School fires cost the UK some £100m a year, according to the Arson Prevention Bureau. There are about 20 major blazes every week, a third of them during school hours. About 90,000 children are affected, with their lessons disrupted and irreplaceable course material and teaching equipment destroyed.

The government put school sprinklers firmly on the curriculum in spring 2007 by indicating that most new and refurbished schools would need sprinkler protection, although it stopped short of making the measure compulsory. A spokesman for the Department for Children, Schools and Families (DCSF) said there would be a presumption in favour of sprinklers being fitted in all new schools, which is noteworthy given that figures from the Insurer Zurich Municipal showed that only about 1% of schools have sprinklers. The resulting guidance, Building Bulletin 100, Design for Fire Safety in Schools, published in September 2007, includes extensive advice on sprinklers and emphasises their importance as a weapon against arson. It also requires local authorities and schools to use a new risk assessment tool to establish whether there is a need to incorporate sprinklers into their plans.

Buro Happold confirmed the DCSF’s view that “all new schools should have fire sprinklers installed except in a few low-risk schools”. It makes clear that “although the provision of sprinklers is not a requirement of the Building Regulations, DCSF expects that the education authority, funding body or overall client of the scheme should request, as part of the employer’s requirements, that a risk assessment be undertaken to assess the validity of providing sprinklers”.

The Bulletin includes a package of design measures to reduce the risks of fire, such as better detection and alarms, more effective means of escape and the selection of robust materials and fire suppression. There are also two design aids: the interactive fire risk analysis tool and a cost-benefit analysis tool. These are applied on a case-by-case basis, with the first determining whether a school is low, medium or high risk and the second helping to judge the cost-benefit of incorporating sprinklers in a new school.

Questions of objectiveness

Based on Buro Happold’s experience of using both tools, the application of BB100 tends to favour the inclusion of sprinklers, in that a “low-risk” school and a negative cost-benefit scenario are rarely identified.

This, obviously, reinforces the DCSF’s policy statement that sprinklers should be installed except in a few low-risk schools. But the question must be asked: are most schools truly medium or high risk?

The BB100 design tools undoubtedly do assist local authorities and design teams to understand the issues and the need for sprinklers, however, because there is no statutory requirement for sprinklers in schools, and there is often an associated lack of funding, the application of the tools can result in a design impasse. This results in increased project costs and delays while the need for sprinklers is debated.

Thomas Deacon Academy

In 2004 Buro Happold’s Fire Engineering Design and Risk Assessment (FEDRA) team was appointed by the Department for Education and Skills to develop a fire strategy for the Thomas Deacon Academy in Peterborough. It was one of the first beacon schools and brought together about 2000 pupils from three other schools.

The city’s mayor and chief fire officer had concerns about fire safety because of several local arson attacks, and so asked FEDRA to demonstrate why sprinklers were not proposed in the building design. This was before the publication of BB100 and was contrary to local policy. With Peterborough in the process of rebuilding 25% of the area’s secondary schools and refurbishing and extending another 50% of them, the issue was clearly critical.

FEDRA carried out a full risk assessment on the fire loads within the school, the ignition sources, nature of the space, construction materials and the people using the space. To identify any additional risks beyond those of a typical school building. The detailed fire engineering strategy was presented to the city council’s members, including assessments on fire sizes, construction materials, human behaviour and protection systems.

The strategy clearly demonstrated that students could evacuate the building safely, thus reinforcing the conclusion that sprinklers were not essential for life safety and were more beneficial for property protection.

A further significant element in the school’s fire safety design was a collaboration with
security consultants. Statistics on the occurrence of school arson highlighted a trend for attacks to take place in the evening. Motion sensor cameras, linked to a remote monitoring centre with a one-way communication system, were incorporated in the design. The CCTV cameras would detect movement around the facade and alert the monitoring centre and onsite facilities management team. Also, the refuse strategy meant that the academy’s waste, a potential arson target, would be locked securely in masonry blocks 15m from the main building.

FEDRA also developed the fire safety management strategy for the academy. This highlighted the general and specific issues associated with operating the school from a fire safety viewpoint, as required under the Regulatory Reform (Fire Safety) Order 2005. This was endorsed by the local fire authority. This last stage effectively closes what can be described as the “circle of fire safety”, harmonising the design with the management.

We successfully made the case that fire safety, in this instance, required a practical and proactive approach rather than a reliance on reactive measures such as sprinklers. In conjunction with the other fire safety provisions, a holistic fire strategy, unique to this building, was successfully developed and implemented.

Holistic fire strategies
In an ideal world, sprinklers would be included in every school because of the widely accepted risk of fire and arson and the loss this can cause to schools and wider communities. To achieve this, sprinklers could be made a statutory provision and new funding made available. But, until such time, it may well be the insurance industry that has the final say on sprinklers, should education authorities be unable to secure competitive premiums on buildings without their inclusion.

The FEDRA team will continue to strive to “design out” fire risk by ensuring that schools have clearly defined perimeters, that recessed doorways and overhanging eaves are avoided, and rubbish storage facilities are carefully located.

Future revisions of BB100 and the design tools could quantify a clearer number and type of passive fire protection measures, and also the levels of security design and fire safety management, as further preventive measures to reduce fire and arson risks.

Sprinklers do have an important role to play in the design of fire safety as a reactive measure to the problems of arson but they should be considered within a holistic fire strategy, taking into consideration a wider range of issues and preventative measures.

Andy Nicholson is an associate with Buro Happold FEDRA.