 1985) some 140 companies are formally appointed for such an evaluation. In the years to come the number is expected to rise to 180.

Safety Regions Act

In the Netherlands public safety is organised in 25 geographical 'safety regions'. Safety regions are platforms of co-operation between municipalities, fire brigades and ambulance services but the safety regions are also network organisations for risk management and crisis preparation. The safety region board consists of the mayors of the communities within the region and is responsible for the safety level. Safety policy and operational response organisation are based upon a regional 'risk profile', an analysis of all vital risks and vulnerabilities in the area. There is a great variety of risk profiles depending on geographic and demographic characteristics and infrastructure. Some parts of The Netherlands are particularly vulnerable to natural disasters like flooding or wildfires, while in other parts transportation accidents and chemical incidents are highly ranked on the risk-list.

Industrial fire brigade report

Managing industrial risks is primarily the responsibility of individual industrial companies. Typical for the Dutch approach however is the role of local and regional authorities in the preparation process of industrial fire fighting. Article 31 of the Safety Regions Act is the carrier of the entitlement to appoint a company for a formal fire brigade. Paragraph 7 describes the process companies have to face in order to determine whether they have the legal obligation to maintain that fire brigade or not. The boards of the safety regions check companies in their working area for certain criteria. Article 31 of the Safety Regions Act applies on companies in the COMAH/BRZO and ARIE-category as explained earlier in this article. Those companies have to make an industrial fire brigade report, describing the characteristics of the firm, production processes, chemicals used and their safety risks, volume of hazardous materials in store and all preventive measures taken to prevent accidents and minimise effects. Specific in this type of legislation is the fact that companies are not allowed to downsize a specific risk to a minimum-level and categorize it as not important. The formal methodology uses reference-scenarios, which means that, if a specific industrial setting is available on the location, an incident-scenario has to be outlined.

The next step is a translation of the on-site available reference-scenarios into 'credible scenarios'. What types of

incidents can occur and what is the impact and the credible range of effect in terms of damage and casualties? In any case casualties outside the perimeter of the firm should be prevented. A checklist of reference scenarios is used to avoid that incident scenarios are rejected too easily because risk analysis 'proves' that the chance for a certain event to happen is extremely small.

For credible scenarios the following criteria apply:

- Incident scenarios must be realistic and typical for the site;
- Scenarios must have negative impact on people and buildings/installations outside the site-perimeter,
- An on-site emergency response organisation must be capable to de-escalate the scenarios.

High capacity pumping: 2x 37.5000 liter, joint investment by tank terminals and municipality in Rotterdam

Once the credible scenarios have been established, a selection is made for so-called normative scenarios. What type and volume response capacity is needed to manage typical incidents in the company? One normative scenario can be the basis for several variables, or more normative scenario's can be appointed.

If the industrial fire brigade report (which is made up by the company itself) "proves" that an in-company fire response organisation is necessary to limit the impact of incidents on the surroundings of the company, the regional safety board can formally appoint a company for a company fire brigade based on a minimal set of requirements (personnel, equipment, readiness and response time, fire water capacity and foam etc). Appointments can vary between basic team size of 5 positions (container terminals for example) to 14 (refineries) and even 19 (chemical cluster with 48 joint BRZO-companies).

From scenarios to response organisation

The role of the Safety Regions Board is limited to appointing a company as obliged for a company fire brigade and determine the demands that have to be met. It doesn't tell companies how to organise the fire fighting service. There is no blueprint for organisation, capacity and operational tasks. Each industrial fire service has specific needs based upon the type of company and location.

There is a wide variety of options. Such as recruiting a voluntary fire service consisting of personnel of production units and other company-branches. A second option is to raise a dedicated professional fire brigade which is stand-by 24 hours a day and 7 days a week. An interesting option is outsourcing the first fire response to a service provider that is already on site for technical or facilitative services, a solution especially fit for companies with a high-risk profile but limited labour resources. 'Rent a fire brigade' based upon a service level agreement between company and provider. For example in The Netherlands a main rail road yard near Dordrecht-Rotterdam, size over 5 km and 50 lanes wide, has a contract with a large international provider for the first fire response.

A specific model in industrial fire brigades is a collective organisation for a cluster of companies, enabling those companies to act in accordance with the legal requirements for fire safety without having to make expensive investments individually. A collective industrial fire brigade can be provided either by companies together as a mutual service, or by government and industry in public-private partnership. The PPP-model is implemented is several industrial areas. The Rotterdam port and industry area has a public-private industrial fire brigade since 1997. Seven fire stations provide mutual fire service, first aid & rescue and technical assistance service on both 60 BRZO-sites and in the public domain of the harbour and 2 suburban areas with tens of thousands of inhabitants. The City of Rotterdam and the participating companies have agreed on a singular organisation with one management and board and joined finance-model for the exploitation.

Confidence

What does the Dutch administration do after appointing companies for an industrial fire brigade? Just rely on responsible company managers saying they will realise and maintain the required organisation? No, frequent inspection proves to be essential for industrial fire safety. Environmental Inspection and Labour Inspection are the dedicated authorities for industrial safety but the Safety regions can also apply inspections on industrial sites to check whether preventive measures and response capacity still fits with the actual risk levels. Companies with an industrial fire response

Article 31-appointment: water and foam capacity on wheels, response: time 6 minutes

organisation have to prove frequently that they are properly prepared and equipped. An industrial fire brigade management system is a valuable instrument for companies to prove the quality of their organisation. For example to prove that all personnel has had the necessary education and training and equipment and stationary provisions are maintained, tested and certified according to the rules.

Article 31-dilemma: balancing the interests of possible large industrial scenario's in public space

Companies look sharply upon the relation between risks and response organisation. Exploiting an industrial fire brigade is expensive while luckily initial response figures are relatively low. For that reason there is a trend within companies to look for smart solutions to provide fire safety without a large equipped response service. For example by choosing for stationary water/foam systems in high-risk process installations or tank storage sites. A solution that might be more cost-effective than a long-term investment in a dedicated company fire brigade with manpower, trucks, equipment, training and education. On the other side an operational response organisation can be more flexible than stationary systems. A combination of both, well balanced, might be the best option for many companies.

The government agrees with smart solutions like stationary systems, but companies must prove that those solutions are effective. Systems must be certified and inspected according to maintenance schedules, based on branch guidelines. With proper stationary systems and preventive measures companies can rely on a more compact first response organisation. At the same time government services must have confidence that company managers take their responsibilities and fulfil their legal obligations. Public safety relies on joined efforts of industry and government. They have a shared interest in preventing industrial fires raging out of control or chemical incidents causing widespread environmental damage and health risks.

The big question is: does the policy of Dutch authorities regarding industrial firefighting lead to a higher safety level and does it justify higher costs? Hard to say yet. These are some facts: based upon the Safety Regions Act appointed companies have a better instrument to prepare for the local specific credible incident scenarios. Companies have considered their risks in terms of incident-scenario's and necessary preparation to match these risks. Another fact: due to the Safety Regions Act co-operation between public and company fire services has improved considerably. The often used way of thinking "incidents inside the fence are ours, those outside are yours" is definitely old school. Training, preplanning, knowledge-sharing is more and more a joint effort. Last but not least, policy has made company fire services on industrial sites more transparent and measurable. This positively feeds the feeling of confidence in safety in The Netherlands, where industry constantly has to manage here license to operate to the community. If "a higher safety level" can be expressed in these terms, the answer is yes.

Editors note: Kees Kappetijn is an independent consultant and safety specialist for public and private organisations with Seveso-dilemmas that have to prepare for large incident and disaster scenario's and must dimension, organise and train their emergency response organisations and crisis management teams. He is a member of the JOIFF Management Committee (www.keeskappetijn.nl)

100 ft. Aerial Platform from Oshkosh Corporation

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Fire protection solutions in data centres

By Alan Elder

The potential for fires in data centres is great. With thousands of servers and other electronic equipment constantly in operation, the risk of a fault occurring and sparking an electrical fire is not insignificant.

On July 2, 1959, a fire started in the United States Air Force computer room inside the Pentagon. The fire burned for more than five hours and caused an estimated $7 million in damages. (Arlington Fire Journal, February 11, 2005) Following this, the NFPA developed the first edition of NFPA Standard 75, Fire Protection for Electronic Data Processing Equipment, which has been continuously updated, and now forms the basis for fire protection regulation in data centres across the world.

Specialist equipment

When considering options for a fire protection system in a data centre, it is important to identify the outcomes that are needed for the business. Of course, the principal requirement is to install a system that can extinguish a fire and protect the occupants. However, other consequences to examine are the potential for data loss and how fast the data centre can be returned to normal operation once a fire suppression system has been activated. For example, the use of water-based solutions could lead to irreparable damage to servers and the loss of irretrievable data, meaning that it could take weeks or even months for the centre to return to full operational capacity.

Data centre fire suppression

In a society so reliant on electronic data, it is not an option for valuable data to become corrupted or unavailable for a long period of time. Companies cannot afford downtime, so a fire suppression system that both extinguishes a fire safely and quickly, while at the same time protecting expensive data and valuable equipment offers the best solution.

Halocarbon vs inert gas suppression

The principal gaseous systems suited to data centre protection are those using halocarbon agents or inert gases, otherwise known as clean agent systems. Developed with the protection of contents and data in mind, clean agent systems are custom engineered to suppress a fire before it takes hold. They can also facilitate a much shorter recovery time, allowing businesses to return to normal operation more quickly. These systems generally work by either absorbing the heat or depriving the fire of oxygen, depending on which type is used, and are particularly suited to suppressing fire in situations where electronic systems cannot be shut down in an emergency and clean-up of agents is not an option.

Halocarbon agents

Halon 1301 used to be the clean agent of choice for fire suppression in facilities containing electrical hazards, as it quickly and effectively extinguished fires without damaging equipment, and was also safe for the building occupants. However, from 1994 production stopped as it was found to be an ozone-depleting chemical. The fire suppression industry has therefore had to develop more environmentally-friendly solutions in order to comply with regulation and meet market trends for more ‘green’ products.

An important advantage of modern clean agent systems is the safety they provide, not just for data and equipment, but also for people and the environment. This focus on green, sustainable and safe solutions has led to the development of products such as the SAPPHIRE 42 bar system which uses 3M™ Novec™ 1230 Fire Protection Fluid. The clear, odourless and colourless fluid vaporises upon discharge, absorbing heat and suppressing the fire rapidly. Used at concentrations between 4.5 and 5.6 per cent, depending on the design code, it is well below the 10 per cent maximum concentration for safe exposure. In addition it has zero ozone depletion (ODP), a global warning potential (GWP) of one and a five-day atmospheric lifetime, while other clean agent systems using HFCs it can be 30 years or more. It is clear that such systems are safe for occupied spaces and offer significantly improved environmental benefits.

The SAPPHIRE 42 bar system is designed to work at pressures of 42 bar, offering greater flexibility, and discharges in 10 seconds, significantly reducing the damage caused by a delayed response. With extensive coverage provided by each nozzle, the system has reduced pipework requirements, facilitating

IT Server Room - data centre article

installation and providing a more cost-effective solution thanks to reduced material and labour costs. In addition, there is a small footprint for the cylinders, reducing the need for a separate storage room. The high pressure system is particularly suited to applications which contain multiple risks and benefit from protection via a central storage location. Selector valves cover several areas from a single point, creating a space-saving and potentially more economical solution, as well as the possibility of more remote storage container locations.

Speed is of the essence when tackling any fire, so clean agent systems such as the SAPPHIRE 42 bar, which are capable of automatic detection and actuation, provide a significant benefit and ensure continued, efficient protection 24 hours a day, 365 days a year. In addition, the system fully meets

EN12094 standards and the requirements of EN15004, and has gained LPCB and VdS approvals to ensure full compliance.

Expert solutions

At Tyco Fire Protection Products, experienced technical teams can provide design support to ensure that the most suitable solutions are in place for each application. With over 20 years protecting data centres they can help a company select, design and install a bespoke system of standardised components that best services its requirements. Any business planning to install these systems must understand how the system integrates into the building design. In this way, involving specialist companies, such as Tyco, from the earliest stages of the design process is invaluable and can often lead to a more cost-effective solution.

Summary

There are clear benefits to using clean agent systems and manufacturers and suppliers can offer the best advice and guidance when selecting the right product. The benefits in terms of speed, effectiveness, reduced downtime and safety to people and the environment have meant that these systems provide an effective and reliable solution for fire protection in data centre applications.

Editor's note: Alan Elder is Director of Engineered systems, Tyco Fire Protection Product.
Tyco Fire Protection Products is a strategically aligned business unit of Tyco with globally recognized products sold under leading brands, including ANSUL, AQUAMIST, CHEMGUARD, DBE, EZCare, FIRECLASS, FLAMEVision, GRINNELL, HYGOOD, KWIKSTRUT, LPG, MCS, NEURUPPIN, PYRO-CHEM, RAPID RESPONSE, SABO FOAM, SHURJOINT, SIMPLEX, SKUM, SPRINKCAD, THORN SECURITY, TOTAL, VIGILANT, WILLIAMS FIRE & HAZARD CONTROL, and ZETTLER. Tyco Fire Protection Products designs and manufactures fire detection and suppression systems, portable extinguishers, extinguishing agents, sprinkler systems, valves, piping products, and fittings, and mechanical building construction solutions for commercial, industrial, institu-tional, governmental, and residential customers. Heavy emphasis is placed on research and development, resulting in innovations and global approvals. For more information, visit www.tfppemea.com.

PIPER ALPHA - PART TWO

Lord Cullen, the judge who led the investigation into the tragedy made 106 recommendations, all of which were adopted by the industry.

In June 2013 the European Union adopted a Directive on safety of offshore oil and gas operations which will make sure that the highest safety standards will be followed at every oil and gas platform across Europe. The new directive sets clear rules that cover the whole lifecycle of all exploration and production activities from design to the final removal of an oil or gas installation.

To date the Piper Alpha incident is rated as the world's worst offshore oil disaster in terms both of lives lost and impact to industry. Since the disaster, the safety of the North Sea has improved beyond all recognition but why does it almost always take the loss of life and property for effective safety systems and controls to be implemented..??? (part 1 on p2)

JOIFF TRAINING NOTES

"TRAIN AS IF YOUR LIFE DEPENDS ON IT,

BECAUSE SOMEDAY, IT MIGHT!"

JOIFF accredited training is within a Competency Based Training framework and involves not only course content, as also critical to the effective provision of training are the facilities of the training provider/training establishment and the capabilities of the instructing staff. JOIFF has developed systems of accreditation for training providers and minimum instructional requirements for Instructors.

All students who successfully complete a JOIFF accredited course/ programme are issued with a JOIFF Certificate of Competence which has its own unique number. Records of all successful students and the courses in which they qualify are retained. There is growing recognition worldwide of the JOIFF Certificate of Competence which is coming to be regarded as a passport to the level of employment and rank which an emergency responder's qualifications enables and entitles them to deserve.

For further information about JOIFF accredited on-Site Competency Based Training Programmes, the range of Fire Service NVQs and any other aspect of JOIFF Training, please contact the JOIFF Secretariat.

JOIFF Accredited Course	Dates	Venue / Organiser
Confined Space Entry Training	As required	On your own site. For further information contact arcfiretraining@ntlworld.com
Fire Incident Command Course (5 Days)	08th – 12th July 16th – 20th September 11th – 15th November	Falck Risc, Rotterdam, Netherlands Email: r.deklerk@falck.nl
Fire Team Leader Course (4½ days)	28th October – 1st Nov.	Fire Service College Ltd. Moreton-in-Marsh, UK Email: enquiries@fireservicecollege.ac.uk
Fire Team Member Course (4½ Days)	3rd – 7th June	
Site Incident Controller Training (1 Day)	3rd September 18th November	Sembcorp UK Protection Group Headquarters Wilton, UK Email: judith.wong@sembcorp.co.uk
Site Main Controller Training (1 Day)	11th October	Sembcorp UK Protection Group Headquarters Wilton, UK Email: judith.wong@sembcorp.co.uk
Combined Site Incident Controller, Site Main Controller & Support Personnel (1 Day)		Sembcorp UK Protection Group Headquarters Wilton, UK Email: judith.wong@sembcorp.co.uk
PERO (1 Day)		Sembcorp UK Protection Group Headquarters Wilton, UK Email: judith.wong@sembcorp.co.uk
Fire Team Member Course (4½ days)	10th March – 14th March 2014	Fire Service College Ltd. Moreton-in-Marsh, UK Email: enquiries@fireservicecollege.ac.uk
Fire Team Member Course (4½ days)	10th March – 14th March 2014	Fire Service College Ltd. Moreton-in-Marsh, UK Email: enquiries@fireservicecollege.ac.uk
Fire Team Leader Course (4½ days)	16th June – 20th June 2014	Fire Service College Ltd. Moreton-in-Marsh, UK Email: enquiries@fireservicecollege.ac.uk

These dates have been provided by JOIFF accredited training providers. If the dates are not suitable for you or your own specific training requirements are not listed below, contact the JOIFF Secretariat.

Diary of Events 2013/2014

July

10 – 11	Ambulex 2013, Coventry, UK
10– 11	Institution of Fire Engineers AGM and International Conference, Stratford-on-Avon, UK

August

13 – 17	International Association of Fire Chiefs Conference and Exhibition, Fire-Rescue International, Chicago, USA

September

3 - 5	Emergency Planning for Major Accident Hazards, Abu Dhabi, UAE
11 – 12	Hazards in Extreme Process Conditions, FABIG, UK
17 – 19	Tank Storage Forum, Sao Paulo, Brazil
24 – 26	Storage Tank and Associated Facilities Fire Hazard Management Workshop, Kuala Lumpur,Malaysia
25—26	Emergency Services Show, NEC, Birmingham, UK

October

8 - 10	Fire and Gas Detection Principles, Aylesbury, UK
17 – 19	Commercial Security and Fire Expo, Shanghai, China
22 - 24	Fire Systems Testing and Integrity Assurance, Kuala Lumpur, Malaysia
30 - 31	Practical Hands on Storage Tank Fire Fighting, Asturias, Spain

November 2013

12 - 14	Fire Systems Testing and Integrity Assurance, Abu Dhabi, UAE
26 – 28	Securex Libya, Tripoli, Libya

January 2014

19—24	Intersec Fire Systems Testing and Integrity Assurance, Dubai, UAE

Please contact the JOIFF Secretariat with details of any event that you think that JOIFF Members might be interested in attending.
Note: *The Catalyst is not responsible for the accuracy of dates and / or venues announced. This is based on information given to the Editors and is published in good faith.*

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