

Fire precautions in the design, construction and use of buildings —

Part 12: Managing fire safety

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Committees responsible for this British Standard

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Association of British Theatre Technicians
Association of Building Engineers
Association of Corporate Approved Inspectors
Association of Specialist Fire Protection
British Cables Association
British Standards Society
Chief and Assistant Chief Fire Officers Association
Consumer Policy Committee of BSI
Department for Education and Skills
Department of the Environment for Northern Ireland
Department of Health — NHS Estates
District Surveyors Association
Door and Shutter Manufacturers' Association
Fire Brigades Union
Fire Safety Development Group
Guild of Architectural Ironmongers
Health and Safety Executive
Heating and Ventilating Contractors' Association
Institution of Fire Engineers
Institute of Structural Engineers
Line of Fire
London Fire and Emergency Planning Authority
Ministry of Defence — UK Defence Standardization
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Foreword

This part of BS 5588 has been prepared by Technical Committee FSH/14.

This part of BS 5588 is concerned with the management of fire safety, and provides guidance for building designers and fire safety managers (in smaller premises, the fire safety manager is likely to be the owner of the building). Clauses 4, 5 and 6 deal with general issues and are of relevance to both building designers and fire safety managers. Clause 7 deals with design issues and is mostly of relevance to building designers. Clause 8 deals with the period prior to occupation of a building and is mostly of relevance to building designers, although it is also of some relevance to fire safety managers. Clauses 9 to 16 deal with management issues following occupation of a building and are mostly of relevance to fire safety managers.

This part of BS 5588 covers premises of all sizes and complexity and in consequence some material is only applicable to certain sizes or types of premises.

Users of this part of BS 5588 should use only those clauses applicable to the premises to which they are dealing, e.g. in respect of existing small business premises, provisions in Clauses 11, 12, 13 and 14 need to be tailored to the actual risks and situation present.

As a code of practice, this part of BS 5588 takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

Assessed capability. Users of this British Standard are advised to consider the desirability of quality system assessment and registration against the appropriate standard in the BS EN ISO 9000 series by an accredited third-party certification body.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 82, an inside back cover and a back cover.

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Introduction

Managing fire safety is the whole process throughout the life of a building, starting with the initial design, which is intended both to minimize the incidence of fire and to ensure that, when a fire does occur, appropriate fire safety systems (including active, passive, and procedural systems) are in place and are fully functional. The management of fire safety is thus an essential element in averting disaster in the event of a fire. Although many buildings will never have a serious life-threatening fire, it is essential for fire safety procedures to be planned for every building.

Often, the one common element in multi-fatality fires is that, when fire is discovered or when the alarm is raised, the occupants of premises, be they staff or members of the public, react and respond in ways which are different from those assumed or expected by the building designer. There are a number of stages by which people react to a fire alarm. Initially they tend to seek information regarding the validity of the warning, possibly by asking colleagues. They then gather belongings or seek associates or family. Only then do they seek to travel to a place of safety. The management of fire safety is intended to accelerate these different stages to minimize the threat from the fire.

There have been numerous fire incidents, both large and small, where there have been lives lost or put at risk as a result of the safety systems provided being inappropriate or not being used effectively. In some occupancies (such as football grounds), fire is not always seen as the biggest safety problem and care is needed to avoid it becoming a neglected issue.

It is now widely acknowledged that the design and engineering put into a building for life safety can only do its job properly if it can be managed, maintained and tested over the whole life of the building, and if the staff are trained to handle incidents and operate effective and tested emergency plans.

Once the designer or engineer has handed over the building, then good management of fire safety becomes the key element to fire safety for the life of the building.

Effective management of fire safety can contribute to the protection of the building occupants in many ways:

- by working to prevent fires occurring in the first place;
- by being aware of the types of people in the building and any special risks or needs (such as disabled people);
- by ensuring that all of the fire safety measures in the building are kept in working order, and in particular that the means of escape are always available;
- by training staff and organizing the evacuation plan, to ensure that occupants leave quickly if a fire occurs;
- by taking command in the event of a fire until the fire service arrives.

These tasks differ in detail depending on the occupancy of the building.

1 Scope

This part of BS 5588 gives recommendations for the management of fire safety over the lifetime of a building, including guidance for designers to ensure that the overall design of a building assists and enhances the management of fire safety. It also provides guidance on fire equipment and fire safety manuals.

This part of BS 5588 provides generic guidance on the provision of fire precautions and facilities within a building. It addresses the issues that need to be considered during the design process as well as those that will apply whilst the building is in use or which need to be taken into account when alterations to the building or the use of it are being considered.

This part of BS 5588 is intended for use mainly by building designers and fire safety managers or their delegated representatives. It is also intended for use by building owners, who are likely to assume the role of fire safety manager in smaller premises.

This part of BS 5588 is not applicable to buildings under construction (i.e. new build prior to partial occupation).

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 1635, *Recommendations for graphic symbols and abbreviations for fire protection drawings.*

BS 5266-1, *Emergency lighting — Part 1: Code of practice for the emergency lighting of premises other than cinemas and certain other specified premises used for entertainment.*

BS 5306-0, *Fire extinguishing installations and equipment on premises — Part 0: Guide for the selection of installed systems and other fire equipment.*

BS 5306-1, *Fire extinguishing installations and equipment on premises — Part 1: Hydrant systems, hose reels and foam inlets.*

BS 5306-2, *Fire extinguishing installations and equipment on premises — Part 2: Specification for sprinkler systems.*

BS 5306-3, *Fire extinguishing installations and equipment on premises — Part 3: Code of practice for the inspection and maintenance of portable fire extinguishers.*

BS 5306-4, *Fire extinguishing installations and equipment on premises — Part 4: Specification for carbon dioxide systems.*

BS 5306-5 (all sections), *Code of practice for fire extinguishing installations and equipment on premises — Part 5: Halon systems.*

BS 5306-6 (all sections), *Fire extinguishing installations and equipment on premises — Part 6: Foam systems.*

BS 5306-8, *Fire extinguishing installations and equipment on premises — Part 8: Selection and installation of portable fire extinguishers — Code of practice.*

BS 5499 (all parts), *Graphical symbols and signs — Safety signs, including fire safety signs.*

BS 5588-4, *Fire precautions in the design, construction and use of buildings — Part 4: Code of practice for smoke control using pressure differentials.*

BS 5839-1, *Fire detection and fire alarm systems for buildings — Part 1: Code of practice for system design, installation, commissioning and maintenance.*

BS 5839-3, *Fire detection and alarm systems for buildings — Part 3: Specification for automatic release mechanisms for certain fire protection equipment.*

BS 5867-2:1980, *Specification for fabrics for curtains and drapes — Part 2: Flammability requirements.*

BS 6263-2, *Care and maintenance of floor surfaces — Part 2: Code of practice for resilient sheet and tile flooring.*

BS 6651, *Code of practice for protection of structures against lightning.*

BS 7036 (all parts), *Code of practice for safety at powered doors for pedestrian use.*

BS 7176, *Specification for resistance to ignition of upholstered furniture for non-domestic seating by testing composites.*

BS 7346-2, *Components for smoke and heat control systems — Part 2: Specification for powered smoke and heat exhaust ventilators.*

BS 7346-3, *Components for smoke and heat control systems — Part 3: Specification for smoke curtains.*

BS 8214, *Code of practice for fire door assemblies with non-metallic leaves.*

BS EN 81-72, *Safety rules for the construction and installation of lifts — Part 72: Particular applications for passenger and goods passenger lifts — Firefighters lifts.*

BS EN 671 (all parts), *Fixed fire fighting systems — Hose systems.*

BS EN 1155, *Building hardware — Electrically powered hold-open devices for swing doors — Requirements and test methods.*

BS EN 12101-2, *Smoke and heat control systems — Part 2: Specification for natural smoke and heat exhaust ventilators.*

BS EN 12416-2, *Fixed firefighting systems — Powder systems — Part 2: Design, construction and maintenance*.

BS EN 12845, *Fixed firefighting systems — Automatic sprinkler systems — Design, installation and maintenance*.

BS ISO 14520 (all parts), *Gaseous fire-extinguishing systems — Physical properties and system design*.

3 Terms and definitions

For the purposes of this part of BS 5588 the following definitions apply.

3.1

access panel

panel used to gain access to service ducts and shafts

NOTE An access panel might or might not be fire-resistant.

3.2

canopy

horizontal structure projecting into a void

NOTE An example is the soffit of an upper level walkway, which is not fully stepped back from the level below.

3.3

cavity barrier

construction provided to close a concealed space against penetration of smoke or flame, or provided to restrict the movement of smoke or flame within such a space

3.4

competent person

person, suitably trained and qualified by knowledge and practical experience, and provided with the necessary instructions, to enable the required task(s) to be carried out correctly

3.5 dampers

3.5.1

fire damper

mechanical device that is operated automatically or manually and is designed to prevent the passage of fire and which, together with its frame, is capable of meeting for a stated period of time the fire resistance criterion for integrity

3.5.2

fire/smoke damper

combined fire damper and smoke damper

NOTE See also “fire damper” and “smoke damper”.

3.5.3

smoke damper

mechanical device which, when closed, restricts smoke passing through an aperture within a duct or structure

NOTE The device may be open or closed in its normal position and may be automatically or manually operated.

3.6

ductwork

system of enclosures of any cross-sectional shape specifically for the distribution or extraction of air and/or smoke

3.7

emergency action

action to be taken in the event of a fire or other emergency

3.8

escape route

route forming part of the means of escape from any point in a building to a final exit

3.9

final exit

termination of an escape route from a building giving direct access to a street, passageway, walkway or open space, and sited to enable the rapid dispersal of persons from the vicinity of a building so that they are no longer in danger from fire and/or smoke

3.10

fire compartment

building or part of a building, comprising one or more rooms, spaces or storeys, constructed to prevent the spread of fire to or from another part of the same building or an adjoining building

3.11 fire doors

3.11.1

fire door

door or shutter provided for the passage of persons, air or objects which, together with its frame and furniture as installed in a building, is intended (when closed) to resist the passage of fire and/or gaseous products of combustion, and is capable of meeting specified performance criteria to those ends

NOTE A fire door may have one or more leaves, and the term includes a cover or other form of protection to an opening in a fire-resisting wall or floor or in a structure surrounding a protected shaft.

3.11.2

self-closing fire door

fire door fitted with a device which fully closes the door from any angle, overriding the resistance of any latch and/or seal but not including rising butts

3.12

fire-fighting lift

lift with fire protection measures, including controls that enable it to be used under the direct control of the fire service in fighting a fire

3.13

fire-fighting lobby

protected lobby provided within a fire-fighting shaft giving access from a fire-fighting stair to an accommodation area, and normally to any associated fire-fighting lift and fire main

3.14

fire-fighting shaft

protected enclosure containing a fire-fighting stair, fire-fighting lobbies, a fire main and, if provided, a fire-fighting lift together with any machinery space

3.15

fire-fighting stair

protected stairway communicating with an accommodation area only through a fire-fighting lobby

3.16

fire load

quantity of heat which would be released by the combustion of all the combustible materials in a volume, including the facings of all bounding surfaces

NOTE The fire load is expressed in joules.

3.17

fire main

water supply pipe, fitted with an outlet and control valve at specified points, installed in a building for fire-fighting purposes

3.18**fire protection measure**

passive or active measure taken within a building to increase the level of protection to the occupants

3.19**fire resistance**

ability of a component or construction of a building to meet for a stated period of time the requirements specified in a fire resistance standard, e.g. BS 476 or equivalent European standard

NOTE These requirements can include stability and/or integrity and/or thermal insulation and/or expected duty.

3.20**fire safety engineer**

person qualified and experienced in fire safety engineering

3.21**fire safety manager**

nominated person carrying out the job of management of fire safety

3.22**fire safety manual**

record of all design, procedural and management issues and events that relate to the fire safety of a building

3.23**fire service access level**

level at which there is suitable entry to a building and to a fire-fighting shaft from an area to which fire service appliances have access

3.24**fire stopping**

sealing or closing an imperfection of fit between elements, components or construction of a building, or any joint, so as to restrict penetration of smoke and flame through the imperfection or joint

3.25**first-aid fire-fighting equipment**

equipment for use by the occupants of a building to fight a fire

NOTE These include hose reels and portable fire extinguishers.

3.26**floor area**

area enclosed by the inner surfaces of a wall, including internal walls

3.27**integrity**

ability of a separating element when exposed to fire on one side, to prevent the passage of flames and hot gases or the occurrence of flames on the unexposed side, for a stated period of time in a standard fire resistance test

NOTE This may be expressed as integrity criterion "E" (see BS EN ISO 13943).

3.28**lift landing**

floor space from which a lift car is normally entered at each level

3.29**management of fire safety**

task(s) carried out by a defined individual or individuals with appropriate powers and resources to ensure that the fire safety systems, passive, active and procedural, within the building are working properly at all times

3.30

means of escape

structural means whereby a safe route or routes (in the event of fire) is or are provided for persons to travel from any point in a building to a place of safety

3.31

phased evacuation

process where a limited number of floors are evacuated at the same time

NOTE This is usually the floor containing the fire and the floor above. The remaining floors are evacuated at later stages if required.

3.32

place of safety

place in which persons are in no immediate danger from the effects of a fire

3.33

pressure differential system

system of fans, ducts and vents provided for the purpose of creating a pressure differential between a fire zone and a protected space

3.34

pressurization

method of smoke control using pressure differentials, where the air pressure in the spaces being protected is raised above that in the fire zone

3.35

protected

enclosed (other than any part which is an external wall of a building) with fire-resisting construction

3.36

protected lobby/corridor

circulation area consisting of a lobby or corridor enclosed with fire-resisting construction (other than any part that is an external wall of a building)

3.37

protected shaft

stairway, lift, escalator, chute, duct or other shaft of fire-resisting construction which enables persons, objects or air to pass from one fire compartment to another

3.38

protected stairway

stair, that is protected from fire elsewhere in the building by fire-resisting construction (including any exit passageway between the foot of the stair and the final exit), discharging through the final exit to a place of safety

3.39

purpose group

classification of a building according to the purpose to which it is intended to be put

3.40

refuge

area that is both separated from a fire by fire-resisting construction and provided with a safe route to a storey exit, thus constituting a temporarily safe space for disabled people to await assistance for their evacuation

3.41

sprinkler

temperature-sensitive sealing device which opens to discharge water for fire extinguishing

3.42

sprinkler installation

part of a sprinkler system comprising a set of installation main control valves, the associated downstream pipes and sprinklers

3.43 sprinkler systems

3.43.1

high-rise sprinkler system

sprinkler system in which the highest sprinkler is more than 45 m above the lowest sprinkler or the sprinkler pumps, whichever is the lower

3.43.2

life safety sprinkler system

sprinkler system forming an integral part of measures required for the protection of life

3.43.3

sprinkler system

system for providing sprinkler protection in a building, comprising one or more sprinkler installations, the pipe work to the installations, and the water supply or supplies except town mains and bodies of water such as lakes or canals

3.44

structural element

member forming part of the structural frame of a building or any other beam or column

NOTE A structural element can be a load-bearing wall or load-bearing part of a wall; a floor; a gallery; an external wall; or a fire compartment wall (including a wall common to two or more buildings).

3.45

vent

device that is either open or capable of being opened to permit the passage of air or smoke between a part of a building and the external air

NOTE Examples include windows, roof lights, doors, louvres and grilles.

4 General

4.1 Spread of fire

A common basis for designing fire safety measures lies in the identification of the possible sources of outbreak of fire and the evaluation of the manner in which it is likely to develop and spread through the building.

The recommendations and guidance given in this part of BS 5588 are based on the assumption that under normal circumstances (i.e. except in the case of arson) a fire is unlikely to start in two different places in a building.

Initially, a fire creates a hazard only in the part of the building in which it starts and is unlikely to involve a large area, although it can subsequently spread to other parts of the building. Fire is less likely to spread if passages, corridors, lobbies or stairways intended for use only for access or means of escape are kept clear of combustible materials.

It is unlikely that fire will originate in the building structure itself. Outbreak of fire is more likely to occur in furnishings, decorations, finished goods, raw materials and/or chemicals, equipment, process plant or service plant in the building. The point of origin is therefore likely to be in display areas, factory areas, storerooms, kitchens or offices, or possibly in the service installations.

When a fire occurs in an enclosed space, hot smoke-laden gases rise to form a layer, which at first has a tendency to flow under the ceiling and then deepens to fill the whole space. The fire tends to grow in area, the flames spreading to nearby combustible furnishings, fittings, exposed papers, etc. The flames increase in height until they reach the ceiling where they are deflected horizontally and, radiating downwards, accelerate fire growth. If the ceiling is combustible, it can ignite and add to the volume of flame and speed of fire growth. If the space has insufficient openings to provide a continuing air supply, the burning rate of the fire diminishes as it draws on increasingly vitiated products of combustion, but the gases generated are then extremely toxic.

Once ignited, combustible products give off hot smoke-laden and toxic gases. Convection and radiation also occur rapidly and, because of the extremely high temperature of the gases, other combustible materials and products within the area of the fire will ignite more easily, further accelerating the progress of the fire. It cannot be assumed that the effects of the fire will be confined to the space in which it originated. If the enclosing walls have no fire resistance or do not form a fire-tight joint with a fire-resisting floor (or ceiling) above, the fire will soon penetrate at ceiling level, where the attack from the flames or hot gases is most severe, to the adjoining space. Even with fire-resisting construction, the buoyancy and expansion of the fire gases can cause them to be driven out of the space to affect other parts of the building.

If the fire gases penetrate into a vertical shaft, such as a stairwell, lift well or duct, they will rise rapidly, attacking the top of the shaft and spreading elsewhere if there are any openings in the shaft. In such circumstances, if a substantial flow of air reaches the fire through an aperture such as a window or door, the vertical shaft can act as a chimney and can greatly accelerate fire growth.

A fire occurring anywhere within a compartment of a building has, therefore, to be regarded as presenting a hazard to all occupants within that compartment, even though in the initial stages of fire development it might seem that persons are well removed from immediate danger. There is also likely to be a risk to persons in other parts of the building.

In the early stages of a fire, the most significant effects are usually those of smoke and other products of combustion. Smoke is often the first evidence of fire detectable by the occupants and is thus likely to be the first cause of alarm. When smoke extends down to head height it produces difficulty in breathing and impairs visibility, which interferes with the efforts of occupants to find their way towards the exits. People who are prevented from escaping by dense smoke, or who are unduly retarded from escaping by it, can suffer from the toxic effects of the products of combustion that accompany the smoke. The asphyxiating effect caused by lack of oxygen or by the intense heat of the gases making up the smoke can cause intoxication, disorientation, incapacity, unconsciousness and, in the worst scenario, death.

The speed at which a space becomes untenable is mainly dependent on its volume and the fire growth rate. For higher and larger spaces the time taken to fill with smoke takes longer and so there is more time for escape and longer travel distances are possible.

These considerations are particularly important when dealing with large numbers of persons, some of whom might be unfamiliar with their surroundings, and who might also vary widely in age and degree of mobility.

To facilitate escape it is thus necessary:

- a) to ensure that protected escape routes are provided and that they are adequately safeguarded against the ingress of smoke;
- b) to limit the time people have to travel before they reach a protected route and/or a final exit;
- c) to consider reverse flows that might occur as a result of a particular exit route being unavailable or as a feature of an evacuation plan for disabled people.

A means of smoke ventilation might be necessary to assist the fire service and, if operated automatically, can also assist escape from the building.

After the outbreak of fire there might only be a short time during which the actions necessary for ensuring the safety of occupants can be carried out. This time will be sufficient only if all provisions for the safety from fire of people, property, business viability and the environment are planned and managed so as to be effective when the occasion arises.

4.2 Management considerations

The guidance given in this part of BS 5588 is primarily concerned with the life safety of persons in and around buildings, but it also takes account of the need to protect property and the environment, and to minimize business disruption, throughout the entire life cycle of the building, addressing such issues as:

- effective management planning and control;
- protection of escape routes from any area that could be threatened by fire (see in particular 7.4.3 and 11.2);
- fire resistance in the building structure, surface finishings, carpets and furnishings (see 7.3.2);
- segregation of high fire risk/hazard areas;
- fire warning systems and, where appropriate, systems for the automatic detection of fire;
- automatic fire extinguishing systems to limit the growth of fire;
- smoke control measures to maintain the effectiveness of escape routes and to assist fire-fighters (see 8.1);
- fire-fighting equipment, whether for use by the staff in containing fire in its early stages, or by way of assistance to the fire service (see in particular 7.4.6 and 11.3);
- reasonable access to the building for the fire service, including facilities for the safe and rapid extinction of fire by the fire service and for the safety of the fire service personnel when fire-fighting (see 7.4.5).

The recommendations given in this part of BS 5588 are general, and all fire safety protection measures, procedures etc. should take into account the particular circumstances of the individual building or complex concerned. The same recommendations generally apply to both existing and new buildings, but existing buildings often pose problems which are unlikely to arise in new buildings. In assessing the fire safety management needs of an existing building which is being modified, it is essential to have a full understanding of the existing structure and any fire safety provisions incorporated, and to take into account all of the following:

- a) any change in use of the premises which could increase or decrease fire safety levels (e.g. increased fire load and process risks, introducing the public, changes to sleeping risk);
- b) how the necessary fire safety levels can be practicably achieved in the existing premises and whether they are appropriate;
- c) historic and environmental aspects of the premises and to what extent they need to be disturbed;
- d) legislation and guidance introduced since the premises were originally constructed, or last altered, or since their fire safety was last assessed;
- e) the interrelationship between life safety and property/contents.

Historic buildings present particular challenges, as many are “listed”, and permitted alterations are limited, without the agreement of the appropriate authorities. The advice of consultative bodies, such as English Heritage, should be sought in the early stages of design. The appropriate authorities sometimes agree to limited modifications to improve life safety where, in turn, there will be added long-term protection and preservation of the original building fabric. Specific issues relating to historic buildings can be divided into three areas:

- 1) the preservation of the ambience and important features of the building such as timber linings to accommodation stairs and slender cast iron structure, both of which can sometimes conflict with the desired fire safety construction but can be accommodated with suitable compensating features;
- 2) the existing construction of the building, including hidden features such as the extent of cavities through which fire could spread and the quality of walls, partitions and floors the fire resistance of which might be unknown or questionable. Life safety can often be addressed by the use of suitable compensating features, but these do not always cover property protection and business interests;
- 3) the fire performance of the existing structural frame. Modern construction standards can seldom be applied to historic premises, but action to maintain an appropriate level of fire safety might be necessary in the event of a change of use of the building.

5 Developing management levels

5.1 Assessing management levels

There will be times during the life of a building, e.g. changes in the use or occupancy, when the standard or quality of management required to operate the building safely, or that actually operating within the building, needs to be reassessed. The standard or quality of management is referred to here as the management level. The person(s) responsible for fire safety design may either specify the management level that is appropriate for the design of building, or anticipate the management level and then design the safety measures accordingly.

Table 1 may be used to determine the necessary management level for a building, or to assess the existing management level. There are three levels, with level 1 giving the highest standard or quality of management and level 3 the lowest. The list of factors given in the tables is not exhaustive, but gives guidance on some of the issues that need to be taken into account when assessing the management level.

The occupancy level of a building provides a qualitative indication of the issues that can affect the demands that are placed on management by the occupants of that building, and can be used to determine the management level.

Table 1 — Management levels

Management factor	Sub-clause	Management level		
		Level 1	Level 2	Level 3
Ownership	5.2	Known	Limited	Not known
Manager's role	5.3	Single responsible person	Known responsible persons	Not known
Resources/authority	5.4	Good	Average	Minimal/none
Staffing level (staff-occupant ratio)	5.5	High	Medium	Low/none
Fire training	5.6	Good	Average	Minimal/not known
Security	5.7	Good	Medium	Minimal
Work control (e.g. repairs to structure)	5.8	Good	Average	Minimal/none
Communications procedures	5.9	Good	Average	Minimal
Maintenance/testing of fire safety systems	5.10	Frequent	Occasional	Minimal
Liaison with the fire service	5.11	Good	Average	Minimal
Contingency planning	5.12	Good	Adequate	None
Degraded systems planning	5.13	Good	Adequate	None
Abnormal occupancy planning	5.14	Good	Adequate	None
Testing/auditing of management system	5.15	Fully independent	In-house	Minimal/none
Risk management	5.16	Good	Poor	None
Fire load management (contents control)	5.17	Good	Poor	None

When determining the management level:

- a) to achieve level 1, all components should lie in level 1, or a strong case should be made with the reasoning and implications stated in the fire safety manual;
- b) to achieve level 2, all components should lie in levels 1 or 2, or a strong case should be made with the reasoning and implications stated in the fire safety manual;
- c) if the ownership of the property is not known, or uncontrolled change of use is possible, then level 3 should be assumed throughout.

In some buildings the physical design of the building, or the provision (or lack) of specific fire protection measures, can also have an impact on determining the management level.

Each management factor (see Table 1) should be assessed in relation to the occupancy level (see Table 2) to which it is being applied. Whilst some indication is given here to guide any assessment, it does, however, follow that such assessments will be largely subjective, and dependant upon the nature of the particular occupancy being assessed.

Once the appropriate management level has been determined it should be adopted as a requirement and specified in the fire safety manual (see Clause 6 and Annex A).

The management system can be changed to a higher level (lower number) without significantly changing either the fire safety management system or the fire engineering, but not to a lower level (higher number). Changes to a lower level may only be made if the fire safety management system is upgraded or the fire safety engineering system is upgraded.

NOTE This imposes limitations on future occupants of the building.

Table 2 — Occupancy levels

Occupancy factor	Occupancy level		
	← Low ^a	Intermediate ^a	High ^a →
People factors			
Occupancy density	Light occupancy	Medium occupancy	High occupancy/not known
Layout knowledge of occupants	All familiar	Some familiar	Few familiar
Reaction times	Fast reaction	Average reaction	Slow reaction (including sleeping)
Disabled people	Few disabled	Some disabled	Many disabled
Occupant profile	Young healthy	Mixed adult	Elderly/children
Use factors			
Risk	Low risk	Medium risk	High risk/not known
Fire load	Low fire load	Medium fire load	High fire load/not known
^a The occupancy levels represent a continuum; moving towards a low occupancy level will not degrade the safety criteria set by the management level, but moving towards a high occupancy level will.			

5.2 Ownership

If the fire safety systems provided in the building are dependant upon a specified level of management, the crucial factor is knowledge of the ownership of the building, since this factor influences all of the others. Some buildings are so limited in the options for their use that the ownership of the building may be assumed for the lifetime of the building. Other buildings are such that they may be expected to change hands many times in their working lifetime, in a random fashion. Others may be expected to change hands, but within a very limited set of owners. Where the ownership of a building is known, the management of the building can be defined, identified, and made readily aware of the management implications in the fire safety design.

5.3 Manager's role

Management responsibilities can reside with a single defined individual or be distributed amongst a number of managers or staff. The management of fire safety is best carried out where a single individual has single, or overall, responsibility, so that there is little or no risk of issues becoming neglected through communication problems. The standard of management of fire safety is likely to be poor if the manager's role is undefined or not known.

5.4 Resources and authority

For the management of fire safety to be effective, the fire safety manager needs to be empowered and to command sufficient resources to maintain the systems. The manager or managers with responsibility for fire safety need to be empowered to enforce requirements, initiate testing, maintenance or repair, and, where necessary, command staff. Such powers need to be supported by the necessary, sufficient and appropriate resources (funds). Managers who have no power and no resources are unlikely to be able to ensure that the fire safety systems are kept fully functional. Managers with limited resources might be able to maintain a minimal or average standard of fire safety.

5.5 Staffing level (staff-occupant ratio)

The appropriate staffing level for a particular building is defined by the use of the building and the types of occupant. For example, a staffing level of one staff member to fifty occupants might be considered “high” for a retail outlet, but only “medium” for a hotel. In addition to catering adequately for the occupants, a high staffing level is one that includes provision for contingencies, sickness or holiday absences. A medium level is one that provides adequate staffing normally, but has no contingency provision. A low staffing level is one that might not be sufficient to communicate with occupants or assist occupants out of the building effectively in an emergency.

5.6 Fire training

A good level of training is one that ensures that there are sufficient numbers of staff trained in all aspects of fire prevention, fire protection and evacuation procedures and able to use the appropriate extinguishing equipment (and media) so as to provide full coverage of the building, with provision for contingencies, sickness or holiday absences. An average level is one that provides coverage of high-risk parts of the building, but has no contingency provision. A minimal level is one that is unlikely to provide cover for most anticipated events.

5.7 Security

Security arrangements influence the risk of arson, but also need to ensure that means of escape remain unobstructed. A good level of security might include regular patrols, perimeter controls, entry control systems, and staff able to respond to an intrusion. A medium level might include just one of these. A minimal level is one that does not offer adequate barriers to potential arsonists.

5.8 Work control

Management systems should be able to control work on site, e.g. repairs to structure, and in particular hot work. A good work control system is one that has clear lines of responsibility, a permit system, with logging and audit, routine checking and supervision. An average system might have a loose recording system with some supervision. A minimal system is one that is inadequate to minimize damage to the fire protection systems or fires as a result of hot work.

5.9 Communications procedures

Communications procedures include means of being alerted to a fire, communications between management, between management and staff, messages to occupants and communications with the fire service in the event of a fire. Good communications procedures are able to ensure that all of those involved in an incident are informed rapidly and effectively, with contingency plans when systems fail. Average level procedures might notify some of those involved, but less reliably. A minimal procedure is one that cannot be relied upon in an emergency.

5.10 Maintenance and testing of fire safety systems

Robust inspection, maintenance and testing schedules and procedures should be in place. A frequent level is one where the equipment is kept fully functional for all the times the building is in use or where alternative procedures are put in place to cover for down-time. An occasional level will include long intervals between inspections and delays in repair.

5.11 Liaison with the fire service

A good relationship with the fire service ensures that expert advice and help is available and that a pre-planned response strategy is in place. Good liaison includes routine meetings with the fire service and always where there has been a significant change in the building or its occupancy. The fire service is likely to have fully developed strategies for most conceivable events. Average liaison allows the fire service to develop general response strategies, but these might not be fully up to date on the day. Minimal liaison means that the fire service has to determine tactics at the incident.

5.12 Contingency planning

Contingency plans need to include preparation and response to a wide range of unusual events. Good planning includes consideration of a wide range of possible emergencies and incidents, shelter, communications, transport, weather, time of day, time of week, time of year (holidays etc.), traffic-related issues, etc., as well as problems such as power failures or floods. Adequate or poor planning might only include a selection of these.

5.13 Degraded systems planning

Management systems should include provisions and alternative procedures for occasions when safety systems break down or are under repair or maintenance. A good system is one that includes plans to provide alternative protection measures when any part of the safety system is unavailable. This includes planned maintenance as well as unforeseen failures, e.g. if the detection system is inoperative then additional fire marshals/fire wardens are provided, or part of the building is taken out of use. An adequate or poor system might only address some parts of the safety system.

5.14 Abnormal occupancy planning

Management systems should include procedures for abnormal occupancy loads, e.g. at Christmas, during sales, or unusual or rare events. Good planning takes account of situations where the occupancy density could seriously affect evacuation plans, e.g. Christmas sales or food shortage scares for retail premises, and special one-off events involving celebrities or jubilee-type occasions for public buildings. Adequate or poor planning might only go a little way to addressing such unusual situations.

5.15 Testing and auditing of management system

A testing and auditing procedure should be in place, with procedures to respond to and correct failures. Testing/auditing programmes that involve fully independent assessors inspecting the systems regularly are most likely to ensure a high standard of fire safety. In-house audits are likely to be far more variable.

5.16 Risk management

Where an occupancy entails special or unusual risks, e.g. the introduction into the building of energy-dissipating machinery or a change in occupancy type from English speakers to non-English speakers, special procedures are needed. A good level of risk management is one where procedures are in place to identify, monitor and record these risks and to ensure that the safety procedures and systems are appropriate. A poor level of risk management is one where the monitoring of special risks is haphazard. Of particular concern are premises where unusual and special risks might be introduced only rarely and where there is little awareness of the need to react.

5.17 Fire load management (contents control)

Management systems should include procedures and authority to limit and control the introduction of combustible materials of any type into an occupancy. A good level is one where procedures are in place to identify, monitor and record the combustible contents of the building. A poor level is one where the monitoring of combustible materials is rare. Of particular concern are premises where unusually high fire loads might be introduced only on occasions and where there is little awareness of this.

6 Fire safety manual

The design of buildings needs to be documented for the benefit of the management of the premises. All relevant information should be included in a fire safety manual. The manual needs to set out the basis on which the fire safety design was planned, the type of management organization envisaged for running the building, and the consequential staff responsibilities. It needs to explain the operation of all the mechanical and electrical systems and to give information on routine testing and maintenance requirements.

The assumptions made at the design stage regarding these aspects should be recorded in the fire safety manual.

For those premises which require a risk assessment to be carried out, the fire safety manual should form part of the information package that contributes to the risk assessment.

The fire safety manual, its contents, use and upkeep should conform to the recommendations given in Annex A.

7 Designing so that a building can be managed

7.1 General

The key management issues relating to a new project should be identified at the earliest possible stage (preferably at the concept stage) and should be taken into account when designing the building. Liaison with other agencies, e.g. building control bodies, fire prevention officers, health and safety inspectors and insurance bodies, should be initiated as early as possible.

Although the formal responsibilities of the designer and the fire safety engineer largely end once the building is completed and occupation and/or use has commenced, many, if not all, of the systems included will entail management assumptions. Some of these will be implicit, e.g. the assumption that structural fire protection remains in place, or the assumption that the fire load within the building does not exceed certain assumed limits, but many others will be explicit, in particular with regard to maintenance and testing of active systems.

By careful and considered design or location, the designer or fire engineer can provide the building with facilities and equipment which can assist fire safety managers in carrying out their duties in preventing the occurrence of fire.

The day-to-day activity of the fire safety manager is made more difficult if the fire safety design conflicts with the “normal”, everyday, use of the building, e.g. by placing fire doors across through-routes, or if it fails to take account of “real” behaviour during an incident, such as counter-flows in escape routes as parents search for children.

In practice, the designer or fire safety engineer can assist the work of the fire safety manager by ensuring that:

- a) active fire safety systems are able to be properly maintained and tested;
- b) passive fire safety systems are not likely to be made ineffective, e.g. during repair work to or penetrations of fire-resisting walls, or by blocking of escape routes;
- c) the building design accurately reflects the anticipated use, fire loading and management of the building, e.g. by making appropriate provisions for disabled people;

NOTE The recommendations given in Clause 7 are based on the assumption that the building is being designed to meet a specific occupancy with a defined management system. However, if greater flexibility is required in the future use of the building, the designer might need to provide for greater levels of safety, and to reduce management issues as far as possible. If the systems provided for fire safety, e.g. sprinkler systems and storage systems, are specified for a defined level of risk, this can determine the management requirements in the building.

- d) suitable facilities and equipment are provided to prevent fires from occurring, including suitable housekeeping measures and security measures (see 7.3.2 and 7.3.4);
- e) suitable facilities and equipment are provided for use in the event of a fire, to contain the fire as far as possible and to enable effective evacuation;
- f) contingency planning is taken into account at the design stage.

Designers should familiarize themselves with the responsibilities and tasks of the fire safety manager so that these can be taken into account in the design.

7.2 Management input

Designers need to take account of human behaviour, in particular in emergency situations, rather than design a complex system which requires a rapid learning process by the occupants at a time of stress. There is therefore a need for the fire safety systems to be appropriate for what people actually do, not what the designer would like them to do.

Fire safety systems should be considered as an inherent part of the basic design, and not as supplementary to other matters such as services or finishes. Where there are conflicts of interest, compromises can be necessary. In any case, a flexible approach is essential if novel problems are to be solved. There can be conflicts between the fire safety requirements and the normal use of the building or with building services or with other safety systems, e.g. a door to restrict the movement of fire or smoke will also restrict the movement of people. There can also be confusion between a fire door, which needs to be kept shut, and a fire exit door, which may be kept open. These conflicts can, however, normally be overcome as there is no purpose in putting in place fire safety measures which do not allow the normal use of the building or will be negated by such normal use.

A clear statement of the design requirements for the management of the complex has to be obtained from the client and conveyed to the design team: architect, designer (and fire safety engineer).

NOTE A design that does not fulfil the management brief can adversely affect the safety of the complex. It can also adversely affect running costs, staffing levels and general efficiency, and can sometimes lead to extensive modifications to cater for conditions that were not anticipated by the designers.

Good management at the design stage is necessary to ensure that full benefit is taken of the experience of specialists in relevant areas. All parties involved in the design of a building should cooperate to ensure that fire safety systems are compatible and that if any changes are made, the consequential effects can be accommodated. In particular:

- a) the owner/developer should give the design team a comprehensive brief on the requirements for management of the building. If it is to be a multi-occupancy complex then this brief should include the management requirements for the components;
- b) those responsible for the future management of the building should, as far as possible, form part of the design team. They should monitor the development of the design concept and the detail of the systems they will eventually have to use and maintain. When construction is under way, they should have access to the site so that they can inspect and understand the various fire safety systems, some of which will not be visible when installation is complete;
- c) the principles and details of all life safety systems should be fully discussed and agreed with the regulatory authorities and all affected specialists in the design team.

Where a project is speculative, without a particular occupier in mind, or even a particular use, then it can be appropriate to design with minimal management requirements.

Other aspects to consider are the management of environmental issues, e.g. water run-off, and the long-term implications of the proposed design for management over the life of the building.

7.3 Designing for the management of fire prevention

7.3.1 General

By careful and considered design or location, the designer can provide the building with facilities and equipment which can assist the fire safety manager in carrying out their duties in preventing fire occurring.

Recommendations for provisions to assist with good housekeeping, building maintenance and security are given in 7.3.2, 7.3.3 and 7.3.4. The general recommendations given in 7.3.5 are also applicable.

7.3.2 Housekeeping

Good housekeeping is essential to reduce the chances of fire starting or developing, and escape routes being blocked. The designer should provide means for as many of the following items as necessary:

- keeping combustible materials separate from possible ignition sources;
- safe storage of flammable liquids, paints and polishes in appropriate containers;
- safe storage of other hazardous items, e.g. LPG cylinders, aerosol cans;
- ensuring that escape routes can readily be kept clear;
- ensuring that fire doors can readily be kept closed;
- waste control and waste disposal;
- carrying out catering and cooking in appropriately designed and protected facilities;
- protection for essential hot work or heat-dissipating processes.

In addition:

- a) buildings should be designed and laid out in such a way that all escape routes can be maintained free from obstruction;
- b) adequate provision should be made for enclosed and/or secure storage areas within the building;
- c) storage should be provided so that goods, materials, unwanted furniture, etc. need not be stored within escape routes;
- d) seating areas should not be provided within escape routes;
- e) surface finishes and coverings (including carpets) on walls, ceilings and floors within escape routes should be such that maintenance would not require the use of materials that might propagate surface spread of flame and/or fire, or adversely affect the means of preventing such propagation;
- f) floor surfaces within escape routes should be maintainable, even and slip-resistant;

g) provision should be made for refuse, waste paper, etc. to be stored separately pending its removal from the premises, so that it does not accumulate on the premises. Wherever possible, it should be possible for all combustible waste to be baled and removed from the premises daily;

h) means should be provided of restricting goods in store rooms so that they are not stacked close to windows, and if there is a sprinkler and/or detection system, that they are stacked not higher than the height recommended in BS 5306-2, BS EN 12845 and BS 5839-1;

i) where it is expected that large fixtures will be introduced into the building (e.g. shop fittings, linings, special displays), the provision for their siting should be such that exits can be kept clear and unobstructed, and exit signs will be visible from the relevant parts of the premises.

7.3.3 Equipment and fittings maintenance

A significant way of preventing fire incidents is to maintain equipment and fittings that might start a fire and to control materials that might allow a fire to develop and spread. The designer should provide means for the fire safety manager to inspect and maintain as many of the following items as necessary:

- potential sources of ignition such as gas, oil and electrical heating installations;
- other electrical and gas installations;
- other heat-dissipating equipment (e.g. factory machines, factory processes or office machines);
- floor coverings, furniture, furnishings, décor, scenery, props, curtains and drapes;
- any other equipment that presents a particular fire risk, such as oxygen-handling equipment (e.g. oxygen tents).

7.3.4 Security

Good security arrangements can reduce the risk of serious fires by arson. In order to reduce the likelihood of arson, and to mitigate its effects if it does occur, the designer should provide means for as many of the following as are deemed appropriate:

- security against intruders;
- intruder detection;
- means of controlling of ignition sources and easily ignitable materials;
- fire detection;
- fire suppression;
- compartmentation;
- segregation of materials and/or processes that could present a risk;
- limiting the proximity of ancillary buildings and of external storage, particularly of combustibles and waste.

The designer should ensure that security arrangements do not prevent occupants from reaching a place of safety (see **10.5**). Security of the building can be in both directions: ingress and egress. In certain premises, such as homes for people with mental ill health, the need to restrict the occupants from leaving the premises should be integrated with adequate and manageable emergency egress.

The selection of hardware should take account of the types of people using the building.

NOTE Some door security measures, e.g. letter-plates, can compromise the fire performance of the door.

When planning the security arrangements, the designer should take account of the needs of members of the fire service who might need to enter the building to effect rescue or fire-fighting, and those of insurers.

7.3.5 Other design issues

A clear space should be provided and maintained around heaters of all types, including convector, tubular and thermal storage heaters. Guards should be provided to prevent the stacking of any combustible materials close to heaters. Similarly, a clear space should be provided around vents of refrigerator compressor motors.

Means of shutting down equipment, stopping machines and processes and isolating power supplies, where appropriate, should be provided.

Special requirements can be imposed by the relevant enforcing authority for areas of high fire risk. Where highly flammable or explosive substances are to be stored or used in excess of prescribed amounts, the area is considered to be of high fire risk and the relevant enforcing authority should be consulted at the earliest possible stage. Similar considerations might be needed for certain storage modes, e.g. high rack, etc.

NOTE If a brief is agreed with the relevant enforcing authority at an early stage as to the intended use of the premises and the materials to be stored or used, this can overcome the need for costly additional fire safety measures to be put in place after the premises are occupied.

7.4 Designing for the management of fire protection

7.4.1 General

Fire protection is needed to assist and protect occupants in the process of moving safely away from danger after a fire has started, via notification of systems such as fire alarm systems, passive and/or active fire safety systems.

7.4.2 Safety systems

7.4.2.1 Control systems and control rooms

The sophistication of the fire alarm system and public address arrangements should be taken into account when establishing which evacuation procedures might be possible in large or complex buildings.

Control systems should be designed such that:

- all background sound systems which do not perform safety functions, including temporary ones, are silenced in the event of fire;
- passenger lifts are brought immediately to the final exit level, and kept there during the fire emergency;
- urgent information is clearly identified and requires minimal response procedures.

Efforts should be made to create systems that avoid information overload, taking into account the fact that in a fire incident, events can be occurring faster than the controller can respond.

Wherever possible, manual control apparatus should be provided outside the building for use by the fire service, or in protected rooms inside the building, close to the entrances to the building.

Recommendations for the management of fire control centres are given in Annex B (see also 12.4).

NOTE BS 5588-5 gives recommendations for the equipping of fire control centres.

7.4.2.2 Availability

Systems are sometimes unavailable because of maintenance, testing, repair, breakdown or impairment. There should be clearly defined limits for the periods when a system is out of commission, and special procedures, including those relating to evacuation, should also be implemented. In some cases it can be necessary to have a duplicate system.

The equipment provided should be such that there is likely to be spare parts, replacement components, or replacement equipment in total, available for the working life of the building.

7.4.2.3 Reliability, durability and resilience

The equipment provided should be sufficiently reliable that it is possible to depend on it in an emergency, and should not be prone to false alarms or failures.

NOTE Systems that are prone to false alarms or failures on a regular basis are more likely to be taken out of service by occupants than systems that function correctly. Systems that are prone to false alarms on a regular basis, even if they are retained in service, can make building occupants complacent and therefore unlikely to react to an alarm signal speedily, thus putting occupants at risk in the event of an actual fire occurring.

Similarly, equipment should be provided that is expected to be durable over a reasonable working life, within the relevant environmental and operational conditions, and able to continue working even with some parts temporarily inoperable.

7.4.2.4 Testability, maintainability and reparability

The design of the equipment provided should be such that it can be readily and easily tested and maintained, both as an item and as part of a larger system, in such a way as to minimize business interruption. There should be an available source of spare parts for the equipment.

If successful operation of a system depends upon devices in other systems (e.g. smoke control systems and fire detection systems), it should be possible to test the systems as a complete entity as well as individually.

7.4.2.5 Other factors

Account should be taken of the usability and ergonomics of fire safety equipment to ensure that it is compatible with the normal use of the building. Equipment provided solely for fire safety can present injury risks (e.g. self-closing fire doors).

The designer should provide for the following where appropriate:

- protection against common mode failures, e.g. with any building management system;
- vandal-proofing and tamper-proofing;
- weather resilience, especially of escape routes (e.g. final exit doors opening into areas prone to snowdrifts) and air-intakes (e.g. for smoke control);
- reliability of water supplies;
- interactions between normal heating, ventilation and air conditioning systems (HVACs) and smoke control systems;
- software-controlled safety systems, means of testing, resilience, failure modes and manual overrides;
- protection of safety-critical software;
- protection of safety-critical electrical and electronic equipment from the risk of damage by discharge of water.

All equipment and systems should be in accordance with the appropriate British Standards.

NOTE Annex C gives examples of fire safety equipment, facilities and systems requiring inspection, maintenance, testing and repair.

7.4.3 Fire doors and escape routes

Buildings should be designed and equipped such that in an emergency the occupants of the building can make their way easily to a place of safety. Designers need to take account of human behaviour, in particular in emergency situations, and seek to use this behaviour to lead people to safety, rather than design a complex system that requires a rapid learning process by the occupants at a time of stress.

For example, people generally prefer to leave a building the same way that they came in, and prefer not to use an unfamiliar route in an emergency. They tend to use stairways with which they are familiar, rather than special dedicated escape routes, so a stairway intended only for use in emergencies would not be recommended. Escape routes should follow the normal circulation within the building as far as is practicable.

Escape routes that consist of stairs, corridors, balconies etc., are generally expected to be safe for the occupants to move to a recognized safe place outdoors. The designer should take into account how the building is to be used and managed, and should design door equipment and provisions along escape routes such that:

- a) all doors that need to be unlocked and readily available for use can be made so readily;
- b) all emergency fastenings can be checked;
- c) any doors, gates or shutters that are required to be locked in the open position can be so locked;
- d) all escape routes and escape doors (both internally and externally) can be kept free from obstruction;
- e) where practicable, fire doors are in positions where they are not likely to be wedged or propped open. Where this is not practicable, fire doors should be provided with hold-open devices on an automatic release mechanism which can be returned to the closed position when required;
- f) where hold-open devices are not provided for a fire door, the door has a warning notice on it reminding people to keep it closed unless it is provided with a hold-open system;
- g) any fire door that subdivides a corridor is provided with vision panels;

- h) where routes are protected for compartmentation purposes by fire-resisting doors or shutters, these doors or shutters are operated only on local detection of heat;
- i) escape routes and escape route signs are adequately illuminated (see 7.4.4) and, where necessary, two power supplies are provided, e.g. mains and battery;
- j) final exit doors open into a place of safety (e.g. not into a roadway or, if so, adequate non-limiting safety barriers are provided). Such exits should be designed to avoid or minimize any risk of obstruction to rapid dispersal of persons from the vicinity of the building;
- k) door securing systems using “swipe cards”, combination locks or any other electrical or mechanical device are released in an emergency and fail-safe unlocked;
- l) any evacuation lifts for disabled people can be kept operative.

7.4.4 Signs and signage

Fire safety signs and signing systems form an integral part of the overall fire safety strategy of a building and are fundamental to the communication of good fire safety management information. Clearly visible and unambiguous signage is essential for speedy escape, particularly in buildings where many of the occupants might be unfamiliar with the building layout.

NOTE 1 Attention is drawn to EC Directive 92/58/EEC [1] in respect of the provision of safety signs at work. Attention is also drawn to the Health and Safety (Safety Signs and Signals) Regulations 1996 [2] and to the Health and Safety (Safety Signs and Signals) Regulations (Northern Ireland) 1996 [3], which require employers to provide safety signs where other methods, properly considered, cannot deal satisfactorily with the risks.

NOTE 2 Information on categories of signs and signage is given in Annex D. Guidance on the regulations is given in HSE publication L 64 [4]. Requirements for fire safety signs are also given in BS 5499.

All fire safety signs should be illuminated under normal conditions (signs that are not internally lit or back-lit should be lit by primary or secondary lighting). Internally lit or back-lit signs should remain illuminated in the event of power failure.

Where a fire risk assessment identifies the need for a sign, the sign should be displayed prominently, conspicuously and appropriately having regard to the environment and occupancy profile of the building. Fire safety signs should not be sited such that they are overridden with other types of public information or property management signs, and should be consistent in style and design throughout the building.

Signs should be provided in stairways to identify the current floor, and the final exit.

NOTE 3 Consideration might need to be given to the provision of signage in appropriate language(s) for the intended occupants of a building, and/or to the provision of special signage for sensory-impaired people.

The location of fire safety signs should be recorded in the fire safety manual (see Clause 6 and Annex A).

7.4.5 Access to the building and its surroundings

The building should be designed in such a way that access for the fire service to the building itself and to any fire main, foam or other inlet, and fire appliance access to required positions within the building, can be kept free of obstruction.

The means by which occupants might expect to leave [see DD 9999¹⁾] should also be taken into account, since people using these routes can impede fire service access.

Fire service access roads and gates leading to the building can become seriously obstructed by the indiscriminate parking of cars and other vehicles using the site. Control and enforcement of parking restrictions can prove difficult, but the provision and maintenance of notices giving clear instructions regarding parking arrangements can go some way to alleviating this problem.

¹⁾ In preparation.

It is important that fire service access roads are provided which can be kept clear and unobstructed to allow access by the fire service and other emergency vehicles at all times. Parking and signage should be provided to reduce the likelihood of cars being left on these roads. In particular:

- a) means should be provided to ensure as far as possible that roads and service roadways used for fire service access are not obstructed in an emergency and that emergency vehicles are able to proceed to within the required distance of any fire main, foam or other inlets. In the interest of security, it might also be necessary to agree with the fire authority to restrict entry along such roadways;
- b) when making provision for car parking, the designer should take account of the fact that cars parked within the building or nearby will often need to be left there until after an emergency (e.g. if the car owners have to report at assembly points), and of the associated risk of impeding access to the fire service;
- c) assembly points should be located sufficiently far from the premises to minimize interference with the fire service or danger from falling debris.

7.4.6 First-aid fire-fighting

Nearly all large fires start out as small fires and if they can be dealt with quickly and safely then major incidents might be avoided.

First-aid fire-fighting equipment should be provided in accordance with BS 5306-0, BS 5306-1 or BS EN 671, and BS 5306-3. It should be of a type appropriate for the risks and for the users of the building, and placed in locations where it can be readily deployed.

Portable fire extinguishers should be selected and installed in accordance with BS 5306-8.

Fixed means of fire-fighting should be installed where the fire risk assessment shows it to be appropriate or necessary.

8 Commissioning and hand-over

8.1 Management issues

Before accepting a building for occupation it is essential that the safety of the staff and public (as well as that of construction personnel if the building is being completed in phases) is assured by ensuring that all safety systems are properly installed and operational.

The design and construction of the building and the systems installed in it should be recorded in the fire safety manual (see Clause 6 and Annex A).

On completion of the fire safety system, the complete installation should be checked for conformity to the approved drawings and system design. Instructions on its use, planned maintenance and testing should be supplied to the owner of the premises and included in the fire safety manual (see Clause 6 and Annex A).

The hand-over procedure should include operation of the system by actuating smoke detectors if appropriate. All elements of the system and control interfaces should then operate automatically. Checks should be made to ensure that any heating, ventilation and air conditioning system (HVAC) does not affect the operation of any smoke detectors.

All fire safety systems should be individually tested to establish whether the final installation conforms to the agreed design specification, is functioning correctly and is ready for acceptance testing. It should be documented in writing that the installation of each system component is complete and the component is functional.

Acceptance testing should be carried out to determine whether the final integrated system installed conforms to the agreed design specification and is functioning correctly. The extent and form of any acceptance tests should be agreed with the enforcing authority at the design stage, but they should include demonstrations that determine whether the correct outputs are produced for given inputs for each control sequence specified. Any non-conformities or malfunctions should be corrected before the system is activated. Upon activation, operation of all active elements (e.g. fans, dampers, doors and related equipment) should be recorded and verified.

If standby generators are installed to provide emergency electrical power, these should be checked for effective operation. If a standby generator is common to a number of emergency systems, then this check should be carried out with all the systems powered by the generator simultaneously to ensure that the maximum potential load is tested.

All installed safety systems should be operational before:

- a) the building (or part of the building) is accepted;
- b) units are handed over to tenants in mixed user developments and premises.

The appropriate members of the management team should be available during the hand-over period to ensure that an understanding of every aspect of the building is passed on.

The use of all installed safety systems should be demonstrated, if necessary by full commissioning tests involving fire and/or smoke, with the appropriate members of the management team and fire service present. Such tests have a number of purposes, including:

- 1) demonstrating the soundness of the safety system design;
- 2) identifying any problems of detail not considered in the design;
- 3) demonstrating that the design has been properly implemented;
- 4) identifying any problems with interactions, or failures to interact;
- 5) providing management with the opportunity to operate the systems;
- 6) giving confidence to the users of the building;
- 7) giving confidence, and training, to the fire service.

The management team should be provided with the fire safety manual (see Clause 6 and Annex A).

Where various functions interface, e.g. smoke detection and smoke control, these systems should be commissioned together to ensure that the prescribed fire safety procedure is implemented.

All components of any installed safety system for which a tenant is responsible should be operational and compatible with the systems common to the complex before the tenant occupies their unit (e.g. the public address system of the complex needs to be able to override any background music or public address system in a unit).

Guidance on commissioning and hand-over of fire safety installations other than smoke control systems is given in the appropriate systems standards. The commissioning and hand-over of smoke control systems should be carried out in accordance with Annex E.

8.2 Approvals and certification

All documentation relating to approvals and certification should be made available to the fire safety manager and should be included in the fire safety manual (see Clause 6 and Annex A).

Any outstanding issues, conditions or other implications should be stated on the approvals documentation.

9 Managing occupied buildings

9.1 Appointment of fire safety manager and other personnel

A competent person should be appointed as fire safety manager. This person should be given sufficient stated authority, powers of sanction and resources to take responsibility for the day-to-day safety management of the building and to ensure that essential repairs or maintenance are carried out. The powers of sanction might include closing the building to the public, restricting its use, or shutting down normal operations.

The role of fire safety manager may be combined with other health, safety or security functions. In small occupancies the role of fire safety manager may be assigned to the owner or general manager.

The fire safety manager should appoint a duty safety officer on every shift to be the key decision maker in responding to a fire incident. A duty safety officer should be present at all times whenever the building is occupied. The most appropriate person could be the senior operator in any central control room who is likely to receive the most information about a fire incident. In the case of a fire incident, the duty safety officer should hand over control to the fire service on their arrival but should be available to provide advice to the fire service on request.

Other fire and security personnel should be fully briefed as to the extent of their duties concerning precautions against fire during and outside working or opening hours. Fire safety training should be given in accordance with Annex F.

In some buildings fire marshals/fire wardens should be appointed to assist in an emergency, in particular with evacuation.

9.2 Management organization and structure

The tasks of the fire safety manager (see 9.1) are likely to interact with other management functions such as facilities management, safety management and security. Such management functions should be integrated in such a way as to avoid conflicts as a result of overlapping responsibilities, or discontinuities in coverage. In an occupancy where a single person has responsibility for all aspects of safety, this is likely to be straightforward, but where two or more persons are responsible for different aspects of safety, e.g. fire safety and security, it is important to define clear areas of responsibility.

In a complex, a fire safety manager should be appointed at senior level to take responsibility for day-to-day safety management, but a committee of senior staff should also be appointed, to be responsible for the major facilities or operational units in the complex. This committee should be headed by the fire safety manager and should include such persons as:

- managers of larger units, e.g. fronting shopping precincts;
- managers of cinemas, theatres or other entertainment venues;
- operators of other discrete parts of a complex, e.g. offices, hotels or transport termini.

The committee should review safety matters and exchange information on special events, changes in operations or proposals for physical alterations that could affect safety management.

The safety management structure should reflect the expectations of the public. For example, in an airport the public might look to the carrier's staff for help, rather than the airport operator's staff, or in a hospital, the public might look to any of the medical staff.

The safety management structure should provide for:

- clear lines of responsibility, authority, accountability and resources, particularly in relation to common areas;
- replacements during the absence of persons with specific responsibilities;
- an emergency services liaison officer to call, and provide information to, the fire service.

Assessed capability. Users of this British Standard are advised to consider the desirability of quality system assessment and registration against the appropriate standard in the BS EN ISO 9000 series by an accredited third-party certification body.

The safety management structure should reflect changing work patterns or changing operational management structures, but frequent changes in responsibilities or procedures should be avoided.

9.3 Overview of the fire safety manager's responsibilities

NOTE 1 Attention is drawn to legal duties relating to fire risk assessment and to the terms, conditions and restrictions imposed by any licence.

The fire safety manager should:

- a) be aware of all of the fire safety features provided and their purpose;
- b) be aware of any particular risks on the premises [e.g. issues relating to hot work (see 10.6) or unusual construction materials such as sandwich panels];
- c) be aware of their responsibilities towards disabled people (see Clause 14);
- d) be in attendance on the premises whenever members of the public are present or when the building is occupied;

NOTE 2 It is acceptable for a competent person other than the fire safety manager to be in attendance at such times, provided that this person has been delegated in writing and that cover is not interrupted.

- e) liaise with, and where necessary seek the advice of, the fire authority, the licensing authority and other relevant enforcing authorities;
- f) have powers to deal with individuals who sabotage or tamper with safety systems, who ignore any smoking policy, or who block exits;
- g) liaise with other fire safety managers in a multi-occupancy building (see 9.4);
- h) ensure that public areas are suitably controlled (see 9.5 and Annex G);

- i) ensure that tenants, concessionaires and caretakers are appropriately briefed (see 9.6 and 9.7);
- j) ensure that all necessary and appropriate communication systems are in place to deal with any fire incident (see 9.9).

The management of fire safety encompasses the entire life cycle of the building and includes:

- day-to-day operation of the building;
- changes to the building (extensions, alterations, refurbishment);
- changes of use;
- units in disuse;
- demolition;
- the fire, if a fire occurs.

The responsibilities of the fire safety manager therefore include:

- 1) identifying and reducing the likelihood of fire occurring;
- 2) developing and implementing a fire strategy appropriate for the particular risk;
- 3) training of staff and maintaining training records;
- 4) inspection, maintenance, and testing of potential hazards (e.g. heat-dissipating equipment);
- 5) monitoring and maintenance of means of escape, evacuation procedures, monitoring the behaviour of occupants and adjusting plans accordingly;
- 6) maintaining access and egress and other special provisions for disabled people;
- 7) routine maintenance and testing of fire safety equipment, systems and procedures;
- 8) inspection, maintenance and testing of emergency communication systems;
- 9) monitoring general maintenance and building works that might affect the fire safety provisions;
- 10) supervision, monitoring and instruction to contractors and subcontractors on the premises;
- 11) agreeing the safe system of work for non-routine activities where these increase the risk from fire, including issuing hot work permits;
- 12) ensuring compliance with the appropriate British Standards;
- 13) notifying the authorities of any changes that might affect the fire precautions in the building, e.g. structural alterations, extensions, alterations to internal arrangements or commencement of keeping explosives or highly flammable materials.

Additional responsibilities of the fire safety manager, primarily in larger buildings, include:

- i) the appointment of fire marshals/fire wardens;
- ii) the appointment or delegated appointment of members of any site fire team;
- iii) development of the training policy for the building;
- iv) ensuring that staff have the necessary competencies;
- v) organizing periodic audits to review:
 - current fire safety management procedures;
 - the effect of changes in personnel or in usage of the building;
- vi) ensuring the effectiveness of automatic fire safety systems, i.e. that they are suitable even after a change in building usage;
- vii) continuous safety system reviews and risk assessment (especially after refurbishment);
- viii) monitoring and control of refurbishments and other building works;
- ix) carrying out checks prior to entry by members of the public;
- x) maintaining emergency plans (including evacuation plans, victim help and emergency accommodation plans) and fire control centre functions;
- xi) regular trials of the fire safety system (including major incident simulations);
- xii) monitoring and reviewing the fire safety manual (see Clause 6 and Annex A);