Local Government Association

automatic fire sprinklers

a toolkit for schools

PREVENTING PROTECTING RESPONDING

For further information, please contact the Local Government Association at:
Local Government House
Smith Square, London SW1P 3HZ

or telephone LGconnect, LGA's information centre on 020 7664 3131
Fax 020 7664 3030
Email info@lga.gov.uk
Website www.lga.gov.uk

promoting better local government

LGA Code F/EP047
ISBN 1 84049 385 2
Printed by The Chameleon Press Limited

introduction

Who should read this toolkit?

This toolkit will be of interest to local authority members and officers involved in:

- education;
- social Inclusion;
- community safety; or
- fire; including especially
- school governors;
- head teachers;
- school premises managers; and
- local education authorities (LEAs) and local authority risk managers.

School fires – the problem

School fires are a national problem. Each year more than 2,000 schools in the UK suffer from fires large enough to need action by local fire brigades.[1]

Figures from the Arson Prevention Bureau show that during the year 2001, school fires were on course to cost the nation £93 million. £93 million is the equivalent to the cost of building 45 new primary schools or employing almost 3,750 teachers.[2]

Fire can occur at a small rural school as readily as at a large, urban comprehensive. Over 70 per cent of school fires are started deliberately.[1]

Since 1994, statistics show the number of school arson attacks that occur when pupils are present, are on the increase. This has caused the proportion of all school arson fires represented by school-time attacks increasing from 13 per cent to nearly one-third.[3]

Why fit sprinklers in schools?

Sprinklers are an effective way of preventing the spread of fire. Most deaths occur within five minutes of fire breaking out, and often even the quickest firefighting intervention cannot prevent these deaths. All current research indicates that fitting sprinklers limits fire deaths and injuries, and substantially reduces damage to property.

Figures show the disruption caused by fire damage is highly unsettling for children and for the community as a whole, particularly in secondary schools. Statistics demonstrate that schools that are most effected by fires are in socially and economically deprived areas.

The consequential losses, only some of which are covered by insurance, can be as serious as the fire damage to the buildings. A large school fire devastates. Its aftermath can linger for years. The long term disruption that follows puts staff and pupils under stress and imposes large financial, educational and administrative costs. It is a price that no school can afford to pay.

Around a half of all school-time school fires in England and Wales are arson attacks. Virtually all (97 per cent) of school-time school arson fires are started within a building compared to about three-quarters (77 per cent) of those occurring outside of school-time. During school-time, arsonists have better access to internal areas, which may also be more secluded than external areas. In the cases of deliberately started school-time school fires that occur internally, the majority (59 per cent) started in a cloakroom. Deliberately started school fires which occur during school-time are more likely to occur between 1pm and 1.59 pm. There is also a suggestion that they are more likely to occur mid-week.[3]

Any school fire safety package **has** to include fire protection such as fire doors, extinguishers, smoke and fire alarms, as well as measures for deterring trespass on sites and the prevention of illegal entry into buildings. We believe these measures should extend to the installation of sprinklers in new schools and promoted in schools in high risk areas, as they are a reliable means of containing or extinguishing a fire.

rules and regulations

With schools that are maintained by a local education authority (LEA), responsibility for fire safety is usually shared between the authority, the governing body and the head teacher. With these schools, the local education authority usually has responsibility for alarm systems and the structural fire integrity of the buildings.

The Fire Precautions (Workplace) Regulations came into force in 1997. They apply to both new and existing school buildings and implement the general fire safety provisions of the European Framework and Workplace Directives and complete the Health and Safety Regulations with respect to fire.

The Regulations add very little to what is already required under the Health and Safety Regulations. They provide for minimum fire safety standards and emphasize the duty of 'The Employer' to ensure that every school has risk assessments carried out. Health and safety responsibilities in schools include fire safety.

The Fire Precautions Act (FPA) 1971 describes the powers of the local fire brigades and procedures for gaining approvals and certificates. It was amended by the Fire Safety and Safety of Places of Sport Act (FSSPSA) 1987. It applies to all premises. Fire authorities are not legally required to inspect schools but, if asked, will give goodwill advice.

Some local authorities have Local Acts which include fire safety matters. The local fire authority should be aware of these.

technical information

All costs quoted are at 2003 prices

General design standards

At present there are two pieces of guidance which relate to the installation of sprinklers, the Loss Prevention Council (LPC) rules and British Standards (BS) for the design. There is also the British Sprinkler Associations *Joint Code of Practice for the installation of Automatic Sprinkler Systems in Schools.*

The *LPC rules for Automatic Sprinkler Installations*

This document includes a copy of the latest British/European Standard covering the design, installation and maintenance standards for sprinklers and a set of technical bulletins which cover insurers' requirements, updates and amendments not included in the British Standard. These include sprinkler system guidelines for dwelling houses and schools.

British Standards

At present there are two current British standards for the design and installation of sprinklers. The latest is *BS EN 12845: 2003 Fixed firefighting systems – Automatic sprinkler systems – Design, installation and maintenance* which supersedes *BS 5306: Fire extinguishing installations and equipment on premises Part 2 Specification for sprinkler systems.* This revision of the standard is, however, only due to be withdrawn in July 2006.

As a result there are presently two sets of LPC Rules for Automatic Sprinkler Installations in circulation, the latest of which includes *BS EN 12845: 2003* and the previous edition containing *BS 5306: Part 2 1990.*

The latest edition of the LPC rules contains technical bulletin TB34 for the protection of schools, it is suggested that the design of systems for these occupancies be based on this basis.

Sprinklers in schools – design criteria

The system should be designed and installed in accordance with accepted standards and guidelines such as the Loss Prevention Certification Rules for Automatic Sprinkler Installations. For the time being, it is recommended that systems for schools be designed in accordance with the issue of the LPC rules containing *BS 5306: Part 2* and technical bulletin 34 until such time as technical bulletin sprinklers for schools *EN TB 221* is included in the latest edition incorporating *BS EN 12845.*

Useful information for schools can also be found in the *Joint Code of Practice for the Installation of Automatic Sprinkler Systems in Schools* published by the British Automatic Sprinkler Association. www.basa.org.uk/pdfs/resources/00000020.pdf

Some general guidelines applicable to schools are as follows:

- all parts of the school buildings should be protected subject to certain exceptions outlined in technical bulletin 34;
- the system should be of the wet pipe type (permanently charged with water); providing the temperature in the premises can be maintained above 4°C throughout the year. If not then additional precautions will need to be taken or an alternate system will have to be installed. Consult your insurers on this aspect;
- the fire hazard classification of the building should be determined by a fire risk assessment and will normally be Ordinary Hazard Group 1;
- design and installation should only be undertaken by sprinkler installers and supervising bodies or registered supervised sprinkler installers who are *LPS 1048* certified. Consideration should be given during design and installation to ensure that the system is secure and as unobtrusive as possible to

prevent tampering. Where heads may be subject to accidental damage or vandalism then the use of concealed heads, use of guards or reviewing of the location of the heads and ceiling design can reduce or eliminate the risk;

- the system should be connected to an acceptable central station for monitoring fire alarm signals and tampering with the valve set;

- once installed, the system should be subjected to suitable weekly tests by the user and maintained by a *LPS 1050* certified contractor in accordance with the requirements of *BS 5306 Part 2;* and

- before a tender document is issued you must consult your insurers. They will also wish to check specifications and drawings, hydraulic calculations and witness commissioning tests. Failure to involve your insurers at all stages could nullify insurance discounts.

Maintenance

To ensure that the system is kept in an operational state the BS states the maintenance that is needed. Some of this can be undertaken by the occupier of the premises eg the weekly tests, but the other must be undertaken by a *LPS 1050* certified sprinkler maintenance company. The checks which are carried out by the company would involve ensuring the water supply is sufficient, that the alarm system works and that the sprinkler heads have not been obstructed. Depending on the installation this could take no longer than 30 minutes.

The annual maintenance cost of a sprinkler system is estimated to be approximately £140 excluding materials.

Water supply

The installation of a fire sprinkler system necessitates a reliable and adequate water supply. This may be difficult to achieve in some areas where there is poor water pressure. Where water supplies are particularly poor, additional features such as water tanks and pumps may be necessary. For schools a reduced water storage tank size is allowed, depending in the inflow into the tank from the towns mains.

Installation

Sprinklers must be installed throughout all areas of the premises, the BS allows certain exceptions but the fire separation is strictly designed.

To obtain insurance approval for the system the installers must be *LPS 1048* certified sprinkler installers and supervising bodies or are LPS certified registered supervised sprinkler installers.

Upon completion of the system the installer must provide a Certificate of Conformity.

Components

Components for sprinkler use should be Loss Prevention Certification Board (LPCB) approved and listed in the current LPCB specifiers' guide, *List of approved fire and security products and services.* Where there is no LPCB approval for specific products the requirements are specified in the BS.

the cost of fitting sprinklers

The cost of sprinkler protection depends largely on the size and design of the school, water supplies and whether it is a new build or retro-fitting in an old building.

The fitting of sprinklers in new school designs would cost approximately 1.8 per cent of the total capital cost. The West Midlands Arson Task Force (ATF) says this would be repaid in an average 7 to 10 years through savings in insurance costs. If the sprinkler system prevented injury, death or excessive damage at just one fire it would pay for itself instantly.

A single storey primary school in Oldham set a precedent in 1990 when it became the first new school in the UK to be protected by an automatic sprinkler system. The school was worth over £1 million, the sprinkler system costs just over £20,000, £15.00 per square metre, less than a decent carpet.[4]

These costs are a guideline only, for more accurate pricing you will need to speak to a local sprinkler supplier.

local authority and government initiatives

Best Value

Local authorities are routinely assessed and compared on service delivery with like authorities. The installation of a sprinkler system would achieve a leap forward in terms of reduction in insurance losses and maintenance costs alone. Thus satisfying the main criteria for Best Value in terms of the three 'E's namely economy, efficiency and effectiveness.

Public Private Partnerships/ Private Finance Initiatives

PPPs are about the public sector and private sector working together to produce new and improved service. A PFI is a major funding tool available to the partnership to achieve their goals.

PPP/PFI offers a means of procuring and maintaining refurbished or new schools. Local education authorities have a key role to play in planning any school refurbishment/new build and can influence the installation of fire protection measures.

If the fitting of sprinklers in schools were to form part of the initial design of the school, then the advantages would be considerable; sustainable buildings, greater flexibility in the design and use of buildings and a giant step towards compliance with the Fire Precautions (workplace) Regulations 1997.

New Deal for Schools (NDS)

LEAs are involved in applying for funding under the government's New Deal for Schools (NDS). This allows LEAs to bid for funding which will support proposals to raise educational standards by addressing the most serious building defects, through PPP where possible.

Building schools for the future (exemplar schools)

A consultation on the building schools for the future initiative was launched in February 2003. The programme aims to raise educational standards by improving schools capital programme. £5.1 billion has been invested for 2005-06 for a new strategic rebuilding and renewal of schools in England. It will use the additional funding available in 2005-06 to renew secondary schools; new investment will also be made to primary school buildings in this period.

Part of the scheme is based on the principle of good design; the government believes that well planned and designed schools raise the educational standards of pupils. The government hopes to achieve this by developing national exemplar designs for school buildings. A competition was set to devise the models for the exemplar designs. Eleven firms of designers have now been chosen, five for primary, five for secondary and one for a 'campus' style school.

Although England is seeing the biggest boom for a generation in school buildings, the DfES has decided that it will not incorporate the cost of installation of sprinklers in its designs. However, some of the exemplar designs at the moment do not comply with the basic constructional requirements of Approved Document B, (ADB), of the building regulations, and may require the alternative approach allowed in ADB. This is based on *BS 5588,* and may well require the installation of sprinklers to practically realise the design. There is also the opportunity to fund the inclusion of sprinkler systems at a local level.

case studies

Withington Girls' School Manchester

More than 100 fires – many of them suspected arson attacks – have been dealt with at schools in the north west of England during the 2003 summer holidays. The bill for repairs is estimated at £97m. In one of the worst fires of the summer, Withington Girls' School in Manchester, suffered serious damage to one of its wings. Police believe it was started deliberately.

Detective Constable Jonathan Wakefield, of Greater Manchester Police, said: *"It has been estimated that £1m damage has been caused to the school"* [5]

Tackling arson in Hampshire schools

Arson in schools is on the increase across the country and the national picture is reflected in Hampshire where Hampshire Fire and Rescue Service (HFRS) are campaigning to get sprinklers installed in all schools.

In Hampshire during 2002 there were 25 serious fires in schools including Hayling Island, Marchwood and Thornden in Chandlers Ford. These are believed to have cost around £5m, there was a similar pattern for 2003 with Newlands School in Southampton and Pinewood in Farnborough.

HFRS runs a very successful Schools Education Unit, taking the safety message to children right across the county as part of the National Curriculum and this has been held up to other fire authorities as an example of an innovative approach to a serious problem. Despite this, a very small minority of youngsters are not getting, or are ignoring, the message about the dangers of fire and how easily fires can take hold. HFRS are therefore pressing education authorities to install sprinklers as the most effective answer.

Cllr Keith Chapman, who is a county councillor and a member of the Hampshire Fire Authority, has championed this approach since seeing how effective sprinklers are. He has succeeded in getting the county council to adopt a policy of installing them in new schools and with major refurbishment for existing schools.

"I have been impressed at how much difference sprinklers make", said Cllr Chapman. *"They are also the only available method of actually tackling a fire at the outset and stopping it from spreading. There is no doubt that had sprinklers been installed at the schools where we have had fires recently then the damage would be a lot less. Of course they add to the cost of the building but only about one to one and a half per cent of the total and the cost of rebuilding just one school would pay for a lot of sprinklers."*

"I think", concluded Cllr Chapman, *"that we are facing a major social problem that is wasting our resources and we really need to tackle this problem positively by giving a greater priority to having sprinklers installed in schools as soon as possible".* [6]

The Tiffin Girls' School, Kingston

More than 60 firefighters took five hours to bring the fire under control at The Tiffin Girls' School in Kingston, south-west London on 15 December 2003. Fifteen classrooms were damaged, as well as power and heating systems, and the roof of the teaching block.

It is thought to have been caused by an electrical fault in a roof cavity in the teaching block.

Parents were told two-thirds of the school was still useable, but as the power and heating had been knocked out, it was shutting for Christmas early. GCSE pupils and sixth formers were told to come in the next week to be briefed on exams and coursework.

Former pupil Helen West was among those looking at the damage from behind the school's perimeter fence.

She said: *"I had to come back to see the school, I was at home when I got a message saying that the school was on fire."It's sad to look at it now and think that was an old form room and now it's not there anymore."*[7]

Horton Mills School, Oldham

On Sunday 1 October 2002, youths broke into the Horton Mills School in Oldham and set fire to a cardboard box of toys. Within five minutes the fire service was alerted by the activation of a sprinkler head. One sprinkler head activated, fire and smoke damage was limited to 1m² of a room. Two fire engines were dispatched but no fire fighting action was needed. The school was open, as usual on Monday morning.[8]

useful contacts

Fire Protection Association

Bastille Court, 2 Paris Garden, London SE1 8ND
Tel: 020 7902 5300
Fax: 020 7902 5301
E-mail: fpa@thefpa.co.uk

www.thefpa.co.uk

British Automatic Sprinkler Association

Richmond House, Broad Street,
Ely, Cambridgeshire CB7 4AH
Tel: 01353 659 187
Fax: 01353 666619
E-mail: info@basa.org.uk

www.basa.org.uk

Local Government Association

Local Government House,
Smith Square, London SW1P 3HZ
Tel: 020 7664 3000
E-mail: info@lga.gov.uk

www.lga.gov.uk

National Fire Sprinkler Network

City Works, Alfred Street, Gloucester, GL1 4DF
Tel/fax: 01452 312 121
E-mail: nfsn@btconnect.com

www.nfsn.co.uk

National Fire Protection Association (NFPA)

1 Batterymarch Park, PO Box 9101
Quincy, Massachusetts 02269 – 9101
Tel: 617 984 7445
Fax 617 770 3000

www.nfpa.org

Arson Prevention Bureau

51 Gresham Street, London EC2V 7HQ

www.arsonpreventionbureau.org.uk

European Sprinkler Network

Alan Brinson, 70 Upper Richmond Road
London SW15 2RP
Tel: 020 8877 2600
Mob: 07733 277630
Fax 020 88772642
Email info@eurosprinkler.org

Zurich Municipal

Southwood Crescent, Farnborough
Hants GU14 0NJ
Tel: 0870 241 8050

www.zurich.co.uk/municipal/zmhome/welcome

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the Local Government Association at:
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