

A COMPLEX WEB OF REGULATIONS

The legislation covering both energy conservation and smoke control is intricate and ever evolving, writes **Felix Mara**

Insulation

It is refreshing to see how sustainability is now less about talk and more about action. Last month's COP21 resolution to agree a universal and legally binding deal aimed at tackling climate change is symptomatic; as is the scale of solar farming, notably in China – as American TV ads used to boast in the 1960s, it really works. For Zaha Hadid Architects, with heavy overseas work commitments, sustainability can now take its place at the core of its practical design work because it is more readily embraced in inauspicious locations such as Saudi Arabia.

Nevertheless, when I attended a CPD event last month, presented by approved inspector Geoff Wilkinson, I realised that energy conservation legislation in England is a complex topic. I say England, because homogenous building control legislation is no longer rolled out across the whole of the UK. Wilkinson highlighted the political background to building control legislation, and in particular the government's use of house-building statistics to improve its chances of re-election. He also stressed how current energy conservation regulations and their underlying philosophies were formulated under previous administrations. Interconnected in a complex dynamic are the Fabric First approach now encouraged

by Approved Document L, which promotes passive environmental design by marginalising what is often considered bolt-on energy-generating technology; the demise of the Code for Sustainable Homes following the Housing Standards Review; the assault on red tape; and the pursuit of house-building targets.

As Wilkinson reminded his audience, the government has stalled the zero carbon emissions programme. Along with other guidelines, such as Secured by Design, the Code for Sustainable Homes (CSH) standards are now followed at the client's discretion, although the architect can have an influence. Nevertheless, some of these standards are now embodied in the Building Regulations, helping to cut down the red tape.

Wilkinson notes that although there are opportunities to challenge CSH targets set as conditions of planning consent and in Section 106 Agreements, it is essential to seek expert advice on these matters.

Code for Sustainable Homes standards are now followed at the client's discretion

Fire

Turning to the topic of fire, there are a number of common pitfalls in smoke control system specification, as Colt International technical director Paul Compton observes. 'Specifying smoke control systems is not always an easy task,' he argues. 'Every design must be assessed on its own merits and the correct solution identified.' To complicate matters further, there is a bewildering array of constantly evolving legislation. The specifier can't afford to get it wrong, he adds. These are life-saving systems and their failure could have dramatic consequences.

Compton characterises smoke control as 'a wide science'. Each type of building – from high-rise apartments to power generation plants and car parks – has its own peculiarities, and some have specific regulations and guidance on smoke control. Correctly specifying a smoke control system requires in-depth knowledge of the building's layout and the most appropriate products and systems to use. Compton argues that designers lack knowledge about fire curtains: they may write excessively long specifications that are irrelevant to the specific application while failing to stipulate the required level of integrity. His observation that over-specification can lead to unnecessary costs is invaluable advice.

In the UK, smoke control systems are subject to a complex network of legislation and standards. As Compton explains, these can be seen as a hierarchy, as shown in the diagram overleaf which shows the most important documents at the top.

The natural process of updating these documents means there are some inconsistencies between them, since it takes time for an update in one to filter through to another that covers the same theme or one related to it.

'There are some grey areas in the guidance,' says Compton. 'For instance, although the regulations set out that it is illegal to sell a natural smoke ventilator without a CE mark, it is not always

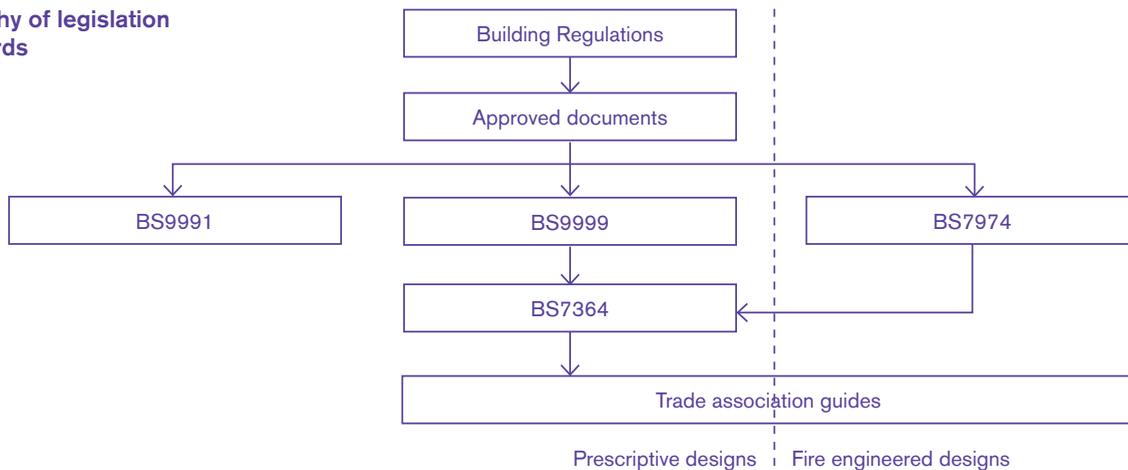


THIS IMAGE AND TOP-RIGHT COURTESY OF COLT

Clockwise from top left
Liverpool One tested the first UK smoke control system for a car park; Colt Labyrinth natural ventilators at Ineos Power station facilitate roof access; Colt OPV control system; King Abdullah II house of Culture and Art by Zaha Hadid Architects



The hierarchy of legislation and standards



clear if automatic opening ventilators or inlet ventilators should be classed as smoke ventilators.’

Nevertheless, as Compton notes, the regulations allow a degree of design freedom. An essential principle in the Approved Documents is equivalence of performance. This means that if a fire-engineered approach can demonstrate equivalent performance to what is prescribed then it may be allowed, which can hugely benefit building owners and operators, since such systems can be made to perform better and costs can be reduced.

In residential buildings a common variation to the requirements of Approved Document B involves extended travel distances. Dead-end travel distances to the nearest stair are not expected to exceed 7.5m. Architecturally, this is quite limiting, says Compton, and it has become common to extend this distance to 20m or 25m, but enhanced ventilation is needed to compensate.

‘It is common to install mechanical systems where we are providing permanent inlet and exhaust to flush through the corridor and ventilate it, to ensure that

smoke will not stay in the corridor for more than a couple of minutes after the door from the apartment on fire is closed,’ he says. These are very specific fire engineered approaches, often supported by computational fluid dynamics data submitted for approval.

It is also essential to ensure smoke control system components work together seamlessly, for example in the case of doors. Pressurisation and shaft systems put additional demands on the choice and specification of doors and their closers. Both the size of the door and the closer settings have significant impacts on system design and performance.

Selecting the right control system is equally critical. ‘There is a bewildering amount of information and conflicting opinions as to the most effective approach,’ says Compton. ‘Should it be a fire alarm control system, an HVAC/BMS system, or one specifically designed for smoke ventilation?’ Should there be open or closed protocol? It is essential to be clear about the required features, and generally a HVAC/BMS system will not have the necessary resilience, argues Compton.

And it is important to specify the correct type of wiring, since it is the link between the control system and the equipment, and the backbone of the smoke-control system. But the requirements are spread over several standards and various levels of protection are available.

Given all these considerations, Compton argues that specialists should be involved at an early stage to help specifiers make the right choices.

Geoff Wilkinson also identifies the need to make Approved Document B more intelligible, referring to the 2009 Lakenal House fire. His CPD reminded architects of the need for adequate fire cavity construction details and the fire safety risk presented by overhead wiring, referring to the Shirley Towers tragedy in 2010. Designers need to be mindful of the potential risks involved and investigate options such as cable trays and pyro cabling. Good design can prevent fatalities and injuries, and will avoid fines levied for breach of the Building Regulations, which Wilkinson reminds us have risen from £5,000 to more than £1 million.