

DEPARTMENT OF THE ENVIRONMENT, HERITAGE  
AND LOCAL GOVERNMENT

GUIDE TO FIRE SAFETY IN HOTELS



## FOREWORD

The protection of people and property from fire is a matter of utmost importance. I am therefore very happy to publish this guide to fire precautions in existing hotels, guesthouses, and similar premises. The Guide will make a positive and comprehensive contribution to fire safety in such premises.

The Guide can be regarded as a 'first' in that the subject has not previously been dealt with in such depth and detail. It should prove of value both to persons in control of hotels, guesthouses etc. and to the officers of local fire authorities.

Internationally-accepted fire safety standards have been taken into account, as have the provisions of the European Communities' Recommendations on fire safety in existing hotels. Accordingly the guide will help towards ensuring that fire safety standards in Irish hotels and guesthouses will continue to be as good as those obtaining elsewhere.

In the preparation of the guide, valuable assistance has been given by:

Mr. D. O'Mahoney, Chief Fire Officer, Cork Corporation  
Mr. J. McGrath, Chief Fire Officer, Limerick County Council  
Mr. M. Raftery, Chief Fire Officer, Clare County Council  
Capt. E. O'Boyle, Chief Fire Officer, Tipperary (N.R.) County Council  
Mr. J. O'Shaughnessy, Chief Fire Officer, Galway County Council  
Mr. J. Hegarty, Asst. Chief Fire Officer, Kerry County Council  
Mr. O. O'Loughlin, Assistant Chief Fire Officer, Limerick Corporation  
Mr. S. Hogan, Assistant Fire Adviser, Department of the Environment

I am glad to have the opportunity of expressing my appreciation of their contribution.

A handwritten signature in dark ink, appearing to read 'Padraig Flynn'.

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**Padraig Flynn, T.D.,  
Minister for the Environment**

**May, 1989.**

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# CHAPTER 1 - INTRODUCTION

## 1.1 Reason for this Guide

Section 18 (2) of the Fire Services Act, 1981 places responsibility for fire safety on the person having control over premises used for the provision of sleeping accommodation for guests to take all reasonable measures to:

- (a) guard against the outbreak of fire, and
- (b) ensure the safety of persons on the premises in the event of fire occurring.

This guide gives advice to persons in control of this type of accommodation on the considerations which apply and the measures they should take to discharge their responsibilities. The guide supersedes a previously published booklet - Fire Protection for Hotels - Information for owners of Existing Hotels which dealt in a general way with some aspects of fire safety.

The guide also provides information which the appropriate officers of fire authorities will find of value, and is designed to help in a uniform approach in dealing with fire safety requirements in respect of such accommodation.

The guide incorporates and, where appropriate, expands on the provisions of European Council Recommendation of 22 December, 1986 on fire safety in existing hotels. It is intended to ensure that tourist accommodation in Ireland conforms to internationally accepted fire safety standards.

## 1.2 Interpretation

Interpretation and application of the technical content of this guide should be entrusted to competent persons with suitable fire-engineering experience. Users of the guide are advised, where the guide calls up standards or codes of practice, to utilise the latest edition of that standard or code, together with published amendments in existence at that time.

Diagrams are not drawn to scale. They are simple and illustrative of the points under discussion and should not be interpreted in any other way. The following is the legend used for the diagrams :

- escape routes .....broken line, green
- wall construction.....hatched,
- fire resisting construction .....red.

## 1.3 Basic Principles of fire safety

The fire safety principles on which the guide is based, listed below, are adopted primarily to protect life, but the measures recommended are also beneficial in protecting property :

- (i) avoiding outbreaks of fire,
- (ii) early detection of fire and warning to staff and guests to facilitate safe evacuation and, if possible, early attack on the fire,
- (iii) provision of escape routes which are protected from fire and smoke and which allow occupants to leave the building safely,
- (iv) limiting the rate of development and spread of fire,
- (v) containing the fire and smoke to the room of fire origin,
- (vi) controlling and extinguishing the fire by first-aid fire fighting and/or by the fire brigade.

The provisions of the guide should if correctly and carefully applied, minimise the number of fires and result in reduced potential for fatalities and injuries, as well as limiting property and consequential losses.

#### **1.4 Legal Provisions**

The primary legislation governing fire safety in Ireland is the Fire Services Act, 1981. Copies of the Act are available from the Government Publications Sales Office. The main provisions of the Act as it relates to hotels/guesthouses are set out in Appendix A.

The recommendations in this guide are advisory, and compliance with its provisions does not confer immunity from legal obligations under the Fire Services Act 1981, or Regulations which may be made under that Act, or any other legal instrument.

## CHAPTER 2 - SCOPE/APPLICATION

### 2.1 Scope of the Guide

This guide addresses the protection of life from fire and similar emergencies in hotels and guesthouse-type accommodation. It discusses and makes recommendations on building layout and construction, fire protection facilities, fire safety management and other measures necessary to minimise danger to life from fire, smoke, fumes or panic.

### 2.2 Premises to which the Guide applies.

This guide applies to existing premises of the following and related categories which provide sleeping accommodation in individual or suites of rooms, (but excluding dormitory type accommodation), on a commercial basis, whether registered or not with Bord Fáilte.

- (i) Hotels
- (ii) Motels
- (iii) Guesthouses
- (iv) Bed & Breakfast establishments
- (v) Farmhouses
- (vi) Town and Country Homes
- (vii) Residential clubs

The guide is intended to protect persons in sleeping areas, including staff quarters, of the listed premises. Appropriate precautions for ancillary accommodation such as reception/ lobbies, sitting-out lounges, dining-rooms, kitchens, laundries, stores and staff rooms are included as these influence the safety of persons in the sleeping area, as well as those in the immediate area. It is considered that in the case of smaller type, family-run premises where guests and family areas are not separate, the fire precautions should apply to the entire premises, if guests are to be adequately protected.

Where part of a premises is used as a place of assembly such as a bar, function room, restaurant, conference or dance area, appropriate fire precautions should be taken to protect persons in those areas also. Copies of a 'Code of practice for the management of fire safety in places of assembly', and a 'Code of practice for fire safety of furnishings and fittings in places of assembly' may be purchased from the Government Sales Office.

### 2.3 Application of the Guide

This guide is intended to apply to buildings of varying size and guest capacity. Factors such as building location, configuration, number of floors, age, type of construction, if purpose-built or converted, affect the life hazard and consequently the level of fire precautions required in particular premises. The guide sets out general principles of safety, which should be applied to the individual circumstances of each premises, rather than a set of rules. The approach outlined is intended to minimise the problem of trying to apply prescriptive, model-code design type requirements intended for new buildings to the layout and structure of existing premises. The approach proposed for dealing with individual premises requires analysis of the risk of fire occurring and the danger this poses to life safety, the fire protection provided in a premises, and implementation of a programme of fire precautions to minimise the risk to life safety. Maximum benefit will only be obtained when the recommendations of the guide as a whole are applied as part of a comprehensive approach to fire safety.

Persons in control of existing hotels, guesthouses etc. are urged to review the fire safety of their premises by reference to the recommendations in this guide. These recommendations cover most aspects of fire safety including the building itself, means of escape, the training of management and staff, fire safety management, the safety of furnishings and fittings and so on. In many cases, persons in control will have already in place many of the requirements and in

such cases, little or no action may be necessary on foot of this guide. Some of the recommendations (e.g. fire safety management measures) are unlikely to involve additional expenditure. It may be, however, that in relation to some premises, major investment would be necessary to fully and immediately implement all of the guide's recommendations. In those cases, it is recommended that immediate steps be taken to draw up a programme for the elimination of deficiencies on a planned basis. Such a programme should take account of the need to begin implementation of the required improvements from the outset so that the improvement of fire safety will determine the priorities of the programme and the deficiencies will be progressively reduced. The programme should, of course, ensure that the requirements of this guide in relation to fire safety are fully taken into account in the normal replacement of contents (furniture, fittings, bedding, etc.).

Where a phased programme is found to be necessary to satisfy the recommendations of this guide, the period for completion of the programme should not normally be more than five years but in exceptional cases where major structural works or substantial replacements are required, a longer period, even up to 10 years, might be appropriate. During the period decided upon, attention should be paid to the scope for a special tightening-up of other fire safety precautions to ensure a satisfactory overall standard.

#### **2.4 New Buildings**

Where it is proposed to erect a new building of the categories listed in Section 2.2, the fire safety provisions of the Proposed Building Regulations (1983) should be applied. In case of alterations and extensions, and 'change of use' of existing buildings, Regulations A8 and A10 respectively of that document should be consulted. When a newly constructed or converted premises comes into use as an hotel/guesthouse the recommendations of this guide will be relevant.

#### **2.5 Equivalent Safety**

Nothing in this guide is intended to prevent the use of different or superior designs, standards, systems or methods of fire safety, from those detailed in this guide, provided that at least an equivalent level of safety is achieved.

## CHAPTER 3 - DEFINITIONS

The following expressions, where they are used in the guide, have the meaning assigned to them here, unless otherwise stated in the text.

**"Accommodation stairway"** means a stairway which is provided for the convenience of occupants in addition to those provided as escape routes.

**"Arson"** means fire originated with malicious intent.

**"Basement Storey"** means a storey which is below the ground storey or, where there is no ground storey, means a storey, the floor of which is situated at such a level or levels that some point on its perimeter is more than 1.2 m below the level of the finished surface of the ground adjoining the building in the vicinity of that point.

**"Cavity"** means any space enclosed by the elements of a building (including a suspended ceiling) or contained within an element other than a room, cupboard, circulation space, protected shaft or the space within a flue, chute, duct, pipe or conduit.

**"Cavity Barrier"** means construction provided to close a cavity against penetration of smoke or flame within the cavity, and includes construction provided for another purpose where such construction conforms with the criteria required for a cavity barrier.

**"Chimney Effect"** means the upward thrust of hot gases and smoke by convection currents confined within a vertical enclosure.

**"Competent Person"** means a person possessing adequate education, training, knowledge, experience and ability to perform his/her work or duties in such a manner as to prevent, as far as practicable, risk of injury.

**"Dead End"** means any floor area, or part of a floor area, from which escape is possible in one direction only.

**"Duct"** means an enclosed space provided for the distribution of services in a building and includes a ventilation duct.

**"Escape Route"** means a route by which a person may reach a place of safety, and means, in relation to any point in a building, a route from that point.

**"Final Exit"** means the termination of an escape route from a building giving direct access to a street, passageway, walkway or space sited so as to ensure the rapid dispersal of persons from the vicinity of a building, or so that they are no longer in danger from fire, smoke or collapse of the building or its elements.

**"Fire"** means:

- (a) process of combustion characterized by the emission of heat accompanied by smoke or flame or both,
- (b) combustion spreading uncontrolled in time and space.

**"Fire Compartment"** means any part of a building separated from the remainder of the building by walls or floors complying with the recommendations for fire resisting construction in Section 5.2 of this guide.

**"Fire Hazard"** means the consequences of the event if fire occurs.

**"Fire Load"** means the calorific energy of the whole contents contained in a space, including the facings of the walls, partitions, floors and ceilings.

**"Fire Prevention"** means measures to prevent the outbreak of a fire and/or to limit its effect.

**"Fire Protection"** means design features, systems, equipment, buildings, or other structures to reduce danger to persons and property by detecting, extinguishing or containing fire.

**"Fire Resisting Construction"** means construction

- (a) such that a specimen constructed to the same specification, if exposed to test by fire in accordance with BS 476 : Part 8 : 1972 or BS 476 Parts 20 - 23 : 1988 would fulfil its function in relation to stability, integrity and insulation for not less than the specified period, or
- (b) which conforms with one of the specifications set out in Part II of the Building Research Establishment Report "Guidelines for the construction of fire-resisting structural elements", 1980 or 1988, and the notional periods of fire resistance given in those publications as appropriate to that type of construction and other relevant factors for not less than the specified period.

**"Fire Resisting Doorset"** means a door or pair of doors, together with its ironmongery and frame, as installed in a building, which is intended to resist the passage of fire and/or gaseous products of combustion and is capable of meeting specified performance criteria - BS 476 : Part 22 : 1988 for integrity, or BS 476 : Part 8 for stability, integrity and insulation. Fire- resisting doorsets are designated by reference to their required performance (in minutes) for integrity only, and whether they are required to retard the passage of smoke at ambient temperature, eg FD 30S. Fire resisting doorsets should be fitted with effective self-closing devices. Self- closing devices and other hardware on fire resisting doorsets should be selected from an appropriate standard, such as the Association of Builders' Hardware Manufacturers - 'Code of Practice for hardware essential to the optimum performance of fire-resisting timber doorsets', or the publications of the Guild of Architectural Ironmongers.

**"Fire Risk"** means the probability of a fire occurring.

**"Fire Stop"** means a seal generally of non-combustible material provided to fully close an imperfection of fit between elements, components, or construction in a building so as to restrict penetration of smoke and flame through that imperfection.

**"Flash-over"** means sudden transition to a state of total surface involvement in a fire of combustible materials within a compartment.

**"High Fire Hazard Room"** means a room or space which because of its contents, or the activity carried on therein, poses an increased risk of fire occurring, or a danger of a more severe fire, than would be the case if that room was a bedroom. Such rooms include large kitchens with deep-fat fryers, stores for bedding materials or rooms containing equipment which dissipate large quantities of energy.

**"High Life Risk Area"** means an area which because of its geometry, location or other relevant factor(s) constitutes a serious danger to the safety of persons in the event of fire occurring in that area. Such rooms include a room with a low ceiling, or a basement or other room without natural ventilation or other means of venting smoke.

**"Hotel/Guesthouse"** includes any premises falling within the description of Section 2.2 of this guide.

**"Management"** means the person whether as owner, hirer or lessee having control of any premises to which this guide relates and, where appropriate, includes any manager or other staff employed on the premises or any other person charged by the person having control of the premises with responsibility for fire safety and for ensuring the safety of persons in the event of fire or other emergency.

**"Protected Lobby"** means a lobby enclosed with fire resisting construction and forming part or the whole of the horizontal component of an escape route, or affording additional protection to an escape route.

**"Protected Route"** means a route including a stairway and any escape passageway leading therefrom to a final exit, enclosed by fire resisting construction (other than any part which is an external wall of a building).

**"Protected Shaft"** means a stairway, lift, escalator, chute or other shaft which enables persons, or goods to pass between different compartments, enclosed by fire resisting construction.

**"Services"** means installations for the introduction into and distribution within a building or structure of water, air, gas, liquid fuel, electricity, telecommunications, heat or other sources of energy, and installations for fire protection.

**"Smoke"** means visible suspension in the atmosphere of solid and/or liquid particles resulting from combustion or pyrolysis.

**"Smouldering"** means slow combustion of material without visible light and generally evidenced by smoke and an increase in temperature.

**"Structural Elements"** means:

- (a) any member forming part of the structural frame of a building or any other beam or column not being a member forming part of a roof structure only,
- (b) a floor not being the lowest floor of a building,
- (c) a compartment wall,
- (d) a loadbearing wall,
- (e) any structure enclosing a protected shaft.

**Surface Spread of Flame Rating "Class O"** means the classification achieved by material which is non-combustible throughout as defined in BS 476 : Part 4 : 1970, **or** material which has a Class 1 surface spread of flame rating throughout when tested in accordance with the procedure specified in BS 476 : Part 7 : 1971, and, when tested in accordance with the procedure specified in BS 476: Part 6 : 1981 has an index of performance (I) not exceeding 12, and a sub-index ( $i_1$ ) not exceeding 6.

**Surface Spread of Flame Rating "Class 1"** means the classification achieved by material tested in accordance with the procedure specified in BS 476 : Part 7 : 1971.

**"Travel Distance"** means the actual distance to be travelled by a person from any point within a floor area to the nearest protected route or final exit having regard to layout of walls, partitions and fittings.

**"Upholstery"** means any filling, padding or stuffing encased in fabric(s) or non-fabric cover(s).

## CHAPTER 4 - MEANS OF ESCAPE

### 4.1 General

The major hazard which fire poses to life safety is caused by the large quantities of smoke and associated gases produced by combustion of materials. These can travel considerable distances through a building, especially vertically, and may reduce visibility, make movement difficult or impossible, and trap people in a burning building.

As a general requirement, a safe route (or routes) should be provided to enable the occupants of any part of a building to leave by their own unaided efforts in an emergency. The escape routes should be available to the occupants for as long as is necessary to ensure safe evacuation, and so should be protected from fire and its effects as recommended in Chapter 5.

It is essential that escape routes are maintained available for use, and that the protection afforded to them is not impaired in the operation of the premises. Advice on this topic is given in Chapter 11. The provision of facilities for the disabled should also be considered and guidance in this area, as well as requirements for means of escape, will be found in the National Rehabilitation Board's 'Access for the Disabled - Minimum Design Criteria'.

### 4.2 Principles of Escape Route Design

Safety from fire is normally considered to be attained in the open, at ground level at a point clear of the building. In larger, fire-compartmented buildings, safety from fire may be considered in terms of partial evacuation, or evacuation to a place of relative safety. Generally, however, three stages of evacuation from hotel/guest house accommodation can be identified: (See Fig. 4.1)

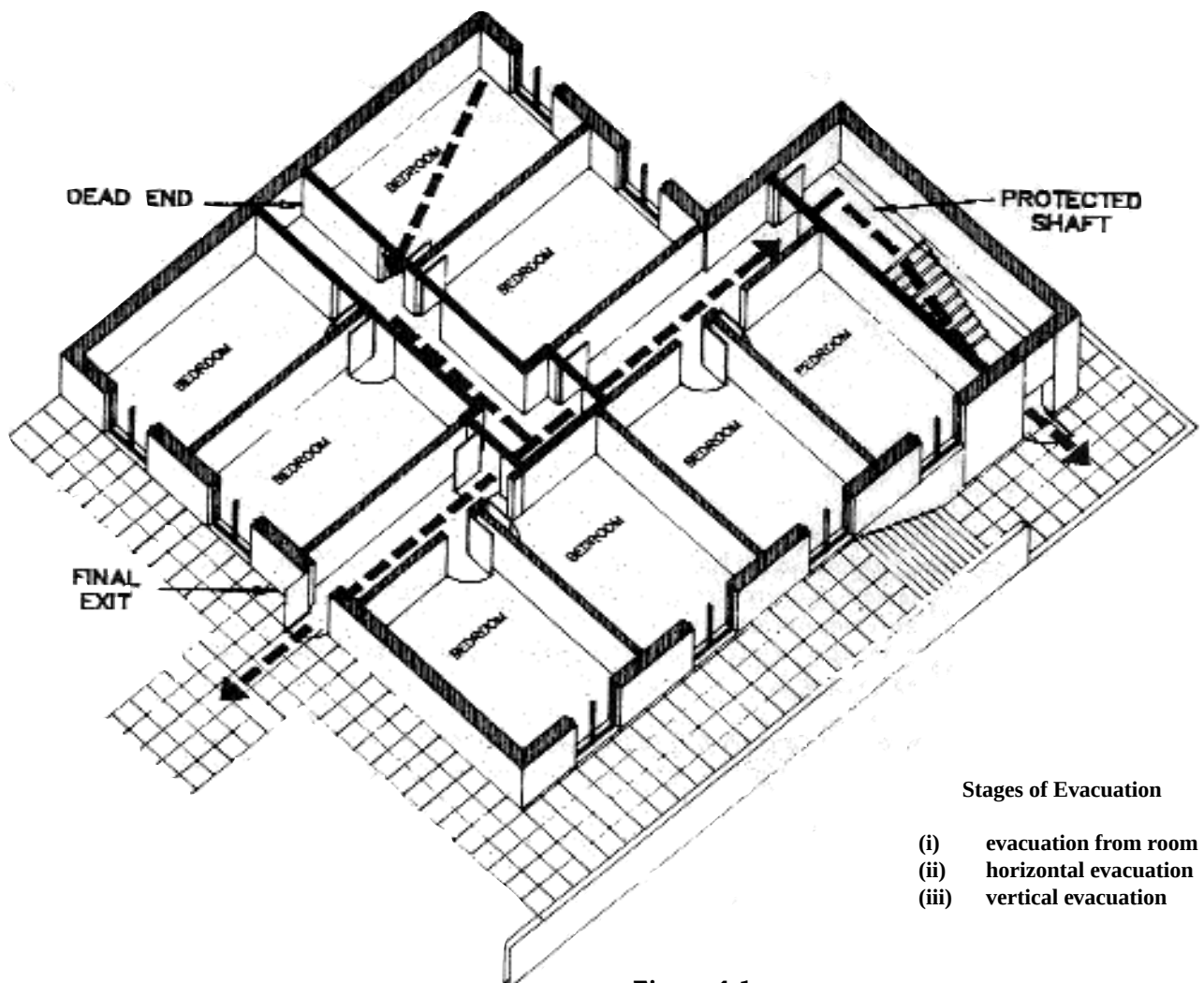


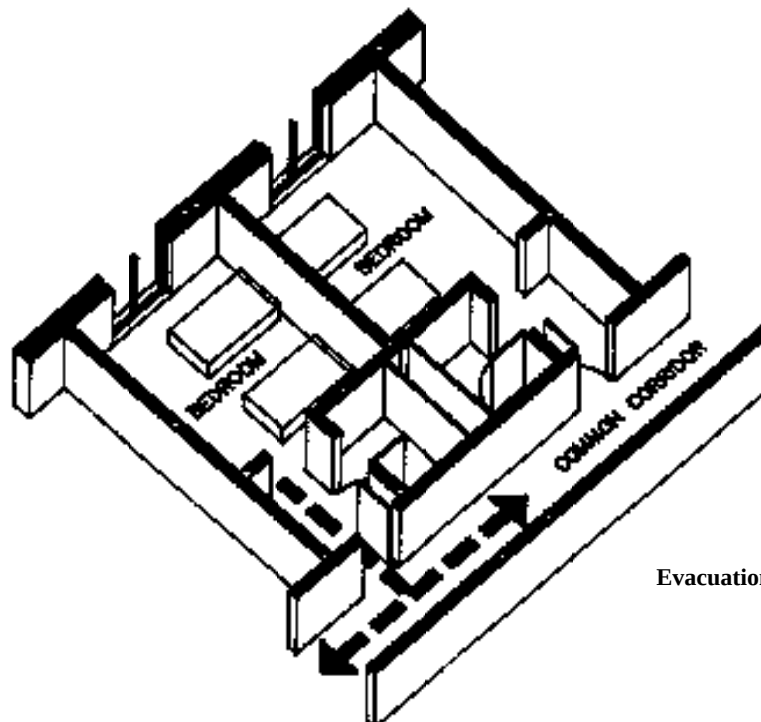
Figure 4.1

- (a) movement from the bedroom - usually to a common corridor.
- (b) horizontal evacuation via a common corridor to protected shaft or final exit.
- (c) vertical evacuation from upper floors, via a protected shaft, to the ground floor and final exit.

As a general principle, it should be possible for a person confronted by an outbreak of fire to turn away from the fire, and move to safety in a direction away from it. To comply with this, each storey of a building providing bedroom accommodation should have not less than two independent escape routes. In situations detailed in Sections 4.3.4 and 4.4.7, escape in one direction, or by one escape route only may be acceptable, provided other aspects of fire precautions are sufficient to compensate for the increased risk to life caused by departing from the principle of having alternative escape routes. Ideally, exits should be sited remote from each other and at the ends of buildings so as to obviate dead-ends (See Fig. 4.2 and 4.5).

The number of escape routes necessary to safely evacuate a building should be determined by reference to relevant factors - egress capacity of escape routes, occupant load, travel distance for each stage of evacuation, the degree of enclosure and protection of escape routes, speed of detection of fire and alarm facilities, directness of escape routes, and pre-planning of evacuation. The adequacy of size of escape routes will be determined by the number of persons who must use them. The occupant density for sleeping accommodation can be readily assessed by reference to the bed spaces provided in a premises. Calculation of capacity of escape routes can then be made on the basis of a discharge rate capability of 40 persons per unit of exit width per minute. A unit of exit width may be taken as 530 mm for calculation purposes.

**NOTES : Chapter 2 of NFPA 101M, Alternative Approaches to Life Safety, 1988, indicates that egress flow is a linear function and not a step function as traditionally assumed. This article contains information useful for calculating egress capacities and flow times for different configurations of existing escape routes. Where it is proposed to utilise a time-based egress analysis of the means of escape of an existing hotel/guesthouse, reference should be made to the chapter titled 'Movement of People' in the SFPE Handbook of Fire Protection Engineering (1988) for a discussion of the application of this technique.**



**Figure 4.2**

Where the bedroom area is combined with a place of assembly, such as a function room or restaurant on an upper floor, escape routes should have sufficient capacity for safe egress of the combined maximum occupancy. Escape routes should ensure a smooth flow of people when in use, and bottlenecks or narrowing down of the routes or obstructions are undesirable, and should be eliminated where 'queueing' could result.

Where bedrooms on the ground floor, or bedrooms opening directly to a balcony or flat roof from which a satisfactory escape route is available, are provided with doors leading directly to the outside, this may be regarded as providing a satisfactory second escape route from bedrooms, provided the doors are readily openable.

Although windows are not normally acceptable as a means of escape, it is desirable that bedrooms should have windows which are accessible to ladders, hydraulic platforms or turn-table ladders, and have openable sections of minimum dimensions 840 mm x 530 mm, which could facilitate rescue in an emergency situation.

### 4.3 Travel Distance

In a fire, conditions which threaten life safety can develop rapidly, and the time available for safe evacuation may be very limited. It is necessary therefore to limit the distance a person must travel to safety, unless the escape route(s) along which the person is travelling is adequately protected.

#### 4.3.1 Escape from a bedroom

The travel distance from a point within a bedroom to the exit door from the room will generally not be significant in determining the safety of the room occupants. The occupants' capacity to observe and respond to the sight, sound or smell of fire within a room, or to an alarm generated by a remote fire, will have greater bearing on their safety than the distance they must travel to the room-exit. Where a bedroom space is subdivided internally, such as with a bathroom en suite, or where suites of rooms are provided, with one room opening off another, it is possible for a fire in an unoccupied space to develop undetected to a stage which would make escape through that space impossible. In the case of a bathroom, it is desirable that the door should be located close to the room exit (see Fig. 4.3).

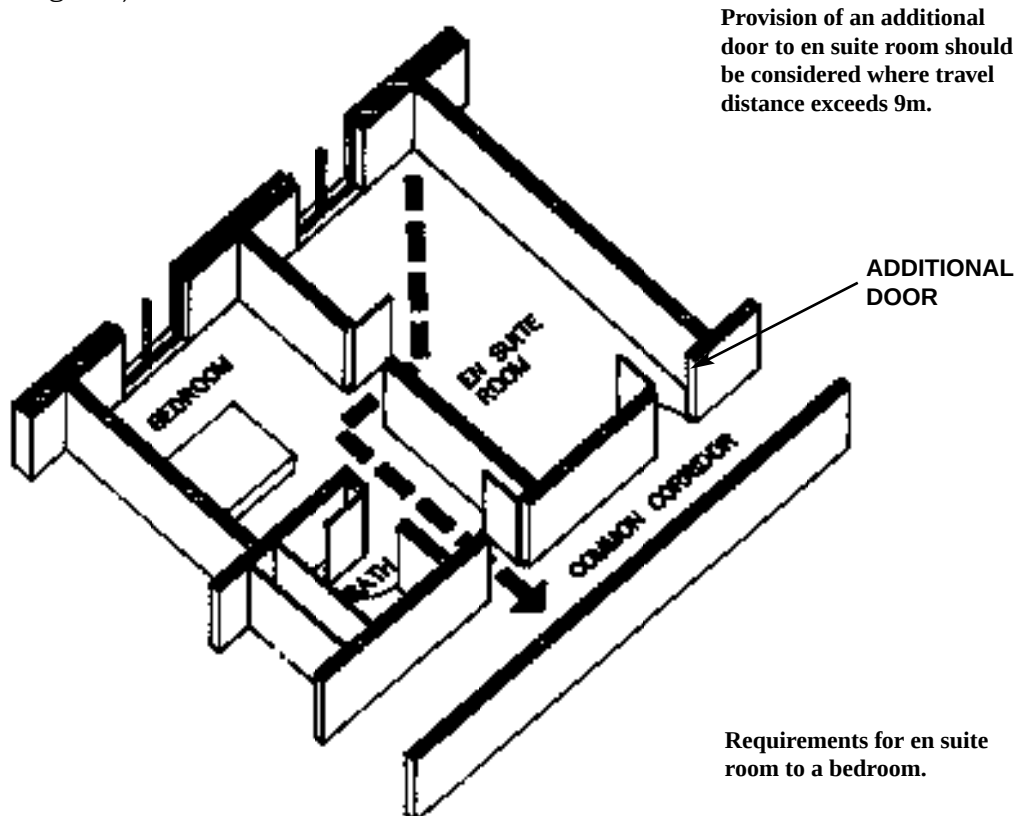
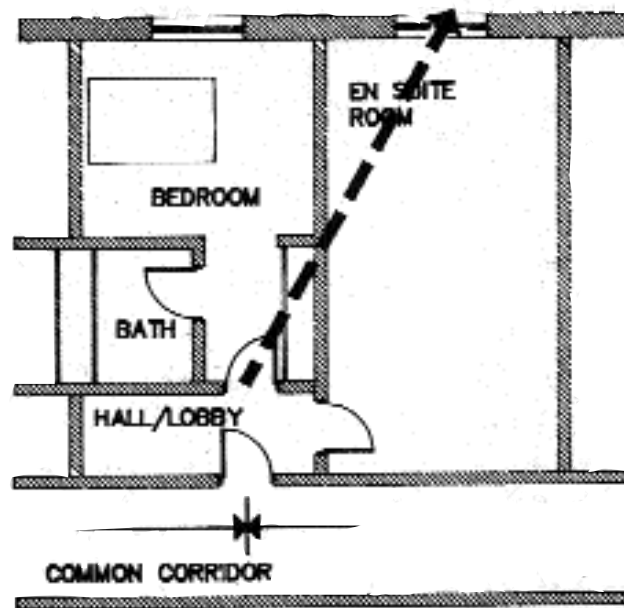


Figure 4.3

In the case of a suite of rooms the travel distance to the suite exit from inner rooms should not generally exceed 9 m unless the suite is protected by an automatic fire detection and alarm system. Bedrooms should have exit doors to the common corridor (or an internal protected lobby). Where the travel distance is excessive, the provision of an additional exit from an inner room other than a bedroom should be considered. If an entrance hall/lobby is provided to the suite, and it is constructed in 30 minute fire resisting construction, it may be regarded as a common corridor for the purpose of measuring travel distance from a point in a room to an exit. Such a hall is effectively a dead-end corridor and should comply with the relevant recommendations of paragraph 4.3.3. (See Fig. 4.4).



Where an inner hall/lobby is provided it should be of 30 minute fire resisting construction if travel distance is excessive.

**Figure 4.4**

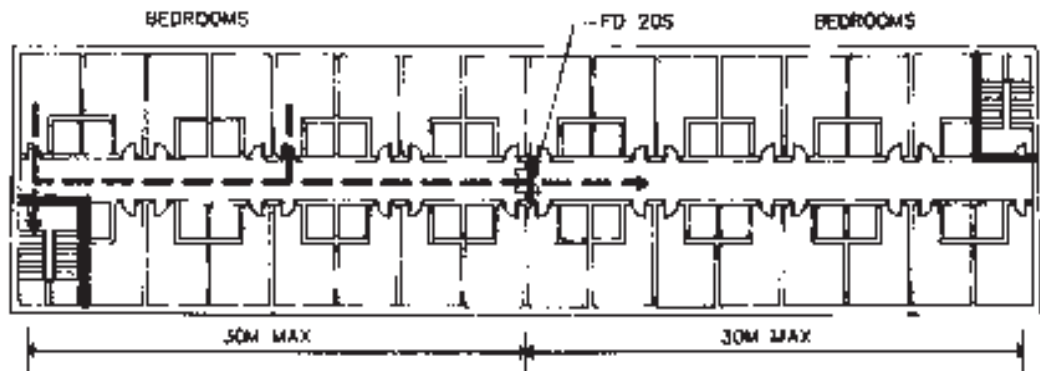
#### **4.3.2 Horizontal evacuation**

Bedroom accommodation is normally served by a common corridor, and when a person leaves a bedroom, it is normally possible (except in the dead-end situation discussed in paragraph 4.3.3) to turn in either of two directions to escape. There are a number of factors which should be considered in determining safe travel distance for horizontal evacuation:-

- (i) The stage to which a fire is likely to have developed before a person becomes aware of its existence i.e. the quality of detection/alarm system;
- (ii) The ability of the construction of walls/doors/floors enclosing the corridor to prevent smoke leakage into the corridor. The presence of service ducts and their potential to carry and spread smoke into the common corridor is relevant;
- (iii) The materials used in the surface finish of the corridor and their potential for becoming involved or contributing to the development of a fire;
- (iv) The nature of the escape route itself - a route with bends, corners and changes in level will make movement difficult for an escaping person;
- (v) Guests' familiarity with the escape route. If the escape route is part of the normal circulation corridor or stairway, then guests are more likely to be familiar with it, and this will speed up their movement. Good sign-posting and lighting of escape routes and exits (see Chapter 10) also improves movement.

It is generally considered that the maximum distance between storey exits should be 60 m. As an additional precaution, and to limit further the distance a

person must actually travel to a protected area from a bedroom door, fire-resisting doorsets (FD 20S) should be provided approximately mid-way between exits to divide corridors. In this way no undivided length of corridor should exceed 30 m and no bedroom should be more than 30 m from the nearest exit or protected shaft (See Fig. 4.5).



Evacuation in two directions  
Subdivision of corridor  
Travel distance to storey exit  
should not exceed 30 m

**Figure 4.5**

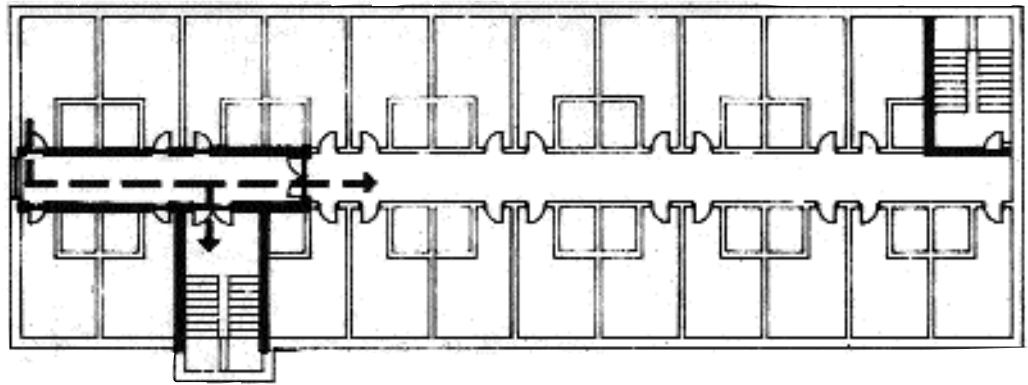
Fire-resisting construction in corridors should be carried above suspended ceilings to the structural floor above, and across the width of the corridor and adjacent rooms. Where corridors form junctions with other corridors, fire-resisting construction and doorsets (FD 20S) should be provided to further limit smoke movement.

#### **4.3.3 Dead-end corridors**

Dead-end corridors serving bedrooms present a major hazard to life safety, and greatly increase the danger of persons being trapped in the event of fire. In such a situation (See Fig 4.1, 4.6 and 4.7), persons can move in one direction only from their rooms to safety, and an outbreak of fire can rapidly prevent them using their sole escape route. Where feasible, dead-ends should be eliminated, and they should only be retained where they comply with the following recommendations :

- (i) they should not generally exceed 10 m. in length, measured from the door of the furthestmost room in the dead end to the storey exit, or a point from which escape is possible in either of two directions, and subject to the overall restriction of not exceeding 30 m to the nearest storey exit or protected shaft. (See Figs. 4.6(a) and 4.6(b) ).
- (ii) dead-end corridors should be enclosed with walls having 30 minute fire resisting construction and 30 minute fire-resisting doorsets (FD 30S).
- (iii) no room other than a bedroom, bathroom or toilet should open off the dead-end corridor.
- (iv) an automatic fire detection system, as recommended in Chapter 8 should be provided covering all rooms, (except bathrooms and wc's), and the dead- end corridor.
- (v) fire-resisting doorsets (FD 30S) should be provided at the head of stairways and corridor intersections to protect persons in the dead-end. An arrangement for by-passing the first stairway should be provided so that escape is possible if that stairway is smoke-logged. (See Figs. 4.7(a) and 4.7(b) ).
- (vi) dead-end corridors should, where feasible, be provided with ventilation facilities, such as an openable window.

# BEDROOMS



Travel distance to two independent escape routes from a dead-end corridor should not generally exceed 10 m.

Figure 4.6a

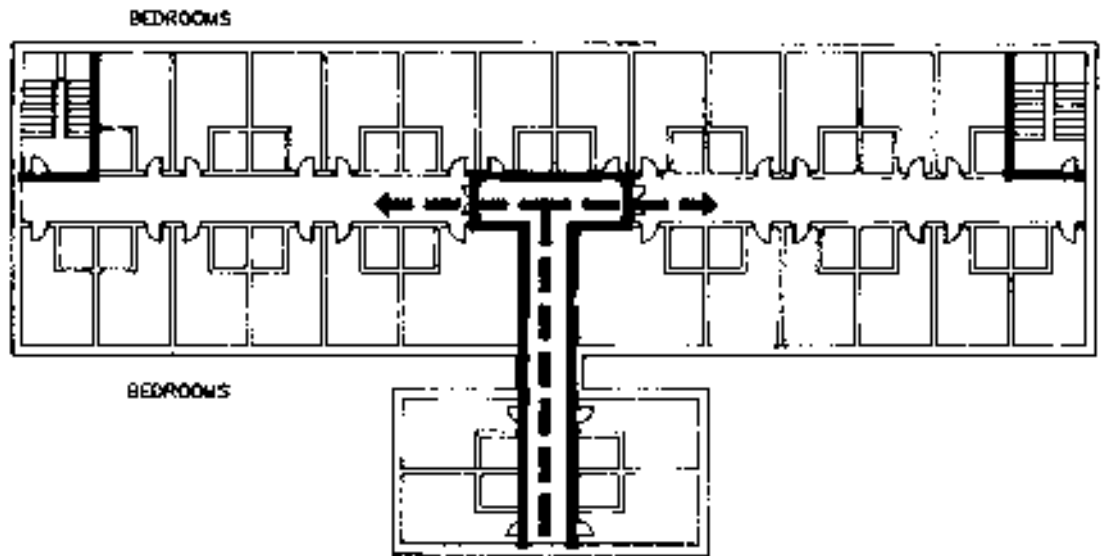
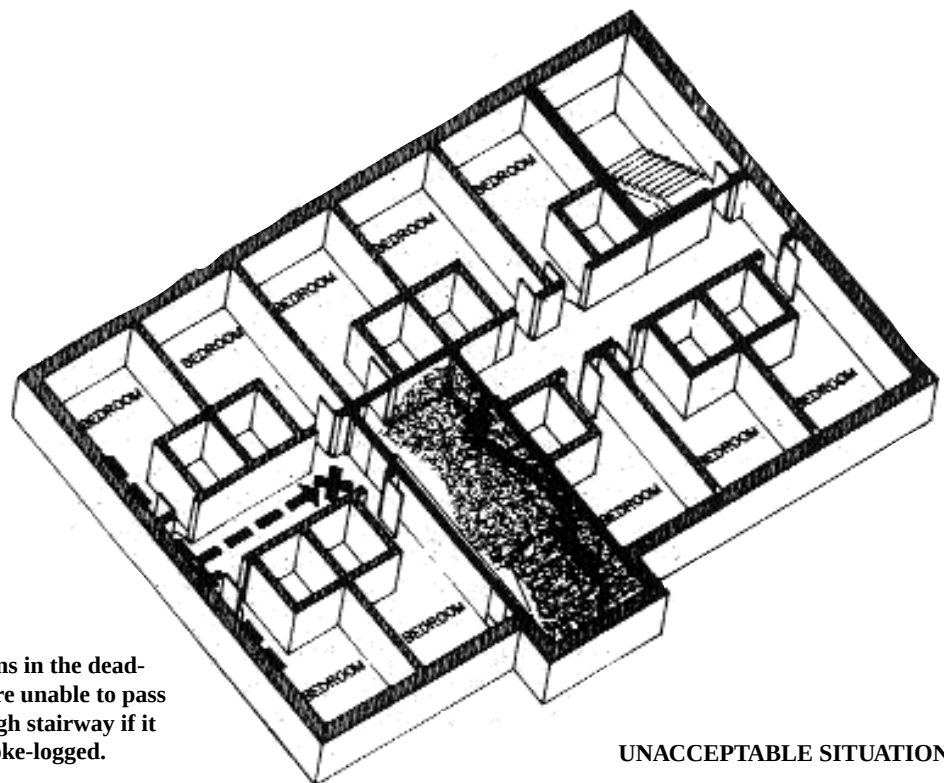


Figure 4.6b

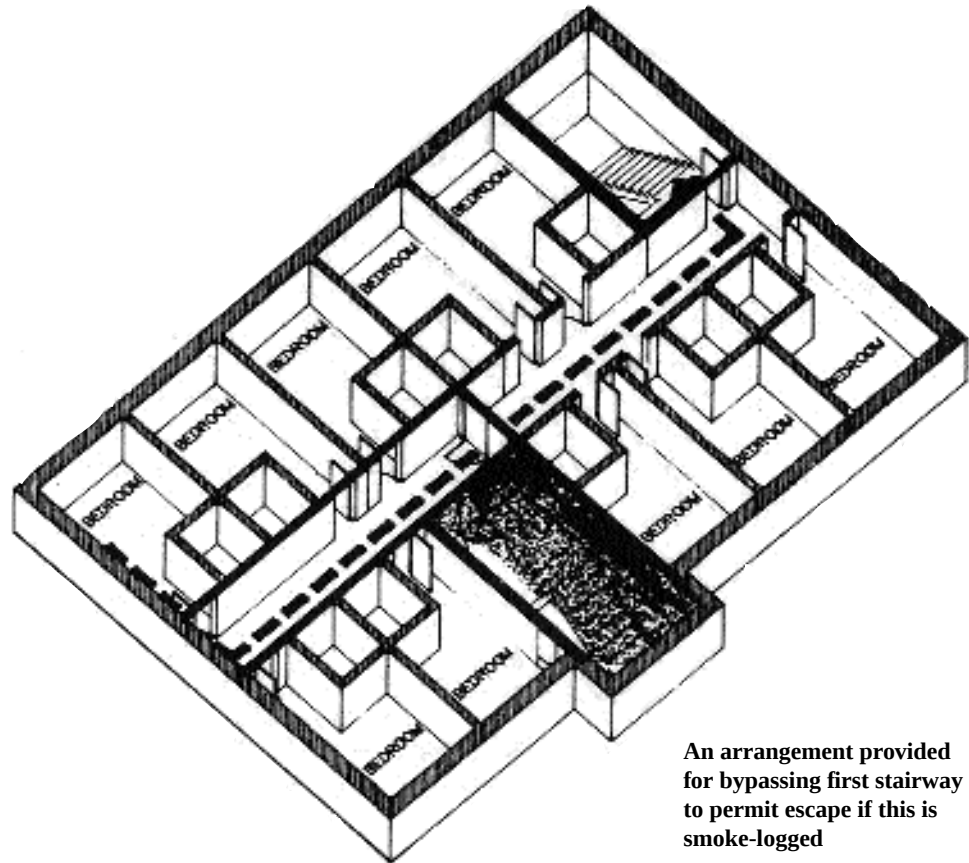


Persons in the dead-end are unable to pass through stairway if it is smoke-logged.

UNACCEPTABLE SITUATION

Figure 4.7a

## ACCEPTABLE SITUATION



An arrangement provided for bypassing first stairway to permit escape if this is smoke-logged

Figure 4.7b

### 4.4 Vertical Escape Routes

#### 4.4.1 Provision of vertical escape routes

The objective of the first two stages of evacuation is to enable escaping persons to safely reach the storey exits. To facilitate the final stage of evacuation, horizontal escape routes on upper floors should discharge into protected shafts. The number and size of protected stairways should be sufficient to discharge the full number of persons who may be expected to use them when applying the calculation methods in Section 4.2 .

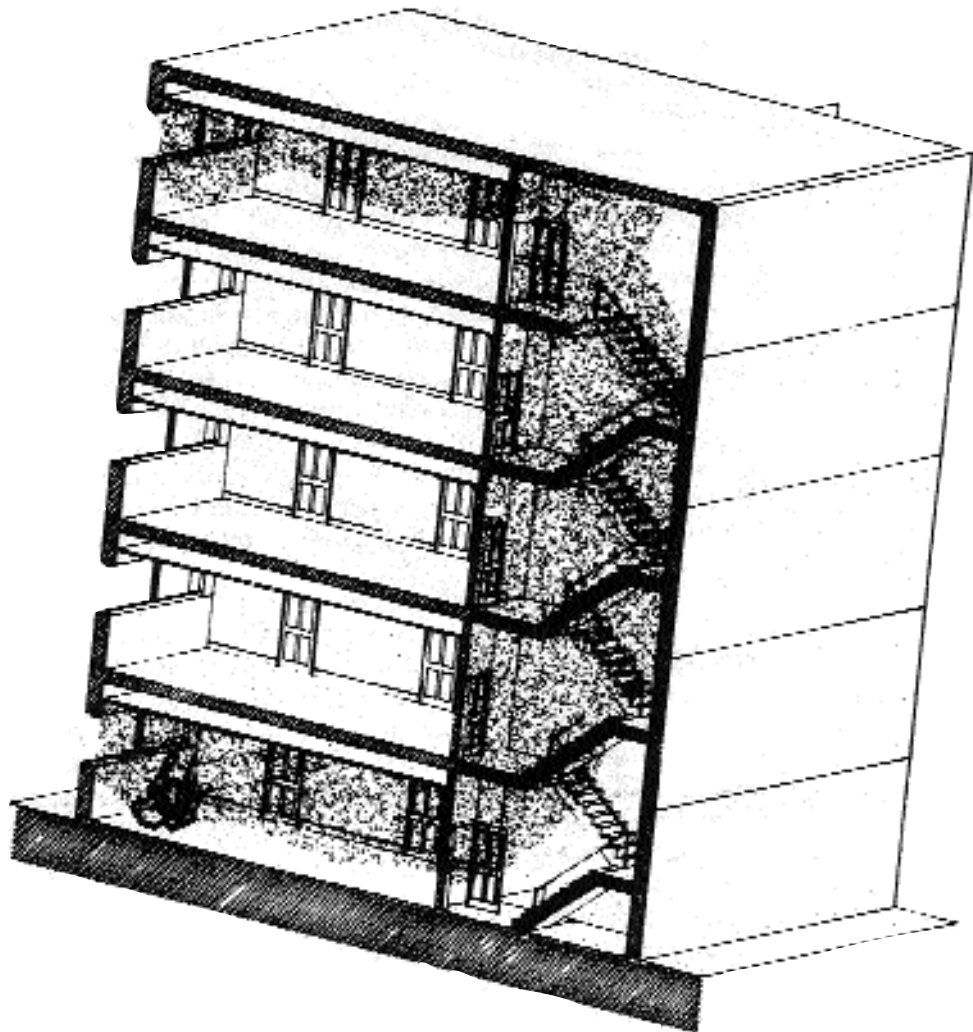
**Note : Chapter 2 of NFPA 101M provides data on egress capacity of different width and thread/riser dimensions of stairways.**

Stairways should be located to comply with the recommendations of Sections 4.2 and 4.3. In situations where there are no feasible alternatives, vertical escape from small premises by a single stairway, or via external stairways may be acceptable. These cases are discussed in paragraphs 4.4.7 and 4.4.8 respectively. Lifts should not be used as a means of escape.

#### 4.4.2 Protection of vertical escape routes

The protection of vertical escape routes, by enclosing stairways in fire resisting construction or within a protected shaft, is essential to prevent vertical escape routes being filled with smoke, and thus rendered unusable for evacuation in the event of fire. Protection of stairways also prevents rapid spread of fire between storeys. Vertical shafts such as stairways may cause a "chimney effect" in a building and spread fire by convection to upper floors (see Fig. 4.8). It is recommended that all stairways other than an accommodation stairway (see Section 4.4.5) should be protected either directly or within a protected shaft. Recommendations for fire resisting construction to enclose stairways and shafts are given in Section 5.2 . The performance of fire-resisting doorsets in protecting

vertical escape routes is one of the most important fire precautions for the protection of life in hotels/ guesthouses, and is especially critical in single-stairway buildings. The need for a very high standard of workmanship in the installation and maintenance of these doors is emphasised.



**chimney effect of a  
vertical shaft**

**Figure 4.8**

In cases where it is undesirable or impracticable to enclose a main or feature stairway at ground floor level, consideration may be given to separating it from the upper floors by fire-resisting construction at first floor level, provided suitable alternative means of escape is available from the upper floors. In general it is undesirable to have bedrooms opening directly onto stairways. Additional recommended precautions are given in Section 4.4.7, where this occurs in small buildings with a single stairway. In other situations where bedrooms open onto stairways, special consideration should be given to the means of escape from those rooms, as well as to the danger such rooms pose to the protection of that stairway. Where feasible, stairways which are not on external walls and do not have openable windows should have ventilation facilities provided at the top of the stairway.

Where pressurization of escape routes is employed to protect vertical escape routes, the design procedure should be to BS 5588 : Part 4 : 1978, 'Code of practice for smoke control in protected escape routes using pressurization'.

#### **4.4.3 Operational aspects of vertical escape route protection**

The operation of a hotel/guest house should be such that the possibility of fire starting within a stairway is minimised. Even where an alternative exit is available, the stress caused by finding a stairway blocked by smoke, as well as the time involved in travelling to an alternative exit, may adversely affect the likelihood of a person leaving a building safely. Stairways which are part of escape routes should not therefore contain hazards which could cause or contribute to the development or spread of a fire. Storage, including temporary storage, of goods in a stairway should be prohibited and enforced by supervisory staff. Notices prohibiting such storage should be erected in positions where it tends to occur. The provision of sanitary accommodation opening into a stairway is not considered to be a danger, provided no hazard, such as gas-burning appliances, are present. Stores for high-hazard materials such as beds, mattresses and cleaning materials should not open directly onto protected stairways. Small stores for fresh bed linen may be acceptable in one stairway of a multi-stairway building where the stores are enclosed in 30 minute fire resisting construction and are kept closed and locked when not in use. Such stores should not contain potential sources of ignition such as unprotected electrical cables or electrical fittings.

A porter's desk or reception area as part of, or which opens into, one protected stairway of a multi-stairway building should generally be limited in size. The fire load and potential ignition sources contained within such an area should be minimised, and it should be protected by an automatic fire detection system.

#### **4.4.4 Independence of escape routes**

Escape routes should be arranged so that it is not necessary to pass through one stairway to reach another, or so that penetration by smoke of one does not adversely affect access to others (See Fig 4.7(a) and 4.7(b)). Where two escape stairways have a common wall, this should be imperforate. The sub-division of corridors which link stairways, recommended in Section 4.3.3, as well as the provision of self closing doors to the stairways helps to reduce the possibility of a fire affecting more than one stairway, and maintains their integrity as independent means of escape.

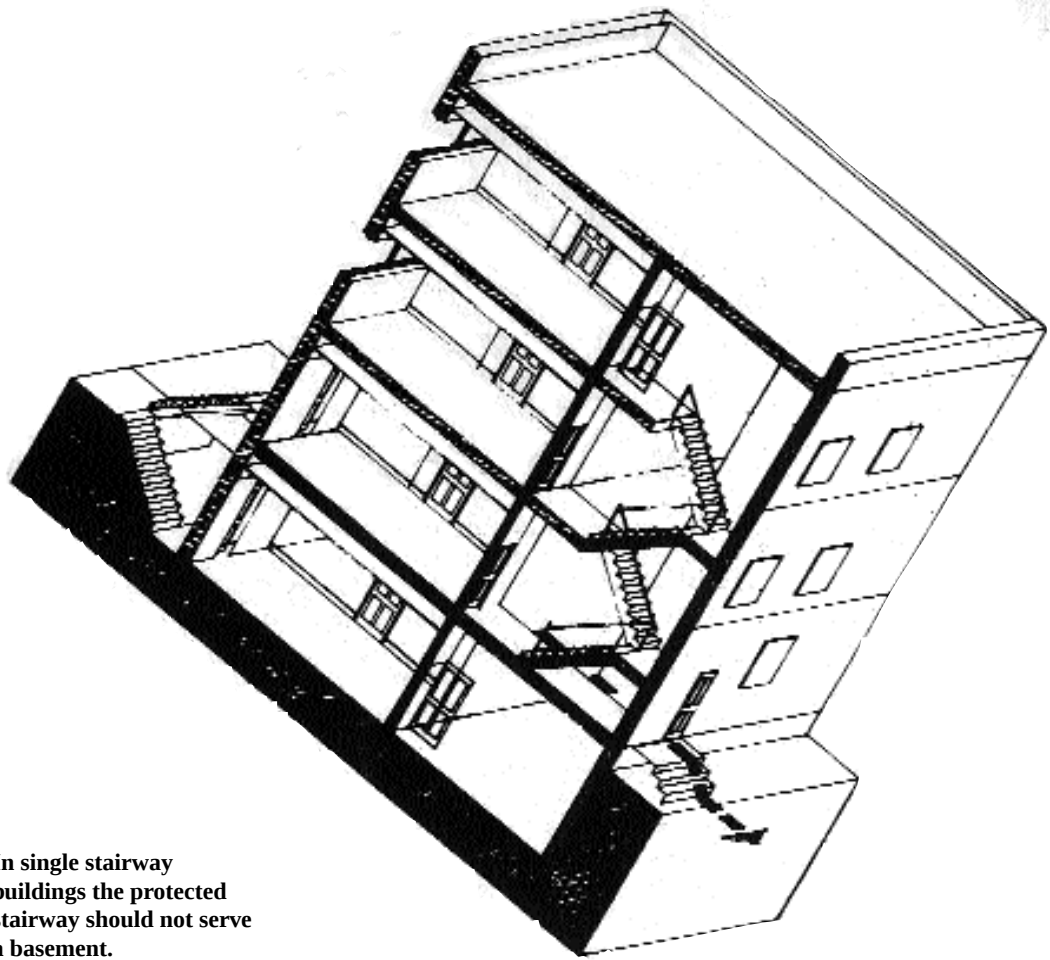
#### **4.4.5 Accommodation stairways**

Where accommodation stairways are provided in hotels/guesthouses they should not serve more than two floors which should be contained within a single fire compartment. Accommodation stairways cannot be regarded as means of escape and should not be the sole means of access between different storeys. The location of accommodation stairways should not be such as to interfere with access to protected escape routes.

#### **4.4.6 Basements**

Basements, or other rooms without windows, are particularly hazardous in the event of fire. Unless there are other means of venting them, they will rapidly fill with smoke. Any vertical passage, such as a stairway, leading from a basement is likely to become rapidly smoke-logged and persons on the upper floors will be endangered if stairways, which are the means of escape from the upper floors, connect with the basement. It is desirable that basements be approached from the outside at basement level or from ground floor level through a separate protected stairway.

In single stairway buildings the protected stairway should not serve a basement. Where there is more than one protected stairway, at least one should terminate at ground floor level, and other stairways which continue to basement levels should be separated from each level of basement by fire resisting lobbies (See Fig. 4.9). This separation may be provided by enclosure of the basement stairways and provision of fire resisting doorsets at the top and bottom.



In single stairway buildings the protected stairway should not serve a basement.

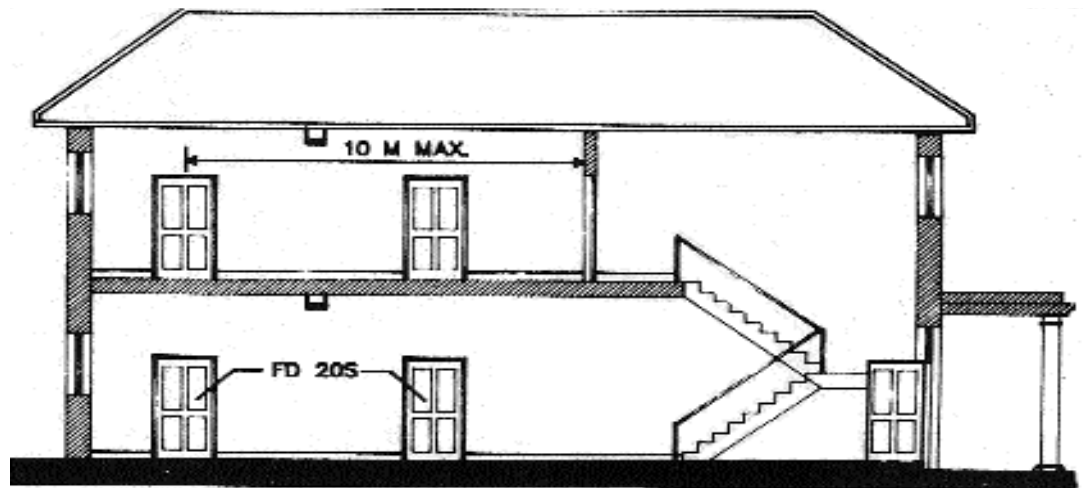
**Figure 4.9**

#### **4.4.7 Small premises with a single stairway**

In small premises with limited accommodation it is considered acceptable to have a single stairway where the following specific conditions apply. The possibility of rescue by the fire brigade should be considered, and bedrooms should have windows which are accessible to ladders, hydraulic platforms or turn- table ladders, and have openable sections of minimum dimensions 840 mm x 530 mm.

#### **Buildings with one floor above ground floor** (see Fig. 4.10)

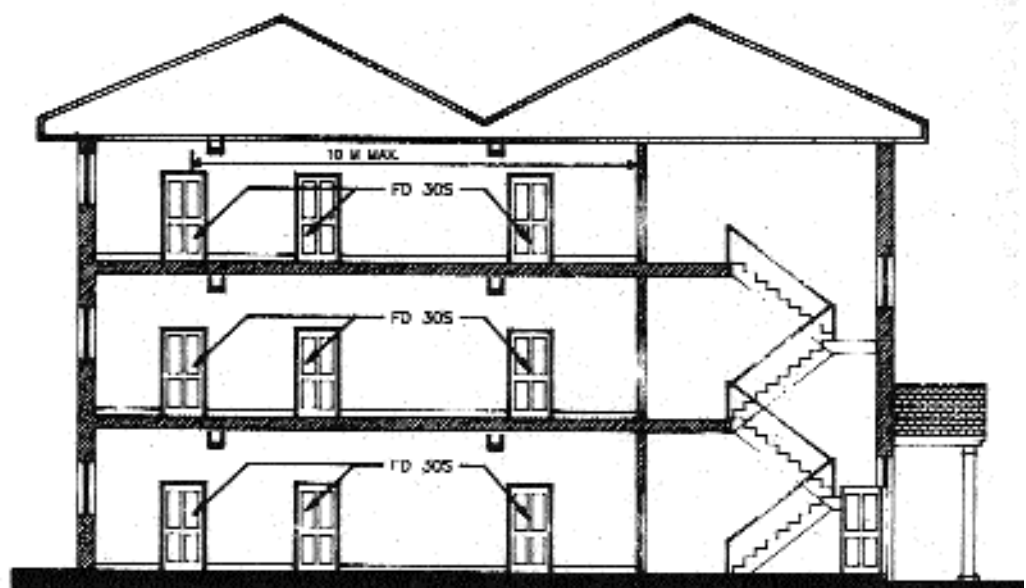
- (i) The stairway should be enclosed within a 30 minute fire resisting construction.
- (ii) Doors to the stairway enclosure at ground floor (other than from toilets or bathrooms) should have 20 minute fire resistance (FD 20S).
- (iii) The travel distance from any bedroom door to the head of the stairway should not exceed 10 m.
- (iv) Not more than 6 bedrooms should be provided on the upper floor.
- (v) Self-contained smoke detectors ( manufactured to BS 5446 : Part 1 : 1977 : Point type smoke detectors) should be provided in the premises as recommended in Section 8.2.
- (vi) The area under the stairway should be cleaned out and blocked off to prevent its use for storage.
- (vii) Electrical control boards should be enclosed in fire-resisting cabinets. Gas services should not be located within the confines of a single stairway.



**Figure 4.10**

**Buildings with two floors above ground floor** (see Fig. 4.11)

- (i) The stairway should be enclosed within a 30 minute fire resisting construction.
- (ii) The doors of rooms opening onto the stairway or corridors connected to the stairway on each floor should have 30 minute fire resistance (FD 30S).
- (iii) The travel distance from any bedroom door to the head of the stairway should not exceed 10 m.
- (iv) Not more than 6 bedrooms should be provided per floor.
- (v) An automatic fire detection and alarm system should be provided as recommended in Chapter 8.
- (vi) The area under the stairway should be cleaned out and blocked off to prevent its use for storage.
- (vii) Electrical control boards should be enclosed in fire-resisting cabinets. Gas services should not be located within the confines of a single stairway.
- (viii) High fire hazard rooms should be separated from the stairway with protected lobbies.
- (ix) No basement should connect to a stairway serving a single stairway building. Where a basement exists, and is connected to the ground floor, it should be separated from the ground floor with a lobby having a one hour fire resisting construction.



**Figure 4.11**

### Buildings with three floors above ground floor

- (i) The stairway should be enclosed within a 30 minute fire resisting construction.
- (ii) The stairway should be approached on each floor by:
  - (a) a corridor enclosed in 30 minute fire resisting construction including 30 minute fire resisting doorsets (FD 30S) and with 30 minute fire resisting doorsets to the stairway (FD 30S), (see Fig. 4.12a) or
  - (b) where rooms open directly onto the stairway, access should be provided through a protected lobby. This recommendation need not apply to the top floor where doors to rooms opening onto the stairway or a corridor connected to the stairway should have 30 minute fire resistance (FD 30S)(see Fig. 4.12 b).
- (iii) The travel distance from any bedroom door to the head of the stairway should not exceed 10 m.
- (iv) Not more than 6 bedrooms should be provided per floor.
- (v) An automatic fire detection and alarm system should be provided, as recommended in Chapter 8.
- (vi) The area under the stairway should be cleaned out and blocked off to prevent its use for storage.
- (vii) Electrical control boards should be enclosed in fire resisting cabinets. Gas services should not be located within the confines of a single stairway.
- (viii) High fire hazard rooms should be separated from the stairway by a protected lobby.
- (ix) No basement should be connected to a stairway serving a single stairway building. Where a basement exists, and is connected to the ground floor, it should be separated from the ground floor with a protected lobby of one hour fire resistance.

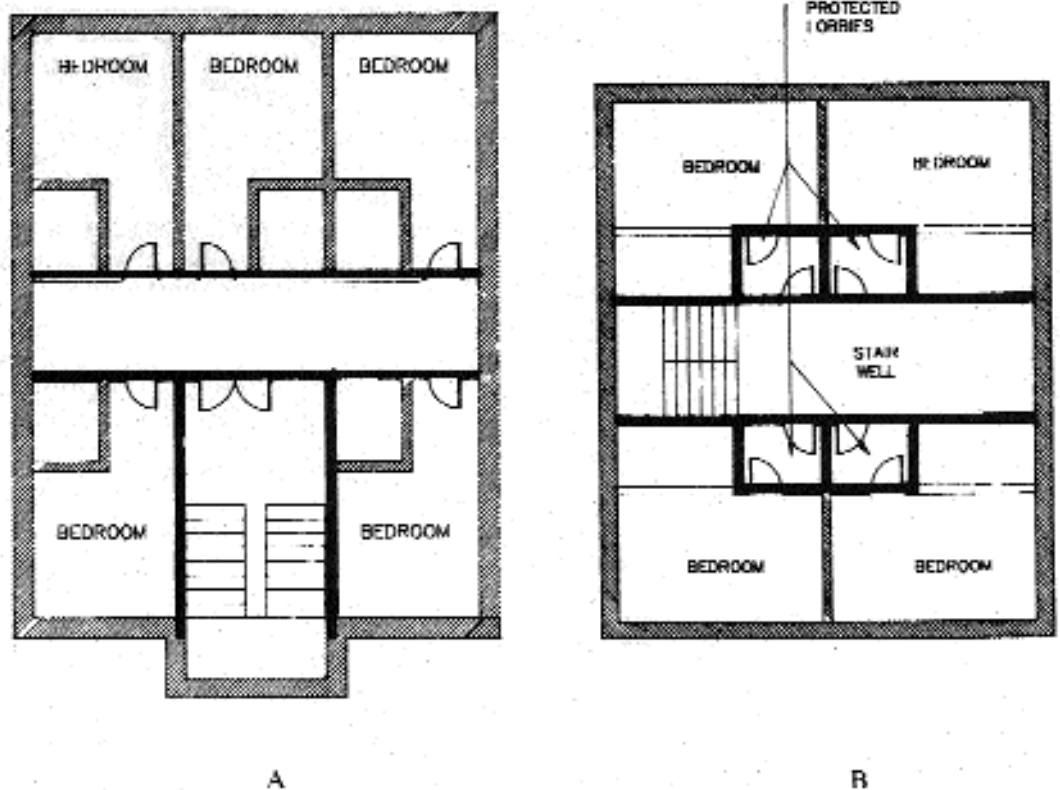
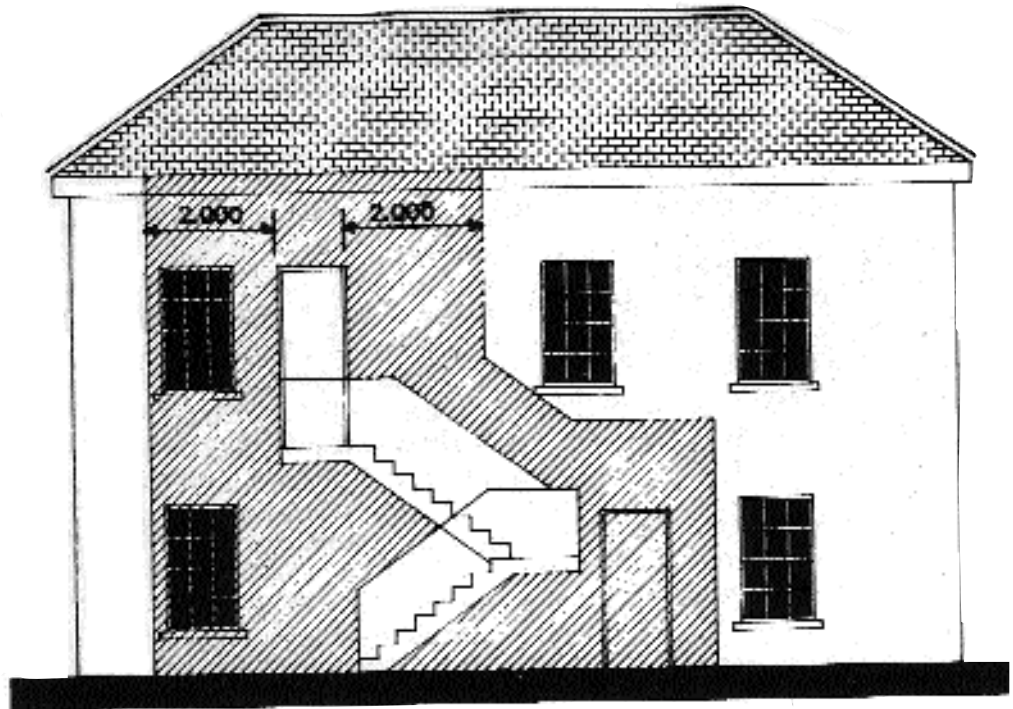


Figure 4.12

#### **4.4.8 External escape routes** (see Fig. 4.13)

As with a single stairway in a small building, it is considered that external escape routes may offer practical, if non-ideal escape routes in some existing hotels and guesthouses. There are difficulties and limitations with external escapes which must be recognised, and the following safeguards should be applied:-

- (i) They should be protected from the effects of fire and smoke in the building. Walls or floors/roofs on which they are located should have fire resistance as recommended in Chapter 5. Openings such as doors, windows, ducts or rooflights, through which fire and smoke could be discharged, and thus prevent use of an external escape route, should be protected. This protection should generally extend 2.0 m in every direction horizontally and to all openings below an external stairway. Doors to external stairways, below top storey, should be self-closing and fire resisting (FD 30S), and should be recessed if necessary to prevent them opening across landings. This latter recommendation would not apply where a stairway is served by a remote access with connecting bridge.
- (ii) External stairways should not contain enclosed spaces, and there should be nothing in its vicinity which could endanger its use.
- (iii) External stairways serving floors higher than three storeys above ground level should have solid treads and solid screen or balustrades up to a height of 1.2 m.
- (iv) External stairways should be designed to cater for both horizontal and vertical loads in accordance with BS 6399 : Part 1 : 1984 'Code of practice for dead and imposed loads'. External stairways should be inspected regularly and maintained in accordance with the relevant section of BS 5395 : Part 1 : 1984 : 'Code of practice for the design of straight stairs'. Regular maintenance and inspection of external escapes is particularly important in seaside or other exposed locations.
- (v) External stairways should be of permanent fixed construction of non-combustible materials (except for timber handrails). Treads should be slip resistant and of suitable design and material for this purpose. They should be laid to prevent water retention. There should be no variation in tread or riser size in a flight. Metal stairways and landings should be of solid or perforated plate; if perforated, openings should not exceed 20 mm in width and treads and landings should have 40 mm deep solid nosings. If constructed of slats or bars, no slat or bar should be more than 12 mm apart.
- (vi) As with other escape routes, external stairways should be capable of safely accommodating the number of persons expected to use them (calculated in accordance with Section 4.2).
- (vii) Illumination levels provided on external escape stairways should be similar to those required for internal escape routes. (See Chapter 10).
- (viii) External stairways should continue to ground level and discharge escaping persons to a safe location, if they are to be acceptable as escape routes.



openings within 2.0 m of external stairway  
to have appropriate fire resistance

**Figure 4.13**

#### **4.5 Construction of Escape Routes**

##### **4.5.1 Escape routes - general**

The function of escape routes is to enable persons to safely evacuate a building. To do this they should meet the following criteria :

- (i) the floors of corridors, lobbies, landings, stairways and passages forming part of escape routes should have non slip, even surfaces.
- (ii) escape routes should have a clear headroom of 2.0 m from floor to ceiling and should not have obstructions or projections below this height.
- (iii) external escape routes should be protected by guard rails as per paragraph 4.5.2 (vi).

##### **4.5.2 Stairways forming part of escape routes**

- (i) stairways should generally have straight flights, be without winders and should be provided with landings top and bottom.
- (ii) doors should not open directly over flights and should be recessed if necessary to provide an adequate landing.
- (iii) on stairways which are expected to cater for large numbers of persons at the same time in an emergency, the minimum desirable tread size is 240mm and risers should not exceed 190 mm.
- (iv) the pitch of a stairway should be constant throughout its length and should not generally exceed 38 degrees.
- (v) stairways and landings should be provided with handrails and balustrades. Where the width of a stairway exceeds 1.1 m, handrails should be provided on both sides. If stairway width exceeds 1.8 m a central handrail should be provided. The handrail should be at a height between 830 mm and 900 mm from the pitch line of the stairway.
- (vi) balustrades which are required to protect edges of landings, balconies or external escape routes should generally be of non-combustible construction and should be between 900 and 1050 mm high. The space between vertical and horizontal elements of balustrades should not exceed 100 mm.

#### **4.5.3 Doors on escape routes**

- (i) doors on escape routes, where the number of persons likely to use them in an emergency exceeds 30, should generally be hung to open in the direction of escape. Doors should not open across stairways or obstruct the clear width of corridors, landings or lobbies when opened.
- (ii) a panel of clear glazing should be provided in doors which open in both directions.
- (iii) revolving doors should not be provided on escape routes without clearly indicated side-hinged exit doors adjacent to them.
- (iv) sliding doors should not be provided on escape routes.
- (v) roller-shutter doors or other lockable protective doors or gates should not be placed outside final exits.
- (vi) automatically operated doors should be provided with a fail-safe mechanism, by which they open in the event of system failure, or which enables them to be opened manually, or have clearly marked side-hinged doors adjacent.

#### **4.5.4 Door locks**

- (i) doors on escape routes through which persons must pass to reach safety should be fastened from the inside in such a manner that can be easily and immediately opened from the inside. They should not be dead-locked or fitted with barrel-bolts. The use of break-glass boxes containing keys for exit doors is not considered suitable for doors on escape routes in hotel/guesthouses. Fastenings should be of a type such as lever handled latches or night latches that can be opened without use of a key. Where panic-bolt type locking mechanisms are used on doors on escape routes, they should comply with BS 5725 : Part 1 : 1981 'Specification for panic-bolt and panic-latches mechanically operated by a horizontal push-bar'. Doors which have panic bolts fitted should have a "PUSH BAR TO OPEN" sign displayed on them.
- (ii) a master-key should be available to allow staff to rapidly gain entry to a room where a person(s) may be endangered by fire.
- (iii) attention is drawn to the possibility that where bedroom doors are fitted with self-closing devices, persons can be easily locked out of their rooms unless door locks require a positive locking action.

## CHAPTER 5 - STRUCTURAL FIRE PRECAUTIONS

### 5.1 General

In the previous chapter, the importance of protecting escape routes from penetration by smoke and fire was discussed, so as to ensure they can be safely used by hotel/guesthouse occupants who may need to evacuate a building in an emergency. A study of casualties resulting from night-time fires (00.00 to 08.00 hrs) in hotels has shown that 73% were caused by fire spreading beyond the room of origin. This chapter discusses requirements to prevent premature fire spread, as well as other important structural fire precautions. As a general requirement a building used for hotel/guesthouse accommodation should :

- (i) be capable of preventing rapid spread of smoke and fire beyond the room of fire origin and into protected escape routes
- (ii) maintain its stability and integrity during a fully-developed fire for the periods required in Section 5.2
- (iii) have wall and ceiling finishes which do not contribute to the initial development and rapid spread of fire.

### 5.2 Fire Resistance Requirements

The requirement for fire resistance is to ensure that essential structural elements resist exposure to fire for appropriate periods. Fire resistance requirements are specified for the individual elements of structure, but the interaction of the elements when subjected to fire should not cause loss of fire resistance.

It is considered that elements of structure in hotels/guesthouses should have fire resisting construction as detailed below :

In buildings having not more than three levels above ground level, with the exception of single-storey buildings, the fire resistance of the elements of structure of the building should be at least 30 minutes. In buildings having more than three levels above the ground level the fire resistance of the building structure should be at least 60 minutes. Basement areas should have a fire resistance of at least 60 minutes.

It is recommended that floor-to-ceiling partitions separating bedrooms from escape routes, and from other rooms, should, in general, have 30 minute fire resistance. Bedroom doors to common corridors which are escape routes should generally have 20 minute fire resistance (FD 20S).

The structure, floors, floor-to-ceiling partitions and floors/ceilings separating bedrooms and escape routes from hazardous areas such as boilers, calorifiers, kitchens, laundries, or areas used for a different purpose such as bars, lounges, conference rooms, dances halls, and stores should have 60 minute fire resistance. Doors should also have 60 minute fire resistance (FD 60S), or be separated with 60 minute fire resisting lobby construction, and two 30 minute fire resisting doors (FD 30S).

### 5.3 Junctions, Cavities, Pipes and Ducts

These three areas frequently constitute points of weakness for fire-spread and should be checked in existing buildings. Junctions between building elements should prevent early transfer of fire from one side to the other by having good bonding, or by a suitable method of fire-stopping.

Cavities and hidden spaces, such as hollow walls and suspended ceilings, are especially dangerous areas, as fire can spread if the cavity by-passes fire barriers. To prevent the spread of smoke and fire the edges of cavities should, where feasible, be sealed, and large cavity areas should be subdivided. Cavities may also be protected by fire detection systems.

Cables, pipes, and ducts which penetrate compartment walls, floors, protecting structures or cavity barriers can also be potential points of weakness in fire. Such penetrations should be protected to prevent unlimited spread of fire and smoke. Special care should be taken with ducts leading from hazardous areas such as kitchens

#### 5.4 Wall and Ceiling Finishes

Decorative finishing materials on exposed wall and ceiling surfaces can have a significant effect on the growth rate of a fire, and consequently on the safety of occupants of hotels and guest houses. In escape routes, wall and ceiling finishes should achieve a Class 0 surface spread of flame rating. In circulation areas and other rooms accessible to the public, other than bedrooms, it is desirable that wall and ceiling finish should achieve a Class 1 rating.

#### 5.5 Fire Resisting Doorsets

Openings in compartment walls, separating walls, protecting structures or other fire barriers should be fitted with fire resisting doorsets. The situations where fire-resisting doorsets should be provided are given in Chapter 4 and Section 5.2 (see Table 5.1). New fire resisting doorsets should be selected in accordance with BS : PD 6512 : Part 1 : 1985 'Guide to fire doors'. Attention is also drawn to Building Research Establishment Digest No. 320 - 'Fire doors'.

Where it is desired for operational reasons to hold open fire resisting doors, this should be done using magnetic-type devices linked to an automatic fire detection and alarm system. The practice of wedging or hooking fire doors open should be prohibited. Fire doors should be fitted with appropriate "FIRE DOOR - KEEP SHUT" signs.

Upgrading of existing doors may be feasible and desirable in some circumstances, and this should be undertaken in accordance with tested and approved methods, such as the Timber Research and Development Association's Wood Information Sheet: Section 1: Sheet 32, "Fire resisting doors by Upgrading" together with the specifications contained in TRADA Wood Information Sheet : Section 1 : Sheet 11, D5, D6, D7, D8, D9, D10, D11 and D12 "Timber Building Elements of Proven Fire Resistance".

**TABLE 5.1**

| Type of Doorset | Situations where required                                                                                                  |
|-----------------|----------------------------------------------------------------------------------------------------------------------------|
| FD 20S          | Subdivision of corridors, bedroom doors in some situations.                                                                |
| FD 30S          | Protection of stairways, bedroom doors in dead ends, single stairway buildings with two or more floors above ground floor. |
| FD 60S          | Enclosure of hazardous areas                                                                                               |

## CHAPTER 6 - BUILDING SERVICES

### 6.1 General

A study of causes of hotel fires has linked building services such as space-heating, water-heating, electrical installation and appliances to the ignition of eighty of three hundred and fifty hotel fires studied. Examination and maintenance of building services is necessary to prevent such fires starting. The services considered in this chapter are electrical installations and appliances, gas, space-heating systems and ventilation systems.

### 6.2 Electricity

There are three areas which need attention to ensure the safe use of electricity in hotels/guesthouses.

#### ***(a) Electrical installation***

The electrical installation comprising wiring, sockets, switches, fuse boards, distribution boards, residual current circuit breakers (RCCB's), earth leakage circuit breakers (ELCB's) etc. - should be inspected regularly and tested by a competent person. Where possible, the original installer should make the inspection, and a certificate should be provided indicating that the installation complies with the Electro-Technical Council of Ireland 'National Rules for Electrical Installations'. Where this is not feasible, the person making the inspection should provide a report on the condition of the installation, with particular reference to fire safety, and outlining the tests done and the extent to which visual inspection of the installation was relied upon. Sufficient socket outlets should be provided for the electrical appliances in use. Dangerous or defective installations should be replaced or remedied in accordance with the E.T.C.I.'s Rules. Competent persons should be employed to carry out such work. It is important that all extensions and repairs to electrical circuits are carried out in a proper manner in accordance with the E.T.C.I.'s Rules. Where defects are found by staff, they should be reported to the fire safety manager, who should have them remedied by a competent person.

#### ***(b) Electrical appliances***

A wide variety of electrical appliances are found in hotels/guesthouses ranging from bedside lamps, electric blankets, hair-dryers, trousers press and televisions in bedrooms, to heavy duty 3-phase equipment in kitchens and laundries. Office accommodation also usually contains a variety of electrical appliances. Appliances with flexible cables should be checked regularly for damage and cables should be replaced, not repaired, if defective. Plugs on flexible cables should be correctly wired, with the flexible cable secured in the cord grip. Broken plugs should be replaced, and fuses in plugs should be correctly sized to suit the load of the appliance.

Special care is required in kitchens and laundries where appliances can come in close proximity to water. Socket outlets should not be sited so as to permit this to happen. Electrical machines supplied through permanent cables should have an isolator on the supply line. Electrical appliances should conform with a standard appropriate at the time of manufacture such as the relevant parts of I.S. 205 : Part 1 : 1980 - Safety of household and similar electrical appliances. Commercial electrical catering equipment should comply with the relevant parts of BS 5784 : Specification for safety of electrical commercial catering equipment. All electrical appliances should be inspected by a competent person and information on their condition should be included in the report required at (a) above. Periodic inspections and servicing should be carried out as appropriate.

#### ***(c) Use of electrical appliances***

Mis-use of electrical equipment is a frequent cause of fire. It is important that all staff and guests should be familiar with correct methods of using electrical

### 6.3 Natural Gas and Liquid Petroleum Gas (LPG)

appliances. Staff should receive appropriate training in the use of electrical appliances, and be constantly reminded of the need for switching off appliances when not in use. Where appropriate, guests should be reminded to unplug appliances in their rooms at night.

The leakage of flammable gas from either a storage tank, supply line or a gas burning appliance can create an explosive atmosphere within a short space of time. In the event of this coming into contact with a source of ignition (e.g. electrical apparatus, lighted cigarettes, open fires, etc.) an explosion may result. It is therefore, essential, that gas installations, storage tanks, pipe lines, gas burning appliances, flues and equipment are correctly installed and fitted with appropriate safety devices and maintained in good condition. All components of gas installations should be inspected at regular intervals by a competent person, who should prepare a report on the condition of the installation, and highlight deviations from essential safety requirements contained in appropriate codes of practice and Irish Standards such as:

|                   |                                                                                      |
|-------------------|--------------------------------------------------------------------------------------|
| I.S. 265 : 1987   | Installation of gas service pipes                                                    |
| I.S. 266 : 1987   | Part 1 - Pipes                                                                       |
| I.S. 329 : 1987   | Code of Practice for gas distribution mains                                          |
| I.S. 809 : 1987   | Regulator installations with inlet pressures up to 7 bar                             |
| I.S. 327 : 1987   | Domestic installations using LPG                                                     |
| I.S. 807 : 1987   | (Three parts) Gas burners                                                            |
| I.S. 3212: 1987   | Code of Practice for piped installation of fixed gas fired space heaters,            |
| I.S. 3213: 1987   | Storage of LPG cylinders and cartridges                                              |
| I.S. 3216: 1988   | Storage of LPG at fixed installations                                                |
| I.C.P.3 : 1984/85 | (Four parts) Domestic installations for manufactured and natural gas                 |
| I.C.P.4 : 1985/87 | (Five parts) Non-domestic installation for manufactured and natural gas              |
| S.R. 8. : 1982    | Recommendations for minimum safety standards for existing domestic gas installation. |

As a general principle, gas installations, including pipework, should not be positioned in escape routes. Gas cylinders and portable gas heaters should not be stored or used in hotels/guesthouses. Two shut-off safety valves should be installed on the gas supply pipeline to a building, one inside and the other outside the building. These valves should be manually operated and their location, purpose and mode of operation should be clearly indicated. Gas-burning appliances should conform with an appropriate standard of manufacture and installation such as :

|                |                                                                                   |
|----------------|-----------------------------------------------------------------------------------|
| I.S 280 : 1986 | Combined appliances : gas fire/back boiler                                        |
| I.S.281 : 1986 | Central Heating boilers and circulators                                           |
| I.S.282 : 1986 | Gas fires                                                                         |
| I.S.283 : 1987 | Flueless space heaters                                                            |
| I.S.284 : 1987 | Flueless catalytic combustion heaters                                             |
| I.S.285 : 1987 | Decorative gas-log and other fuel effect appliances                               |
| I.S.286 : 1987 | Safety of flueless gas-fired space heaters                                        |
| I.S.644 : 1983 | Domestic cooking appliances burning gas                                           |
| I.S.645 : 1983 | Gas burning appliances for instantaneous production of hot water for domestic use |
| I.S.800 : 1987 | Safety of gas-fired infrared space heaters                                        |
| I.S.801 : 1987 | Direct gas-fired forced convection air heaters                                    |
| I.S.802 : 1987 | Indirect gas-fired forced convection aid heaters                                  |
| I.S.803 : 1987 | Gas-fired fanned circulation ducted air heaters                                   |
| I.S.804 : 1987 | Gas-fired water boilers with inputs of 60 kW to 2 MW                              |
| I.S.805 : 1987 | Gas-fired storage water heater                                                    |

#### **6.4 Space-Heating**

Many hotels/guesthouses are provided with central heating systems powered by solid fuel or oil burning appliances, and where installed to an appropriate standard, this is a safe system of space heating. As a general rule, appliances powering such systems should be separated from the rest of the building by fire resisting construction (see Section 5.2), and access to them should be from outside the building. Fuel supplies to oil burners should be fitted with fusible link operated shut-off valves. Boilers in basements may need to be protected also by a foam inlet valve. Appliances should be serviced at regular intervals. Where open fire-places are present, spark-guards, preferably with retaining hooks, should be provided, and flues should be cleaned regularly.

#### **6.5 Ventilation Systems**

Where provided, ventilation systems and air-conditioning systems should comply with an appropriate standard such as BS 5720 : 1979 : Code of practice for mechanical ventilation and air-conditioning in buildings.

## Chapter 7 - FURNISHINGS AND FITTINGS

### 7.1 General

The flammability and properties as a fuel of the contents of hotels/ guesthouses are important in determining the ease with which fire can start, and also its rate of development. The type and quantity of product which results from combustion of furnishings and fittings have a great bearing on the safety of the occupants of a building. Generally, furnishings and fittings are made of materials which are combustible, and only a degree of safety can be attained by utilizing components based on resistance to ignition characteristics, and low or non-toxic combustion properties. Five areas are covered in this chapter:-

- (i) seating
- (ii) vertical hangings
- (iii) floor coverings
- (iv) bedding
- (v) miscellaneous

**NOTE: Attention is drawn to the requirements contained in IS 244:1980, IS 418:1988 and IS 419:1988 and SI 366 of 1988, Institute for Industrial Research and Standards (now Eolas) (Fire Safety Domestic Furniture) Order, 1988**

### 7.2 Seating

This section details the requirements for all types of seating, both upholstered and non-upholstered. Seating can be ignited by a lighted cigarette or lighted match dropped onto or left on the seating. It can also be ignited by ignition of combustible materials on, underneath or adjacent to the seating. As a general functional requirement all seating should be constructed from materials which cannot easily be ignited by a lighted cigarette or a small flaming source.

#### **Recommendations**

- 7.2.1** Foam filling materials used in seating and cushions should comply with I.S. 419 :1988:Fire safety requirements for components of furniture - Clause 2. Non-foam and composite filling materials should comply with Clause 3.1 of the same standard.
- 7.2.2** Upholstery in seating should, when tested in accordance with I.S. 254 : 1983 : Flame resistance requirements for upholstery - pass the smouldering cigarette test and Ignition Source Grade No. 5 test. In high life-risk areas it should pass the Ignition Source Grade No 7 test.
- 7.2.3** Rigid plastic seating should, when tested in accordance with I.S. 254: 1983, and modified as in Appendix C, pass the smouldering cigarette test and Ignition Source Grade No. 5 test (or should pass the Ignition Source Grade No. 7 test in high life risk areas.) . If upholstered the seating should also comply with 7.2.1 and 7.2.2.above.
- 7.2.4** Permanent covers which form part of the upholstery of an item of seating should comply with Clause 4 of I.S. 419: 1988
- 7.2.5** A Test Certificate as in Appendix D should be provided by the supplier/installer of items of new furniture for the owner/occupier, and kept for inspection on the premises
- 7.2.6** The covering materials of upholstered seating should be maintained free of cuts and tears and filling materials should not be exposed.

### 7.3 Vertical Hangings

This section details the flammability requirements for vertical hangings such as curtains, drapes and blinds of all types. Vertical hangings can be ignited by flaming ignition sources and can transmit flame from the floor to the ceiling above. They may also act as a multiple ignition source for other combustible room contents by lateral flame spread and/or by production of flaming droplets. As a general functional requirement, vertical hangings should be constructed from materials which do not easily ignite, or which, if ignited, transmit flame for a short distance only. Existing materials may be upgraded by suitable processes

to achieve the desired standards. Appropriate processes which do not damage inherent or upgraded flammability properties should be used for cleaning or laundering vertical hangings.

#### **Recommendations**

- 7.3.1** Curtains and lining fabrics (where applicable) used in high-life risk areas should comply with the requirements for Type C of BS 5867 : Part 2 : 1980 : Flammability requirements - and for other areas with the requirements for Type B of that standard when subjected prior to the test to an appropriate washing procedure specified in BS 5651: 1978
- 7.3.2** Materials used in the production of blinds should comply with the designation of " flameproof " in BS 3120 : 1959 : Specification for performance requirements of flameproof materials for clothing and other purposes - when subjected prior to the test to an appropriate washing procedure in accordance with BS 5651: 1978.
- 7.3.3** A Test Certificate as in Appendix E should be completed for each specified new treated or upgraded item. A copy of this Certificate should be provided to the owner/occupier of the premises by the supplier of the curtains, drapes etc. and kept for inspection at the premises.
- 7.3.4** Where there are a number of identical items of this same type one test certificate will suffice for all items of that type.

### **7.4 Floor Coverings**

This section details flammability requirements for floor coverings. Floor coverings may be ignited by flaming and/or smouldering ignition sources i.e. matches, cigarettes or other combustible materials and may assist fire spread to furniture and fittings. As a general functional requirement, floor coverings should not ignite easily and, if ignition does occur, the burning should not spread.

#### **Recommendations**

- 7.4.1** Textile floor coverings (e.g. carpets) should be tested according to the method specified in BS 4790 : 1972 : Method for the determination of the effects of a small source of ignition on textile floor coverings - and assessed according to BS 5287 : 1976 : Assessment and labelling of textile floor coverings tested to BS 4790. The use of textile floor covering with a 'low radius of effects of ignition' is recommended. Carpets are not recommended for use in a vertical plane to a height exceeding 100 mm from the floor, and should not be used as wall linings.
- 7.4.2** A Test Certificate as in Appendix F should be completed for each new item. A copy of this Certificate should be provided to the owner/occupier of the premises by the supplier of the floor covering and kept for inspection at the premises.

### **7.5 Bedding**

Beds may be ignited by flaming and/or smouldering ignition sources such as matches, cigarettes, radiant heaters or by electric blankets on the bed. As a general functional requirement bedding materials should not easily ignite and, if ignition does occur, fire should not spread.

### **7.6 Miscellaneous**

- (a) Waste receptacles can pose a hazard through combustible materials in them being ignited accidentally. They should be constructed from materials which do not burn. In public areas, combined waste-paper with separate ashtray top receptacles should be used.
- (b) Ashtrays can make a significant contribution to reducing the number of accidental fires caused by smokers materials. The following are illustrations of ashtray design which reduce the possibility of fire being caused by this source.



Figure 7.1(a)



Figure 7.1(b)

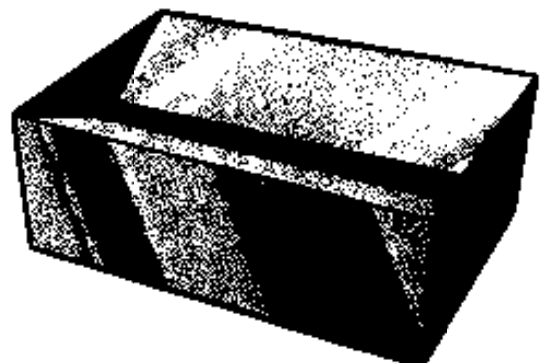


Figure 7.1(c)

## CHAPTER 8 - FIRE DETECTION AND ALARM SYSTEMS

### 8.1 General

This chapter deals with automatic fire detection and alarm systems and their role in protecting life in hotels/guesthouses. The main functions of fire detection and alarm systems are -

- (i) to detect an abnormal condition, which indicates a fire, by either manual and/or automatic means.
- (ii) to warn occupants and staff in all parts of the building of the existence of a fire.
- (iii) to activate various emergency devices.
- (iv) to alert an appropriate person who will call the fire brigade.

Installation of Fire detection and alarm systems in hotels/guesthouses protect life safety by reducing the period of fire development before occupants become aware of its existence, thus allowing early and safe evacuation. Such a system can also have property protection benefits.

The installation of a fire detection and alarm system should not be regarded as giving complete protection against fire, and should be used in conjunction with other measures recommended in this guide. The installation of a fire detection and alarm system should be part of an integrated fire safety strategy, in which the human response is as critical to safety, as correct design, installation, hardware and maintenance of the system.

Fire detection and alarm systems are a developing and complex field of fire safety engineering, and work connected with them in hotels/guesthouses should only be undertaken by competent persons.

The following sections are intended as a general guide to the installation of fire detection and alarm systems in hotels/guesthouses. Proprietors and technical advisers should consult BS 5839: Part 1: 1988 : Fire detection and alarm systems in buildings - for full information on the design, installation and maintenance of fire alarm systems.

### 8.2 Requirements for Installation of Fire Detection and Alarm Systems

Hotels/guesthouses should be provided with a fire detection and alarm system, unless the premises is fully covered by an automatic sprinkler system, as discussed in Chapter 9. New installations of automatic fire detection and alarm systems should be in accordance with Type L2 specified in BS 5839 : Part 1 (1988). Existing installations should be assessed for adequacy, and if serious deficiency exists should be upgraded. Adequate existing systems may continue in use, provided they were installed and commissioned as required by BS 5839 : 1980 and are maintained to this standard.

While the installation of automatic fire detection and alarm systems is generally recommended, full automatic systems are not considered essential in the following categories of persons.

- (a) In single-storey premises with not more than six bedrooms domestic detectors, manufactured to I.S. 409: 1988 "Self Contained Smoke Detectors for Private Dwellings" or BS 5446 : Part 1 : 1977 : Point type smoke detectors may be adequate.
- (b) In single-storey premises with more than six bedrooms, a manual electric system with a single zone panel, (Type M) as per Appendix G of BS 5839 : Part 1 (1988), in conjunction with point type smoke detectors may be adequate .
- (c) In two-storey premises with not more than than six bedrooms, the provision of self-contained smoke detectors/alarms to BS 5446: Part 1: 1977, powered by mains supply and with battery back-up, and interconnected so that an alarm condition in one will activate all the units, may be adequate.

### **8.3 Fire Procedures**

The presence of an automatic fire alarm and detection system will not in itself extinguish a fire, or enhance the life safety of the occupants or staff, unless people respond in a rational and pre-determined manner. Fire drills involving response to fire alarms should be carried out at regular intervals as recommended in Chapter 11.

"FIRE INSTRUCTION NOTICES" should be displayed at the following locations to ensure that staff and guests are fully aware the procedure to follow in the event of an alarm :

- (a) adjacent to each manual call point,
- (b) at telephone switchboards,
- (c) on the doors of all bedrooms, and in other information leaflets for guests.

### **8.4 Installation, Commissioning and Certification**

The design and installation of new automatic fire detection and alarm systems should comply with BS 5839 : 1988 : Part 1 - Section 3, and should be carried out by competent persons. A commissioning and installation certificate as detailed in Appendix B of BS 5839 : Part 1 : 1988 should be retained with the Fire Safety Register on the premises.

### **8.5 Maintenance**

After the installation of an automatic fire detection and alarm system, it is vital that the system should operate when required to do so. Automatic fire detection and alarm systems should be regularly and correctly tested, maintained and serviced. See the Section on 'User's Responsibility' in BS 5839 : Part 1 : 1988.

## CHAPTER 9 - FIRE SUPPRESSION

### 9.1 General

The suppression and/or extinction of a fire which has occurred will generally be achieved by one of three methods :

- (i) automatic fire suppression installations,
- (ii) first-aid fire fighting by properly trained staff using correct equipment,
- (iii) the fire brigade.

### 9.2 Automatic Fire Suppression

Automatic fire suppression systems are utilised to attack an outbreak of fire at an early stage and to suppress or control it. They can provide total coverage of a building as with sprinkler systems, or be used to protect particular hazards such as boilers or deep-fat fryers in kitchens.

#### 9.2.1 Sprinkler systems

Sprinkler systems are designed to provide an automatic means of detecting and extinguishing/ controlling a fire by the application of water in its early stages, through the installation of overhead pipes on to which sprinkler heads are fitted at intervals.

Each sprinkler head is in effect a heat-operated valve designed to open at a predetermined temperature and to discharge water under pressure from the installation. The water emerging from the head is directed into a specific pattern by a deflector incorporated in the head, and the flow of water also causes an alarm to sound. Sprinkler heads function effectively as fire detectors as well as fire controllers, a feature which has been aided by the development of 'fast response' sprinkler heads.

Traditionally sprinklers have been used in a property protection role, but in recent years their value in life protection has been recognised. In the USA especially, the significance of sprinklers in containing fires in a pre-flashover state has resulted in the installation of sprinklers being made mandatory in some situations. Following a series of major hotel fires resulting in multiple-fatalities, there has been a growing lobby for the adoption of sprinkler systems as a standard life protection measure in US hotels.

In existing hotel/guesthouse buildings, which are deficient in some areas of fire safety and where upgrading is required, sprinklers may offer a practical means by which the level of fire safety can be improved.

One of the following standards should be used for the design, installation and maintenance of sprinkler systems, where they are to be used in hotels/guesthouses.

- (i) Rules of the Fire Offices Committee (FOC) for Automatic Sprinkler Installations - 29th Edition.
- (ii) National Fire Protection Association (NFPA) Code No 13, 1987: Installation of Sprinkler Systems.
- (iii) BS 5306 : Part 2 : 1979 Sprinkler systems
- (iv) Factory Mutual (FM) Loss Prevention Data Sheet 2 - 8N, 1982 Installation of Sprinkler Systems.

When installed, a system should be maintained ready for automatic and efficient operation. This is critical where a life-protection role is intended, and attention is drawn to the additional recommendations in Appendix B of BS 5306 : Part 2 :1979 in this regard.

#### 9.2.2 Non-Aqueous Fire Extinguishing Systems

In situations where use of water as an extinguishing medium would be inappropriate, there are alternative systems available, which generally involve use of halogenated hydrocarbons or carbon dioxide. The selection of a system

### 9.3 First-Aid Fire Fighting

should be made in accordance with BS 5306 : Fire extinguishing installations and equipment on premises : Part 0 : Guide for the selection of installed systems and other fire equipment.

Where selected, carbon dioxide systems should be installed to the requirements of BS 5306 : Part 4 : Specification for carbon dioxide systems. The gas should comply with BS 6535 : Fire extinguishing media : Part 1 : Specification for carbon dioxide.

Halogenated hydrocarbons should be installed to BS 5306: Part 5 : Halon systems : Section 5.1 : Halon 1301 total flooding systems or Section 5.2 Halon 1211 total flooding systems. The gas should comply with BS 6535 : Part 2 : Specification for halogenated hydrocarbons.

Strategic positioning of extinguishing equipment throughout an hotel/guesthouse enhances the fire protection of the building, by enabling an attack to be made on a developing fire in its early stages. Extinguishing equipment does not itself offer protection, and indeed it may be a safety hazard, unless personnel are trained in its proper, safe, and effective use. ( See Table 9.1 and Staff Training in Chapter 11). First-aid fire fighting equipment in hotels/guesthouses is generally provided using one or a combination of :

- (i) hand held portable fire extinguishers.
- (ii) hose reels.

#### 9.3.1 *Hand-held portable extinguishers*

Portable fire extinguishers can be divided into five categories according to the extinguishing agent they contain, their method of operation and the class of fires they safely extinguish, as specified in Table 9.1. There are four classes of fires :

- (i) Class A - Fires involving ordinary combustible materials such as wood, cloth and paper.
- (ii) Class B - Fires involving flammable liquids (petrol, paraffin, paints), or liquefiable solids (oils, greases and fats).
- (iii) Class C - Fires involving gases. (Gaseous fires should only be extinguished by closing or plugging the leak. Extinguishing a gas fire before the supply is cut off could cause a gas explosion).
- (iv) Class D - Fires involving burning metals.

Aerosol operated disposable extinguishers, or types such as soda acid or chemical foams or extinguishers operated by inversion are considered unsuitable for use in hotels/guesthouses.

New hand-held portable fire extinguishers which are provided in hotels/guesthouses should be manufactured in accordance with the requirements of either I.S. 290 : 1986: Portable Fire Extinguishers or BS 5423 : 1987: Specification for portable fire extinguishers. They should be installed to take account of the information summarised in Table 9.1 , and in accordance with the recommendations of BS 5306 : Part 3 : 1985 Code of practice for the selection, installation and maintenance of portable fire extinguishers, and should comply with the following general requirements:

- (i) Extinguishers should generally be located in conspicuous positions on brackets, stands or purpose built housings at designated 'FIRE POINTS' where they can be readily seen by persons travelling along an escape route. Consistent positioning of 'Fire Points' on each floor is desirable. If their location is concealed from direct view, it should be indicated by a suitable sign.
- (ii) The most suitable locations for siting extinguishers are near to room exits, corridors, stairways, lobbies and landings. Extinguishers should not be positioned away from exits unless they are necessary to cover a particular hazard.

- (iii) Extinguishers should be readily accessible and available for immediate use at all times, and should be so sited that it is not necessary to travel more than 30 m from the fire location to reach an extinguisher.
- (iv) Extinguishers provided to deal with special risks should be sited near the risk concerned, but not so close as to be inaccessible in case of fire. If the special risk is contained in a confined space or small room, it is generally advisable to place the extinguisher outside that space or room.
- (v) Extinguishers should be mounted so that the carrying handle of large, heavy extinguishers is about 1m from the floor, and smaller extinguishers should be mounted so that the handle is about 1.5 m from the floor.
- (vi) The operation of extinguishers is affected by temperature, and they should not be exposed to storage temperatures outside the operational range marked on the extinguisher. In particular, extinguishers should not be placed over or close to heat producing appliances.
- (vii) Extinguishers, unless specially treated by the manufacturer or specially housed for the purpose, should not be located where they would be exposed to unduly corrosive atmospheres, or to splashing by corrosive fluids.
- (viii) It is necessary that fire extinguishers are regularly inspected, maintained and recharged in accordance with the appropriate standards. Fire extinguishers that comply with I.S. 290 : 1986 should be inspected and maintained in accordance with I.S. 291 1986, and other extinguishers with BS 5306 : Part 3 : 1985.

**TABLE 9.1**

**Extinguisher to Use**

| TYPE                                           | COLOUR CODE | HOW IT PUTS OUT FIRES                                                                                                                                                             | CLASS OF FIRE                                                                                                                                | HOW TO USE                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Water                                          | Red         | Mainly by cooling the burning material                                                                                                                                            | Class 'A' <b>DANGER:</b> do not use on live electrical equipment or on burning oil                                                           | Direct jet at the base of the flames and keep it moving across the area of the fire. Seek out any hotspots after main fire is out.                                                                                                                                                                                                                                                |
| Foam                                           | Cream       | Forms a blanket of foam over the surface of the burning liquid and smothers the fire.                                                                                             | Class 'B' fires                                                                                                                              | Do not aim the jet directly into the liquid. Where the liquid on fire is in a container direct the jet at the edge of the container or on a nearby surface above the burning liquid. Allow foam to build up and flow across the liquid.                                                                                                                                           |
| AFFF (Aqueous film forming foam Multi purpose) | Cream       | Forms a fire extinguisher water film on the surface of the burning liquid. Has a cooling action with a wider extinguishing application than water on solid combustible materials. | Class 'A' and 'B' fires                                                                                                                      | For class 'A' fires use as directed for water extinguishers. For class 'B' fires use as directed by foam extinguishers.                                                                                                                                                                                                                                                           |
| Dry Powder                                     | Blue        | Knocks down flames                                                                                                                                                                | Class 'B' fires. Safe on live electrical equipment although does not readily penetrate spaces inside equipment, a fire may re-ignite.        | Direct discharge horn at the flames and with a rapid sweeping motion drive the flame towards the far edge until the flames are out. If the extinguisher has a shut-off control wait until the air clears and if the flames are visible attack the fire again. <b>WARNING:</b> this type of extinguishing medium does not cool the fire very well and the fire may start up again. |
| Dry Powder (Multi Purpose)                     | Blue        | Knocks down flames and on burning solids, melts down to form a skin smothering the fire. Has some cooling effect.                                                                 | Class 'A' and 'B' fires. Safe on live electrical equipment although does not readily penetrate spaces inside equipment a fire may re-ignite. | Ditto                                                                                                                                                                                                                                                                                                                                                                             |
| CO <sub>2</sub> Carbon Dioxide                 | Black       | Vaporising gas which smothers flames by displacement of oxygen in the air.                                                                                                        | Class 'B' fires. Safe and clean to use on live electrical equipment.                                                                         | <b>WARNING:</b> These types of extinguishers do not cool the fire very well and the fire may start up again. <b>DANGER:</b> fumes from CO <sub>2</sub> and Halon 1211 (BCF) extinguishers can be harmful to users in confined spaces or if used on hot metal. Ventilate the area as soon as the fire has been controlled.                                                         |
| Halon 1211 (BCF)                               | Green       | Vaporising liquid gas giving rapid knock down by chemically inhibiting combustion.                                                                                                | Class 'B' fires. Clean and light can also be used on small surface burning class 'A' fires. Effective and safe on live electrical equipment. | Ditto                                                                                                                                                                                                                                                                                                                                                                             |
| Hose Reel                                      | –           | Mainly by cooling the burning material.                                                                                                                                           | Class 'A' fires. <b>DANGER:</b> do not use on live electrical equipment.                                                                     | Direct jet at the base of the flames and keep it moving across the area of the fire.                                                                                                                                                                                                                                                                                              |
| Fire Blanket                                   | –           | Smothering.                                                                                                                                                                       | Class 'A' and 'B' fires. Good for small fires in clothing and small spillages of liquid fires.                                               | Place carefully over fire. Keep hands shielded from the fire. Do not waft the fire towards you.                                                                                                                                                                                                                                                                                   |

European Standards recommend that the bodies of the water extinguishers should be coloured signal red. Other extinguishers should be predominately red with a second colour to indicate the extinguishing medium covering an area sufficient to be readily apparent.

### **9.3..2 Hose-reels**

Hydraulic hose reels for first-aid fire-fighting should be considered as an alternative to fire extinguishers in larger premises. The advantages of hose-reels are :

- (i) they provide a continuous flow of water, and they are more effective as well as safer for fire-fighting.
- (ii) maintenance costs of hose-reels may be lower than for individual extinguishers, especially if large numbers of extinguishers are used.

Their disadvantages are:

- (i) the initial installation costs may be high;
- (ii) a reliable and adequate water supply is necessary; and
- (iii) areas where the use of water as an extinguishing medium is not suitable still require fire extinguishers of an appropriate type.

Where installed, hose reels should comply with the requirements of BS 5274 : 1976 Specification for fire hose reels for fixed installations - and be installed to BS 5306 : Part I : 1983 Hydrant systems, hose reels and foam inlets.

In general, one hose reel should be provided to cover every 800 m<sup>2</sup> of floor space or part thereof. Hose reels should be sited in prominent and accessible positions at 'FIRE POINTS' on each floor level adjacent to exits on escape routes, in such a way that the nozzle of the hose can be taken into every room and within 6 m of each part of a room.

Hose reels should not form obstructions on escape routes and should be installed in recessed cabinets if necessary. Doors provided for hose reel cabinets should open approximately 180 degrees, so as not to obstruct the hose being run out in either direction. These doors should not normally be fitted with locks. Where hose reels are located in recessed cabinets to which doors are fitted, the doors (whether glazed or otherwise) should bear the appropriate sign in accordance with the requirements of BS 5499 : Part 1 : 1984 Specification for fire safety signs - with a minimum letter height of 50 mm.

As a minimum, the water supply for hose reels should be such that when the two topmost reels in a building are in use simultaneously, each will provide a jet of approximately 6 m in length and will deliver not less than 0.4 litre/sec or 24 litres/min.

Where the water pressure in hose reel mains needs to be boosted, an electrically driven pump usually provides a convenient method. A duplicate standby pump should also be provided. Both motors and pumps should be sited in fire protected positions and electrical supply should be by exclusive circuit, with the cables following a route of negligible fire risk, or provided with adequate protection. The booster pumps system should come into operation automatically on a drop in pressure or a flow of water. Both pumps should be automatically primed at all times. Pumps should also be capable of being started or stopped manually. The standby pump should be so arranged to operate automatically on a failure for any reason of the duty pump. An audible and visual alarm should be provided at a suitable position to indicate that the equipment and the pumping plant have been operated.

Where water authorities do not permit booster pumps to be connected directly into supply mains, the installation should be fed from a suction tank, or inter-connected tanks, having a minimum capacity of 1125 litres. Tanks supplying water for domestic purposes should not be used as suction tanks for hose reel installation, unless arrangements have been made for these domestic supplies to be drawn off in such a manner that the requisite reserve of water for the hose reel installation is always preserved

For hose reels which do not have automatic valve action, a notice should be provided indicating the need to turn on the inlet valve before running out the hose. This notice should be affixed to the wall in a prominent position adjacent to the reel. Such notices should be set out in graphically illustrative form or in letters easily read in adverse conditions.

#### **9.4 Facilities for the Fire Brigade**

Hose Reels should be subjected to regular maintenance in accordance with Section 9, paragraph 39 of BS 5306: Part 1: 1976.

Suitable facilities should be provided to enable effective and successful fire fighting operations to be carried out by the fire brigade. Access roads and hard standing are necessary on the outside of buildings for fire brigade appliances, and in large, high and complex buildings special facilities such as fire lifts and wet or dry riser mains are needed inside the buildings. Such facilities not only ensure that firemen can reach a fire with their equipment without delay, but that adequate water supplies are readily available when they arrive. The areas listed below should be considered, and facilities should be provided or upgraded to take account of the fire hazard and level of fire precautions in the building, and the potential for intervention by the fire brigade.

- (i) Access for fire appliances,
- (ii) Rising mains,
- (iii) Hydrants,
- (iv) Fire lifts,
- (v) Boiler rooms and fuel stores,
- (vi) High voltage discharge lighting,
- (vii) Water supply

Facilities provided in accordance with the recommendations contained in Part 2 of the Proposed Building Regulations, 1983 may be deemed adequate.

## CHAPTER 10 - EMERGENCY LIGHTING AND SIGNPOSTING

### 10.1 General

Emergency lighting and signposting of escape routes are required to ensure that these facilities can be safely and quickly used by guests who must evacuate an hotel/guesthouse in an emergency. Emergency lighting and signposting should be provided :

- (i) in all stairways, corridors and other parts of escape routes including external elements;
- (ii) in all areas of public assembly, e.g restaurants, dining rooms, function halls, bars and lounges.

Emergency lighting should be sufficient in intensity and duration to provide illumination to facilitate evacuation of the building in an emergency should all or some critical subcircuits of the normal lighting fail. Emergency lighting is normally supplied from one of three sources :

- (a) self-contained luminaires,
- (b) central battery systems, or
- (c) central generator systems

Reliable hand lamps should be issued to responsible staff members in all premises who should keep them in good condition and ready for use in evacuations and emergencies.

### 10.2 Design, Installation and Commissioning

A reliable emergency lighting system is a basic requirement to facilitate safe and speedy use of escape routes in the event of an emergency during periods of darkness. The reliability of the system is dependent on it being designed, installed, commissioned and maintained in accordance with recommended standards. All new emergency lighting systems should comply with I.S. 3217 : 1989 : Code of Practice for Emergency Lighting. Existing systems should be appraised against this standard for adequacy, irrespective of standard in use at the time of their installation. Defective or inadequate installations should be repaired/ upgraded to the new standard.

#### **10.2.1 Design of Emergency Lighting Installations**

The following are recommended as general design guidelines for emergency lighting in hotels/guesthouses, but Section 10 of I.S. 3217 : 1989 or BS 5266: Part 1 : 1988 : should be consulted for more detailed information on design procedures:

- (i) the response time of the emergency lighting system should not exceed five seconds from failure of the normal lighting;
- (ii) the horizontal illuminance at a level 1.2 m above the floor on the centre line of a clearly defined escape route should not be less than 0.5 lux although higher levels may be required on complex routes, or in particular circumstances;
- (iii) in large open areas where exit routes are not clearly defined the horizontal illuminance should not be less than 1.0 lux;
- (iv) light coloured walls and ceilings can contribute significantly (up to 60%) to the level of emergency lighting at floor level;
- (v) uniformity of levels of emergency lighting is desirable and variation should not exceed 2% from the recommended level at any point;
- (vi) care should be taken to minimise glare or dazzling of people moving along an escape route, mainly due to use of too few units of too high intensity;

- (vii) mirrors or other highly reflective surfaces should not be positioned so as to cause confusion on escape routes in the event of an emergency.

**10.2.2** Emergency lighting luminaires should generally be positioned as follows:

- (i) to illuminate escape routes and final exits from premises clearly. EXIT signs should be illuminated, and should contribute to the overall level of illuminance;
- (ii) to ensure exterior areas of final exits are lit to at least the same level as the area immediately inside the exit, to enable people to move away from the exit to places of safety; public lighting on thoroughfares may help to fulfill this need;
- (iii) near each intersection of corridors;
- (iv) near each change of direction;
- (v) near each stairway so that each flight receives direct light;
- (vi) near any other change of floor level which may constitute a hazard.
- (vii) to illuminate fire alarm call points, fire safety instructions and fire fighting equipment;
- (viii) in plant, switch and control rooms;
- (ix) within passenger lift cars;
- (x) in public toilet areas;
- (xi) as required so as to ensure that the lighting of the escape route complies with the recommendations for the minimum illuminance of 0.5 lux, and to ensure a uniformity ratio of 40 : 1 along the central line of the escape route is not exceeded.

### **10.2.3 Commissioning**

On completion of a new installation, the entire system should be tested thoroughly and, on resolution of any problems that may arise at this stage, a completion certificate in accordance with Appendix C of I.S. 3217 : 1989 should be given by the installer to the owner or occupier of the premises, together with records of the entire installation and written instructions on the operation, testing and maintenance of the system.

## **10.3 Routine Testing and Maintenance**

Emergency lighting systems should be tested on a regular basis in accordance with I.S. 3217 or BS 5266 to ensure continued proper functioning. Circuits should be fitted with test facilities, and be properly identified and labelled. The test information should be recorded along with details of routine checks, defects and alterations in the Fire Safety Register.

## **10.4 Sign-posting of Escape Routes**

**10.4.1** Clear, legible signs are required to ensure that guests who are not familiar with a building can follow escape routes from any point within an hotel/gueshouse to a place of safety. All signs should be uniform in colour and format and comply with I.S. 413 : 1989 : Safety Colours and Safety Signs (see Fig 10.1). An EXIT sign should be placed over each door which forms part of an escape route in addition to directional signs where direct sight of the exit door does not exist. Where possible, all signs should be at right angles to the direction of escape. These signs should be illuminated during the hours of darkness by either the normal or emergency lighting.

Emergency exit  
to the left

- (a) Person proceeding  
towards open door,  
with directional  
arrow.



OR

- (b) Open door, with  
directional arrow



**NOTE: The mirror images of these signs should be used to denote Emergency Exit to the right.**

**Figure 10.1**

#### **10.4.2 Alternative 'EXIT' or 'EMERGENCY EXIT' signs**

Signs which are different from those indicated above may have been used to indicate exit and escape routes in some premises heretofore, and where such signs conform with following specifications they are considered satisfactory :

**(i) Signs placed above exit**

The style, size and spacing of the lettering of the word EXIT in exit and emergency exit should be in accordance with the requirements of Appendix B of I.S. 413: 1989.

**(ii) Signs indicating exit to left or to right.**

The style, size and spacing of the lettering of the words EXIT or EMERGENCY EXIT as appropriate should comply with the requirements specified above. In conjunction with the wording a directional arrow should be used, conforming to the design of arrow shown in Figure 10.2 or in Figures 10.1 (a) or (b). However, the colour of the arrow should be green with the background in white, in order to match the colour scheme of the lettering and background. The arrow should be of a size such that the direction which it is intended to indicate is immediately apparent when it is seen from the maximum viewing distance for which the accompanying exit or emergency exit sign has been designed. The distance between the sign and the nearest part of the arrow should be not greater than 150 mm, and should preferably lie between 25 mm and 50 mm.

**ARROW**

**General indication of direction to .....  
(may be used in conjunction with other signs, e.g.  
10.3.1)**



**Figure 10.2**

## CHAPTER 11 - MANAGEMENT OF FIRE SAFETY

### 11.1 General

As outlined in Section 1.1, persons in control, ie owners/managers of hotels/guesthouses have a legal responsibility to take reasonable measures to prevent the occurrence of fires and to protect the lives and safety of guests/patrons and staff in the event of fire occurring in their premises. The fire precautions contained in the earlier chapters can be completely negated if management and staff are unaware of the significance of the precautions, of their own role with regard to fire prevention, and of the appropriate action to take in the event of fire. The aim of this chapter is to provide standardised procedures for the development and implementation of a 'Fire Safety Programme'. This should be an integral part of the day-to-day management and operation of an hotel/guesthouse. A fire safety programme incorporating arrangements for the following should be prepared for each individual premises :

- (i) prevention of outbreaks of fire, through the establishment of day-to-day fire prevention practices,
- (ii) instruction, training and exercising of management and staff on all matters relating to fire safety,
- (iii) emergency procedures and fire and evacuation drills,
- (iv) provision of fire safety instructions to the public/guests,
- (v) maintenance of fire protection equipment,
- (vi) maintenance of the building and its fittings and services,
- (vii) maintenance of escape routes,
- (viii) liason with the fire authority and assisting the fire brigade, and
- (ix) keeping of fire safety records.

A fire safety programme will be effective only if it is implemented in total, and is monitored on a day-to-day basis. For this reason it is important that responsible person is designated as a "Fire Safety Manager" for drawing up, implementing and overseeing the fire safety programme. The Fire Safety Manager should be of adequate status within the organisation, and have authority to effectively discharge his/her responsibility. It may be necessary in some situations relating to larger premises to establish an 'executive fire safety group' to co- ordinate the work of different parties who have an input to fire safety.

At its simplest, the fire safety programme will consist of a brief statement outlining the persons responsible for fire safety and arrangements made to execute the requirements of sections (i) to (ix) above. A fire safety programme may need to be extended to incorporate fire safety requirements from other parts of this guide. Most of the areas covered in this chapter are matters of good house-keeping. They can generally be implemented without significant cost implication and will result in immediate improvement in fire safety standards in a premises.

### 11.2 Fire Prevention

Day-to-day fire prevention measures are a key element in the fire safety management of hotels/guesthouses. This work involves the identification and elimination of potential fire hazards both inside and outside the building, and the establishment of good house-keeping practices, periodic inspections and the diligent application of safety rules. The following fire prevention measures are recommended for adoption in the day-to-day running of premises.

#### **11.2 (i) Rubbish and Waste**

Combustible rubbish and waste materials such as waste-paper, wrappings etc are frequently the fuel involved in starting fires, and proper arrangements should be made for collection and removal of waste at regular intervals. Pending removal, rubbish and waste should be stored in suitable containers at a

designated location, away from sources of ignition. Staff should be made aware of the importance of keeping all areas of the premises clean and tidy. In particular, rubbish and waste must not be stored or permitted to accumulate in stairways or escape routes.

#### **11.2 (ii) Smoking**

Smoking and careless disposal of smokers' materials is one of the more common causes of accidental fires. A study of hotel fires indicates that 40% of hotel bedroom fires over a two year period were caused by smokers' materials. Where practicable, smoking should be restricted to approved areas, and large "No Smoking" signs should be displayed in areas where smoking is forbidden. Smoking should be prohibited in stores, plant rooms and other areas not normally occupied. In areas where smoking is permitted a plentiful supply of suitable ashtrays should be provided. Ashtrays with an inner and outer rim separated by a bowl enables a cigarette to rest on the inner rim and to continue burning with less danger of it falling onto the surrounding surface. If the cigarette is left or forgotten the remaining portion will fall into the outer bowl. Ashtray designs with safety features are illustrated in Section 8.6 of this guide. Ashtrays should be emptied frequently into metal bins, with smouldering material being first extinguished. The introduction of "No Smoking" guest bedrooms is beneficial to fire safety, and should be encouraged where practicable.

#### **11.2 (iii) Electrical Installations and Appliances**

Inspection and testing of the electrical installation and appliances in hotels/guesthouses is dealt with in Section 6.2 of this guide. Staff should be trained to use electrical equipment correctly and safely, and to report defective electrical equipment to the Fire Safety Manager. Defective items should not be used until repairs have been carried out by a competent person. Circuits should be switched off when not in use. Where appropriate, guests should be advised as to the correct use of electrical appliances provided in their bedrooms and to unplug electrical appliances at night.

#### **11.2 (iv) Kitchens**

Kitchen fires present particular problems in catering establishments. Cookers, extract fans, fume extraction hoods, filter ducts and machinery need to be regularly cleaned of oil, grease and dust. Equipment should be serviced regularly. Gas, oil and electrical cut off switches and valves should be provided in clearly marked and accessible areas away from the equipment which they serve. Kitchen staff should be instructed on how to prevent fires occurring in oil and fats by :

- taking care not to over heat,
- not leaving cooking operations unattended,
- changing oil as recommended,
- not over filling cooking pans, and
- not leaving combustible materials (e.g. towels, napkins etc) over stoves.

Staff should also be familiar with the location and correct use of available first-aid fire fighting equipment in kitchens.

#### **11.2 (v) Laundries**

Many larger hotels have their own laundry facilities, and these also pose particular fire hazards. There are three major sources of fires associated with laundries:

- (a) spontaneous combustion of compacted linen which has been tumble dried. This problem can be prevented in a number of ways. Ideally tumble driers should have automatic cooling at the end of the drying cycle, and this is especially important where laundry work is programmed to avail of night-

- rate electricity charges. Linen should not be overdried and tumble driers should be unloaded immediately after use and left empty. Operators should separate and fold tumble dried material as soon as practical, but in any case it should be loosened to dissipate heat on being taken from the machine.
- (b) solvents which are highly flammable are sometimes used for spot cleaning in laundries. Only small quantities needed for immediate use should be kept in the laundry. The main bulk of this type of liquid and general cleaning solvents should be stored in the open air or in specially designed stores. Containers for solvents should be kept closed to prevent the vapours leaking. Smoking should be prohibited in laundries and signs to this effect should be displayed.
  - (c) fluff or lint which is extremely flammable can accumulate in laundries. A programme should be instituted to remove build-up of such materials, especially from hot areas such as electric motors, and other hidden locations.

### **11.2 (vi) Renovation and Maintenance Work**

The nature of any proposed work by builders, decorators and maintenance staff in or around a premises should be considered by the Fire Safety Manager, and should be supervised by a competent person to ensure that safe systems of work are followed. Corridors, doorways and escape routes should not be blocked. If work involves the use of hot-processes, consideration should be given to the need for a permit system to ensure that proper safety precautions are implemented. Access by members of the public to areas of work should be restricted. Where work involves removing or switching off fire protection facilities, alternative arrangements to maintain the level of safety should be made. Hazardous equipment and materials should be removed from the building at the end of each working day, and a final check should be made to ensure that no fire danger exists after work finishes.

### **11.2 (vii) Hazardous Substances**

Flammable liquids, and other potentially hazardous substances which are needed in kitchens, laundries, garages and stores should be limited to quantities required for immediate use, handled with extreme care and stored in suitably labelled containers in designated storage areas away from sources of ignition.

### **11.2 (viii) Fire Resisting Doorsets**

Fire resisting doorsets are a critical part of the fire defence system in hotels/guesthouses. Staff should be made aware of the vital role which such doors play, and of the importance of not propping or wedging them open. In situations where it is necessary for operational reasons to hold open such doors, this should be done with electro-magnetic devices linked to an automatic alarm system, as discussed in Section 5.5. Appropriate "Fire Door-Keep Shut" signs should be displayed on each fire resisting doorset.

### **11.2 (ix) Arson**

Basic steps should be taken to limit the opportunity presented to potential arsonists. Security arrangements are required to prevent access to premises by vandals, and by intruders in search of valuables. Use of closed circuit television to monitor entrances or circulation spaces is beneficial to fire safety as well as security. Other fire precautions such as removal of rubbish will deprive the potential arsonist of ready fuel and care should be taken that flammable substances are kept safely locked away.

### **11.2(x) Electric Blankets**

These are a common source of ignition in fires involving bedding. Where used they should comply with the following requirements :

- (i) operate through an extra low-voltage transformer and a three-amp fuse
- (ii) be manufactured to BS 3456 : Section A4 : 1971 : Electrically heated blankets.

- (iii) be tested by a competent person every twelve months
- (iv) to avoid damage to the heating element when in use should not be folded or placed under insulators such as pillows because of danger of overheating.
- (v) when not in use, they should either be rolled loosely, or stored flat, but not folded.
- (vi) be cleaned in accordance with manufacturers instructions.
- (vii) should be used in the intended mode of operation, as an under or over-blanket.

### **11.3 Management and Staff Training**

For a Fire Safety Programme to be effective, both management and staff should be familiar with the parts of the fire safety programme in which they have a role to play. Comprehensive instructions and training on the relevant areas should be given to persons involved.

#### **11.3 (i) Management Training**

The fire safety manager should be alert to possible fire dangers and of how to control them, and should attend available training courses on this subject. The fire safety manager should also ensure that instruction and training is given to management and all other members of staff, and should keep a record of the relevant training undertaken. In larger hotel groups, it may be convenient that group fire prevention officers undertake training work.

#### **11.3 (ii) Staff Training**

Staff should receive instruction and training in an hotel's fire precautions and should be given a written copy of individual duties and responsibilities. Staff to whom specific duties have been assigned should be given appropriate instruction and training in those duties. Staff should receive training and instruction in relation to the following :

- the fire prevention measures in Section 11.2 (i)
- the fire and evacuation procedures devised for the premises
- the layout of the building including escape routes
- the location of fire alarm call points and fire fighting equipment
- arrangements for evacuation of guests
- arrangements for assisting the fire brigade
- fire control techniques including:
  - (a) use of first aid fire fighting equipment,
  - (b) safe procedure for entering a room where a fire may exist to prevent "flashover",
  - (c) closing doors to inhibit fire growth and spread, and
  - (d) where appropriate, shutting off electricity and fuel supplies.

### **11.4 Emergency Procedures and Fire and Evacuation Drills**

If a fire or an emergency situation occurs on a premises it is imperative that management and staff are able to respond properly by calling the fire brigade, evacuating the premises and controlling the incident, if possible, until the arrival of fire brigade. Accordingly, a predetermined plan outlining the procedures to be adopted for such an event should be prepared and arrangements made for its implementation. The predetermined plan can be broken down into a number of sections:

- a procedure for raising the alarm
- a procedure for calling the fire brigade
- an evacuation procedure geared to the degree of mobility of guests (including the disabled)
- a procedure for fighting the fire using first-aid fire fighting equipment if it is safe for personnel to do so, and does not cause fire and smoke spread
- a procedure for reporting to a pre-determined assembly point and informing a designated person/s of the situation

- a procedure for accounting for each person on the premises (Hotel Register) and
- a procedure for assisting the fire brigade on their arrival.

To assess the effectiveness of a predetermined plan and preparatory training, drills which simulate fire and emergency situations should be carried out on a regular basis. These drills are known as fire and evacuation drills. They can generally be organised for times which cause minimum disruption to the operation of the premises, but care should be taken that all relevant staff are involved. The objectives of drills are:

- to familiarise staff with their roles,
- to test the availability and effectiveness of staff,
- to test arrangements for an emergency situation,
- to identify shortcomings.

Drills should simulate realistic, worst-case situations. Fire and evacuation drills should be planned and organised in the following manner :

- the emergency action appropriate to the premises in the event of fire should be established.
- fire and evacuation drills should be held prior to the commencement of the season or at least every six months, simulating conditions in which one or more of the escape routes is obstructed by smoke.
- all permanent and temporary staff should be involved in fire and evacuation drills, including those on shift work.
- fire and evacuation drills should be repeated and carried out at varying times and on different days of the week so that part-time and shift work staff are included in such training.
- proper arrangements should be made for observing the performance during the drill, and a review should be held afterwards. Deficiencies should be noted and arrangements made to remedy problems encountered.

## 11.5 Fire Safety Instructions

The effective operation of a fire and evacuation plan in a real fire situation depends on the extent and quality of instructions given to staff and guests.

### **11.5 (i) Instructions to staff**

To successfully deal with a fire incident, hotel staff should be familiar with the layout of the premises, capable of activating the alarm correctly, and using the available fire-fighting equipment. Individual instructions should be prepared for members of staff and issued to them. General fire precaution notices should be prepared and posted throughout staff areas.

Instructions issued to staff should cover the following specific areas, as well as more general fire prevention instructions :

- raise the alarm immediately on discovery of fire,
- call the fire brigade,
- evacuate the premises,
- report to an assembly point.

Special instructions are required for:

- switchboard staff or others who will receive calls notifying them of emergencies, and who must respond to fire alarms and also call the fire brigade.
- staff responsible for checking out alarms and evacuation of guests.
- those selected to meet the fire brigade on their arrival.
- persons responsible for taking a roll call at the assembly point.
- fire safety and security staff.
- fire fighting teams.

### **11.5 (ii) Instructions to guests**

Precise instructions on the action to be taken by guests in the event of a fire should be prominently posted in each bedroom in the premises. These instructions should be in other languages where appropriate, and use internationally accepted symbols. The instructions should be accompanied by a simple floor plan showing schematically the location of the room in relation to the escape routes, stairways and/or exits. Particular attention should be drawn to the fact that lifts should not be used in the event of fire, except for lifts reserved for the disabled and which are specially protected from fire. A sample of the type of schematic drawing required together with the fire safety instructions is given in Appendix B.

### **11.6 Inspection and Maintenance of Fire Protection Equipment**

The safety and protection of the public in the event of a fire will depend greatly on reliable functioning of fire protection equipment such as - fire detection and alarm systems, sprinkler systems, emergency lighting systems and fire extinguishing equipment. In existing buildings, a high degree of reliance is sometimes placed on such "active" fire precautions, and in consequence a very high level of responsibility rests with the management to ensure that such equipment is monitored and maintained to the highest standards. To ensure correct functioning, all such equipment should be inspected on a regular basis by a designated member of staff. Details of inspection procedures for fire protection equipment are given in the chapters of this guide dealing with that equipment. If faults/deficiencies are discovered they should be noted and corrective action taken as well as, if appropriate, steps to prevent a recurrence. In addition to regular in-house inspections specified in the Fire Safety Register, [see Section 11.10] it is also necessary that equipment should be maintained and serviced at recommended intervals and a record kept of this work. Maintenance contracts should be arranged with competent companies or persons.

### **11.7 Maintenance of the Building and its Services**

Hazardous situations may develop if the condition of the building itself deteriorates over time. This includes integrity of walls, doors or floors which are part of fire compartmentation or protection of escape routes. Fire resisting doorsets are especially critical to life safety in hotels/guesthouses and should be regularly checked to ensure that they are in effective working order (see Section 5.5). A UK study has found that the common defects in fire resisting doorsets listed below contributed significantly to fatalities in hotel fires :

- (a) dropped hinges allowing the door leaf to stick on the carpet in open position
- (b) excessive gaps between the door leaf and frame due to poor fit and distortion
- (c) friction spring closer ( in which arm projects across face of door at mid-height) had lost its tension
- (e) an overhead door closer incorrectly adjusted and had missing or damaged components
- (f) a concealed chain and spring (set into the core of door at mid-height) had lost its tension or was incorrectly set
- (g) double action door spring hinges allowed the door leaves to swing ajar up to 50 mm whenever nearby doors were opened

The fittings, equipment and services in the building can also cause or contribute to fire and arrangements should be made for regular checking of furnishings and fittings, electrical installation and appliances, gas-burning appliances, heating, kitchen and laundry equipment. A record of these checks, as well as deficiencies and remedial and maintenance work should be noted in the Fire Safety Register [see section 11.10].

### **11.8 Maintenance of Escape Routes**

In the event of a fire or other emergency, occupants should be able to evacuate the premises by routes safe from fire and smoke and free from obstruction. This can only be achieved if escape routes are unobstructed, if fire resisting doorsets are kept closed and exit doors are readily usable at all times while the premises is occupied. In order to maintain escape routes to the standard required, all

such facilities within the premises should be inspected on a regular basis by a designated member of staff. If an impediment is noticed in the areas of egress, then it should be removed immediately and steps taken to prevent a recurrence. It is recommended that prominent prohibitory signs should be erected at points where problems can occur in this regard, such as at the bottom of stairways.

Regular inspection of escape routes should ensure that :

- all escape routes are kept un-obstructed and immediately available for use
- escape routes are clearly indicated, signposted and adequately illuminated by the main and emergency lighting systems
- exit doors are capable of being readily opened at all times
- doors and gates across escape routes are secured in a manner that they can be easily and immediately opened by persons on the premises.
- curtains, drapes or hangings are not placed across or along an escape route in a manner which would impede or obstruct escape
- mirrors are not placed across or along an escape route or adjacent to an exit in such a way as to confuse the direction of escape
- floor coverings, rugs and mats are fixed or laid so that people will not slip or trip on them during an evacuation, and they are not used to prop open doors
- fire resisting doorsets along escape routes are kept closed at all times, unless where they are held open with electro-magnetic devices linked to the fire alarm system during the day and closed at night
- external areas at or near exits are kept free of vehicles, portable cabins, excavations and or other obstructions, so as to allow unimpeded escape to a place of safety
- doors, gates or traffic do not block escape from a concourse or yard to a place of safety in the open air.

#### **11.9 Liaison with the Fire Authority and assisting the Fire Brigade**

##### ***(a) Liaison with the Fire Authority***

The local fire authority may be prepared to offer advice on matters relating to fire safety. The fire authority may also carry out inspections of selected buildings, and inform the owners/managers/occupiers of fire safety deficiencies noted. Seminars on hotel fire safety may be organised by fire authorities, and proprietors and managers should avail of these. Intended alterations or refurbishment in a premises should be brought to the fire authority's attention.

##### ***(b) Assisting the Fire Brigade***

In order that rescue operations and fire fighting by the fire brigade can be carried out as effectively as possible, pre-planning should be done in advance of a real emergency. This pre-planning requires consultation between the management and the fire brigade with the aim of:

- identifying the areas which present particular risk
- ensuring that access and facilities are adequate, e.g. approach by fire brigade vehicles and equipment is not obstructed, and immediate use can be made of equipment such as hydrants, dry risers and foam inlets
- examining the layout of the building so that the fire brigade officers can work out plans of action for particular scenarios which they may face on being called to a fire
- arranging for people to assist the fire brigade on their arrival - certain staff should be delegated to meet the fire brigade, and brief them on the situation on their arrival.

##### ***(c) Plan of Premises***

A plan of the hotel/guesthouse should be lodged with the fire authority which should indicate the location of :

- stairways and escape routes,
- fire protection facilities,
- first aid fire fighting equipment,
- gas and electricity supply shut-off points,
- where appropriate:

- (a) the control device for ventilation systems
- (b) the control panel for the automatic detection and alarm system.

This type of plan, which would normally be similar to that required to indicate escape routes to guests, should be of a suitable scale, and cover a floor or compartment per sheet.

#### **11.10 Keep-ing of Fire Safety Records**

The person responsible for the implementation and over-seeing of the fire safety programme in a premises should keep a Fire Safety Register as a complete record of all fire safety matters on the premises. This register should be kept on the premises at all times, be kept up to-date and should be available for inspection by authorised officers of the fire authority. A sample copy of the relevant pages of a Fire Safety Register is provided at Appendix G. The following information should be recorded in a register :

- the name of the fire safety manager, and those nominated to deputise for him/her
- the details of specific fire duties that have been assigned to staff
- the details of instruction and training given to staff, and by whom
- the date of each fire and evacuation drill, the names of those taking part, and the type objective and results of exercises held
- the type, number and location of fire protection equipment in the premises, including water supplies, hydrants etc.
- the date of each inspection and test carried out on fire protection equipment and systems, along with brief comments on the results of the checks and actions taken (and by whom) to remedy defects
- the date of each inspection of the building itself, its fittings and services and the actions taken to remedy any defects found
- details of all fire incidents and false alarms that occur and the actions taken as a result.

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## **APPENDIX A**

### **Information on the Fire Services Act, 1981**

The purpose of this note is to explain in general terms the provisions of the Fire Services Act, 1981 as it relates to hotels/guesthouses. It is not intended to be a legal interpretation of the Act.

#### **A.1 Legal Responsibilities**

Section 18(2) of the Fire Services Act imposes a duty on persons having control over premises providing sleeping accommodation for guests to -

"take all reasonable measures to guard against the outbreak of fire on such premises, and to ensure as far as is reasonably practicable the safety of persons on the premises in the event of an outbreak of fire".

Section 18(3) of this Act imposes a duty on any person in such accommodation -

"to conduct himself in such a way as to ensure that as far as is reasonably practicable any person on the premises is not exposed to danger from fire as a consequence of any act or omission of his"

The Act provides for substantial penalties with fines of up to ten thousand pounds (£10,000) and/or two years imprisonment for persons convicted on indictment of offences under the Act.

#### **A.2 Fire Safety Notices**

Under Section 20 of the Act, a fire authority may serve a fire safety notice on the owner or occupier of a "potentially dangerous building", which is defined as a building which constitutes a serious danger to life in the event of a fire occurring therein. Such a notice may prohibit the use of a building (or part of it) and may require the owner or occupier to carry out specified fire precautions in that building. There is provision in Section 21 of the Act for a person on whom a fire safety notice is served to appeal against the notice in the District Court within fourteen days from the date of service. In a situation of extreme and urgent concern about fire safety, a fire authority may apply under Section 23 of the Act to the High Court for an order to restrict or prohibit use of a building immediately.

It is an offence under the Act to fail to comply with the terms of a fire safety notice, and penalties similar to those outlined above may be imposed on a person convicted of such an offence.

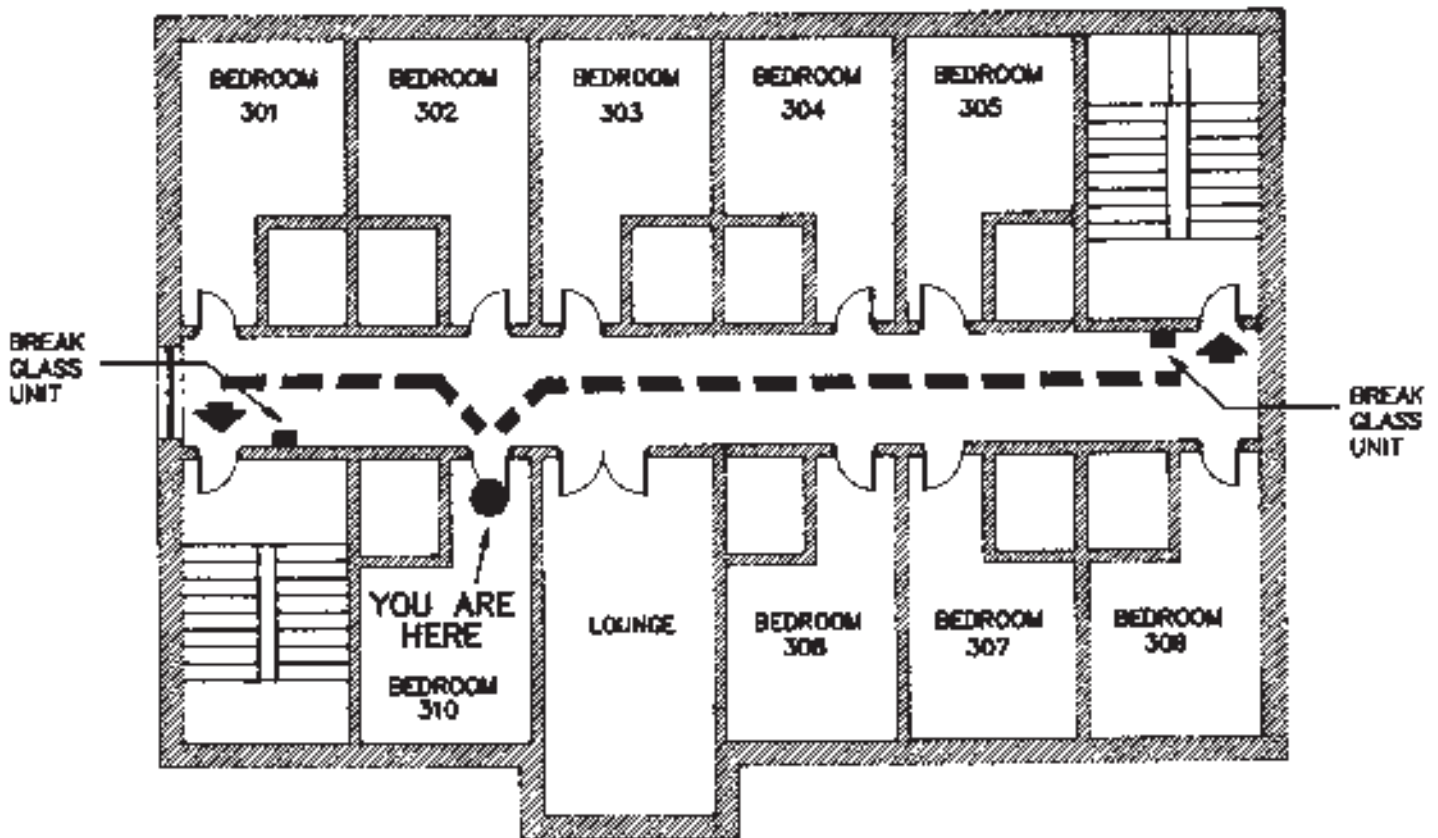
#### **A.3 Powers of Inspection**

Section 22 of the Act gives powers to any "authorised person" from a fire authority to inspect premises. It is an offence under Section 22 (6) to -

- refuse entry to an authorised person,
- obstruct or impede an authorised person,
- fail or refuse to give information which a fire authority or an authorised person is entitled to require,
- provide false or misleading information to a fire authority or an authorised person.

## APPENDIX B

### Sample premises layout drawing



### Sample Instructions to Guests

To ensure your safety:

- study the instructions given here
- check your escape routes
- do not cause fire by smoking in bed
- unplug electrical appliances

#### **IF YOU DISCOVER A FIRE**

Raise the alarm by dialing ...and giving the operator the location, or by breaking the glass in the nearest fire call point in the corridor.

**IF YOU HEAR THE FIRE ALARM** - which is continuous sounding of bells

Leave the building at once using the nearest escape route indicated on the plan above.

Do not stop for anything.

Do use the lift. Assemble in front of the building.

## APPENDIX C

### Method of Test for Rigid Plastic Seating

The test shall be carried out in accordance with I.S. 254: 1983 modified as follows:

**Section 1 - 4**            No change

**Exception: 4.4**        Add in (3) Flaming droplets shall not be formed

**Section 5.1**            Not applicable

**Section 6**              Not applicable

***Replace by:***

- (a)    In the case of chairs and stools, the test piece shall consist of the finished item without upholstery.
- (b)    In the case of bench seating the test piece shall consist of one metre length.

**Section 7**              No change

**Section 8**

***Add in:***

The crib shall be placed under the test piece and positioned directly beneath the back rest of the central position such that the distance between the top of the crib and the underside of the seat is 100 mm. In the case of items without backs the crib shall be placed beneath the centre of the seat.

APPENDIX D

Ignitability Test Certificate for Seating

1. Name of Test Centre

Address

2. Date of Test
3. Certificate Number
4. Seating submitted for test by

5. Full Description of Finished Item of Seating including details of filling material, interliner and covering material

- (6)(a) I certify, that the item of seating specified at 5 above complies with I.S. 419: 1988 Clause2/Clause 3.1 *(Delete clause not applicable)* and when tested in accordance with I.S. 254: 1988 passed:

(a) the smouldering cigarette test; and

(b) Ignition Source Grade        Test
- 6(b) I certify, that the item of plastic seating specified at 5 above when tested in accordance with I.S. 254: 1983 as modified in Appendix C passed the:

(a) the smouldering cigarette test, and

(b) Ignition Source Grade        Test

*(Delete (a) or (b) as appropriate)*

Signed

On behalf of

Position

Date

Test Centre

APPENDIX E

Test Certificate: Curtains and Drapes

1. Name of Test Centre

Address

2. Date of Test

3. Certificate Number

4. Item supplied by

5. Description of Fabric

6. Description of Lining Fabric (if any)

7. Description of B.S. 5651: 1978 Dry Cleaning/Washing Procedure (if applicable)

8. I, certify that the item of Curtain/Drape/Blind specified at 5, 6 and 7 above complieswith:
- (a) type (please specify) performance when assessed in accordance with BS 5867 Part 2: 1980 when subjected to an appropriate washing/dry cleaning procedure in accordance with BS 5651: 1978 before test (where required).

(b) the designation "flameproof" when assessed accordance with B.S. 3120: 1959 when subjected to an appropriate washing/dry cleaning procedure in accordance with BS 5651: 1978 before test (where required).

(c) the designation "flameproof" when assessed in accordance with B.S. 3120: 1959 without being subjected to an appropriate washing/dry cleaning procedure before test (where required).
- (Delete as appropriate)

Signed

On behalf of

Position

Date

Test Centre

**APPENDIX F**

**Test Certificate: Floor Covering**

|                               |       |
|-------------------------------|-------|
| <b>1. Name of Test Centre</b> | _____ |
| <b>Address</b>                | _____ |
|                               | _____ |
|                               | _____ |

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|                                       |       |
|---------------------------------------|-------|
| 2. Date of Test                       | _____ |
| 3. Certificate Number                 | _____ |
| 4. Floor covering supplied by         | _____ |
| 5. Full description of floor covering | _____ |
|                                       | _____ |

I certify, that the floor covering specified at 5 above when and assessed in accordance with B.S. 5287: 1976 has a low radius of effects of ignition.

|                     |       |                    |
|---------------------|-------|--------------------|
| <b>Signed</b>       | _____ |                    |
| <b>On behalf of</b> | _____ | <b>Test Centre</b> |
| <b>Position</b>     | _____ |                    |
| <b>Date</b>         | _____ |                    |

**APPENDIX G**

**Fire Safety Register**

**Name of Premises** \_\_\_\_\_

\_\_\_\_\_

**Address** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Telephone Number** \_\_\_\_\_

**Name of Owner/Hirer/Lessee** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Type of Business** \_\_\_\_\_

**Name of Fire Safety Manager** \_\_\_\_\_

**Name of Deputy Fire Safety Manager** \_\_\_\_\_

**1. SPECIFIC FIRE DUTIES ASSIGNED TO  
PARTICULAR STAFF MEMBERS**

**Name** \_\_\_\_\_

**Position** \_\_\_\_\_

**Fire Duties** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Name** \_\_\_\_\_

**Position** \_\_\_\_\_

**Fire Duties** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Name** \_\_\_\_\_

**Position** \_\_\_\_\_

**Fire Duties** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**ETC**

## 2. FIRE AND EVACUATION DRILLS/ INSTRUCTION/TRAINING

**Date** \_\_\_\_\_

**Instructor** \_\_\_\_\_

**Nature of Training** \_\_\_\_\_

**Training Received By** \_\_\_\_\_

**Duration** \_\_\_\_\_

**Date** \_\_\_\_\_

**Instructor** \_\_\_\_\_

**Nature of Training** \_\_\_\_\_

**Training Received By** \_\_\_\_\_

**Duration** \_\_\_\_\_

ETC

### 3. FIRE FIGHTING EQUIPMENT

#### 3A. FIRST AID EQUIPMENT

##### Inventory of First Aid Equipment

Number of Water Extinguishers

Number of Foam Extinguishers

Number of CO<sub>2</sub> Extinguishers

Number of Halon Extinguishers

Number of Hose Reels

Number of Fire Blankets

##### LOCATION OF FIRST AID EQUIPMENT

| TYPE | SIZE | NUMBER | LOCATION |
|------|------|--------|----------|
|      |      |        |          |

## MONTHLY INSPECTIONS OF FIRST AID EQUIPMENT

| DATE | NO. OF APPLIANCES<br>INSPECTED | INSPECTED<br>BY | DETAILS OF FAULTS<br>AND ACTION TAKEN |
|------|--------------------------------|-----------------|---------------------------------------|
|      |                                |                 |                                       |

**ANNUAL MAINTENANCE OF FIRST AID EQUIPMENT**

Number of Fire Extinguishers Inspected

Number of Hose Reels Inspected

Extent of Work Undertaken

Inspected by

For and on behalf of

**SERVICE ORGANISATION**

**3B. FIRE HYDRANTS**

Total Number of Fire Hydrants

Location of Fire Hydrants \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

| HYDRANT NUMBER | LOCATION |
|----------------|----------|
|                |          |

**MONTHLY INSPECTION OF FIRE HYDRANTS**

| <b>DATE</b> | <b>NO. OF HYDRANTS<br/>INSPECTED</b> | <b>INSPECTED<br/>BY</b> | <b>DETAILS OF FAULTS<br/>AND ACTION TAKEN</b> |
|-------------|--------------------------------------|-------------------------|-----------------------------------------------|
|             |                                      |                         |                                               |

**ANNUAL MAINTENANCE OF FIRE HYDRANTS**

Number of Hydrants Inspected

Extent of Work Undertaken

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The above Hydrants have been inspected by me in accordance with B.S. 5306: Part 1: 1976

Signature

---

For and on behalf of

---

**SERVICE ORGANISATION**

**3C. RISING MAINS**

**Location of Inlet** \_\_\_\_\_  
\_\_\_\_\_

**Total Number of Dry Riser Outlets**

**Total Number of Wet Riser Outlets**

**LOCATION OF OUTLETS**

|  |  |
|--|--|
|  |  |
|--|--|

**SIX MONTHLY/ANNUAL MAINTENANCE OF RISING MAINS**

Date of Inspection \_\_\_\_\_

Extent of Work Undertaken \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

The system has been inspected by me in accordance with B.S. 5306: Part 1: 1976  
\_\_\_\_\_

Signature \_\_\_\_\_

For and on behalf of \_\_\_\_\_  
**SERVICE ORGANISATION**

#### 4. EMERGENCY LIGHTING

##### Inspection and Test

| DATE | INSPECTED BY | DETAILS<br>OF FAULTS | ACTION TAKEN |
|------|--------------|----------------------|--------------|
|      |              |                      |              |

**EMERGENCY LIGHTING**

**Model Inspection and Test Certificate** \_\_\_\_\_

**Occupier** \_\_\_\_\_

**Name, Address and Telephone Number of Premises** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Date of Inspection** \_\_\_\_\_

**Inspected by** \_\_\_\_\_

**Extent of Work Undertaken** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**This system has been inspected by me and complies in all respects with the recommendations of I.S. 3217: 1989**

**Signature** \_\_\_\_\_

**For and on behalf of** \_\_\_\_\_  
**SERVICE ORGANISATION**

**Date** \_\_\_\_\_

## 5. FIRE ALARM SYSTEM

Number of Zones

Number of Sounders

Number of Smoke Detectors

Number of Heat Detectors

Number of Manual Call Points

Location of Secondary Battery

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### MODEL CERTIFICATE OF QUARTERLY/YEARLY TESTING OF FIRE ALARM SYSTEM

Certificate of Testing of Fire Alarm system at:

Protected Area

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Address

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This system is operational and has been checked and tested in accordance with B.S. 5839: Part 1: 1988.

Signed

---

Status

---

Date

---

For and on behalf of

---

SERVICE ORGANISATION

## **FIRE ALARM SYSTEM**

### **Log Book**

Any "event" affecting the fire alarm installation should be recorded.

An "event" should include fire alarms, false alarms, failure, inspections tests, disconnections, dates of service, and outstanding work.

| <b>DATE</b> | <b>TIME</b> | <b>ZONE</b> | <b>EVENT</b> | <b>ACTION<br/>REQUIRED</b> | <b>COMPLETION<br/>DATE</b> | <b>SIGNATURE</b> |
|-------------|-------------|-------------|--------------|----------------------------|----------------------------|------------------|
|             |             |             |              |                            |                            |                  |

**6. SPRINKLER SYSTEMS**

| DATE | INSPECTED BY | DETAILS<br>OF FAULTS | ACTION TAKEN |
|------|--------------|----------------------|--------------|
|      |              |                      |              |

## 7. FIRE RESISTING DOORSETS AND EXIT DOORS

| DATE | INSPECTED BY | DETAILS<br>OF FAULTS | ACTION TAKEN |
|------|--------------|----------------------|--------------|
|      |              |                      |              |

**8. UPHOLSERED SEATING**

| DATE | INSPECTED BY | DETAILS<br>OF FAULTS | ACTION TAKEN |
|------|--------------|----------------------|--------------|
|      |              |                      |              |

## **DOCUMENTS REFERRED TO IN THIS GUIDE**

Fire Services Act, 1981 - S.I. No. 30 of 1981.

"Fire Protection for Hotels - Information for owners of existing hotels" - Department of Local Government 1966 (out of print)

European Council Recommendation of 22 December, 1986, Fire Safety in Existing Hotels - 86/666/EEC

Building Research Establishment Report - "Factors determining life hazard from fires in group residential buildings Part 1: Hotels and boarding houses."

A.W. Williams and J.S. Hopkinson

H.M.S.O. (1986)

"Code of Practice for the Management of Fire Safety in Places of Assembly" - published by the Department of Environment, 1989.

"Code of Practice for Fire Safety of Furnishings and Fittings in Places of Assembly" - published by Department of the Environment, 1989.

"Proposed Building Regulations" - issued by Department of Environment, 1983.

Fire Sizes in Hotel Bedrooms - Importance for Smoke Control Design Fire Safety Journal No. 8 (1984/1985), p 177 - 186.

"Fire danger in Hotels" available from National Safety Council, 32 Northbrook Road, Ranelagh, Dublin 6. Telephone (01)-963422

"Access for the Disabled - Minimum Design Criteria" available from National Rehabilitation Board.

NFPA 101M - Alternate Approaches to Life Safety, 1988 published by National Fire Protection Association, Batterymarch Park, Quincy, MA 02269, U.S.

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Association of Builders' Hardware Manufacturers - 'Code of Practice for hardware essential to the optimum performance of fire-resisting timber doorsets'

Building Research Establishment Report- 'Guidelines for the construction of fire-resisting structural elements', 1980 and 1988 by W A Morris, R E H Read and G M E Cooke.

Building Research Establishment Digest No. 320 - 'Fire Doors'

Timber Research and Development Association - Wood Information Sheet: Section 1: Sheet 32, "Fire resisting doors by Upgrading"

Timber Research and Development Association - Wood Information Sheet : Section 1 : Sheet 11, D5, D6, D7, D8, D9, D10, D11 and D12 "Timber Building Elements of Proven Fire Resistance".

Electro-Technical Council of Ireland - 'National Rules for Electrical Installations'

|                               |                                                                                                                   |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------|
| BS 476 : Part 4 : 1984        | 'Non-combustibility test for materials'                                                                           |
| BS 476 : Part 6 : 1981        | 'Method of test for fire propagation for products'                                                                |
| BS 476 : Part 7 : 1987        | 'Method for classification of the surface spread of flame of products'                                            |
| BS 476 : Part 8 : 1972        | 'Test methods and criteria for the fire resistance of elements of building construction'                          |
| BS 476 : Part 20 : 1987       | 'Method for determination of the fire resistance of elements of construction (general principles)'                |
| BS 476 : Part 21 : 1987       | 'Method for determination of the fire resistance of loadbearing elements of construction'                         |
| BS 476 : Part 22 : 1987       | 'Methods for determination of the fire resistance of non-loadbearing elements of construction'                    |
| BS 476 : Part 23 : 1987       | 'Methods for determination of the contribution of components to the fire resistance of a structure'               |
| BS 3119 : 1959                | 'Specification for method of test for flameproof materials'                                                       |
| BS 3120 : 1959                | 'Specification for performance requirements of flameproof materials for clothing and other purposes'              |
| B.S. 3456 : Section A4 : 1971 | 'Electrically heated blankets'                                                                                    |
| BS 4790 : 1972                | 'Method for the determination of the effects of a small source of ignition on textile floor coverings'            |
| BS 5287 : 1976                | 'Assessment and labelling of textile floor coverings tested to B.S. 4790'                                         |
| B.S. 5306:                    | Fire Extinguishing installations and equipment on premises :                                                      |
| Part 0 :                      | Guide for the selection of installed systems and other fire equipment.                                            |
| Part 1 :                      | 1983 Hydrant systems, hose reels and foam inlets                                                                  |
| Part 2 :                      | Sprinkler systems                                                                                                 |
| Part 3 :                      | 1985, Code of Practice for the selection, installation and maintenance of portable fire extinguishers,            |
| Part 4 :                      | Specification for Carbon Dioxide systems.                                                                         |
| Part 5 :                      | Halon systems : Section 5.1 : Halon 1301 total flooding systems, Section 5.2 : Halon 1211 total flooding systems. |
| BS.5423 : 1980                | Specification for portable fire extinguishers.                                                                    |

|                            |                                                                                                                                 |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| BS 5438 : 1976             | 'Methods of test for flammability of vertically oriented textile fabrics and fabric assembly subject to a small igniting flame' |
| BS 5446 : Part 1 : 1977    | 'Point type smoke detectors'                                                                                                    |
| BS 5499 : Part 1 : 1984    | 'Specification for fire safety signs'                                                                                           |
| BS 5588 : Part 4 : 1978    | 'Code of Practice for smoke control in protected escape routes using pressurization'                                            |
| BS 5720 : 1979             | 'Code of Practice for Mechanical Ventilation and Air-conditioning in Buildings'                                                 |
| BS 5725 : Part 1 : 1981    | 'Specification for panic-bolt and panic-latches mechanically operated by a horizontal push-bar'                                 |
| BS 5784 :                  | 'Specification for safety of electrical commercial catering equipment'                                                          |
| BS 5839 : Part 1 : 1988    | 'Fire detection and alarm systems in buildings'                                                                                 |
| B.S. 5866 : 1980 : Part 2. | 'Specification for cotton cellular blankets'                                                                                    |
| B.S. 5866 : 1983 : Part 3  | 'Specification for synthetic fibre cellular blankets'                                                                           |
| BS 5867 : Part 2 : 1980    | 'Flammability Requirements'                                                                                                     |
| BS 6399 : Part 1 : 1984    | 'Code of Practice for dead and imposed loads'                                                                                   |
| BS PD 6512 : Part 1 : 1985 | 'Guide to Fire Doors'                                                                                                           |
| B.S. 6535 :                | Fire Extinguishing Media :                                                                                                      |
| Part 1 :                   | Specification for Carbon Dioxide.                                                                                               |
| Part 2 :                   | Specification for halogenated hydrocarbons.                                                                                     |
| I.S. 205 : Part 1 : 1980   | 'Safety of Household and similar electrical appliances'                                                                         |
| I.S. 254 : 1983            | Flame resistance requirements for upholstery                                                                                    |
| I.S. 265 : 1987            | Installation of gas service pipes                                                                                               |
| I.S. 266 : 1987 Part 1     | Pipes                                                                                                                           |
| I.S 280 : 1986             | Combined appliances : gas fire/back boiler                                                                                      |
| I.S.281 : 1986             | Central Heating boilers and circulators                                                                                         |
| I.S.282 : 1986             | Gas fires                                                                                                                       |
| I.S.283 : 1987             | Flueless space heaters                                                                                                          |
| I.S.284 : 1987             | Flueless catalytic combustion heaters                                                                                           |
| I.S.285 : 1987             | Decorative gas-log and other fuel effect appliances                                                                             |

|                                 |                                                                                      |
|---------------------------------|--------------------------------------------------------------------------------------|
| I.S.286 : 1987                  | Safety of flueless gas-fired space heaters                                           |
| I.S. 290 : 1986                 | Portable Fire Extinguishers                                                          |
| I.S. 291 : 1986                 | The Use, Sitings, Inspection and Maintenance of Portable Fire Extinguishers          |
| I.S. 329 : 1987                 | Code of Practice for gas distribution mains                                          |
| I.S. 413 : 1989 :               | Safety Colours and Safety Signs                                                      |
| I.S.644 : 1983                  | Domestic cooking appliances burning gas                                              |
| I.S.645 : 1983                  | Gas burning appliances for instantaneous production of hot water for domestic use    |
| I.S.800 : 1987                  | Safety of gas-fired infra-red space heaters                                          |
| I.S.801 : 1987                  | Direct gas-fired forced convection air heaters                                       |
| I.S.802 : 1987                  | Indirect gas-fired forced convection aid heaters                                     |
| I.S.803 : 1987                  | Gas-fired fanned circulation ducted air heaters                                      |
| I.S.804 : 1987                  | Gas-fired water boilers with inputs of 60 kW to 2 MW                                 |
| I.S.805 : 1987                  | Gas-fired storage water heater                                                       |
| I.S. 809 : 1987                 | Regulator installations with inlet pressures up to 7 bar                             |
| I.S. 327 : 1987                 | Domestic installations using LPG                                                     |
| I.S. 413 : 1989                 | Safety Colours and Safety Signs                                                      |
| I.S. 419 : 1988                 | Fire safety requirements for components of furniture                                 |
| I.S. 807 : 1987 (Three parts)   | Gas burners                                                                          |
| I.S. 3212: 1987                 | Code of Practice for piped installation of fixed gas fired space heaters,            |
| I.S. 3213: 1987                 | Storage of LPG cylinders and cartridges                                              |
| I.S. 3216: 1988                 | Storage of LPG at fixed installations                                                |
| I.S. 3217: 1989                 | Code of Practice for Emergency Lighting                                              |
| I.C.P. 3 : 1984/85 (Four parts) | Domestic installations for manufactured and natural gas                              |
| I.C.P. 4 : 1985/87 (Five parts) | Non-domestic installations for manufactured and natural gas                          |
| S.R. 8. : 1982                  | Recommendations for minimum safety standards for existing domestic gas installation. |