



NO SMOKE WITHOUT FIRE

Smoke control can be an essential part of the life safety systems in buildings, yet there is evidence that suggests systems are of variable quality. Can a new British Standard help to improve industry practices and save lives? *MBS* convened a roundtable to look at how BS 7346 Part 8 can make a difference, as **Andrew Brister** reports.

Often it is not fire that kills — it's smoke, and a building's smoke-control system can significantly improve the life safety protection of the building. Yet, in comparison with the fire alarm and sprinkler industries, this is a nascent area of building services, and there is evidence to suggest that designs and installations are of variable quality, with smoke control in high-rise residential buildings being a particular area of concern.

It's good news then to see the recent publication of BS 7346 Part 8: Components for smoke control systems — Code of practice for planning, design, installation, commissioning and maintenance. Will it make a difference? *MBS* convened a roundtable debate to discuss what has been going wrong, highlight best practice and look at how the standard can improve matters if implemented.

Matthew Ryan is with the Fire Engineering Group at London Fire Brigade, where post-fire investigation is helping to build a picture of what can go wrong with

smoke-control systems. 'Smoke ventilation is not identified and assessed as much as we would like as part of fire-risk assessment,' says Ryan. 'Often it's just a simple yes or no answer to the question: "is there smoke ventilation?" We need to look at what there is, assess if it is suitable and how it compares to modern standards. At the moment, risk assessment of smoke-ventilation provisions is falling through the gaps, and the assessment side needs to be much better educated.'

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Recent investigations have attributed the majority of system failures to a lack of maintenance. 'Often, we have all the certificates from when a system was installed, but no-one has been back since to carry out maintenance and check things are still operating as they should with the correct cause and effect,' says Ryan.

This is despite the best efforts of the Regulatory Reform (Fire Safety) Order (RRO), which came into force in 2006, and includes tough measures to address this issue. Under the order a 'responsible person' must ensure that all components of fire safety systems are kept in 'efficient working order' and 'good repair'. They must carry out a fire-safety risk assessment and then put a planned-maintenance regime in place. Failure to meet the requirements of the RRO can result in the issuing of enforcement notices or prohibition notices, and where significant breaches of the legislation have been incurred, fines and/or prison sentences are possible outcomes for those deemed to be the 'responsible person' under the order. →



Winter, left: identify sticking points and communicate them.

Ryan, right: assessment side needs to be much better educated.

Who's who on the panel

Gary Daniels, Associate, Hoare Lea and president of the UK chapter of the Society of Fire Protection Engineers

Chuck Lewis, Standards and Compliance Director, Coopers Fire

Andrew Perfect, Associate Director (M&E), Mace

Will Perkins, Managing Director, SE Controls

Matthew Ryan, Fire Engineering Group, London Fire Brigade

Stuart Winter, Senior Engineer, Fire Engineering, Arup

Ryan also reported evidence of tampering and vandalism in high-rise residential buildings, which can have unintended consequences. 'For example, residents may seek to increase the flow of fresh air into common areas for comfort reasons by forcing open smoke vents, without realising these are critical fire-safety systems. Any damage sustained to the system when this occurs can then go unnoticed meaning that, should a fire then occur, the system may not operate as intended, potentially creating challenging conditions within the common areas for both residents and fire fighters,' he says.

The Smoke Control Association (SCA) recognised a number of years ago that there was a need to raise the standards across the industry. The SCA created a FIRAS-accredited installer certification scheme to ensure systems were consistently and safely installed, commissioned and maintained in accordance with clear design criteria. The development of the scheme brought into sharp focus the urgent need for a common standard against which assessments could be made. This led to the formation of the BS 7346-8 working group, comprising key industry

stakeholders, including manufacturers, regulators and the Fire & Rescue Service.

SE Controls is a long-standing corporate member of the SCA, and managing director, Will Perkins, chaired the working group. The standard was published at the end of 2013. 'We can't look at any element of the smoke-control system in isolation,' says Perkins. 'You've got to take a holistic approach, a start-to-finish look at the life of the whole smoke control system. One of the drivers for 7346-8 was the lack of understanding at early design stage, going right through the contractual cycle to handover and beyond to operation.'

Gary Daniels is an associate at consultant Hoare Lea and president of the UK chapter of the Society of Fire Protection Engineers. 'The way we build buildings in this country is a little cock-eyed, to some extent,' he says. 'Design information is handed over to a main contractor, with different subcontractors carrying out isolated bits of work. The more complex the chain, the more errors creep in and the less overall responsibility you, as the designer or installer, have.'

Responsibility is a key issue that 7346-8 seeks to address. Through the standard, the responsibility and acceptance of responsibility for key procedures, phases and elements of the system are built in to ensure compliance and adherence to the relevant regulations. It demands that performance documentation for every phase of the work should be fully recorded by the person or organisation taking responsibility



for the stage. This has the effect of verifying performance, standard of design, installation and maintenance at each phase and acting as a quality or 'due diligence' procedure as an integral system feature.

Although various contractual arrangements are possible, the overall responsibility for checking that the performance of the system should be assumed by one organisation that is 'competent'. In this instance, competence can be typically demonstrated through accreditation under a third-party scheme, such as FIRAS.

Daniels believes that smoke control needs to be more like the sprinkler industry: 'Sprinkler installation is all done by one organisation and is accredited and certified.' Yet, the nature of smoke systems makes them more complex. 'There is an issue with the interfacing with other systems,' points out Andrew Perfect, associate director (M&E) at Mace. 'Smoke system installation is a blend of a number of different contractors, and the way it interfaces with

the fire alarms and the building management system (BMS) makes it complex, and that's the difficulty.'

Stuart Winter, senior engineer at Arup Fire Engineering believes that the intent needs to be made crystal clear throughout the contractual chain. 'It's important that there is a means by which things are carried through the process, that everyone understands what all the various systems and measures in the building are aiming to do to ensure life safety. It's critical that the intent is clear. You might test individual systems, but what about a building-wide cause and effect test?'

While the construction team may understand the intent, does the operator of the building understand it? 'One issue we face is with familiarisation training with the client at practical completion,' says

Perkins: lack of awareness over CE marking.

Perfect: problem with training at practical completion.





Perfect. "Often the client is a project manager, and ideally you want to be training the people who are going to be maintaining the buildings, but they are not appointed yet. There is a gulf between our training and what is effectively third-party training at a later date."

"During post-fire investigations, we ask the responsible person about any smoke-ventilation system present, what is it meant to do and what is their understanding of it, and in a lot of cases there isn't a good grasp of the system purpose or operation," says Ryan. "We [relevant stakeholders] all then have to go back and put the pieces together

retrospectively, which is not the way we are supposed to do it."

CE marking

Will Perkins raised the issue of a lack of awareness of the need to use CE-marked products, a legal requirement since July 2013. "In a building where there is a fire, contractors could face criminal prosecutions — you have to install fully-compliant products which are third-party tested," he says. The move came in under the Construction Products Regulation (CPR). "CPR touches everyone right down the chain, from design right down to the person maintaining the system," says Chuck Lewis, standards and compliance director at Coopers Fire. "Ignorance won't be an acceptable defence."

While policing of regulations could always be tighter, Perkins expects the marketplace to regulate itself. "It's a competitive economy; those people that have got tested products will effectively be whistleblowing on their non-complying competitors, otherwise trading standards would simply be swamped," he says.

Daniels wondered, given the potential lack of ability for trading standards to enforce CPR during design and construction, if it is more likely to be used to prosecute designers after a fire. He also wondered if it would be used in building defects analysis and by surveyors and other professionals during due-diligence and building-condition surveys.

Competence

While the FIRAS scheme has addressed the issue of competent contractors, at least when it is specified, what about those further up the chain? "It is easier to certify installers," argues Daniels, "but there is no

certification of designers, and you will find people who are lacking in any reasonable level of skill or expertise. I have reviewed some appalling risk assessments from people calling themselves fire engineers that bear no resemblance to what a risk assessment should look like under the RRO. Anyone can call themselves a fire engineer, get insurance and practice."

"It's important that everyone involved has a duty to make sure that the process is carried out by the correct people and in a competent and correct way," says Stuart Winter. "Where are the sticking points, where could we trip up? Let's identify those early and communicate them."

Responsibility for the planning, design and installation of smoke ventilation systems is a key

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component within BS 7346-8. Daniels summarised the recommendations with the advice that building-services designers should ensure that 'the responsible person has been confirmed in writing' and that a designer should be 'prepared to issue certification for every aspect you've been involved in'. Example certificates for the designer are provided within Appendix B of the standard.

Daniels also sees the potential lack of competence with those carrying out risk assessment as one of the main problems with the RRO. "It trusts the responsible person to fire assess the building, and that's where the RRO fails. I don't think in many cases it is being done, and I don't think it's being done correctly. There is no standard for it, no benchmarking, and anyone can offer them. It should strengthen the definition of responsible person to be more specific and include a level of qualification needed to do risk assessment."

It is less than 12 months since the introduction of BS 7346-8, so is it fair to expect it to have yet made an impact? "It's not as widely specified as it should be, but it's only been out for a year and there is a natural lag between the introduction of a new standard and getting it into specifications," admits Daniels. "Unfortunately, they are guidance documents and if they are not referenced in the specification or the employer's requirements then there is no obligation to follow them." The Smoke Control Association should be applauded for getting the standard introduced — now the industry needs to make sure it's adopted.

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Lewis: ignorance won't be an acceptable defence.