



Justice and Home Affairs Committee

Corrected oral evidence: Fire safety in prisons

Tuesday 23 June 2026

11.35 am

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Members present: Lord Foster of Bath (The Chair); Lord Anderson of Ipswich; Lord Bach; Baroness Bertin; Baroness Buscombe; Lord Dubs; Lord Empey; Baroness Hughes of Stretford; Lord Moraes.

Evidence Session No. 4

Heard in Public

Questions 53 - 63

Witnesses

[I](#): Alasdair Perry, Chief Executive, British Automatic Fire Sprinkler Association; Richard Cebreiro, Technical Committee Chair, British Automatic Fire Sprinkler Association; Derek Killaspy, Managing Director, Fireworks Fire Protection Ltd.

USE OF THE TRANSCRIPT

This is a corrected transcript of evidence taken in public and webcast on www.parliamentlive.tv.

Examination of witnesses

Alasdair Perry, Richard Cebreiro and Derek Killaspy.

Q53 **The Chair:** Welcome to this session of the Justice and Home Affairs Committee's inquiry into fire safety in prisons. We are grateful to our three witnesses for joining us today. Before we begin, can you please introduce yourselves?

Alasdair Perry: Good morning. I am the chief executive of BAFSA, the British Automatic Fire Sprinkler Association. We represent around 230 companies. Of the sprinklers fitted in the UK, our companies fit around 90% by value of systems installed. My background is that, prior to joining BAFSA three years ago, I was in the Scottish Fire and Rescue Service as a deputy assistant chief officer. I ended up in charge of prevention and protection.

Richard Cebreiro: Good morning. I am the technical chair at BAFSA. I facilitate its technical committee, which looks at the new codes and new implementations coming into the industry. My background is in designing automatic fire suppression systems, with mainly water-based and foam-based protections. I have been in the industry for nearly 40 years as a consultant and working on the oil refineries, so I have a broad base.

Derek Killaspy: I am the CEO of two fire protection companies in the UK: Fireworks Fire Protection Ltd and a company called Hydramist. We manufacture and install the majority of the water mist fire suppression equipment that is currently installed on the HMP estate in England, Wales and Scotland.

The Chair: Thank you very much indeed. We will kick off with a question from Lord Anderson—sorry, Lord Moraes. It was quite fun to see Lord Anderson's face there.

Q54 **Lord Moraes:** I want to kick off with a basic question. How do the three of you see prisons currently managing fire risk, and what happens when there is a fire?

Richard Cebreiro: At the moment, among the assets, it is a mixed bag. A number of prisons have already had sprinkler protection installed, which gives you an immediate fighting ability on any fire that is generated within the asset. A number of prisons do not have any automatic systems installed, where it is based on manual handling—handheld extinguishers and the like. There is a reaction lag when it comes to handheld extinguishers, of course, because sprinklers are an automatic system and they operate very quickly in the environments that we are looking at in prisons. I do not know what the percentages are between the two, but I know that a number of detention centres that were built about 20 years ago were provided with sprinkler systems. I can only assume that the new prisons that are built nowadays are fitted with sprinkler systems, or another method of fire protection, automatically.

Derek Killaspy: New prisons are fitted with a new type of sprinkler system, which is referred to in the industry as water mist. These systems work at a much higher pressure than conventional sprinklers and use significantly less water. Most of the water that is introduced into a cell, or any area in a prison that is on fire, with a water mist system is used to fight the fire. A sprinkler system works with a tried-and-tested method: making everything wet so that the fire cannot spread. A water mist system works where it is tested on individual fires to find the correct flow of water to suppress and control the fire successfully. Water mist is also able to prove that it can reduce the amount of smoke in the air so that you can reduce the toxin levels as well—particularly in an enclosed space, such as a cell. Water mist has been the preferred choice in fire suppression across the whole of the UK for the past 20 years.

Lord Moraes: What proportion of the estate has water mist?

Derek Killaspy: About 90% of the estate has water mist of one sort or another at this moment in time, we believe. Richard referred to manual intervention systems. It might help the committee if I gave a bit of the history of where we come into the mix.

Around 20 years ago, we were approached by the MoJ's fire specialist, who had come from the fire and rescue background and understood a little about water mist. They could see that water mist could be a great substance for them to use in this environment. We set up some fairly low-scale testing, for which we provided equipment. We established that what they really needed was a fixed nozzle in each cell—an automatic-style system—but they did not already have that. When asked why they did not have sprinklers, the answer was simply, "We can't afford them". We asked what they used. They were using conventional hose reels, which they would put through a hole in the door called an inundation port. A fire is detected, by whatever means, and a prison officer attends and brings with him a hose reel from a nearby cabinet. He removes the inundation point, puts the hose reel through the door and opens the nozzle to flow in water.

The problem they had with the hose reels is that the flow rate is around 65 litres a minute; it can vary on pressure, but that is a rough average. Of course, you cannot actually see where the fire is, because all you have is a small window and the room you are looking into is full of smoke. Therefore, getting any of the water on to the fire was the first challenge, but what was happening was that the smoke was not being combatted in any way, so that the person inside the cell began to choke. Inevitably, it ended with the officer making the decision to open the door and do a rescue, which could then involve him being overcome by smoke. It was an extremely dangerous situation for them to deal with. Also, once you have opened the door, the smoke has access to the rest of the prison, so you could have smoke going under other prison doors.

This is why the MoJ started looking for a better way. When we established that its method of firefighting was using conventional hose reels, we set about designing and developing high-pressure water mist

hose reels to do exactly the same job. On the way high-pressure water mist works, the system we designed works at 100 bars because the testing demonstrated that, the higher the pressure, the more smoke particles you capture and, therefore, the more toxins you remove from the air. You also use all the water mist because, as the fire draws oxygen, the water mist, being very light and floating in the air almost like a gas, will also be drawn to the fire. Therefore, you have a twofold result, in that you quickly cool and suppress the fire and you remove the toxins.

In later testing, two or three years down the line, the MoJ organised full-scale testing at the Building Research Establishment, of which we were a part. We were able to measure the exact amounts of gas and toxins in the air. The report that the MoJ has from the BRE demonstrates that the system was able to provide a life-tenable atmosphere for a minimum time of five minutes. Five minutes was set as, after the alarm had gone off, the reaction time of enough people arriving to effect a safe rescue from the cell, rather than it just being one person on their own. In the initial stages, one person would react with a handheld lance and, within five minutes, support would arrive to help them remove someone from the cell. The critical part there is that the life-tenable atmosphere was achieved during those five minutes.

Alasdair Perry: I have listened to some of the previous evidence to the committee. From my background in the fire service, we always very much pushed automatic fire detection because it is clearly critical that, if there is a fire, people are aware and can get out. That is one area where, when I look at fire protection in prisons, I focus on getting automatic fire detection in there.

Beyond that, from my experience in the fire service during Covid, we identified that there was a doubling of fire deaths in Scotland, and they were generally in a specific population: people over 60 who lived alone, had mobility issues and could not leave their property when there was a fire, as well as having other vulnerabilities. I see the prison population as quite similar. Although we fitted smoke detection in their properties and reduced fire deaths the following year, I kept coming back to that problem and thinking that the solution was sprinklers because, if people cannot leave the property, you are, in many cases, alerting them to a fire from which they cannot escape. Therefore, smoke detection is part of the solution, but it is not the whole solution.

On the other matters, the key parameter is time. The MoJ's own study in 2007 said that, in six minutes, you are injured, in seven minutes of a fire occurring, you are unconscious, and, in eight minutes, you are dead. If you have some of the manually operated systems that Derek has spoken about, you have to be alerted to the fire, collect equipment and deploy that equipment. That can take up time. With the automatic response of sprinklers and other fire suppression or water mist—it is in the name; it is automatic—to a fire occurring, a normal fire will be extinguished by a sprinkler or suppressed in one to four minutes. Sprinklers also control the

smoke—not quite in the same way and as effectively as water mist does, but they stop the fire, suppress it and prevent smoke being produced.

There is a variety of suppression solutions. Water mist is an excellent solution, but there are others. It is about that time parameter, for me. You cannot get away from the fact that the automatic actuation of automatic fire suppression is particularly effective.

The Chair: That leads us neatly on to Lord Tope.

Q55 **Lord Tope:** We largely covered this in the previous question and answer. What fire suppression equipment is currently used? More to the point, what would you like to see being used that is not currently being used or is not used very much?

Derek Killaspy: The majority of the equipment being used is high-pressure water mist. It is a mixed bag of mobile manual equipment; a wheeled trolley with a stored amount of water that is taken from a secure store to the fire and used in that way; and fixed hose reels along the wing, all the way up to fixed reels in cells, where we have high-pressure water mist installed in exactly the same way, as has been described, as a conventional sprinkler system would be installed.

The absolute ultimate would be to have fixed automatic in every cell. The method of operation could be traditional, which is a bulb in the nozzle. That does open itself up to tampering, unfortunately, and false activations. The preferred method in England and Wales is to use remote detection systems that operate the system. You have a tamper-proof nozzle that has been tried and tested, cannot be blocked by toothpaste and so on and has been designed so that you cannot attach a ligature point to it, in order to prevent anybody using it as a means of ending their own life through hanging.

Lord Tope: Is that already in use anywhere?

Derek Killaspy: Yes. Many prisons have that in use.

Lord Tope: Could it be used more?

Derek Killaspy: It could be every prison, in the way that has been described. We differentiate between water mist and sprinklers, but, in the automatic way in which they work, they are similar systems. The way they deal with a fire is slightly different, but their method of operation is the same: it is a pump, valves and pipework, all the way up to a nozzle in each of the protected areas. The nozzle is opened automatically, either by remote detection or by a frangible glass bulb located in the head.

Richard Cebreiro: We would also like to see automatic systems extended to all parts of the prisons, rather than just cells. The cells will control a fire if left on their own because they are highly compartmentalised. You also have areas of a prison, such as stock-rooms, storerooms and workrooms, that are large areas where a fire could take over the building. In those areas, it is important that you have

a system that starts fighting the fire as soon as it is detected, because those remote areas are not always full of people. You could have a fire break out and, by the time someone gets there, the fire has propagated to a point at which it cannot be controlled by manual intervention any more. We would like to see an automatic system that is designed for the risk that you will find in that compartment.

Derek Killaspy: We currently have water mist systems installed in areas other than cells. In the Titan prisons, they are installed in association areas, and we are increasingly seeing that being rolled out across the estate in more areas. Storerooms are not always, but sometimes, included. Workshop areas tend not to be included because they are populated by prisoners only when they are under guard. They are not allowed in there on their own, so they are deemed, as I understand it, as areas where the fire risk is quite low.

Alasdair Perry: For me, it is about the individual risk. The size of compartments can have a massive impact on which system you would choose and which system is effective. The design of any system, particularly a bespoke system or a fully hydraulic calculated system, is a complicated engineering process. Depending on the prison, it may require that. Water mist definitely has advantages. Likewise, sprinklers have advantages. They are very similar, but they are also different. It would require, to me, an effective fire engineering resolution being thought through for that prison. It is not simply that one size fits all. The appropriate solution would depend on the geography of the prison building. Of course, BAFSA is a free source of information and guidance. We are happy to help with anything associated with that.

Q56 **The Chair:** I have two quick questions. You have talked about how kit must be designed specifically to take account of the possibility that people might use them as ligature points. As I understand it, equipment that avoids that particular problem is now available. The other issue will, of course, be people deliberately tampering with equipment. Can you tell us a bit about anti-tampering equipment, including whether there is such equipment and it is used in prisons?

Derek Killaspy: The water mist equipment that we provide has been designed to be anti-tampering. Part of the test process has a standardised test called the toothpaste test. A combination of toothpaste and other gunk, if we can call it that, is crammed into outlet ports on the nozzle and left to set. You then have to operate the system and prove that you can still achieve an 85% flow rate; in fact, we were achieving a 99% flow rate with all that.

The other advantage of having a higher pressure is that it clears that out. The pressure is only in the back of the nozzle. Once it comes out of the nozzle, there is no pressure. You can put your hand over the nozzle without any harmful effects. That back pressure will clear out anything that somebody might have inadvertently, or otherwise, decided to coat all over the top of the nozzle—including paint, which we have seen

occasionally. I believe that the equipment that is currently in use has been designed to be anti-tampering.

It is not equipment that was available before we were approached by the MoJ in 2005. We spent quite a lot of time specifically designing equipment to suit exactly that risk, including doing fire tests for that risk and expanding fire testing out. For example, we talked about protecting other areas. In a standard installation in an association area, we would give it a classification of OH1, so we would put a water mist system with a test up to OH1 in that area. It would be a different nozzle than we would put in a cell. A range of different designs using water mist are in the prison.

Q57 The Chair: That is very helpful. My other question is more general. We will move on in a minute to the barriers to achieving what you want to do in prisons, but we also need to be clear on what we want to do. One dilemma is that all prisons are different, with different designs. Some are incredibly old and some are brand new; we will come on to all that in a second.

Broadly speaking, in designing a plan for a prison, what is more important: detection or suppression? I think I know the answer, but we will come on to that in a second after I have heard what you have to say. When it comes to suppression, is it your view that we need to have suppression in all parts of a prison? You talked about the large communal areas, as distinct from prison cells. Bearing in mind that most of the fires are individual prisoners deliberately setting fires in individual cells, does that have an impact on what you decide? What is your view of what an ideal and realistic, in financial and other circumstances, system looks like? Is it suppression everywhere and detection everywhere or something different?

Richard Cebreiro: One thing you have to look at is the environment with which you are dealing. It is quite a volatile environment. Detection, which is important in making you aware that there is a fire, cannot go with the normal escape routes. You cannot immediately vacate everyone from that area because you need a secure area in which to put them. That is where suppression becomes more important, because you need to be able to control the fire as well as controlling the people in the area.

If you just have a detection system, you are aware that there is a fire, but now you have to evacuate people from that area safely and have an area to take them to. If you have a suppression system in the cells, it means that you can at least attack the fire while everyone else is safely in their cell. They do not have to be evacuated straightaway. There could be a staged evacuation or a method by which you can start taking those people from one area to another.

When we look at the larger areas, such as the workshops, we see the same thing. Although the majority of the fires are set by the prisoners, you still have occasions when you have a fire because of an electrical short circuit or something. You need to have a method that does not put

the whole prison into panic, where you know that it is being dealt with by the system that has been installed in that area.

Primarily because of the people you are dealing with and the environment you have, this is vital. You have a serious outnumbering of prisoners to prison guards, so the prison guards have to be applied effectively when there is a fire. If they know that the fire is being dealt with by a system, it means that they can concentrate on managing the prisoners, rather than trying to manage the fire.

Alasdair Perry: I am thinking about the risk. It clearly needs a robust risk assessment to identify where the prison is most at risk and so on, so that you can start prioritising the intervention. However, whichever way you cut it, you need three things: you need to know that there is a fire; you need a way of dealing with the smoke produced by that fire; and you need a way of controlling, suppressing and extinguishing that fire. All three are, whichever way you look at it, essential. I would not want to go down the line of saying that one is more important than the other.

There are different ways of doing each of those things. There are different ways, which Derek has described, such as using water mist, mobile systems and so on—and sprinkler systems, similarly, although they would be full building protection. There are different ways of doing it. It depends on the risk. You cannot do everything all at once all the time. You need a risk-managed approach to look at getting detection in, which is essential; a way of controlling the smoke, which is essential; and a way of controlling that fire, whether through a hose reel, through high-pressure water mist, which is an effective solution, through full building-wide protection via sprinklers or through automatic water mist that is fitted in the cells. There is a range of solutions that are appropriate, depending on the risk.

The Chair: It is not always easy to achieve them, though.

Q58 **Lord Empey:** Good morning, gentlemen. What are the main barriers to improving fire safety infrastructure across the prison estate?

Alasdair Perry: For me, the first thing would be starting with the new builds. Protect them fully—no question—with full AFD, smoke control and suppression.

Beyond that, the real challenges are in the nature of the risks in a prison. Richard can speak to this better than I can, but, if you are doing a normal fit, you will bring all the kit on-site. You will have the guys with their IDs so that they can get access and so on. You go in and start the day, and you work all day then you leave. I believe from discussion with Richard that, in the prison environment, you cannot just leave your kit because it could be stolen, used for nefarious purposes and so on. It has to be taken off-site and on-site every day. That takes up time.

The speed of it is difficult. You have to have gaps in walls and so on to fit whatever fully protected system you are fitting. That takes time. You need to work on the cell. It will involve decanting prisoners, which, given

the population issues in the prison estate, might be a challenge. There is the cost as well. We are not talking about your standard sprinkler head or your standard water mist head. We are talking about bespoke designs for the prison system that are likely to incur a bigger cost. Those are the challenges that I see.

Richard Cebreiro: What you want to achieve in a design is the nozzle or the sprinkler being the single point at which the prisoners have access to the system. You need to route the pipework, enclose the equipment and protect the plant so that there can be no interference. These systems involve an awful lot of pipework. Some of the pipework is quite robust, but it can still be damaged. A lot of the pipework routing is within reachable distance. It is not as high as this ceiling; it is quite low down. At a lot of points, prisoners can interact with the system. It is about ensuring that the system is installed so that at no point can the prisoners access any part of the system or any part of the kit, apart from the nozzle. Then, all you have to worry about is whether the nozzle is fit for purpose.

The nozzles tend to be installed in systems. In a prison cell, you will find that the system involves the lighting and tends to be in the corner of the room. It is in a robust enclosure that encloses the lights in a particular way and everything else so that the prisoners, who have an awful lot of time on their hands, cannot sit there chipping away at it. In new prisons, you can accommodate that because you can build in service voids; you can build in riser voids and everything else.

For the enclosure, you cannot just use plasterboard. It has to be a secure enclosure for these pipes. Retrofitting where these enclosures are is important. That needs to be looked at. Even the fixings of the enclosures are vital, simply because these prisoners can think on their feet. They have a lot of time on their hands. You want to make sure that at no point is there a weakness where they can access the system. Of course, if they operate the system, it creates an awful funfair in the prison because all the bells are ringing and no one knows where the fire is, even if they are just doing it for mischief. These are the kinds of issue you are looking at.

Lord Empey: Are you saying that the barriers are in the nature of the environment that you are trying to protect?

Richard Cebreiro: Yes.

Lord Empey: Clearly, cash will be another important factor, as is the fact that you are dealing with properties that range from modern to Victorian. That is a barrier in and of itself.

Richard Cebreiro: Security sits on top of that. You have to be aware of what is being brought on to the site. If it is a populated site, you have to be aware of what is being brought on to the site and taken away from the site. You do not want a box of screws or anything of that nature being left behind. Everything has to be accounted for—even the design drawings.

Lord Empey: I presume that, when people start a fire deliberately to evacuate people, there is a risk where you have prisoners who are isolated for safety. That adds an additional complication around how they get into the yard and whether they can be retained separately from others.

Richard Cebreiro: I am not overly sure, but I assume that most prisons are not designed to handle a huge number of prisoners at the same time. You have a limited resource of prison officers, so you can deal with only a certain number of prisoners at the same time if you are routing them from one place to another.

Derek Killaspy: Your original question was about the barriers, but you answered the question as well. It is mainly about funding. If unlimited funds were available, every prison would already have a water mist fixed fire suppression system in every cell and every space, including storerooms and workshops. We have to come back to the reality of what is available.

I am not involved in designing the fire strategy for prisons, but I believe that you could still use those fixed fire systems in smaller areas in prisons. I overheard you talking earlier about reporting in prisons and how that can differ from prison to prison. In all business, reporting is the key thing that you need to understand how your business is operating. It is the same for a prison: if you have accurate reporting, you know what is going on and you can make decisions on how to improve.

Say you have 10 repeat offenders who are constantly setting fires, and we have established that they are getting all the help they need. As was mentioned before, they could be vulnerable people, so more punishment will not help them, but you could put them together. If you have satisfied yourself that they are just nuisance-makers, as an example, you could put them together and protect that area of the prison with an automatic system and still leave the rest of the prison running on the more cost-effective, manually applied systems. As I say, in an ideal world, you would protect the whole prison and you would not have to worry about where anybody was, but we are not in an ideal world. Funding is definitely a pressure that prisons suffer from.

It is also worth looking at where they were 20 years ago and where they are now. The prison population in the UK has risen over the past 20 years, but the casualty rate has not matched that. The casualty rate is still relatively low. It is similar to the rates of 20 years ago, before they had water mist. Putting water mist in the prisons has enabled them to reduce the casualty rate, so it would appear that doing more of that will help more.

Q59 **Baroness Bertin:** May I bring us back to a practical and slightly mundane but important point? In the aftermath of a fire, how do you get back to being fully operational as a prison—particularly in terms of the cells that have been affected—if sprinklers go off, with water drainage and so on? Do you have to refit the sprinklers? Can you talk us through

that, please?

Richard Cebreiro: For a sprinkler system, it is quite easy; all you need to do is replace the sprinkler head. For the rest of the system, it is a case of resetting.

One problem is removing the water because there is an awful lot of water. The benefit of mist systems is that they use far less water, but a generous amount of water is still produced in a small environment, and that needs to be cleaned up. Of course, water, like everything else, will find the lowest point. If there are any cracks, you will find water pouring down there. There needs to be an idea of the process and the procedure after a fire, in terms of how you deal with the water and how that is being built in, as well as dealing with the smoke damage.

Baroness Bertin: Is that being built in? Is it mops and buckets? What is the process?

Richard Cebreiro: Unfortunately, apart from mops and buckets, you cannot use much else. Unless specific drainage systems have been built into the infrastructure of the building to take the wastewater away, such as gullies and—

Baroness Bertin: Presumably, that is not very common in cells.

Richard Cebreiro: No, but it could be installed—not in cells but in the general areas, with a grate outside the door or something like that to take the wastewater away. However, that becomes a complicated system because you then have lots of pipes taking the wastewater away. You have to look at the practicalities and the timescale involved in clearing up. What do you do with those prisoners in that block while you are clearing up from a fire? There are quite a number of things, but they are all part of a fire strategy and the procedures that is put together for prisons by the MoJ.

Derek Killaspy: With water mist, you have much less water flowing in the first place. To give a comparison, a sprinkler system in a cell would flow at—I am not 100% sure on this, so please correct me if I am wrong—somewhere between 65 and 80 litres a minute. Is that right?

Richard Cebreiro: It is around 45 to 60.

Derek Killaspy: Okay. We would flow at somewhere between seven and 15, so it is significantly less. We would also use most of that water to fight the fire. When it comes in contact with the fire, it converts to steam, which, without getting too technical, is how it cools the fire quickly. Very little residue is left in a cell after a water mist activation, so a mop and bucket is sufficient.

We know of occasions when an inmate has started a fire, a manual system has been used, the fire has been dealt with, the inmate has been removed from the cell and held close to the cell under guard, the cell has been checked to make sure that nothing in there is burning and that

anything damaged is removed, and the inmate is put straight back in the cell because there is no reason why they cannot go straight back in. It is possibly a little damp around the edges, but it is habitable. Then whatever has been burned is provided as new. You do not have the issue of moving water.

Again, let me give a little historical information on where water mist came from. Originally, it was developed for the marine industry. One reason is because, if you have a ship on fire and you pump lots of water into the ship, you will eventually capsize or sink the ship, which does put the fire out but is not the desired outcome. Water mist was successful at using small amounts of water to fight the fire but not destabilise the ship or add to any risks. Exactly the same principle applies in buildings, and prisons are a classic example of that.

Baroness Bertin: Sorry if I missed this in previous answers, but do we know what proportion of cells have water mists and more conventional sprinklers?

Derek Killaspy: I am not aware of any that have conventional sprinklers. Around 90% of prisons in the UK have water mist systems in one form or another, be they manual or fixed in-cell. The majority of fixed in-cell systems are in the prisons that have been built within the past five years. The new Titan prisons have fixed in-cell. Some of the refurbished prisons and new prisons that are coming online soon will have fixed in-cell. That is the preferred approach from the MoJ to protect.

Baroness Bertin: Do the Victorian prisons have water mist?

Derek Killaspy: They do, yes. Victorian prisons have water mist, but it is a combination. Again, it is where we have developed products specifically for the risk. The original product would have been a hose reel with a pipe running all the way through the building from a centralised pump.

When we were installing systems in Lancaster Castle about 20 years ago, we found the walls to be quite hard, extremely thick and very difficult to get through. We developed stand-alone equipment: hose reels that had their own pump mounted in the bottom of the reel so that you did not have to connect them up to a ring main. You put them where the traditional hose reel was—water is already there—and you connect power to them. The solution was born from that.

Being able to adapt the product to a specific risk has been a key part of what we have done over the past 20 years, working closely with the MoJ and its technical people to make sure that we give them what they need and what they can use—setting aside the fact that we would still like to see fully automatic water mist systems in every part of the building. We accept that funding is unlikely ever to allow that.

Q60 **Lord Anderson of Ipswich:** I am tempted to ask whether there is anything that water mist cannot do. Perhaps I could ask this, as part of a more general question. Fires come in different kinds, of course. They

have different causes. Some are fires in individual cells. I imagine that, sometimes, a number of fires may be set around a prison estate, perhaps at a similar time. Thinking about the control, suppression and extinguishing of fires, do you see any blind spots in our prisons? Are we badly equipped to deal with any particular scenarios? If so, do you have a remedy? It is probably water mist.

Derek Killaspy: Kitchens with deep fat fryers still use wet chemical or dry powder systems, which have testing and approval. They do work, but they are not particularly effective. The risk of re-ignition is quite high because they do not cool the oil. Also, once they have gone off, the kitchen is closed. I know of a story of a prison that had a fire in the kitchen. The back-up plan was to go out and buy 300 Big Macs with chips. If you are an inmate, that might be a preferable way to get a much nicer meal of an evening; I am not saying that that happens, but it is an example.

Putting water mist on deep fat fryers seems slightly counterintuitive. Why would we put water on fat? If you put water into oil, it is heavier than oil. The cooking temperature of oil is typically around 130 degrees. If the oil is above 100 degrees, it expands very quickly and makes around 1,700 litres of steam from one litre of water. They call it a fat explosion, but it is actually a fat eruption because it pushes the fat out. If you spray atomised water over the oil, the heat from the oil converts the droplets to steam, so you cool and suppress it. You bring the oil temperature down to below 100 degrees before any water touches it. We have tests and approval for that. I would love to see that installed in prisons, no matter who it comes from, because it would be a significant safety advantage for that application.

Alasdair Perry: Not detracting from that, we have water mist and sprinkler companies in the association and support both. There are situations where one is not appropriate. You can use sprinklers on, for example, deep fat fryer fires. However, for larger spaces, water mist is not as effective a solution. It works well in those contained spaces that you get in a prison cell and is an excellent solution, but, for larger areas, particularly those with higher ceilings, it is not as effective because you cannot maintain the pressure that is so important for it to work in a large environment.

Richard Cebreiro: There is also high storage, especially if you have storage in racking, which you will have in quite a lot of parts of the building because you have bedding and mattresses that have to be stored. You have large storage areas that need to be protected, where sprinklers have a good track record. Those areas need to be addressed early on because management could also be put in place as far as the storage risk is concerned, such as limiting the amount you store or storing it in a particular way that makes it less of a risk. That is what we like. We like working with clients and saying, "Have you thought about storing it in a different way that means you do not need such a high-category system to protect it?"

Lord Anderson of Ipswich: Presumably, that would be at the discretion of an individual governor. It is not dictated to them, is it?

Richard Cebreiro: I was involved in a number of detention centres that were built more than 10 years ago. That was the kind of discussion we had. The sprinklers were installed throughout, in the cells, the storage areas and the communal areas. That is the conversation we had about the way in which things were stored; it is far easier for them to store with one system rather than another because it is easier to fire-protect that particular storage system. It was about looking at it with that method.

Lord Anderson of Ipswich: What about multiple fires? I read somewhere that there was a multiple fire at HMP Ford, an open prison, 15 or so years ago. How well equipped are we to deal with something on that scale?

Richard Cebreiro: All systems can fight multiple fires. All systems are designed to operate to a maximum area of operation at a maximum performance level. As long as those multiple areas do not overwhelm the system, in terms of for the combined performance it has been designed for, you are okay.

One type of sprinkler system is designed to operate at a density of 5 millilitres over an area of 260 square metres and is designed for one fire intervention. If you have multiple interventions that added up to more than 260 square metres, you overwhelm the system; it is not designed for that. You are hoping to attack that fire at the incipient stage so that it does not propagate over to a high area coverage. The automatic systems come into their own there, in that they automatically fight the fire while it is still in a small condition, rather than waiting for it to become a large condition where you have to use a huge amount of water.

Q61 **The Chair:** I have one issue that none of you have picked up yet, in terms of the design of a system: doors. In a theatre or whatever, we have fire doors. You cannot get in from the outside, but you can get out from the inside. Clearly, they are not recommended in prisons, because that would be slightly problematic. The other problem in prisons is that of prisoners deliberately blocking doors. If there is a fire, people will have difficulty getting out if the prisoners decide to keep them stuck in. They have designed anti-barricade doors, but they are not often installed. What is your view on that, if you have one?

Richard Cebreiro: Primarily, fire doors are used as a life safety benefit. Fire doors are mainly used for smoke control and evacuation. They are to safeguard people. When it comes to extinguishing systems, although we require a level of fire resistance for the compartment walls, fire doors do not come into it. We do not look at fire doors as part of the strategy for suppressing a fire.

The Chair: Presumably, you have to look at the issue of people not being able to get out because people deliberately block the doors, which we know has happened.

Richard Cebreiro: Yes, but that does not form part of the suppression system; it forms part of the life safety side of the strategy that is looked at in a prison, in the same way as, if you need to evacuate, how you evacuate the people. It is on that side of the system and the strategy. The fire suppression side of the strategy does not take that into account.

The Chair: I understand that but, presumably, that should be taken into account when looking at the overall picture, which is fire suppression plus evacuation.

Richard Cebreiro: In a fire strategy, which is a holistic view of dealing with a fire in a prison, that needs to be looked at, yes.

Alasdair Perry: In reality, whichever suppression system is used in a facility—you can blend them if that is appropriate—that is nothing but a benefit to the problem you have described because, whichever side of the door you are on, if there is full building protection, the suppression system will have operated. Your life is more tenable because of the fire suppression, because it will suppress the fire.

The issue comes in when you try to fight the old way, through a hole in the door or using a portable system and fighting the fire through the door. You have to open the door; a barricade might affect that. The suppression system is likely to overcome that, from the perspective of barricading the door. I am sure that people could find ways of barricading a sprinkler head if they so wished, but it is about reducing the risk associated with a door.

The Chair: That is helpful. I will leave you, Derek, to come in in a minute—you can do so in a second—because we will end with a question from Baroness Buscombe. I rather suspect that, as with Lord Anderson, the answer might be water mist.

Q62 **Baroness Buscombe:** Quite a lot of what I want to ask about has already been covered. We know that the majority of injuries come from smoke, rather than fire. How do prisons deal with smoke suppression? Derek touched on this in response to the first question, and it has been a thread running through. Do you have anything to add on how we can deal with smoke suppression to avoid injuries?

The Chair: Derek, this is your opportunity to add what you were going to say.

Derek Killaspy: Thank you very much. The testing that we did with the Building Research Establishment in Watford in 2008 demonstrated that the water mist product that is still in use in prisons at the moment combats the toxic gases and smoke effectively so that you arrive at a life-tenable atmosphere in the cell.

We have subsequently done further testing more recently—not in the UK but in another country that uses water mist already and would like to increase the fire load in the cell, if we can call it that. We have repeated the tests with a higher fire load to the same effect, where we are able to

control and suppress the fire, but, more importantly, we can provide a life-sustainable, life-tenable atmosphere in the cell for a minimum of five minutes—that is, five minutes and ongoing.

That has been the crucial thing in all fires. As you already understand, it is smoke that kills, not fire. You are overcome by smoke and fumes and rendered unconscious long before the flames get to you. That is the crucial part of it, which echoes what Richard and Alasdair have been saying about automatic detection being critical. The quicker you have detection and react to the fire, the quicker you deal with the smoke.

Baroness Buscombe: That is incredibly helpful. People will be surprised, if they do not already realise this, when they hear about just how quickly all this has to operate in order to save lives.

Q63 The Chair: Thank you very much. We will end by asking you to help the committee because, of course, we will end up making some recommendations to the Government on what needs to change. Do you have any recommendations to us as to what we should, in turn, recommend to the Government? Let us take each of you in turn.

Alasdair Perry: There should be a risk-assessed approach such as the “red, amber, green”, or RAG, system to identify those who are at greatest risk. It seems ludicrous, given the time imperatives that we have talked about and the impact of suppression on creating a tenable atmosphere, that you would not build suppression into new-build prisons.

Retrofitting is more challenging. That is when the RAG status would come in, identifying those prisons most at risk, looking at the possibility of retrofitting, deciding which system would be most appropriate for that premises and starting the process of retrofitting. For those lower-level prisons, it may be that the portable water mist systems are an appropriate solution. I certainly cannot see an argument for not having that risk-based approach, with all new prisons definitely having suppression, other than ignoring the risk to life. It is then about a risk-based approach to retrofitting, prioritised on that risk, after that.

Richard Cebreiro: My suggestion would be not to limit yourself to proposing just one type of system. Water mist systems are very good in areas. They work well, and sprinklers are similar. In a prison, you could use a mixture of the two systems for different areas. Whereas mist systems would work well in the cells, sprinklers could work very well in bulk storage areas. It is about not limiting yourself to one system but looking at which system is better for the environment to which you are applying it.

Derek Killaspy: I suggest that we keep doing more of what we are already doing. Linking systems together is a nice ideal; I understand the merits of that. The reality, though, is that you would need two pump sets because they operate at different pressures. If you use a water mist system at the pressure a sprinkler works at, you lose the ability to remove smoke because the droplets are larger. The critical part of the

system's operation is gone. It is not practical to mix systems in this environment, but, in other environments, it is possible. Let us do more of what we are doing, please.

The Chair: Okay. I thank you all very much indeed. We are enormously grateful. We have to move on to some other business; I remind colleagues online to change their means of being online in a minute. For the time being, this session has now ended.