



# FIRE SAFETY IN SCHOOLS

BUILDING OUR FUTURE: SCOTLAND'S SCHOOL ESTATE



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SCOTTISH EXECUTIVE



# FIRE SAFETY IN SCHOOLS

BUILDING OUR FUTURE: SCOTLAND'S SCHOOL ESTATE

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# 1 | INTRODUCTION

- 1.** This guidance is aimed at local authorities and other stakeholders with an interest in establishing and maintaining a safe school environment free from fire and its effects. It has been developed as part of the school estate strategy and complements 'Building Our Future: Scotland's School Estate'.<sup>1</sup>
- 2.** Each year more than 2000 schools in the UK suffer fires large enough to need action by the fire service. These range from small external rubbish fires to larger more damaging internal fires that seriously affect the operation of the school. The odds on having a fire in a school are about 1 in 15. This, however, is not the full picture. Many fires in schools go unreported to the fire services, particularly if a member of staff has extinguished them or they have burned themselves out.
- 3.** The most recent estimate of the cost as a result of school fires in the UK is £115 million per annum.<sup>2</sup> This includes damage to the building and also costs incurred by the fire service and the police.
- 4.** The cost of a fire cannot simply be expressed in financial terms. The effect of a school fire can be devastating to the local community. School records and course work may be irreparably damaged, classrooms and community facilities may be unusable for long periods and in extreme cases, entire schools may be destroyed.
- 5.** In Scotland, an average of four educational establishments suffer a reported property fire every week. The effective management of fire in educational establishments is essential to ensure the safety of pupils, teachers and the wider community. This guidance provides essential information to those charged with managing schools in Scotland to enable them to effectively discharge their duties with regard to fire.
- 6.** Standards of fire safety, together with management practices in schools, have ensured that fatalities and injuries caused by fire in school premises are rare. In 2001 in the UK,<sup>3</sup> there were no fatalities, but there were 47 non-fatal injuries.
- 7.** Many fires in schools are started deliberately. An alarming trend is that deliberately set fires are becoming more prevalent during school time. These fires are generally set from inside the school, increasing the risk to the occupants. Over 70% of school fires are started deliberately: this includes 90% of larger fires, and accounts for 85% of the total cost of school fires.

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<sup>1</sup> *Scottish Executive/COSLA, 2003.* <http://www.scotland.gov.uk/library5/education/bcfs-00.asp>

<sup>2</sup> *School Arson: Education Under Threat 2002*, Arson Prevention Bureau. [www.arsonpreventionbureau.org.uk](http://www.arsonpreventionbureau.org.uk)

<sup>3</sup> *Fire Statistics United Kingdom 2001*, Office of the Deputy Prime Minister

8. The Scottish Executive is committed to decreasing instances of deliberate fires, particularly those fires with huge social costs. This follows on from *Fire: Raising the Standard*,<sup>4</sup> a joint thematic review by The Fire Service Inspectorate and the Inspectorate of Constabulary.

## STATUTORY DUTY

### Local Authority

9. The responsibility for ensuring the health and safety of those in the school rests principally with the headteacher. However, for local authority schools, responsibility for fire safety is usually shared between the authority and the headteacher. Between them, they must ensure that fire precautions in schools comply with all relevant health and safety legislation, in particular, in respect of fire safety, the *Fire Precautions (Workplace) Regulations*<sup>5</sup> and the *Management of Health and Safety at Work Regulations*.<sup>6</sup>
10. The local authority will generally be responsible for meeting the relevant building standards and it usually assumes responsibility for the installation and maintenance of fire alarm systems and the structural fire integrity of the buildings. All building work in schools that involves a change of use, an alteration or a building extension will require a building warrant application to be submitted to the local building authority. The Scottish Building Regulations provide requirements and standards with regard to the structural fire protection of the building and to the means of escape from the building should an emergency occur.
11. The headteacher will generally be responsible for on-going compliance with fire safety legislation and for fire safety management in the school.
12. In independent schools, responsibility for fire safety generally rests with the proprietor, who is required to register the school with the Scottish Registrar for Independent Schools.<sup>7</sup> Registration will depend, amongst other things, on the provision and maintenance of adequate fire precautions.

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<sup>4</sup> *Fire: Raising the Standard* 2002, Joint Thematic Inspection by HM Inspectorate of Constabulary for Scotland and HM Fire Service Inspectorate for Scotland. [www.scotland.gov.uk/hmic/publications.asp](http://www.scotland.gov.uk/hmic/publications.asp)

<sup>5</sup> *The Fire Precautions (Workplace) Regulations 1997 (as amended)*, Statutory Instrument 1997 No 1840

<sup>6</sup> *The Management of Health and Safety at Work Regulations 1999*, Statutory Instrument 1999 No 3242

<sup>7</sup> *Education (Scotland) Act 1980*

- 13.** The *Fire Precautions (Workplace) Regulations* require a risk assessment to be carried out with regard to the dangers fire presents in the workplace and for the provision of suitable fire precautions. Nearly all school premises require a written fire risk assessment that records the most significant findings of the fire safety assessment. These must be written down if there are five or more employees. Risk assessment should take into account all the people that are likely to enter the school buildings, including staff, pupils, parents, members of the public and contractors. Prior to the introduction of these regulations, some fire services carried out school inspections on a goodwill basis, giving recommendations and advice as necessary. There is a statutory duty on the employer to carry out a workplace fire risk assessment and failure to do so can be a criminal offence.

#### **Fire Service**

- 14.** The fire service is responsible for enforcing the *Fire Precautions (Workplace) Regulations*. However, enforcement is not their only role and they must also give fire safety advice when requested. This is usually provided by a local fire safety officer.
- 15.** The fire service will not carry out fire risk assessments on behalf of the responsible person. However, as part of their enforcement role, they will use the school's fire risk assessment as a starting point for any inspection. Part of the inspection process will be to provide guidance on compliance.
- 16.** The level of enforcement will depend on the findings of an inspection. Where the responsible person has caused or permitted a situation that places employees in danger from fire, the fire service can issue an Enforcement Notice, highlighting where breaches of the regulations have taken place. There is a 21-day period where the person served with a notice can appeal. In cases where the risk to people in the building is so severe that they are in imminent danger, the fire service can serve a Prohibition Notice<sup>8</sup> which prohibits the use of all or part of the building.

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<sup>8</sup> *Fire Precautions Act 1971*. This piece of legislation at the time of going to press is under review



2 | ISSUES

## MEANS OF ESCAPE

- 1.** This section sets out the main issues which are relevant to fire safety in schools.
- 2.** A satisfactory means of escape should allow staff, pupils and any other person in the school to move quickly to a place of safety.
- 3.** Escape from any part of a building will normally be by one of two alternative routes, each leading to a final exit or to a door to a staircase that is protected by fire doors and walls. Rooms with only one exit should accommodate no more than 60 people. Escape routes should be short enough to allow all occupants to escape in two or three minutes. In higher risk areas, such as kitchens, or areas with only one direction of escape, this time may need to be halved. Escape routes providing only one way out should be no more than approximately 15 metres to an exit or stair enclosure or, where two ways out are provided, approximately 32 metres. The fire service can offer advice on the acceptability of existing means of escape.
- 4.** The reaction times to allow for the delay before people start to move should also be considered. This will vary considerably and depend on how well staff and pupils know the fire drill. When a school is used for community purposes, the reaction time will be higher as the occupants may be unfamiliar with the alarm and evacuation procedures.
- 5.** A serious situation may arise if a fire starts in a corridor, since it may not be detected before smoke cuts off escape from nearby rooms. For this reason a corridor which serves as a safe exit for any room should have non-combustible finishes to exposed wall and ceiling surfaces. Escape routes should also have fire resistant walls and ceilings and fire and smoke control doors should be fitted on protected escape routes. If the integrity – the ability to stop the spread of fire and smoke – of fire resisting construction or doors is compromised, an entire escape route may be unusable in the event of fire. Examples of common problems are:
  - › missing or damaged ceiling tiles
  - › missing or damaged fire barriers in concealed voids
  - › broken or missing automatic door closers
  - › fire doors which are damaged, ill fitting or wedged open.
- 6.** Fire doors should never be wedged. An alternative to wedging doors open is to use electro-magnetic door retainers. These are linked to the fire detection system and hold the door open in normal use. If there is a fire they automatically release the doors and let them shut. A building warrant is required before these can be fitted.

- 7.** Final exit doors on escape routes are often fitted with push bars. These are ideal for fire safety, but some types can be forced open by an intruder. Potentially dangerous methods to make push bars secure, such as hooking chairs over the push bars or chaining the push bars shut, should be avoided. Security measures should not compromise the ability of the occupants to escape from a building in the case of fire. It is important to consider whether the type of locking mechanism on doors is appropriate for the use of the building. It could be that the type of locking device is perfectly acceptable during normal school hours but unacceptable for use by members of the public, outwith school hours. In such cases, it is always best practice to design the locking devices for the public escape scenario. Detailed guidance for timber fire and escape doors can be obtained from the *Building Hardware Industry Federation Code of Practice*.<sup>9</sup>
- 8.** The *Technical Standards to the Building Regulations* give detailed advice on issues such as temporary waiting spaces in stair enclosures for disabled people. The structural integrity of the stair enclosure including the doors must be able to withstand the effects of fire and inhibit smoke spread into the stair enclosure until all occupants have evacuated the building. Temporary waiting spaces should obviously not be used for storage.
- 9.** Risk assessment should take account of building use. Escape routes should be inspected regularly to check they are not obstructed and that fire exit doors are unlocked. Self closing doors, and those with automatic release devices, should also be checked to ensure they close fully. Any defects should be reported and remedied at the earliest opportunity. Current building standards require that roller shutters must not be used on escape routes or over final exit doors and alternative security measures should be discussed and agreed with the local crime prevention officer, building control officer and fire officer.
- 10.** In existing situations where roller shutters are provided on escape routes and are used to secure the building whilst it is unoccupied, these shutters must not be left down when the premises are occupied. The means of escape requirements for cleaning staff and those using the premises out of school hours need to be assessed and managed. The risk assessment must ensure that all required means of escape are available at all times when the building is occupied.

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<sup>9</sup> *Hardware for Timber Fire and Escape Doors*, November 2000

## MINIMISING THE SPREAD OF FIRE

- 11.** Existing buildings may have hidden wall, ceiling or roof voids, which can allow undetected smoke and fire to spread quickly within the building. Whilst the installation of an automatic fire alarm and detection system will provide early warning, the unseen spread of fire makes fire-fighting very difficult and greatly increases the potential for large loss. The installation of fire barriers in concealed spaces and additional fire doors will limit the spread of fire and significantly reduce the area that could be affected. Wall and ceiling surfaces on escape routes can be upgraded with minimal disruption and cost to comply with current minimum standards.

## HIGH RISK AREAS

### Teaching areas

- 12.** Some school activities carry a higher fire risk, such as:
- › design technology
  - › laboratories
  - › home economics
  - › art
  - › photographic darkrooms
  - › drama.

### Non-teaching areas

- 13.** These include kitchens, offices, science and technology rooms, boilerhouses, most storage areas and electrical switchrooms. Some of these areas, such as kitchens and boilerhouses, have a higher than normal fire risk and particular attention must be paid to fire precautions. All storage areas should be kept clean and tidy. Particular attention should be paid to caretakers' and groundskeepers' stores, stage storage areas, PE stores for foam mats, waste storage areas and similar places where flammable material can accumulate.

### Residential accommodation

- 14.** A high standard of fire precaution is required for residential accommodation which should take account of the numbers and ages of pupils. A risk assessment is required in accordance with the *Fire Precautions (Workplace) Regulations*. See *Fire Safety, An Employer's Guide* for further guidance.<sup>10</sup>

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<sup>10</sup> *Fire Safety, An Employer's Guide*, 1999, ISBN 0 11 341229 0, from The Stationery Office

### **Activity centres outside schools**

- 15.** Activity centres carry certain fire and security risks and school staff should be provided with relevant information on fire and security risks and procedures prior to every visit. School insurance cover may not extend to residential accommodation in activity centres and insurance cover should be checked before the visit.

### **Displays**

- 16.** Corridors often have displays along their length. Stairwells and entrance foyers are a popular location for notices and posters. Displays are often suspended from ceilings, light fittings or placed close to heaters. Sometimes displays are laid out on tables and obstruct escape routes. The cardboard, paper and plastic that go into these displays can be a means of rapid fire spread. Some general principles that can help reduce the risks of fire spread along display materials are:
- never put displays in stairways which are part of a designated fire escape route
  - in school corridors, display material should be kept away from curtains, doors and heat sources, so that fire cannot easily spread to the building fabric
  - limit the total area used for displays in any one area. The area may be increased if the displays are treated with a proprietary flame retardant spray or locations are agreed with the fire service
  - never attach displays to lights, heaters or any fire safety equipment such as smoke detectors or sprinkler heads
  - keep displays away from ceiling voids that lack fire barriers
  - keep displays away from exits.
- 17.** Displays should not obstruct escape routes or obscure fire notices, fire alarm call points, fire fighting equipment, emergency exit signs or lights. Notice boards should be limited to lengths of three metres with gaps of at least one metre between boards. In corridors, displays should not be placed immediately opposite each other. Hanging displays can trigger intruder alarms at night, resulting in false alarms.

### **Waste handling**

- 18.** Fires starting in externally stored waste are perhaps the most common in schools today.<sup>11</sup> Schools can generate a lot of waste and this should not be allowed to accumulate and should never be stored in the school overnight. At the end of each day, or more frequently if necessary, waste should be collected and taken to a secure external waste storage area, at least ten metres from the building. If a compound for storing waste cannot be provided, then secure anchor points, at least ten metres from the building, where waste bins can be secured by a chain and padlock, should be provided if possible.

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<sup>11</sup> *The design and protection of new school buildings and sites*; 2003. Zurich Municipal

- 19.** If the waste area is near a building then care should be taken to ensure that bins cannot be pushed against the building, particularly close to windows or roof eaves, and set alight. It might be appropriate to build a new, detached bin store. The design of a bin store should take account of the possibility that the bins inside may be set on fire and should allow their contents to burn safely.
- 20.** If waste skips or receptacles such as recycling containers are brought on to the school site, they should either be removed by the end of the day or be lockable so that their contents cannot be used as fuel for a fire. Waste skips should not be placed within ten metres of a building.
- 21.** It is advisable to fit 'skirts' around the bases of temporary classrooms. These consist of boarding material which prevents combustible materials being placed under the structure which can then be ignited. These also stop the accumulation of ordinary rubbish.

### **Smoking**

- 22.** Many schools have a no smoking policy or restrict smoking to specially designated areas. Wherever smoking is allowed, fireproof receptacles should be provided with notices indicating their position and purpose. Waste bins should not be used as ashtrays and ashtrays should not be emptied into waste bins, but into metal containers.

## **ELECTRICAL EQUIPMENT**

- 23.** Computers and other equipment can impose heavy demands on the electrical system. Wiring, plugs and sockets that are overloaded or in poor condition are a fire hazard. The risk of overloading sockets can be a particular problem in winter if supplementary electric heaters are used. Electrical equipment should be switched off when not in use unless it is designed to be permanently connected. A blown fuse should only be replaced after the cause of its failure has been discovered. It should always be replaced with a fuse of the correct rating and never with a fuse of a higher rating or a makeshift fuse from a length of wire.
- 24.** Procedures should be in place for the regular testing and inspection of electrical circuits and portable equipment.<sup>12</sup> Before using any electrical equipment, it is important to visually inspect it for damage. This inspection should include checking:
  - › the cables leading to the equipment for fraying and other damage
  - › the plugs and sockets for cracks, missing parts
  - › the correct use of a current protection device
  - › the casing of the equipment for damage and exposed wiring.

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<sup>12</sup> *Maintaining portable and transportable electrical equipment.* Health and Safety Guidance HS(G)107

- 25.** Flammable material should not be kept in electrical switch rooms or boiler houses and care should be taken to ensure that any materials stored in switch rooms do not obstruct access to the switchgear. All combustibles should be kept well clear of electrical equipment and switchgear.

#### **Portable heaters**

- 26.** The use of portable gas or electric heaters should be strictly controlled. Users should follow the manufacturers' instructions and be fully aware of the hazards these heaters can present. It is good practice to discourage use of personal portable heaters and electrical equipment, such as kettles. Where they are allowed, the items should be registered with the school and checked by a competent electrician or gas fitter before use. Portable heaters should be guarded and located so that there is no possibility of them coming into contact with flammable material, including clothing. They should not be positioned on escape routes. When a gas heater is not in use its cylinder should be disconnected. Spare cylinders for portable gas heaters should not be stored inside the school building.

## FLAMMABLE LIQUIDS AND CHEMICALS

- 27.** Flammable liquids must be stored in accordance with the *Dangerous Substances and Explosive Atmosphere Regulations*.<sup>13</sup> These regulations require the employer to carry out a risk assessment of any work activities involving dangerous substances to eliminate or reduce the risk as far as reasonably practicable. The storage of flammable liquids should be strictly monitored, with the amounts of flammable liquids and chemicals stored inside the school kept to the minimum necessary for day to day use. Chemicals should be stored in locked areas.
- 28.** Safety principles which should be followed in respect of flammable liquids are:
- ventilation: good ventilation will mean any vapours given off from a spill or leak will be rapidly dispersed.
  - ignition sources: ignition sources should be kept away from flammable liquids. Ignition sources include sparks from electrical equipment or welding and cutting tools, hot surfaces, open flames and smoking materials.
  - containment: flammable liquids should be kept in suitable containers.
  - exchange: can a less hazardous material be used instead of the materials currently used or can the flammable substances be eliminated altogether?
  - separation: flammable substances should be stored and used well away from other processes and general storage areas.

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<sup>13</sup> *Dangerous Substances and Explosive Atmospheres Regulations 2002* Statutory Instrument 2002 No. 2776

- 29.** Flammable liquids can give off large volumes of flammable vapours at room temperature. Mixed with air, these vapours can ignite, often violently. Spilled flammable liquids can flow a long way to an ignition source and then flash back to the source of the leak. Spills on clothing can represent a serious risk of injury if ignited. To help control these risks:
- store flammable liquids in a separate storage building or area, or in a purpose-made bin or cupboard
  - dispense and use them in a safe place where there is good ventilation and no source of ignition
  - keep containers closed when not in use. If possible, use safety containers which have self-closing lids
  - dispense liquids over a tray and keep non-flammable absorbent material handy to mop up spills
  - staff should know how to deal with spills. Dispense liquids over a tray and keep non-flammable absorbent material handy to mop up spills
  - dispose of contaminated materials safely or call in disposal experts.
- 30.** Rooms containing flammable liquids should be kept locked when not in use. There must be no smoking in any place where a flammable liquid is present. Further guidance is available from the Health and Safety Executive, local authority petroleum licensing officers and the local fire service.

#### **Gas supplies in laboratories and other serviced spaces**

- 31.** Wherever possible, an isolating valve should be fitted in each laboratory to enable gas supplies to gas taps on benches to be shut off at the end of the day's activities.

#### **Liquefied Petroleum Gas (LPG) and other gas cylinders**

- 32.** Storage and marking of liquefied petroleum gas (LPG) and other gas cylinders should comply with the Health and Safety Executive, Approved Code of Practice.<sup>14</sup> Cylinders in use should be kept in a secure area, such as a locked room. Spare cylinders should be stored in a safe position, such as a wire cage protected against direct sunlight, or in a ventilated fire resistant structure. The structure should be secured against vandals.

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<sup>14</sup> *Storage of full and empty LPG cylinders and cartridges*, Approved Code of Practice 7, Health and Safety Executive

## FURNITURE AND FURNISHINGS

- 33.** Upholstered furniture used in schools should comply with the *Furniture and Furnishings (Fire Safety) Regulations*.<sup>15</sup> These regulations require that the filling and covering materials meet certain criteria in respect of their resistance to ignition.
- 34.** Upholstered furniture manufactured prior to regulations may contain foam fillings that are easily ignited, burn fiercely and generate dense toxic smoke. Existing furniture should therefore be checked to ensure it conforms to the regulations. Any furniture labelled that does not conform should be removed from the school site as soon as practicable. Any upholstered furniture offered as a gift should be similarly checked. If in doubt contact the fire service for advice.
- 35.** Curtains, including stage drapes, should be labelled during manufacture to indicate that they are either made from inherently fire retardant fabrics or that they have been chemically treated to achieve fire retardance. The manufacturers' or suppliers' instructions should be followed when cleaning. Some treated materials require regular washing to remove dust build-up which can impair their retardant properties, while other treatments must be reapplied after fabrics have been washed. Existing curtains which cannot be verified as fire retardant may be suitable for treatment. Such treatment is normally professionally applied, although some treatments are available for user-application and some of these may also be applied to stage scenery and decorations.
- 36.** Gymnasium mats and crash pads with cellular foam fillings are a particular hazard in a fire, as they may burn fiercely and generate dense toxic smoke. This type of mat is very popular as they are of high quality. When not in use they should be kept in a securely locked store, which has a minimum fire resistance of one hour.
- 37.** The layout of loose furniture, particularly in open plan or semi-open plan teaching areas, should not obstruct escape routes and should take account of the needs of occupants such as wheelchair users.

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<sup>15</sup> *The Furniture and Furnishings (Fire) (Safety) Regulations 1988* (as amended in 1989 and 1993)

## BUILDING WORK

**38.** Any adaptations or modifications to the school should always take fire precautions into account. A building warrant may be required and the local authority building control officer should be consulted in all cases. The local fire safety officer can offer advice on issues such as:

- › partitioning rooms
- › creating one room from two
- › creating a room within a room
- › exits or escape routes
- › positions of incoming gas or electrical mains
- › ventilation systems
- › provision of fire exits
- › occupant capacities in halls
- › security arrangements.

**39.** Building work can significantly increase the risk of fire and may cause obstruction to escape routes. This may include:

- › operations using heat. Plumbing work, paint stripping and repairing flat roofs are possibly the most common examples of high risk work
- › storing combustible materials or flammable liquids in, or close to, school buildings, which could act as fuel supply for a fire. Examples include petrol, paints, thinners, propane cylinders and waste skips
- › breaking through fire walls. When a school is rewired, or cables are fitted for telephones or computer networks, wiring is often carried above a suspended ceiling and taken through fire walls. Such breaks in the fire barriers should be made good with materials of the same fire resistance
- › impacting on the normal security measures of the school making it more vulnerable. An example is scaffolding erected against the building which could give an intruder easy access to upper floors
- › reducing the width or availability of escape routes during building work, or by the positioning of ladders, trestles, scaffolding, materials or equipment.

- 40.** These risks can be anticipated by discussing with the contractor how the work is intended to be carried out. Similarly, arrangements for the proper storage of combustible materials, flammable liquids, gases and the siting of skips can be agreed before the contractor comes on site. Arrangements should be made to monitor escape routes and to prevent obstruction. Where obstruction is essential to the work activity, satisfactory alternative arrangements should be made for the safe evacuation of all occupants in an emergency.
- 41.** If work involves heat processes, such as blow lamps or welding, then a hot work permit system should be used. This identifies hazards associated with the task and allows control measures to be implemented and managed, thereby reducing the risk of fire. Hot work permits require confirmation that fire precautions have been taken prior to work commencing. These arrangements are easiest to make on larger, long term projects, where a method statement will be a requirement from the contractor under the *Construction (Design and Management) Regulations*, but are also relevant for smaller repair work. The school should be informed every time a heat process is used, so that any necessary precautions can be taken. All building works should report to the school to discuss their work before they start. Construction sites are not subject to the *Fire Precautions (Workplace) Regulations* unless the school is still in use but the *Construction (Health, Safety and Welfare) Regulations* apply.

## **Typical hot work permit checklist of fire precautions**

### **Setting up**

- › fire fighting equipment and systems are maintained and are in service
- › fire extinguishers and fire blankets are to hand
- › hot work equipment is in good condition
- › gas containers/flammable liquid containers to be changed/filled in the open air.

### **Within 15 metres of the work**

- › floors swept clean of combustibles and wetted down or covered with non-combustible material where necessary
- › combustible materials, hazardous or flammable liquids have been removed or are protected with non-combustible curtains, sheets or shields
- › all wall and floor openings and gaps through which sparks can fall have been covered with non-combustible curtains or sheets
- › non-combustible covers suspended beneath work to collect sparks.

### **Work on walls or ceilings**

- › any combustible material has been protected against sparks or heat
- › combustibles moved away from other side of walls and away from metal through which heat can be transferred.

### **Work on enclosed equipment (tanks, containers, ducts, dust collectors, etc.)**

- › equipment cleaned of all combustibles and dust
- › containers purged of flammable liquids and vapours.

### **Fire watch**

- › fire watch to be provided during and until 30 minutes after operation
- › to be supplied with fire extinguishers, fire blankets and/or hose reel
- › someone to be present who has been trained in basic fire fighting and in sounding the alarm.

### **Final check**

- › final checks to be made 60 minutes after completion of any operation
- › if contractors have had access to the roof space, check the openings in roof voids are properly closed and locked.



# 3 | MANAGEMENT

## IDENTIFYING AND MANAGING RISKS

- 1.** Health and safety responsibilities in schools include fire safety<sup>16</sup> and the employer is required to make a suitable and sufficient assessment of:
  - › the risks to the health and safety of employees whilst they are at work, in accordance with the *Management of Health and Safety at Work Regulations*
  - › the risks to the health and safety of other persons (e.g. pupils, parents, contractors) whilst they are on the premises
  - › to record the significant findings of the assessment where five or more people are employed (whether or not they are at work in the same school at any one time or at separate workplaces).
  
- 2.** Where the assessment relates to general fire precautions for the safety of employees, the fire service is responsible for enforcement. In practice, the fire service will tend to concentrate activities on workplaces with a higher fire risk than schools (but provision of boarding accommodation is likely to influence their inspection programme). Guidance<sup>17</sup> to employers explains what fire risk assessment is and how to go about it. It also focuses on the provision of fire precautions in the workplace in the light of the findings of fire risk assessment.
  
- 3.** Local authorities and Head Teachers need to manage fire safety in the same way they manage other health and safety issues, by implementing the policies agreed and monitored by the employer. To do this they will usually consult professionals from within the local authority, the local fire service and their insurers.
  
- 4.** The main duties regarding fire safety management are to:
  - › make hazard and risk assessments
  - › be responsible for fire safety training
  - › produce an emergency plan and put up fire notices
  - › conduct fire drills
  - › check the adequacy of fire fighting apparatus and its maintenance
  - › consult with and implement recommendations of the local fire service
  - › conduct fire safety inspections, preferably every term
  - › make more frequent informal checks to confirm that the fire safety rules are being followed

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<sup>16</sup> *Managing Health and Safety in Schools*, 1995, ISBN 0 7176 0770 4, available from HSE books

<sup>17</sup> *Fire Safety, An Employers Guide*, 1999, ISBN 0 11 341229 0, from the Stationery Office

- › ensure fire escape routes and fire exit doors/passageways are unobstructed and doors operate correctly
  - › check that fire detection and protection systems are maintained and tested and records kept
  - › ensure close down procedures are followed
  - › include fire safety in the regular health and safety reports.
- 5.** It is useful to keep a fire logbook to record essential information such as evacuation procedures, tests on fire fighting equipment, details of training sessions and results of fire drills.
- 6.** For a risk assessment to be suitable and sufficient it should cover all aspects of the schools use and take account of all of the people likely to use the building. A risk assessment should follow the steps<sup>18</sup> set out opposite.
- 7.** They identify possible hazards and suggest suitable precautions. The hazards are grouped in two tables. The first group can be dealt with by the school itself, whereas the second is likely to require professional input to the risk assessment. Professional advice can be obtained from local authority risk managers, fire services, police crime prevention officers and insurance companies.

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<sup>18</sup> *Five Steps to Risk Assessment*. HSE Publication available from HSE Books, PO Box 1999, Sudbury, Suffolk CO10 2WA

## Fire risk assessment

**STEP 1 Identify all likely fire hazards**, including ignition sources and sources of fuel.

**STEP 2 Decide who may be in danger** and note their locations. Consider the needs of staff, visitors, pupils, contractors, young, old and disabled.

**STEP 3 Evaluate the risks** and carry out the necessary training to minimise the risks.

Decide if the existing fire safety measures are good enough, or if more needs to be done to make reasonably sure that nobody would be injured if a fire occurs.

Do this by checking:

- controls on ignition sources/sources of fuel
- that a fire can be detected in a reasonable time and that people can be warned
- that people who may be in the building can get out safely
- provision of fire fighting equipment
- maintenance and testing of fire precautions
- that fire safety training is adequate to ensure that those in the building know what to do if there is a fire.

A checklist is useful in identifying the hazards and risks.<sup>19</sup>

**STEP 4 Record findings and take action.**

In particular you should list the more significant hazards and your most important conclusions, for example:

Rubbish bins                      Kept in secure compound that is locked when not in use and located away from building structure

Electrical sockets                No sockets found overloaded. Portable equipment checked regularly. Electrical installations tested every five years or more frequently if in poor condition.

**Prepare an Emergency Plan.**

**Inform, instruct and train employees in fire precautions.**

**STEP 5 Keep assessment under review.** Check that it is up to date and revise it if necessary.

You must review your fire risk assessment and your fire safety measures on a regular basis. This should be done if:

- changes to the school are proposed
- changes to any activity are proposed, such as the introduction of flammable material to science rooms
- changes to the number and needs of people
- a near miss or a fire occurs.

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<sup>19</sup> Fire and Security Check lists available on: [www.zurich.co.uk/Municipal/LocalAuthorities/Publications](http://www.zurich.co.uk/Municipal/LocalAuthorities/Publications)

## HAZARDS THAT CAN BE DEALT WITH BY THE SCHOOL

Hazard	Action
Evacuation in the event of a fire.	Staff training. Fire practice drills. Suitable fire action notices displayed.
Combustible materials. PE mats of the type that burn to produce toxic gas. Flammable foam filled furniture.	Identify combustible materials. Make sure they are not stored on escape routes or near sources of ignition; reduce fire risk. Store in one hour fire rated store. Replace or locate in area of low fire risk, e.g. away from escape routes.
Fire exit doors locked, poorly maintained or without Fire Exit signs.	Ensure doors are regularly inspected and maintained. Locks or fastenings should be able to be over-riden without the use of a key from the side approached by people making an escape. A notice should be displayed explaining the operation of the device. Fire Exit signs should be provided where appropriate.
Sources of ignition. Light bulbs and fittings near flammable materials. Overloaded multi-point adapters in electrical sockets. Portable electric or LPG heaters in use. Combustible waste. Unsecured moveable waste and recycling bins and skips left near school buildings.	Reduce the risk of fire, by identifying possible sources of ignition. Replace tungsten filament bulbs by fluorescent fittings in areas where there is a possibility that combustible materials may be ignited. Alternatively, move fittings or combustibles. Only use adapters where it is unavoidable. Do not overload. Provide additional sockets if necessary. Replace naked flame and radiant heaters with fixed convectors or a central heating system. Remove waste frequently. Bins at least ten metres away from any building, either locked to a metal post or within a secure enclosure.

Hazard	Action
Flammable wall and ceiling finishes.	Remove or treat flammable wall or ceiling linings.
Display materials.	Location and quantity of display materials on escape routes kept under control. Displays can be sprayed with fire retardant.
Highly flammable materials.	Store highly flammable materials in fire-resisting stores away from sources of ignition.
Hazardous spaces, such as heat bay areas in design technology and chemistry laboratories.	Procedures to reduce risk established and followed; fire resistant materials used where needed and fire fighting apparatus provided.
Ducts, chimneys and flues.	Keep clean and in good repair.
Contractors, e.g. using naked flame or heat processes.	Operate a hot work permit system. Give outside contractors and maintenance staff fire safety information.
Smoking areas, if allowed.	Provide ashtrays and fire-proof waste bins for cleaners.
Sub-standard electrical installation posing a fire risk, e.g. due to insulation breakdown on old wiring.	Keep electrical inspection and testing up to date and carry out repairs.
Dangers from electrical equipment.	Carry out portable appliance tests. Only allow a competent nominated person to wire plugs, using the correct sizes of fuse. Keep flexes as short as possible and never use equipment with damaged cables. Take faulty equipment out of use immediately. Make sure that staff know how to isolate the main electrical supply in an emergency.
Fire fighting apparatus.	In correct locations and tested annually.

## HAZARDS REQUIRING PROFESSIONAL ADVICE

Hazard	Action
<p>Escape routes involving corridors and stairs.</p> <p>Hazardous areas, e.g. kitchen, boiler room, and chemical store.</p> <p>Combustible wall or ceiling linings which could promote rapid spread of flames.</p> <p>Fire doors not fitted with smoke/fire seals, damaged or poorly fitting in door frames.</p>	<p>Limited travel distances, enclosing construction has adequate fire resistance, fire exits, exit and directional signs and possibly emergency escape lighting.</p> <p>Enclosing construction has adequate fire resistance.</p> <p>Surfaces have adequate resistance to surface spread of flame.</p> <p>Fire doors provided at appropriate positions have correct fire and smoke rating and in good working order.</p>
<p>Gas in kitchens, domestic science or science laboratories.</p>	<p>Isolate gas supply preferably with removable key or automatic gas isolation system.</p>
<p>Extinguishing the fire.</p>	<p>Adequate means of access and facilities including water supply for fire brigade.</p> <p>Adequate fire fighting apparatus for occupants, e.g. hose reels, extinguishers, sand buckets and fire blankets.</p>
<p>Evacuation of disabled people.</p>	<p>Design for any special needs, such as the provision of temporary waiting spaces on escape stairs.</p>

Hazard	Action
<p>Buildings with over-large fire compartments.</p> <p>Inadequate fire/smoke barriers between fire compartments.</p> <p>Inadequate fire stopping of services penetrations, such as ducts, pipework and cableways.</p> <p>Inadequate fire resistance of ducts, flues and chimneys.</p>	<p>Very difficult to correct; some low cost improvement may be possible.</p> <p>Difficult to assess without investigating ceiling voids. Fire plans should show where fire barriers are located.</p> <p>Additional fire doors and fire stopping installed in fire strategic locations.</p> <p>Increase fire resistance.</p>
<p>Out of date system, with poor wiring and liable to false alarms.</p> <p>Fire alarm break glass call points inadequate.</p> <p>Locality of high fire risk due to arson.</p> <p>Hazardous areas, e.g. kitchen, boiler room and chemical store.</p>	<p>Update system, test and maintain to BS 5839.</p> <p>Upgrade number and location.</p> <p>Provision of automatic detectors, sprinkler system or other measures.</p> <p>Provision of automatic heat or smoke detectors.</p>

## COMMUNITY USE

- 8.** Many schools provide extra curricular activities for pupils, and community use in the evening and at weekends. The local building control officer should be consulted to establish if a building warrant is required for the extension of use from educational establishment to community facilities.
- 9.** Often only part of the school is open in the evenings and at weekends and it is normal to unlock only those parts of the school which are actually in use. This needs to be done carefully to avoid shutting off escape routes. People using the school in the evening may be unfamiliar with the layout of the building and have additional needs, for example in the marking of exit routes. Visitors should always be aware of the fire drill and the means of escape from the building.
- 10.** Community groups sometimes bring their own equipment into a school, for example drama groups often bring their own lighting and sound equipment. Such equipment should be checked beforehand to confirm that it:
  - › complies with the safety requirements for portable equipment
  - › will not impose unduly high loads on electrical services
  - › will be properly used by competent people
  - › is compatible.

### **Public performances**

- 11.** When a school is used by members of the public for dancing, music, stage or film shows then a public entertainment, theatre or cinema licence may be required. Any function at which alcohol is offered for sale will need a licence, application for which should be made to the Clerk to the local Licensing Board. Other licences are issued by local authorities under the terms of the *Civic Government (Scotland) Act* and will usually impose conditions on, amongst other things:
  - › the number of people present
  - › the type of seating
  - › the layout of the seating
  - › the marking of emergency exits
  - › the provision of emergency lighting.
- 12.** In some areas it is possible that a fire officer will inspect the school before the licence is issued and in some cases, it is possible that a check will be made when performances are in progress to confirm that the conditions laid down in the licence are being met.

- 13.** Areas of the school that are open to the public during public performances, such as school plays, should have emergency lighting on escape routes. Someone should take responsibility for checking that fire exit doors are functional and that other fire precautions are in place before the public is admitted. Competent attendants are also required to look after the public during the performance. They should:
- › be identifiable to the public
  - › carry a torch whenever part of the public areas are in darkness
  - › ensure there are no areas of overcrowding
  - › keep exits and gangways clear
  - › be aware of the needs of disabled people.
- 14.** The number of attendants required will depend on the size of the audience and the type of performance. The responsible person and the attendants should be familiar with the fire routine, escape routes and the need for any fire doors to be kept shut. Refresher training on emergency procedures for the responsible persons should be held at least once a year.
- 15.** Rooms used for general assembly or other audiences where there is likely to be more than 60 people present, should have emergency lighting. Hand held torches carried by attendants and available in dressing rooms are also a useful addition during evacuation of the building.

## TRAINING

- 16.** The objectives of fire safety training are:
- › to make everyone aware of the importance of fire safety
  - › to ensure competence in the school evacuation procedures
  - › to provide staff with a knowledge of basic fire fighting.

### General training

- 17.** Very few people have experienced a fire and the feeling of panic that it can cause. Training can overcome this to some extent. It should stress the importance of keeping fire doors shut at all times. Every pupil and member of staff should receive training in:
- › general fire prevention
  - › action to be taken if they discover a fire
  - › how to raise the alarm
  - › action to be taken on hearing the alarm
  - › location of escape routes and assembly points
  - › evacuation and roll call procedures.

### **Staff training**

- 18.** Members of staff should also be given training in:
- › the operation of the fire alarm control panel
  - › the procedure for alerting the fire service
  - › the location of fire fighting equipment
  - › the use of fire fighting equipment
  - › the arrangements for the safe evacuation of disabled staff and pupils
  - › stopping machinery
  - › liaising with the fire service on arrival.
- 19.** In large schools it may not be necessary to train all staff in the use of fire fighting equipment, but a sufficient number of trained staff should always be present when the school is occupied. All staff should know what hazards the fire extinguishers cover and the dangers of using the wrong type of extinguisher in areas of special risk, such as on fat fires in kitchens and on electrical or chemical fires. Staff should also be given training in directing, and if necessary, guiding members of the public to a place of safety and checking that they are all out of the building. This process is greatly assisted by an access control system, which requires members of the public to sign in and out of the premises.
- 20.** The fire service may provide training in the use of fire fighting apparatus, such as extinguishers. Some fire services may also provide practical courses on fire safety for fire safety managers and headteachers.

### **Evacuation procedures**

- 21.** There should be a fire drill at least once a year and preferably once a term. This should be based on the scenario that one or more of the fire escape routes is affected by fire and cannot be used. Members of the school management team or, possibly, the health and safety representatives, should act as observers and be told beforehand of the drill. It is also helpful if a member of the local fire service attends, at the debriefing they can point out lessons to be learned and areas where improvements can be made.



- 22.** Fire drills cannot adequately simulate the confusion and uncertainty, which can arise in an emergency. Evacuation procedures should make allowance for:
- *false alarms* Any delay in evacuating the premises such as waiting until an alarm is investigated and confirmed as genuine could have very serious consequences. To prevent false alarms it may be necessary to reposition break glass call points and automatic detectors, so that they are more easily supervised by staff. Also anti-tamper devices are available from manufacturers and the local fire safety officer will be able to advise on these.
  - *full or partial evacuation* In large schools, particularly those with a number of separate buildings, restricting evacuation to the block concerned may minimise disruption. However, registration classes may differ from teaching classes and it may therefore be difficult to establish that the building has been fully evacuated. It can also be difficult to know who is on the school site, for example during lunch time. The success of a partial evacuation also depends upon positively identifying the location of the fire and the certain knowledge that it cannot spread to other buildings. Unless there is absolute certainty on these points then a full evacuation should be the rule.
  - *pupil safety* The first priority of staff is the safety of the pupils in their charge. They may choose to lead their class to safety from the front, so that they are best placed to select the safest route. If so, they may have difficulty in making sure that their class stays together. Alternatively, they may guide the class from the rear, in which case route finding may have to be left to the pupils leading the way. There is no single correct answer. Each school must devise its own way of handling evacuations based upon layout, and the age and ability of its pupils.
  - *disabled staff and pupils* Arrangements must be made for the safe evacuation of disabled staff and pupils. This may require special training of staff. Lifts must not be used once the fire alarm has sounded. Evacuation lifts (as defined in BS 5588: Part 8) may be considered acceptable in certain circumstances: the local fire service can advise on this.
  - *fire fighting* Members of staff should only consider fighting a fire after they have seen to the evacuation of the pupils in their charge and raised the alarm. They must inform other members of staff of their intention to fight the fire and must be certain that their actions will not place themselves or others in danger. If they are in the slightest doubt then they must evacuate the building along with their pupils.

## EMERGENCY PLAN AND FIRE NOTICES

- 23.** All workplaces are required to have an emergency plan. This should include the actions to be taken by staff in the event of a fire, evacuation procedures and arrangements for calling the fire service. In order to familiarise both staff and pupils with the evacuation procedure it is recommended that a fire action notice should be conspicuously displayed in every occupied room informing occupants:
- › how to raise the alarm if they discover a fire
  - › action to be taken on hearing the alarm
  - › escape routes to the assembly point
  - › the location of the assembly point.
- 24.** The last two points may usefully be illustrated on a plan of the school.
- 25.** The age and ability of pupils; use of the school by the community who will be less familiar with the buildings, and the needs of speakers of other languages, should be taken into account when preparing the notices.
- 26.** In workshops, laboratories, craft areas and kitchens it might be appropriate to display fire prevention notices as a reminder to check that, at the end of lessons, equipment is switched off, electric plugs removed from sockets and gas supplies isolated where appropriate. All fire doors, smoke control doors and designated fire exit routes which need marking as a result of a fire risk assessment, are required to be identified by means of signs complying with the *Health and Safety (Safety, Signs and Signals) Regulations*.<sup>20</sup>

### Close down procedure checklist

- 27.** Good housekeeping and proper close down procedures are important steps in fire prevention.
- 28.** The following close down checks are recommended:
- › all flammable materials are locked away
  - › all valuable equipment is secured
  - › no cash is left unsecured overnight
  - › all rubbish/waste has been removed from the building and placed in secure storage
  - › everyone has vacated the premises and all rooms, especially toilets and showers
  - › the external lighting is working correctly
  - › all windows are shut and locked
  - › all internal doors are closed (to prevent the spread of fire)
  - › the intruder alarm and fire alarm systems have been correctly set
  - › all the external doors have been secured
  - › gates in the perimeter fences are shut.

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<sup>20</sup> *Health and Safety (Safety Signs and Signal) Regulations* 1996. SI 1996 No 341, HMSO and Guidance Regulation L64, HSE Books 1997

## FIRE FIGHTING EQUIPMENT

The fire service can advise on the choice of fire fighting equipment and its maintenance.

### Sand Buckets

- 29.** If provided these should be marked 'Fire' and have lids to prevent contamination. They are useful for containing spillage of flammable or heavy liquids. It is recommended that two buckets of sand be provided in each laboratory for use in conjunction with an appropriate fire extinguisher. One or the other can deal with nearly every type of outbreak likely to occur in a laboratory.

### Fire Extinguishers

- 30.** Extinguishers are available to deal with three types of fires that can occur in schools:
- *class A fires* involve ordinary combustible materials such as wood, paper and textiles. Water extinguishers are suitable for these fires
  - *class B fires* involve flammable liquids such as oils, solvents used in chemistry, and cooking fat. Foam, dry powder or carbon dioxide may be used on these fires
  - *electrical equipment fires* Dry powder or carbon dioxide can be used on these (dry powder is also recommended for vehicle fires). Unlike water or foam, they do not conduct electricity.
- 31.** Since 1997 all new extinguishers have been coloured red. Earlier fire extinguishers were identified by a distinctive colour: red for water; cream for foam; blue for dry powder; and black for carbon dioxide. This colour scheme is still used on the labels, but these must not exceed 5% of the surface area of the cylinder. Existing extinguishers need not be replaced until the end of their useful life. Extinguishers should be maintained in accordance with the appropriate British Standard. Weekly checks are recommended to include:
- checking the safety clip and indicating devices to determine whether the extinguisher has been operated
  - checking the extinguisher for any external corrosion, dents or other damage that could impair the safe operation of the extinguisher.
- 32.** In addition, a competent person, usually the supplier, should carry out a basic annual service.

### **Hosereels**

- 33.** Hoses are sometimes used in larger buildings, or where there are special risks, as an alternative to portable extinguishers. Due to maintenance costs, many schools are replacing their hosereels with water extinguishers, and the local fire safety officer can provide advice on this. Hoses normally consist of a maximum of 30 metres of 19mm internal bore hose connected to the mains water supply. They should comply with the British Standard on specification for fire hose reels (water) for fixed installations. Hoses should be checked annually.

### **Fire Blankets**

- 34.** These are normally found in kitchens, laboratories and workshops and should meet the British Standard specification for fire blankets. They can be used to smother small fires involving cooking fat and other flammable liquids. Fire blankets are also invaluable in dealing with people whose clothes are alight and who should be wrapped and rolled in the blanket.

### **Location**

- 35.** Fire fighting apparatus should be located so that it is:
- › conspicuous
  - › accessible when needed. If mounted on brackets, its weight should be taken into account in determining the height of the extinguisher above floor level
  - › protected from accidental damage.
- 36.** In addition to the annual check of fire extinguishers by a competent service engineer, the type and location of each item of fire fighting equipment should be noted on the fire plan.

## **FIRE DETECTION AND ALARM SYSTEMS**

- 37.** Electrically-operated fire detection and alarm systems provide:
- › for the prompt and reliable detection of fire
  - › to alert the occupants so that evacuation can begin
  - › to inform the fire service so that they can extinguish the fire
  - › to minimise damage to the buildings and their contents.
- 38.** In small single storey schools with fewer than 160 pupils hand operated bells or gongs may be sufficient to sound the alarm if there is a fire. These should be sited so that they are audible without exposing the operator to danger from fire. In all other schools some form of electronic fire alarm system will be required. An electronic fire alarm system consists of automatic detectors, break glass call points, a control panel and fire alarm sounders.

## Use of Fire Fighting Equipment

Fire fighting apparatus	Location
<b>Fire Extinguishers</b> Water <sup>(1), (2)</sup>	Craft rooms Workshops Stages of every assembly hall On escape routes, so that the walking distance to the nearest extinguisher does not exceed 30m
Foam or Dry Powder	Laboratories <sup>(2), (3)</sup> Home economics rooms <sup>(3), (4)</sup> Kitchens
Foam	Boiler rooms where fuel oil is used
Carbon Dioxide or Dry Powder	Electrical switch rooms and places where live electrical equipment is known or thought to be present, e.g. stage lighting control areas and IT classrooms
Dry Powder	Vehicle protection
Fire Blankets	Adjacent to fire extinguisher in kitchen, laboratories, design technology practical spaces and assembly halls
Sand Buckets	Two in each laboratory, adjacent to the extinguishers

### Notes

- (1) In general, one 13A rated extinguisher per 200 square metres, adjusted up or down, depending on the risk, with a minimum of one per floor.
- (2) In laboratories and home economics rooms, the capacity of extinguishers should be: for water about 9 litres capacity (13A rated), dry powder about 1.5 kg and carbon dioxide not less than 2.5 kg.
- (3) In some laboratories where very volatile liquids are used or fragile equipment is installed, dry powder or carbon dioxide may be preferable to foam.
- (4) Where there is no fixed frying equipment, dry powder may be preferable to foam.

### *Automatic detectors*

- 39.** When the school is in session every pupil and member of staff may be regarded as an independent, mobile fire detection system. A fire in an area of an occupied building, even one started deliberately, will usually be discovered quickly, the alarm raised and the premises evacuated. However, areas that are unoccupied or partly occupied, for example, during evening use and, particularly those in isolated positions, are more at risk. It follows that automatic fire detection is of greatest value in unoccupied or partly occupied buildings or high risk areas such as boiler rooms and kitchens and that its prime purpose is the protection of property rather than the prevention of loss of life. A fire risk assessment will help identify these high risk areas.
- 40.** It is important that the detector is matched to the environment that it is to protect. For example, it is better to fit a heat detector in a kitchen rather than a smoke detector which could be triggered by the fumes from cooking. The number and location of detectors will depend upon the size of the buildings, their type of construction and the use of different areas within the building.

### *Smoke detectors*

- 41.** Smoke detectors include ionisation devices that sense smoke particles that are invisible to the naked eye and optical detectors that recognise smoke in the atmosphere.

### *Heat detectors*

- 42.** Heat detectors respond to increases in temperature. Older types rely on a strip of plastic or metal melting at a relatively low temperature, but detectors using the expansion of solids, gases and liquids have mostly superseded these. The temperature for the activation has to be outside that normally experienced in the protected area. Some detectors are activated by the rate that temperature rises, as well as by a maximum temperature.

### *Fire alarm sounders*

- 43.** The alarm should be clearly heard throughout the school and continue to operate until the building is evacuated. It should be instantly recognisable and different from every other audible or visible signal used by the school. If the fire alarm system is also used as a class change system, then its continuous operation should indicate a fire while intermittent operation should indicate class change. Visitors and out of hours users may find the use of an intermittent signal confusing, as, in general use, this indicates 'stand-by for evacuation'. They would need to be told that an intermittent signal is used for class change.

### *Control panel*

- 44.** This monitors the operation of the entire system. Some panels group detectors into zones which are switched on or off from the panel. In this case, a plan of the school showing the zones should be positioned next to the fire alarm panel.
- 45.** Addressable systems allow each detector to be controlled either individually, or in zones that can be changed as circumstances require.

### *Signalling system*

- 46.** A signalling system can allow the alarm to be raised at the control panel at the school by sounding the alarm, or at a central station by an automatic telephone link. Since the majority of school fires take place when the premises are unoccupied, alerting a central station which provides a rapid response from the fire service is most important. The sounding of bells or sirens alone at an unoccupied school is unlikely to lead to a prompt response. To keep costs down, a telephone link to a central station can be shared with an intruder alarm installation and monitored, so that any tampering with the telephone line will be observed by the central station. The system will run from the mains electrical supply, but if there is a power failure a standby battery will provide continuity of power.

### **Specification**

- 47.** The design must reflect the individual circumstances of the school and should allow for ease of operation, reliability, and quick and cheap extension or modification. Various types of alarm systems are described in British Standard 5839<sup>21</sup> together with the levels of protection they provide. The cost of fire detection equipment is such that serious consideration needs to be given to the type of system to be provided. When specifying a system, the maintenance costs as well as the initial capital cost should be considered. Some companies guarantee to provide ongoing maintenance to their systems for a number of years and some offer third party certification to protect the consumer. In the UK the Loss Prevention Certification Board (LPCB) provides such certification and has produced a list of approved fire and safety products and services.<sup>22</sup>
- 48.** As far as possible, the initial design should take into account the likelihood of further development of the system. If the specification for the control panel takes future growth into account, it becomes possible to add zones and detectors to the system with minimal delay and at least possible cost. In this way the design can take realistic account of resources.

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<sup>21</sup> BS 5839 *Fire Detection and Alarm Systems for Buildings Part 1 2002*

<sup>22</sup> *List of Approved Fire and Safety Products and Services, A Specifiers' Guide, Loss Prevention Certification Board, July 2003*

- 49.** The positions suggested in the British Standard for break-glass points, smoke and heat detectors sometimes need to be modified slightly in order to prevent nuisance alarms or damage. Anti-vandal devices offering protection against nuisance alarms are available. It may also be possible to reduce the number of automatic detectors without compromising on safety, to provide a more economical degree of protection of the building fabric. For example, the provision of one automatic detector per fire compartment might be considered. In such cases the local police and fire service should be jointly consulted to explore the feasibility of installing an integrated alarm system providing a minimal combination of intruder and fire detection based on a holistic risk assessment.
- 50.** There is a tendency when specifying fire alarm systems to specify complex state of the art analogue addressable systems together with automatic smoke or heat detectors throughout the buildings. This level of provision is rarely necessary in a school. However, these more sophisticated systems can offer an increased level of protection, a reduction in false alarms, easier testing, and the ability to identify where a fire alarm originates.
- 51.** Professional advice should be sought on the specification of fire alarm systems. This should include the most efficient use of detectors, their location and the minimum amount of automatic detection required. Insurers, the LPCB, the local education authority risk manager or the local fire service can offer advice on fire detection and alarm systems and reputable installers.

#### *Maintenance and testing*

- 52.** Fire detection systems should be regularly tested by the user and serviced by a trained and qualified engineer:
- a daily check of the control panel by the user
  - a weekly test by the user comprising:
    - a manual call point or smoke detector test. Each week a different call point or detector should be selected
    - check that the sounders operate and then reset the system
    - complete the fire logbook with details of the date, time and trigger device tested, and enter 'Routine Weekly Test' in the event section. Any defects should be entered in the 'Action Required' and reported to a responsible person
  - quarterly, yearly and 3 yearly maintenance and testing by a qualified engineer.

- 53.** The costs for maintenance of analogue addressable systems are typically about 20% more than for conventional systems. However, the initial capital cost of an analogue addressable system is usually less than a conventional system, due to the saving in the amount of wiring needed. Analogue addressable systems require a single cable loop, whereas conventional systems require multiple radial cables. When any changes or additions are made to the fire alarm systems it is important that the record drawings are updated.

## EMERGENCY LIGHTING

- 54.** The purpose of emergency lighting is to provide sufficient illumination in the event of a failure of the normal electric lighting, so that a building can be evacuated quickly and safely, and to ensure that processes and machinery can be closed down safely.
- 55.** In schools, emergency lighting is usually only provided in areas not lit by daylight and used out of normal hours. These include halls and drama spaces used for performances, rooms for evening classes and escape routes from all of these areas to final exits from the building. Emergency lighting is not normally provided on other escape routes, since pupils and staff are generally familiar with the buildings and, for most of the year, daylight normally extends to the end of the school day. Examples of places where emergency lighting might be considered are escape corridors, escape stairways and corridors without any windows. It should always be provided in residential accommodation. If necessary, escape routes should be checked when it is dark to assess whether emergency lighting is required. In some cases fluorescent marker lines may be effective: these reduce the level of light necessary to see the escape route.
- 56.** Halls and other areas used by the public after dark are likely to need emergency lighting that is permanently illuminated. On designated escape routes and fire escape stairs, the non-maintained type, which will only operate when the normal electric lighting fails and will operate for not less than one hour's duration, may be sufficient. The advice of the local fire service should be obtained, particularly if a public entertainment or other licence is required. Emergency lighting should sufficiently illuminate the escape routes from the building, together with the fire alarm call points, the fire fighting equipment, exit signs and any permanent hazards along the escape routes, such as changes of direction or stairs. Emergency lighting should be maintained by a competent person and should be checked at least every month.

## A MANAGEMENT CHECKLIST

### **Fire Safety Policy and Responsibilities**

Consult the Employer's Fire Safety Policy and establish responsibilities of staff for fire safety.

### **Fire Hazard and Risk Assessment**

Identify all fire risks and adopt appropriate control measures.

### **Provide and Maintain Fire Safety Equipment and Fire Fighting Apparatus Training**

Teaching, non-teaching staff and pupils should all receive training in fire evacuation procedures and fire prevention awareness. Staff should be trained in the use of fire fighting equipment.

### **Contingency Plan**

This will cover the actions to be taken to minimise the effects of a fire upon your school.

### **Checks and Records**

Establish procedures to carry out regular fire checks and record the results.

### **Good Housekeeping**

Day to day measures to minimise the fire risks. These include storage of flammable material, heat processes, temporary heaters and waste disposal.

### **General Security**

Good general security can help to reduce the risk of arson.

### **Monitor and Review**

Fire safety is an on-going task. The risks constantly change, therefore the effectiveness of risk control measures must be regularly reviewed.



## 4 | PLANNING

## PLANNING RECOVERY FROM A MAJOR FIRE

1. Fire precautions do not end with the outbreak of a fire. After a major incident, the restoration of lost facilities can take from two to five years. The action taken in the first few hours can save thousands of pounds and speed the recovery process. The time to consider what action to take is before the fire starts and not as the school is burning. Making a contingency plan will allow time for discussion, consultation and the full briefing of all those involved. Even if there has only been an informal discussion between local schools, it is help if a fire occurs. The following points are worth considering:

*security:* a major fire will disable alarm systems and affect the physical integrity of the buildings. The school site should immediately be made secure. To avoid losses, theft for example, of portable equipment, light fittings, radiators and pipe work.

*salvage:* if salvage work is started promptly then much material and equipment can be brought back into full operational order, saving the cost of replacement and waiting time. Such material needs to be removed to a safe place where it can be repaired and stored ready for reuse.

*health and safety:* it is possible that a fire might affect parts of the structure containing asbestos, chemicals in laboratories, gas cylinders, and other flammable substances. The location of any of these potential hazards should be noted on the fire plans and these plans should be made available to the emergency services.

*accommodation:* if classrooms have to be taken out of use, is there sufficient spare accommodation remaining or will it be necessary to find space in another school or provide temporary classroom accommodation? If arrangements have been made beforehand, other schools may be able to help with the loan of replacement equipment and materials.

If the school is to be closed immediately after a large fire, how will this information be communicated to pupils and their parents? What arrangements are to be made to look after children whose parents are at work?

*meals:* if the kitchens are taken out of use, what arrangements can be made to provide meals?

*transport:* if classrooms in another school are used, it is possible that pupils will require transport. How quickly can this be arranged?

*services:* water and power supplies to the remaining part of the school may be affected and will need to be checked. Until the telephone lines are restored it might be necessary to consider using mobile phones.

*records:* loss of records can mean severe delays. Many are now held on computer. Are these being backed up at the end of each working day, or at least weekly? Are back-up copies held in a secure off-site location? This should include a copy of the contingency plan.

*construction work:* if the building, or parts of it, need to be made safe, who will carry out this work? Who will co-ordinate reconstruction work?

*insurance:* who will inform the insurance company? Who will liaise with the loss adjuster and agree the insurance claim?

*contact list:* a list of emergency contacts should be made and a copy should be kept off-site. Proper planning, supported by staff training, can minimise the effects of a major fire and bring the school back to normal as quickly as possible. The costs of disaster planning are low, but the benefits can be incalculable.

## DESIGN

2. The design and protection of school buildings and sites is an important issue, given the tremendous loss suffered. Poor building design, together with poor compartmentation of existing schools, can allow a relatively small fire to be set undetected, which quickly leads to a major fire resulting in severe damage to the school. Preventing fire damage in new and existing schools requires a multi-pronged approach and needs to consider the security of the site, the building design, fire compartmentation and fire suppression systems.

### Fire suppression systems

3. A suitably installed sprinkler system will not only prevent the fire from spreading, but in most cases actually extinguishes the fire. The damage is generally limited to the room of origin and the school will quickly return to normality after the fire. The provision of sprinklers should be considered for new schools and for existing high risk schools to provide an optimum level of protection should a fire occur.
4. A sprinkler system is best regarded as a combined detection and suppression system. They have a proven track record over many years of successfully controlling fires in commercial buildings. The number and distribution of the sprinkler heads is arranged to cover the area to be protected. With a school, this is usually the entire floor area. Sprinklers are expensive to install retrospectively, however they are extremely cost effective when included in the initial building costs of a new school. Once installed the maintenance costs are very small.

### Security

#### *Security Risk Assessment and Fire Safety*

5. Since arson is the main cause of school fires, there is a considerable overlap between fire prevention and site security. *How to Combat Arson in Schools*<sup>23</sup> published by the Arson Prevention Bureau, contains a vulnerability assessment, a checklist for the Head Teacher and a monthly checklist for the site manager. The following checklist is based on the risk assessment method for school security given in the booklet, *Improving security in schools*.<sup>24</sup>

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<sup>23</sup> *How to Combat Arson in Schools*, Arson Prevention Bureau, 1998

<sup>24</sup> *Improving security in schools*, 1996, Managing School Facilities Guide No 4: ISBN 0 11 270916 8, The Stationery Office

- 6.** Alarms are commonly found in schools and provide protection from theft; they also detect those intent on causing damage. If possible the alarm should be linked to a remote signalling centre where the lines are continually monitored. The system must be carefully designed so as not to cause unwanted signals that waste police time.
- 7.** Access to a school should be controlled. CCTV cameras and a suitably sited monitor can be of use, though it should be assumed that a CCTV camera itself will prevent antisocial behaviour or a crime occurring. A properly used CCTV system will greatly assist security staff in policing remote and high risk areas. Care is needed when designing and incorporating a CCTV system into a security programme. The user must be aware of the requirements of the system and of the choice of cameras available. Advice on CCTV should be sought from your local Police CCTV Liaison Officer.
- 8.** Other controls such as the provision of adequate fencing will improve the security of the school. Fencing provides a physical barrier to trespassers and demarcates the school's boundary. Fencing can be used to restrict access to play areas, such as those for the very young.
- 9.** Other considerations are the standard of windows and doors. If IT equipment has to be located on the ground floor, then the level of security on the access doors should reflect the risk from intruders.
- 10.** However, security measures must not compromise the safe evacuation of the school in an emergency. Increasingly, roller shutters are being provided on school exits to secure the building at night. These shutters must be managed effectively and opened if required for means of escape purposes. If these shutters are over doors required for means of escape, a building warrant is required and should be submitted to the local authority for the area the school is situated. Cleaning staff are particularly at risk if these doors are closed while only they occupy the building.
- 11.** The provision of lighting for security purposes requires careful consideration. Areas that are overlooked by houses or a roadway may benefit from security lighting. However, if the area to be protected cannot be seen, even when illuminated, there is little point in providing it.
- 12.** Good community involvement and parental support for a school has a positive benefit on security and should be encouraged. If the school is seen as an essential part of the community it may discourage attacks from vandals and arsonists.
- 13.** Your local Police Architectural Liaison Officer can provide information and should be consulted when new schools are proposed and when building alterations are required. The above measures will go some way to prevent fires in schools.

## SECURITY CHECKLIST

Issue	Example of low risk	Example of high risk
Trespass	No cases of trespass in school grounds	Trespassers commonly present in school grounds
Vandalism	No cases of vandalism reported	Frequent and costly vandalism
Intruders	Good locks on windows and doors. Intruder alarm system linked to a central station	Poor locks and no intruder alarm system
Arson	No previous arson attacks of the school or locality	School itself or school in the locality have suffered from recent break-ins or arson attacks
Site security	Very difficult for intruders to approach the school unseen	Easy to reach school buildings (e.g. perimeter has weak points or no fence at all)
Out of hours use of school facilities	No reported problems and/or security breaches from out of hours use	Many security problems due to out of hours use, special risks (e.g. bars, social clubs)
Community ethos and support for the school	Strong community and parental support benefits security, e.g. active PTA	Insignificant parent or community involvement or negative attitudes
Condition and appearance of buildings	Buildings well kept and in good repair, with no graffiti Undersides of temporary buildings closed off	Buildings badly kept and in a state of disrepair, with graffiti and vandalism a problem. Undersides of temporary buildings open to rubbish accumulation and arsonists
Recess and internal courtyards	Not part of the building design, or fenced off	Numerous places for intruders and arsonists to start a fire unobserved
Roof	Roofs cannot easily be climbed onto due to design, application of anti climb paint or other devices	Easy access to roof and upper windows (e.g. building features providing natural ladders, low eaves, landscape features)

Issue	Example of low risk	Example of high risk
Security lighting	Lighting of all entrances, footpaths and building facades	No lighting or lighting in the wrong place
Surveillance	Effective surveillance such as buildings overlooked from a main road and housing and CCTV covering access	Remote buildings with no effective surveillance
Fire detection/ Suppression systems	Automatic detection system linked to a central station. Sprinkler system installed	No automatic fire detection or fire suppression system



## 5 | FURTHER INFORMATION

Local authorities, insurance and risk managers and insurers are able to offer advice on fire safety and insurance matters. Advice is also available from the local fire service.

There are several national organisations that offer advice:

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](mailto:fpa@thefpa.co.uk)  
Web: <http://www.thefpa.co.uk>

Loss Prevention Certification Board Limited,  
Melrose Avenue,  
Borehamwood,  
Herts WD6 2BJ.  
Tel: 020 8236 9600, Fax: 020 8236 9601.

The Arson Prevention Bureau,  
51 Gresham Street,  
London EC2V 7HQ.  
Tel: 020 7216 7474, Fax: 020 7696 8996.  
Web: <http://www.arsonpreventionbureau.org.uk>

The LPG Gas Association,  
Pavilion 16,  
Headlands Business park,  
Salisbury Road,  
Ringwood,  
Hampshire BH24 3PB.  
Web: <http://www.lpga.co.uk>



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