

Smoking out the standards

Smoke and toxic gases are bigger killers than fire, yet legislation on smoke protection is inadequate. *John Pyatt* puts the case for a British Standard on smoke controls.

BRITISH business lost more than £475m in stock through fire damage to commercial property in 1988, according to the British Insurers Association. This shows a steady upward trend which saw the cost of fire damage grow more than 40% over the decade.

Fire protection will have an

important role in building specifications throughout the 1990s. But the biggest influence on the development and specification of fire-rated products, will be the recognition that smoke and toxic gases pose a greater threat to life than fire.

Home Office figures show that smoke-related deaths in the UK have increased fivefold over the past 30 years, while fire deaths have remained static. In that same period smoke has become the biggest killer, claiming 600 lives in 1987.

One reason for this is the rapid increase in cheaper man made materials in the building fabric. This was illustrated chillingly last month by the disco disaster in Zaragoza, Spain, when burning plastics, cloth and carpets gave off cyanide fumes causing 43 deaths. When plastics burn it takes only minutes to generate clouds of lethal pollutant smoke which kill faster than fire.

Nevertheless legislation and guidance on the specification of smoke-related building products, unlike that for fire, is dangerously inadequate. But the forthcoming review of the Building Regulations suggests things might change.

In the industrial and

commercial doors sector, fire-related products are being specified for a growing number of applications. The big increase in large scale developments such as shopping centres, distribution depots, and central storage warehouses have raised the stakes in the event of fire damage and heightened the need for careful considerations when specifying doors and shutters.

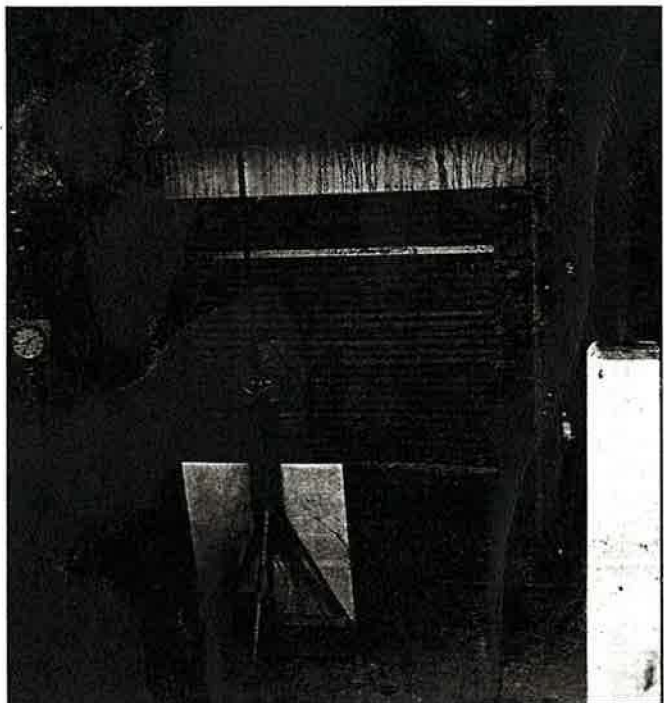
Smoke-related products will come on to the market now that there is greater awareness of the risks of smoke. But how will the proposed smoke legislation affect the design and specification of fire doors?

The major problem for manufacturers and specifiers is the absence of concrete legislation to deal with the smoke issue. There are two areas in which both parties need guidance. The first involves setting regulations for acceptable levels of smoke. The second is creating standards to show how specifiers and manufacturers should comply with these regulations.

However, at the moment it is difficult for specifiers to assess the precise design and manufacturing process needed to provide adequate smoke



Moment of truth: but test conditions for smoke tightness of doors (BS 476) do not reflect real fire conditions with hot swirling gases.





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protection. For example, the test conditions for smoke tightness of doors laid down in BS 476 apply only to ambient temperatures. They do not reflect real fire conditions in which hot swirling gases fuelled by pressure changes behave differently from smoke at room temperature. Moreover, under intense heat certain door components will distort, inevitably leading to smoke leakage.

Without standards specifiers have to rely on manufacturers to demonstrate the smoke propagating qualities of their products. This is unsatisfactory since the only criteria a manufacturer can follow is that no component in the door will react during a fire to create toxic gases.

The confusion looks set to continue even when the forthcoming review of the Building Regulations comes out. For the first time it appears that regulations will look at the smoke issue. Specifiers will be required to show they have assessed and made provisions for smoke risks. But there are no plans to define acceptable levels of smoke performance.

It is likely the regulations will recommend the adoption of dual

fire protection systems combining "active" solutions such as sprinklers with "passive" barriers such as doors and shutters. This trade-off approach goes some way to providing a more comprehensive fire protection strategy. But it points to the need for stricter guidance on smoke performance in fire doors to cope with the higher smoke levels generated by sprinklers.

"Sprinklers have an important role but they only act when the fire is well advanced, by which time smoke can already be a serious problem," says Nigel Campion, senior fire prevention officer at Leicestershire Fire Services.

A firmer stance on smoke will depend on the effectiveness of the European Committee for Standardisation (CEN) in incorporating requirements on smoke control in the new European Standards. These will be drafted along the framework outlined in the Construction Products Directive. The Directive has to be implemented in July 1991 but the European Standards which rely on the (CPD) will not be finalised for years to come.

However, time is short. In the absence of alternative

legislation, particularly in the form of UK proposals, it appears the strict German DIN standard on smoke controls could form the model for its European counterpart.

The problem is that not all national standards transcend national boundaries – the UK building industry may have to conform to norms which are not appropriate to its needs.

For example, several European countries insist on the specification of insulated fire doors to counteract the effects of radiant heat, whereas the UK Building Regulations stipulate that single skin doors are adequate.

Henderson Door Systems is lobbying for the formulation of a British Standard on smoke controls, through its involvement in the European Door and Shutter Federation and TC33, the technical committee responsible for creating testing standards to show compliance with the CPD.

Doors and shutters are just one element in a wide range of smoke control options. Each fire protection combination depends on the individual needs of buildings and it is rarely possible to say which is better than another. But some smoke

control features in doors are likely to be looked at in the future and therefore deserve a mention.

Intumescent seals, in the form of beading which runs along the door edge, are designed to swell up during fire to seal any gaps in the door frame. These can be effective but are vulnerable to the physical abuse associated with doors and do not have long life expectancy. Their main drawback is that they are only at 70°C, by which time smoke is already a serious problem if there is no effective ventilation.

A brush seal made of bristles which sweep against the closing jamb to provide a physical barrier to 98% of smoke transmission is another design option. This has the advantage of not being temperature activated and can be replaced quickly if damaged.

Other brush seal options deal with anticipated temperature requirements – for example, an interlocking brush seal can be used to combat swirling high pressure smoke and gases. Magnetic systems which lift the seal from the rest position and clamp on to the door during a fire are also available [S]

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