



Protection minefield

The impact of fire and the need for fire protection were addressed by experts from the fire world during *IFJ*'s filmed roundtable discussion in London in April. Lotte Debell reports.



Understand the objective of the system; take a holistic approach to protection; and work with a consultant who can help guide you to the supplier and the solution that best meets your needs – these were some of the key messages aimed at end users looking for the right fire protection system.

Too many business owners still view the purchase of fire protection systems like car insurance and buy the cheapest possible because they hope never to use it. This attitude only exposes businesses to further risk and the very real chance that if there is a fire, the system either will not work or it could even lead to as much damage as the fire itself. The costs in either event could be crippling.

To help industrial customers navigate through the fire protection minefield, *Industrial Fire Journal* gathered a panel of experts to take part in a roundtable discussion on fire protection systems, sponsored by 3M.

Joining event facilitator Paul Hutton and *IFJ* editor Jose Sanchez de Muniain were Bart Goeman, business development manager, EMEA, at 3M, Alan Elder, Tyco Fellow, Engineered Systems and Johnson Controls, Graham Turner, MD of Bryland, Peter Eisenberger, head of product support, gaseous systems, Minimax GmbH/Viking EMEA, and Chris George, MD of Falck Fire Consulting.

Left to right:
Alan Elder,
Graham Turner,
Bart Goeman,
Paul Hutton,
Jose Sanchez
de Muniain,
Peter Eisenberger,
Chris George.

The impact of fire

3M's Bart Goeman was quick to point out the dangers of the mindset often described as, 'it will never happen to me', quoting insurance statistics showing that around 70% of businesses with no fire protection will never reopen after a fire. "They may have lost all their data, or it might take too long to get online again, or maybe their customers went to another supplier... This is why we always make the case for ensuring you have proper protection."

And for facilities tempted to rely on back-up or redundant systems that are designed to kick in should a fire occur, Alan Elder from Johnson Controls had a sobering message: there is a real risk that these systems will not work if a fire occurs. This is something that Johnson Controls has observed from analysing events, and Elder said it is very important that people are aware that back-up systems may not work as intended.

The potential impact of fire is made worse by the fact that many companies are consolidating their facilities in one location, and the potential cost of a fire can run into the tens of millions as a result. Which is why, said Elder, it is vital that businesses consider not only the impact of a fire but also the impact of a fire suppression system and choose the most appropriate solution.





As Peter Eisenberger put it: "Water can extinguish almost any fire, but if the water causes the same amount of damage as the fire, it is time to think of an alternative."

There is no one-size-fits-all solution, agreed Falck's Chris George. A variety of different solutions might be required within the same facility, especially now these facilities are becoming so big. "What we often see is an emphasis on protecting critical rooms and critical data, whereas the fire protection philosophy holds that the whole facility should be protected."

Sprinklers, water mist, gaseous systems – all these have a place in the protection of a facility, said Elder. "Sprinklers save lives; that is an undisputed fact. But whether a sprinkler system is the ideal solution for the hot areas of the data centre is a different discussion. A holistic solution for a data centre will often have a mix of sprinklers and clean agent systems."

One such clean agent is Novec 1230 from 3M. Stored in liquid form, it becomes gas when the system is activated and works by rapidly cooling the fire. Like other clean agent systems, it is ideal for facilities such as data centres because it leaves no residue. "After the event there will be no trace of it, and no clean up," said Goeman. "This is the fundamental point with clean extinguishing agents – they protect your business and your safety."

"Do companies understand that the greater the risk to their business, the greater their need for this enhanced protection?" asked Hutton. 'Not really' was the general consensus. And as Bryland MD Graham Turner pointed out, for data centres processing huge amounts of data in a small space of time, speed is key. "If you have a suppression agent that isn't going to deal with the fire quickly, and that causes downtime, the consequential loss for that client can be phenomenal. It is vital that the fire is detected and dealt with quickly. Novec 1230 offers that capability."

Regulation and its impact on fire protection

One of the main impacts of regulation has been on the agents themselves. As Goeman neatly summarised, halon was the initial fire suppression agent and it was very effective, but it was phased out because it had a significant impact on ozone depletion and global warming. Then came the second-generation products, mainly HFCs, which did not cause ozone depletion but were still guilty of global warming. HFCs are now in phase-down mode – it might take a few years, but they are on their way out. Now we are on the third generation, including synthetic agents like Novec 1230 and inert gases.

However, with this history of phased-out agents, how can business owners have confidence that the system they install won't be regulated away at some point in the future?

IFJ's Jose Sanchez said that, in his experience, installers and fire engineers are steering well clear of HFCs, even if they will remain legal for some years. "The message is very strong – don't risk it. There are plenty of alternatives out there."

HFCs are no longer commercially viable anyway, said Turner, as prices are rising rapidly. And a lot of HFC systems are coming up for their ten-year recertification, which poses an issue for business owners. "It is not a practical proposition to replace those HFCs with inert gases to run on the same pipework. However, if you have the correct drawings for the installation, it is feasible to use Novec 1230 as a drop-in replacement using 70-bar technology, provided you change the nozzles and ensure all the pressure calculations are correct. This is a fantastic tool for data centres."

But will Novec 1230 be around for the long haul, or will it too fall foul of future environmental concerns? The fact that Novec is a chemical agent does prompt questions about its longevity, said Goeman, but 3M is confident there is no cause for concern – so confident, in fact, that Novec 1230 has a 20-year warranty.

"Novec 1230 breaks down in five to seven days on contact with UV light rather than remaining stable in the atmosphere for years," Goeman explained. "There is no risk of ozone depletion and no impact on global warming. We issued the warranty to reassure the market. If it is later discovered to be damaging to the environment, end users will be compensated. But we are 100% certain that will never happen."

"So can Novec 1230 solve the problem of existing systems that have become obsolete through regulation change?" asked Hutton.

"It can do," said Turner. "Right now we are seeing data centre owners in many industrial applications having to completely re-engineer and replace ten-year-old HFC systems. That can be very expensive. Using the Novec 1230 product could be more economically viable."

But there was a note of caution from Chris George who wanted to know how such a situation will be policed. "There are unscrupulous contractors out there, and when clients put these jobs out to tender they are not necessarily selective about who the contract ends up with. So how do you know



Clean agent systems such as Johnson Control's new 70-bar Sapphire Plus enable the use of fewer cylinders. Top: the cost of a gaseous system in a data centre is usually less than 1% of the equipment it protects (image: Shutterstock).



these re-engineered systems and retrofitted nozzles will be properly installed?"

"Third-party certification for installers is absolutely key," replied Turner. "I can't stress enough the importance to system owners that they should deal only with reputable fire companies that have the necessary knowledge, expertise and skills to install the systems and maintain them correctly. Third-party certification is a policing tool that enables us to ensure that the system, when it is required in anger, will be correctly deployed."

"But don't rely on paperwork," said Sanchez. Certifications are all very well, but they are no use if the system doesn't work when needed, and anecdotal evidence from the insurance industry suggests that many do fail. "Make sure you test the system for yourself or with your insurance company, because you never know," he said.

"The standards we have in place now in Europe – EN15004 and EN12094 – are as robust as they have ever been," added Elder. "But it is the marrying of those standards together with the processes used to apply them, audited and checked by a reputable third party and the notified bodies, that ensure you have a robust system."

Standards and approvals

The appropriate BS and EN standards must be referenced whenever a system is specified, said Elder. EN15004 leads the way for system design, and EN12094 is a component-by-component set of standards designed to comply with the construction production regulations. These do not constitute a fire protection system in themselves.

"The components that make up the system should be tested and certified according to EN12094, then the system, including design, installation, maintenance and the testing, should be done in accordance with EN15004."

However, as Hutton pointed out, business owners are not experts. They are not the ones specifying the system. How can they trust the specifier and who should be checking the specifier? The insurance company? A third-party?

Your first step in the UK, Elder explained, is to check that the company is a member of the FIA and to ensure they are applying EN15004. Then look for the installation certification, whether that is BAFe or LPS 1204. "That way you have full traceability of all aspects of the planning, design, installation or maintenance."

Yet it is still a minefield, which is why working with a consultant is essential, argued Eisenberger. "I have seen many companies that think they have a working system, or they tell you it is CE approved. There is no such thing as a CE-approved system; there are only CE-approved components. And these could be from several companies, all

put together in a sprinkler system, and nobody ever checks that all these components actually perform together in a test scenario. The only insurance is to work with someone who guides you through the process and helps you to select the right company."

It also comes down to how much companies are prepared to spend, said Goeman. "A fire protection system is like an insurance policy, and when you buy a car, you want the cheapest insurance you can find. It's the same with fire protection systems, but then you end up with commodity agents, commodity components, and no system approval. It ticks the boxes, but whether it works or not is a different question. Customer education is key. We need to be more proactive about going out into the market and explaining to customers what they need to be properly protected."

Lack of awareness is arguably linked to the dearth of publicity around successful incidents of fire suppression, of which there are many. Perhaps unsurprisingly, owners of data centres and other facilities do not want to publicise the fact that they have suffered a fire, with the result that many end users simply have no concept of just how often these fires occur. Some may also believe they can rely on the fire service if anything did happen, but the primary concern of fire services is saving lives, not data. "And we all know that water and electrical components do not make a successful mix," said Turner. "Whereas a clean agent system, correctly engineered, can avert disaster."

"But how does the buyer balance cost and risk?" asked Hutton. "Customers may understandably be of the view that they need to keep the system as economical as possible because they hope never to use it."

Eisenberger argued that the cost of a gaseous system in a data centre is usually less than 1% of the value of the equipment it protects, but he added that there are additional costs to installing or maintaining a system that people often forget. "For example, if you have a room with no outside doors, it can be costly to install a duct to the outside. With the Novec 1230 system, you can utilise the existing air conditioning system."

Total cost of ownership also encompasses unit costs, cylinder storage, real estate costs, maintenance and recharge over the lifetime of the system. In terms of cylinder storage, Novec 1230 offers an advantage over other systems as it lends itself to a modular system, Turner explained. "This means you can make use of space that might otherwise not be used. If you need a dedicated cylinder store that impinges on lettable space, the financial cost can be quite significant."

What are the options?

There is no single solution in fire protection. In addition to sprinklers, water mist is an emerging technology that is very effective in the right circumstances, and where water is not appropriate, gaseous systems including inerts and clean agents can be used. There are even hybrid technologies such as nitrogen and water mixes. The right solution in each case depends on the key criteria for that end user and the principle objective of the system.

"Is it to extinguish the fire, to suppress the fire, or to control it?" asked Elder. "When you identify this objective, it begins to guide you to the solution. Water-based systems are very good at controlling and suppressing fire, and clean-agent systems like Novec 1230 are extremely efficient at extinguishment. That's the principle purpose of installing such a system."

Gaseous systems such as Novec 1230 are so effective at extinguishment because they function in three dimensions. "That means you let them go, and they go everywhere," said

Around 70% of businesses with no protection never reopen after a fire. (Image: Shutterstock)





Goeman. "A water particle, no matter how small, still has mass and that means it will go down – it functions in two dimensions. As a result you will have reduced penetration of small openings, and this has an impact on effectiveness."

An added consideration for a data centre, in particular, is the fact that water and electronics are not a happy combination. "Even if you use deep ionised water or distilled water, it is still water," said Goeman. "And by the time it reaches and sits on electronics it will no longer be deep ionised water."

Looking to the future

Regulations have changed, some substances have been outlawed, new technology has been developed. So, what's next for fire protection?

The fire industry is a conservative one, agreed panellists. Unlike some other industries, it has a long innovation cycle, but it is possible to discern future trends. For example, Eisenberger pointed to a strong focus on making systems smaller, more flexible and more effective. Improved connectivity and remote servicing and diagnostics is another key future trend, said Elder.

"Currently we have mechanical systems that need a lot of mechanical intervention if there is an issue, and as we go forward I think we will see more systems that interface electronically with the service provider, which can be notified instantly if something goes wrong. We will go from two interventions when there is an issue to just one."

"The fire industry is struggling a bit with the smart world," agreed Sanchez, who said that some big companies are taking the initiative and developing their own cloud-based connected fire protection systems rather than waiting on the industry to come up with a solution. "Projects like this are leading the way and organisations like the NFPA are now listening and developing standards in this area. However, it will probably take another 10 to 15 years to get there."

Sanchez added that he believes environmental scrutiny will also continue to tighten. "If we look at fire extinguishing agents in general, foam is going through a tough time and some types have even been outlawed in certain places. Then there are the REACH Regulations and closer scrutiny of the ingredients in fire extinguishing and suppression agents. As science catches up, I think this will increase."

There may even be advances in detection, one of the most important aspects of fire protection. Part of the clean-agent approach is about ensuring that the system detects and deals with a developing issue before it becomes a fire and starts to cause damage. This means no downtime and no clean up.

"Historically clean agent system were deployed in spaces where still air existed," Elder explained. "The detection system would sense an incident and shut down the air handling system in the room. However, modern data centres can't exist without high airflow, and we need to take that into account when designing systems. Right now, people are protecting these facilities in a very traditional way, by putting discharge nozzles in each of the separate volumes. I feel it is worth further research to understand whether these airflows can actually be used to aid the distribution of gas."

A challenge for the industry is to bring all the methods of detection together into an accepted standard, said Eisenberger. "This is something we have to push more, and it is why representatives of the industry are sitting on various committees to convince authorities, insurance companies and consultants to be more open and holistic in their approach."

A more holistic approach is exactly what's needed, agreed Turner. "There does need to be some coordination between all the stakeholders and the fire suppression industry.



CO₂ extinguishing cylinders in a thermal power plant.

Unfortunately, that is just not happening at the moment."

It might not be happening at that level, but Elder believes there is an increasing degree of interaction between the fire system providers and the users of those systems. "Certainly, the data centre community is very much involved in the development of the data-centre fire protection standard. And we have EN50600, a data centre standard that includes sections on fire protection and helps guide the user to the right system."

Ultimately, said Goeman, it is important that every company carries out a proper hazard and risk analysis and determines exactly what it is that they want to achieve. "Work with a consultant, approach multiple suppliers, and find a solution that suits the end risk. Novec 1230 will not be the solution for every risk, but we are trying to commercialise it only through companies that are fully compliant with standards and design, so that we know that wherever it is ultimate installed, it will do exactly what it is supposed to do."

The name in Safety, Rescue and Survival.

- Stretchers
- Stretcher Kits & Accessories
- Evacuation Chairs
- Backboards
- First Aid
- Fire Blankets

3121 Millers Lane
Louisville, KY 40216
Tel: 502-775-8303
Fax: 502-772-0548
Toll Free: 888-458-6546

JUNKIN
SAFETY APPLIANCE COMPANY
www.junkinsafety.com