
British Standard

Fire precautions in the design and construction of buildings

Part 3. Code of practice for office buildings

(Formerly CP 3 : Chapter IV : Part 3)

Règles de prévention des incendies dans la conception et la construction des bâtiments
Partie 3. Code de bonne pratique pour les immeubles de bureaux

Brandschutzmaßnahmen bei Planung und Errichtung von Gebäuden
Teil 3. Richtlinie für Bürogebäude

Foreword

This code of practice, prepared under the direction of the Fire Standards Committee, is a revision of CP 3 : Chapter IV : Part 3 : 1968, which is withdrawn.

In accordance with current BSI practice, this revised code is published as a Part of BS 5588. In addition to the existing BS 5588 : Part 4, other Parts will include new codes for the precautions to be taken in places of public assembly and the provision of fire-fighting lifts, and the revisions of the following three Parts of CP 3 dealing with residential use, shops and departmental stores:

CP 3 : Chapter IV Precautions against fire (houses and flats of not more than two storeys)

CP 3 : Chapter IV : Part 1 Flats and maisonettes
(in blocks over two storeys)

CP 3 : Chapter IV : Part 2 Shops and departmental stores

Other Parts may be added to BS 5588.

Some of the more important changes from the text of CP 3 : Chapter IV : Part 3 are as follows.

(a) In sections three, four, five and six, the commentary on the relevant principles is followed by any recommendations that are made. The specific recommendations do not form a separate section of the code as previously. The commentary on the relevant principles is intended to provide an explanatory background to any recommendations that are made, especially if the recommendations might otherwise appear to be arbitrary. Structural precautions against fire that have to be implemented, for example those in building regulations, if discussed are not repeated as recommendations, but reference may be made to them if the regulations are not consistent in all parts of the UK.

(b) Diagrams have been included.

(c) The subdivision of escape routes into first stage, second stage and third stage has been superseded by a division into horizontal travel and travel down or up stairways.

(d) Recommended travel distances no longer include greater distances at ground and first floor levels than at higher levels.

(e) Fire doors are no longer referred to by 'type', instead reference is made to their performance in fire tests.

It has been assumed in the drafting of this code that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose guidance it has been prepared.

Compliance with a British Standard does not of itself confer immunity from legal obligations. In particular, attention is drawn to 3.5 and 24.1.

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General

1 Scope

This code of practice provides guidance for designers and the building construction team in their task of incorporating into new buildings or alterations to existing buildings, measures that should in the event of fire, safeguard the lives of employees and the public in office buildings of all sizes and heights and that may help to protect the building and its contents against the effects of fire.

This code deals with planning, construction and equipment for fire safety, and the provision of escape routes in case of fire, in new office buildings and in alterations and extensions to existing offices. It includes the measures and equipment necessary for preventing the rapid spread of fire and those required to assist fire-fighting in buildings with upper storeys beyond the reach of mobile fire appliances operating outside the building. This code makes specific recommendations in terms of protection, number and position of exits, provides guidance on design principles for preventing the spread of fire and indicates the fire precautions necessary in these buildings.

Appendix A provides guidance for managers of office buildings to aid them in making the best use of these design features of the building, and acts as a guide to designers in passing to their clients information about the fire precautions designed into a building. In a building that has to have a fire certificate, the advice given may have to be varied in accordance with the conditions of the fire certificate.

This code is not intended to apply to buildings during the course of construction or alteration. Guidance on fire precautions in such buildings is available from HMSO*. In those cases where a building is in course of construction or alteration and is in part used, guidance for management is given in appendix A.

NOTE. The titles of the publications referred to in this code are listed on the inside back cover.

2 Definitions

For the purposes of this code the following definitions apply.

2.1 access room. A room that forms the only escape route from an inner room.

2.2 accommodation stairway. A stairway, additional to that or those required for escape purposes, provided for the convenience of occupants.

2.3 cellular planning. The conventional subdivision of a floor area into separate offices with access corridors.

2.4 dead end. A place from which escape is possible in one direction only, or in directions less than 45° apart that are not separated by fire-resisting construction.

2.5 direct distance. The shortest distance from any point within the floor area, measured within the external enclosures of the building, to the nearest storey exit, ignoring walls, partitions and fittings, other than the enclosing walls/partitions to protected stairways.

2.6 escape lighting. Lighting, for use when the normal lighting fails, provided to ensure that the means of escape can be safely and effectively used.

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

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

2.9 firefighting stairway. A protected stairway communicating with the accommodation only through a firefighting lobby.

2.10 fire resistance. The ability of a component or construction of a building to satisfy for a stated period of time the appropriate criteria specified in the relevant Part of BS 476.

2.11 height (of a building). The level of the surface of the highest point of the floor of the highest storey (excluding any such top storey consisting exclusively of plant rooms) measured at the centre of that face of the building where the measurement is greatest from the level of the footway or paving in front of that face, or if there is no such footway or paving, from the level of the ground.

2.12 higher fire risk area. An area with a fire risk higher than that of an office area.

2.13 inner room. A room from which escape is possible only by passing through an access room.

2.14 means of escape. Structural means whereby a safe route is provided for persons to travel from any point in a building to a place of safety.

2.15 non-combustible. Capable of satisfying the performance requirements specified in BS 476 : Part 4, or any material which when tested in accordance with BS 476 : Part 11 does not flame nor cause any rise in temperature on either the centre (specimen) or furnace thermocouples.

2.16 open spatial planning. The internal arrangement of a building in which several storeys or working levels are contained in one undivided volume.

2.17 open storey planning. The internal arrangement of the storeys of a building in which almost the whole area of each storey is undivided by partitions.

*Standard fire precautions to be taken by contractors engaged on building and engineering works for the Department of the Environment (P.5), HMSO.

2.18 pressurization. A method of protecting escape routes against the ingress of smoke by maintaining the air within them at pressures higher than those in adjacent parts of the building.

2.19 protected stairway/lobby/corridor. A stairway, including any exit passageway leading therefrom to its final exit, or lobby or corridor enclosed with (other than any part that is an external wall of a building) fire-resisting construction.

2.20 storey exit. A final exit, or a doorway giving direct access to a protected stairway, firefighting lobby, or external escape route.

2.21 travel distance. The actual distance to be travelled by a person from any point within the floor area to the nearest storey exit, having regard to the layout of walls, partitions and fittings.

2.22 firefighting lobby. A protected lobby for providing access from a firefighting stairway to the accommodation area, and to any associated firefighting lift.

2.23 depth (of a building). The level of the surface of the lowest point of the floor of the lowest storey, measured at the centre of that face of the building where the measurement is greatest from the level of the footway or paving in front of that face, or if there is no such footway or paving, from the level of the ground.

3 Use of this code

3.1 Means of providing for safety

The recommendations in this code are intended to provide safety from fire by means of:

- (a) planning and protection of escape routes leading to safety both horizontally and downwards (and/or possibly upwards in a few special circumstances) from any area that may be threatened by fire, so enabling any person confronted by an outbreak of fire to turn away and make a safe escape without outside assistance;
- (b) construction and finishing with suitable materials and embodying adequate fire resistance in the structure where these are not covered by building regulations;
- (c) segregation of higher fire risk areas;
- (d) the provision of means of giving warning of fire and, where appropriate, of detecting outbreaks of fire;
- (e) the provision of fire-fighting equipment, whether for use by the occupants in containing fire in its early stages, or by way of assistance to the fire service, or for automatically extinguishing an outbreak of fire.

3.2 Avoidance of manipulative apparatus for means of escape

Reliance for fire safety on manipulative apparatus for means of escape, or on external rescue from the lower storeys of a building by the fire service using mobile ladders is not satisfactory. This code provides for employees and the public on any storey of an office building being able to escape safely from the building without outside assistance should a fire occur.

3.3 Use of the principles and recommendations

It is not possible to make comprehensive recommendations capable of covering every possible risk, and an intelligent appreciation of the principles and application of the recommendations of this code is therefore essential. The fire hazard of a particular office and its contents have to be appreciated when designing a building, and in order to use this code effectively, the behaviour of a fire occurring in the building has to be anticipated according to the assessment made.

3.4 Application of all the recommendations

Individual recommendations of this code should not be applied in isolation. To secure maximum benefit all of the recommendations should be applied. Although the basic principles and recommendations for escape from office areas are described in section three, the most conscientious application of these recommendations would be undermined unless supported by the necessary measures relating to ancillary accommodation, construction, engineering services, and fire protection facilities set out in sections four to six.

3.5 Relationship with statutory provisions

3.5.1 General. It is important to appreciate the relationships between this code and the various statutory provisions relevant to the design and construction of new buildings and to the fire precautions to be provided in existing buildings. The relevant legislation indicated in general terms in **3.5.2** and **3.5.3** has to be complied with in the event of a conflict with this code. However, there are two main ways in which this code is intended to supplement the legislation. The first is that, since Acts and Regulations are necessarily drafted in broad terms and cannot deal in detail with a wide variety of different situations, one of the objects of this code is to provide guidance for the building designer in matters not covered in sufficient detail by the legislation. Secondly, because the objectives of the legislation are mainly concerned with the health and safety of the general public, this code is of wider scope and includes matters relevant to the protection of the building and its contents from fire as well as the safety of the occupants.

3.5.2 Building regulations. The design and construction of new buildings, and of alterations of existing buildings, are controlled by the following statutory provisions, collectively referred to as building regulations in this code:

- England and Wales: The Building Regulations
- Scotland: The Building Standards (Scotland) Regulations
- Northern Ireland: The Building Regulations (Northern Ireland)

It should be noted that some county and other authorities in England and Wales have local powers in respect of fire precautions.

3.5.3 Legislation and other regulations for fire safety in office buildings. In addition to the controls mentioned in 3.5.2, fire safety and means of escape for a wide variety of buildings is dealt with under the following legislation.

England and Wales:

The Fire Precautions Act, 1971 as amended by the Health and Safety at Work etc. Act, 1974

The Building Act, 1984 (except in Inner London where the fire provisions of the London Building Acts, 1939–1982 as amended by the Local Government Act, 1985 apply)

Scotland:

The Fire Precautions Act, 1971 as amended by the Health and Safety at Work etc. Act, 1974

The Building (Scotland) Act, 1959

Northern Ireland:

The Fire Services (Northern Ireland) Order, 1984 and the Health and Safety at Work (Northern Ireland) Order, 1978

The Building Regulations (Northern Ireland) Order, 1979

It should be noted that for premises subject to the Fire Certificate (Special Premises) Regulations, 1976, the regulations also apply to any office buildings within the premises.

There are also a number of local Acts as well as entertainment and other licensing legislation which deal with fire safety and means of escape. The designer should consult the fire authority or building authority at an early stage to make certain the building as planned will meet the requirements those authorities may make particularly if a fire certificate or licence may be necessary.

Designers may find it useful to study 'Guides to the Fire Precautions Act; No. 3; Offices, Shops and Railway Premises', HMSO, in addition to the Acts and Regulations mentioned above.

NOTE. Under the Fire Precautions Act, 1971, fire authorities in England and Wales cannot, as a condition of the issue of a fire certificate, require structural or other alterations relating to escape from the premises if the plans of the building comply with building regulations, unless the fire authority is satisfied that the means of escape in case of fire are inadequate by reason of matters or circumstances of which particulars were not required to be supplied to the local authority in connection with the deposit of plans for building regulation purposes.

3.6 Information to be given to clients

Designers are advised to inform their clients of the nature, function and (if necessary) limitations of the fire precautions that have been designed into the building, and especially those whose nature may be less evident. This will enable a better understanding of the responsibility for ensuring that a high standard of safety is maintained.

The advice given in appendix A is intended not only as a guide to the management of fire precautions in an office building, but also as a guide to the information concerning the fire precautions that have been designed into the building which designers are advised to pass to their clients.

3.7 Diagrams

The figures are intended only to clarify concepts, and should not be taken as indicating the only acceptable forms of planning.

Analysis of the problem

4 Planning in relation to fire

4.1 Spread of fire

The only sound basis for designing means of escape from fire is to attempt to identify the positions of all possible sources of outbreak of fire and to predict the courses that might be followed by a fire as it develops, or, more particularly, the routes that smoke and hot gases are likely to take, including concealed spaces. Only against this background is it possible to design and protect escape routes with some confidence that they will be safe.

In office buildings designed, maintained and supervised in accordance with this code, the risk of fire starting in corridors, lobbies or stairways intended for use only for access or means of escape may be regarded as negligible. It is also unlikely that fire will originate in the structure itself. Outbreak of fire is more to be expected in equipment, furnishing, decorations or service plant in the building, and the point of origin is therefore likely to be in the store rooms, kitchens or offices, or possibly in the service installations. Corridors, lobbies and stairways ought to be kept clear of obstructions, and adequate and convenient protected storage space ought to be provided.

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

The effects of the fire will seldom be confined to the space in which it originated. If the enclosing walls have no fire resistance or do not form a fire-tight joint with a fire-resisting floor (or ceiling) above, the fire will soon penetrate at ceiling level, where the attack from the flames or hot gases is most severe, to the adjoining space. Even with fire-resisting construction the buoyancy and expansion of the fire gases can cause them to be driven out of the space to affect other parts of the building. If they penetrate into a vertical shaft, such as a stairwell, liftwell or duct, they will rise rapidly, attacking the top of the shaft and spreading elsewhere if there are any openings in the shaft. In such circumstances, if a substantial flow of air reaches the fire through, say, a window or door, the vertical shaft can act as a chimney and may greatly accelerate fire growth.

A fire occurring anywhere within a compartment of a building has therefore to be regarded as offering an immediate risk to all occupants within that compartment even though in the initial stages of fire development it might seem that persons are well removed from immediate danger. It should also be realized that there may also be a risk to persons in other parts of the building.

4.2 Smoke

In the early stages of a fire, the most important effects will usually be those of smoke and other products of combustion. Often smoke will be the first evidence of fire detectable by the occupants and is thus likely to be the first cause of alarm. When first present, smoke tends (in the absence of any strong air currents) to collect at ceiling level, filling the space from top downwards. When it extends down to head height it will produce discomfort to the eyes and difficulty in breathing, both of which will interfere with the efforts of occupants to find their way towards the exits. People who are prevented from escaping by dense smoke, or who are unduly retarded from escaping by it, may suffer from the toxic effects of the products of combustion that accompany the smoke and the asphyxiant effect caused by lack of oxygen. Intoxication, incapacity, unconsciousness and possibly death may result. These considerations are particularly important when dealing with large numbers of persons, some of whom are unfamiliar with their surroundings, and who may also vary widely in age and degree of mobility.

To facilitate escape it is necessary

- (a) that protected escape routes are safeguarded against the ingress of smoke in bulk by self-closing fire doors;
- (b) to regulate the distance people have to travel before they reach a protected stairway or a final exit (because they may be especially endangered by smoke in any unprotected part of the escape route).

To assist the fire brigade in rescue, fire-fighting and clearance of smoke after the fire, means of smoke control may be necessary. This would be made use of as required in relation to prevailing wind conditions by the fire brigade; it is not intended that it should be operated by people escaping from the building.

After the outbreak of fire there may be only a short time during which the actions necessary for ensuring the safety of occupants can be carried out. This time will only be sufficient if all contributing factors, e.g. the design of the building, the materials at risk, the cooperation of the staff, the functioning of equipment, are planned and managed so as to be effective when the occasion arises.

4.3 Site planning

The siting of office buildings is usually dictated by restrictions imposed by urban development. These restrictions may produce conditions potentially dangerous from the point of view of fire spread from a building on fire to another exposed to its effects. Building regulations accordingly lay down structural requirements for the external walls of buildings in relation to the distance between the building and the site boundary, and these requirements are related to the nature and use of the areas inside the building and adjacent to the external walls. There are also legal requirements for access to buildings by fire appliances; these, together with the effect of car parking adjoining the building, have to be considered at the planning stage. A further site planning consideration

is the safety of escape routes outside the building, and outside neighbouring buildings, from the effects of a fire in the building concerned.

4.4 Mixed user and town centre redevelopment schemes

The principles and recommendations of this code will apply straightforwardly where offices are contained in a single, separate building, and the words 'office' and 'building' are both used in this sense.

However, offices are often located in mixed user buildings, as well as forming parts of town development schemes. In these cases it is important to consider the effect of one risk upon another. A fire in an unattended office could have serious consequences on, for example, a residential or hotel use in the same building. Similarly a high fire risk in one part of a building could seriously affect office areas in another part of that building.

It is therefore important to consider whether completely separate routes of escape should be provided from each different use, or whether other effective means to protect common escape routes can be provided. This would depend upon the extent of one risk upon another and the management and control of the building from a fire safety point of view. This consideration would include the fire alarm arrangements and the type and extent of any automatic fire detection system.

The recommendations of the relevant Part of BS 5588 or legislation appropriate to each use should be applied to the whole of any route where passing through and connected to other users, right up to the final exit, even if such standard is higher than that required for the use through which the route is passing (e.g. the use of fully ventilated lobbies).

Guidance on fire precautions in town centre redevelopment schemes has been published by HMSO*.

4.5 Offices in different occupation

Different offices, whether on the same storey or different storeys, may be occupied by different tenants in the same building. In these cases considerations apply similar to those applicable to mixed users as referred to in 4.4 so far as the risk of fire in an unattended office or an office in different occupation is concerned.

4.6 Internal subdivision

4.6.1 General. The manner in which a building is subdivided internally will affect the risk to users and their ability to use the means of escape arrangements in case of fire.

The various forms of subdivision and their effects on users are considered separately in 4.6.2 to 4.6.5.

4.6.2 Compartments. The internal subdivision of a building into fire compartments predetermines the escape arrangements, particularly as regards evacuation procedures and the number of stairways and exits. This is because only the occupants and contents within a fire compartment have to be regarded as being initially at risk from a fire occurring anywhere within that compartment. In an uncompartmented building the whole of the occupants and contents of the building have to be considered at risk in the event of fire.

4.6.3 Open spatial planning. In open spatial planning several storeys or working levels are contained in one uncompartmented volume such that smoke and heat will travel readily throughout all floors. This form arises (for example) by the adoption of one or more of the following planning arrangements:

- (a) split-level floors;
- (b) floors arranged as a spiral throughout the height of the building;
- (c) balconies or gallery floors overlooking a central well or courtyard, as in the case of an atrium.

Open spatial planning may infringe to some extent the requirements of building regulations relating to compartmentation of buildings. Where this form of planning is envisaged, early discussion with the relevant control authorities is desirable because a relaxation or special consent may be necessary.

Although many of the occupants would be aware of smoke from a fire at the outset, or soon after, and therefore would have early warning in this type of planning, they would all be at risk simultaneously. It is therefore an arrangement not recommended for tall buildings.

4.6.4 Open storey planning. In open storey planning almost the whole floor area of a storey is undivided by partitions although there may be some screens or high furniture to give privacy to some areas. In this case many of the occupants of one storey may be aware of smoke from a fire at the outset and this will give the advantage of early warning. Nevertheless, the rapid spread of fire and smoke by some modern furniture materials in the early stages of a fire can produce very hazardous conditions. In this respect the smaller an area of office accommodation, the greater protection there will be against the spread of smoke.

4.6.5 Cellular planning. Cellular planning is the conventional subdivision of floor areas into separate offices with access corridors.

*Fire Prevention Guide No. 1, *Fire precautions in town centre redevelopment*, Home Office and Scottish Home and Health Department, HMSO.

4.7 Ancillary accommodation and high fire risk areas

Sections three and four contain principles and recommendations for the planning and construction of those parts of office premises that are allocated to the office and reception accommodation and that are likely to be occupied by employees and perhaps the public. Other parts, ancillary to the office accommodation, are referred to in this code as ancillary accommodation, and are covered in section five.

Where highly flammable or explosive substances are stored or used in any quantity, the area is considered to be of high fire risk. The fire authority may impose special requirements for such areas in connection with the issue of a certificate under the Fire Precautions Act 1971; early consultation is desirable.

5 Escape from fire

5.1 General

In an emergency there have to be exit facilities sufficient to allow the occupants of an office to reach an area of relative safety without delay. The place of ultimate safety is of course beyond the final exit but often it would not be practicable to evacuate the whole of a large office building upon the occurrence of fire in any part.

Nevertheless, it is essential that the occupants are able to reach, without undue delay, areas of relative safety within the building that lead ultimately to the open air.

The exit capacities listed in table 3 have been based on an evacuation time of 2.5 min through a storey exit on the assumption that a unit width of exit of 500 mm permits the flow of 40 persons per minute. Stairway widths have been similarly calculated taking into account also the number of persons who could occupy a stairway (see tables 4 to 6).

5.2 Evacuation

The assumption need not be made that the whole building necessarily has to be evacuated in a fire emergency. Provision is made in this code for designing the building so that employees and the public may remain in a fire compartment not affected by the fire, provided that they are still free to leave the building altogether by protected escape routes. Evacuation procedure is dealt with in A.4.6 to A.4.8.

5.3 Disabled persons

When an office building is being planned, whilst it will not as a rule be possible to reliably predict its usage by disabled persons, it may be expected that some employees or members of the public will be people with a disability of some kind. The designer should therefore study the recommendations of BS 5588 : Part 8.

Planning of escape from office areas

6 General

Planning of means of escape from office floor areas involves consideration of a number of interrelated aspects which ought to be considered as a whole and not in isolation.

For example, although maximum distances of travel (see 7.1) may have a major influence on the number of escape routes and stairways required and their disposition, the geometry of the building (see 7.2 and 8.3), the number of persons to be evacuated (see 7.3 and 8.4), and whether or not the building is to be in multiple occupation (see 7.5), will also have a bearing on the sizes and disposition of the stairways. Although these factors may in some circumstances suggest that a single stair would suffice, the height and size of the building may nevertheless necessitate the provision of more than one stairway (see 8.2) or stairways for fire-fighting purposes (see 29.2).

Clause 7 deals with horizontal escape along a suitable escape route to a storey exit. The recommendations are mainly concerned with providing more than one escape route (except in severely restricted circumstances), limiting the distance to be travelled, and ensuring that the routes are wide enough.

Clause 8 deals with vertical travel down or up a stairway towards a final exit. The recommendations are mainly concerned with the provision of a sufficient number of stairways of adequate aggregate width. Lifts are disregarded for purposes of escape except for some disabled persons (see 5.3 and A.4.7).

Means of escape from ancillary accommodation is covered by 11.4.

7 Escape routes within, and exits from, a storey

7.1 Distances of travel and number of escape routes

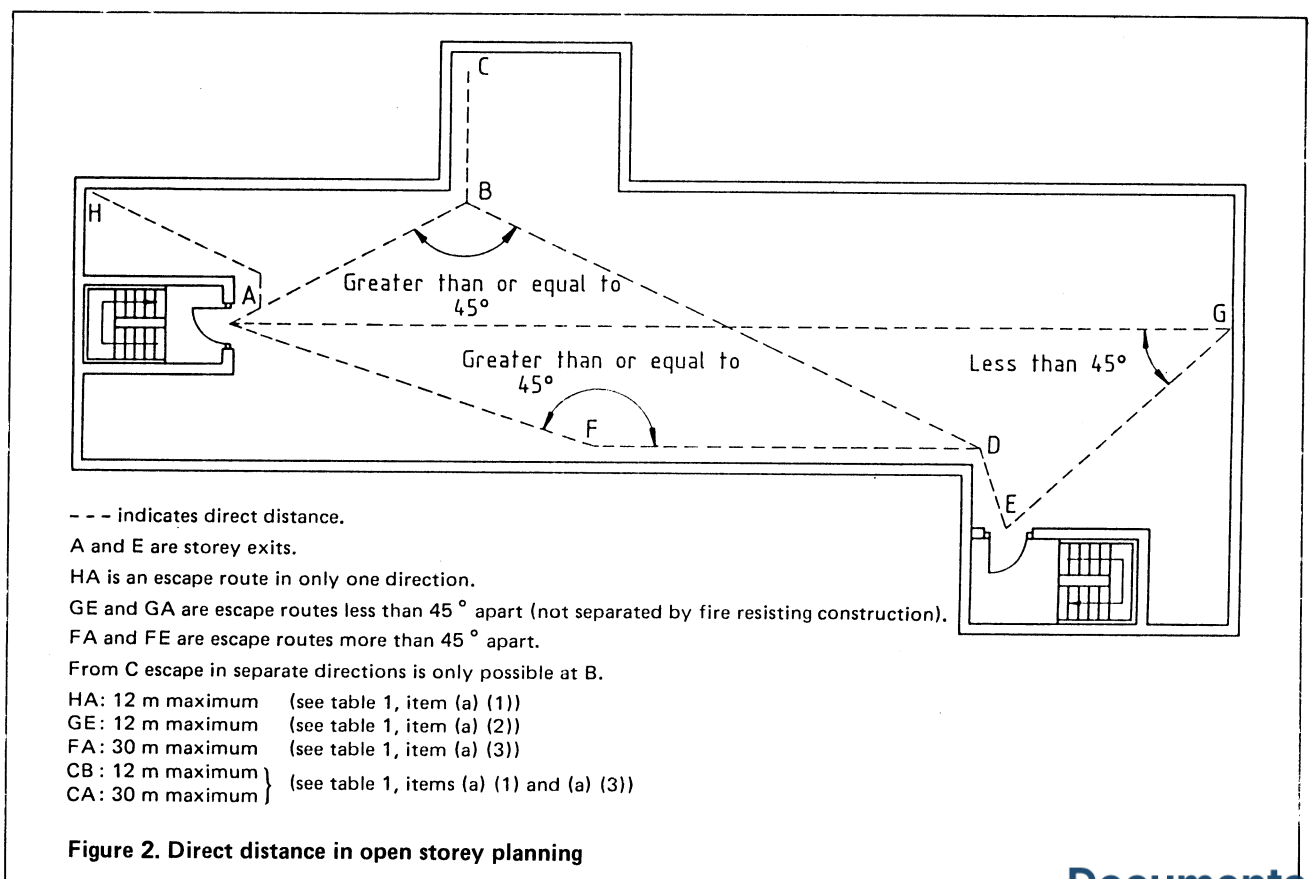
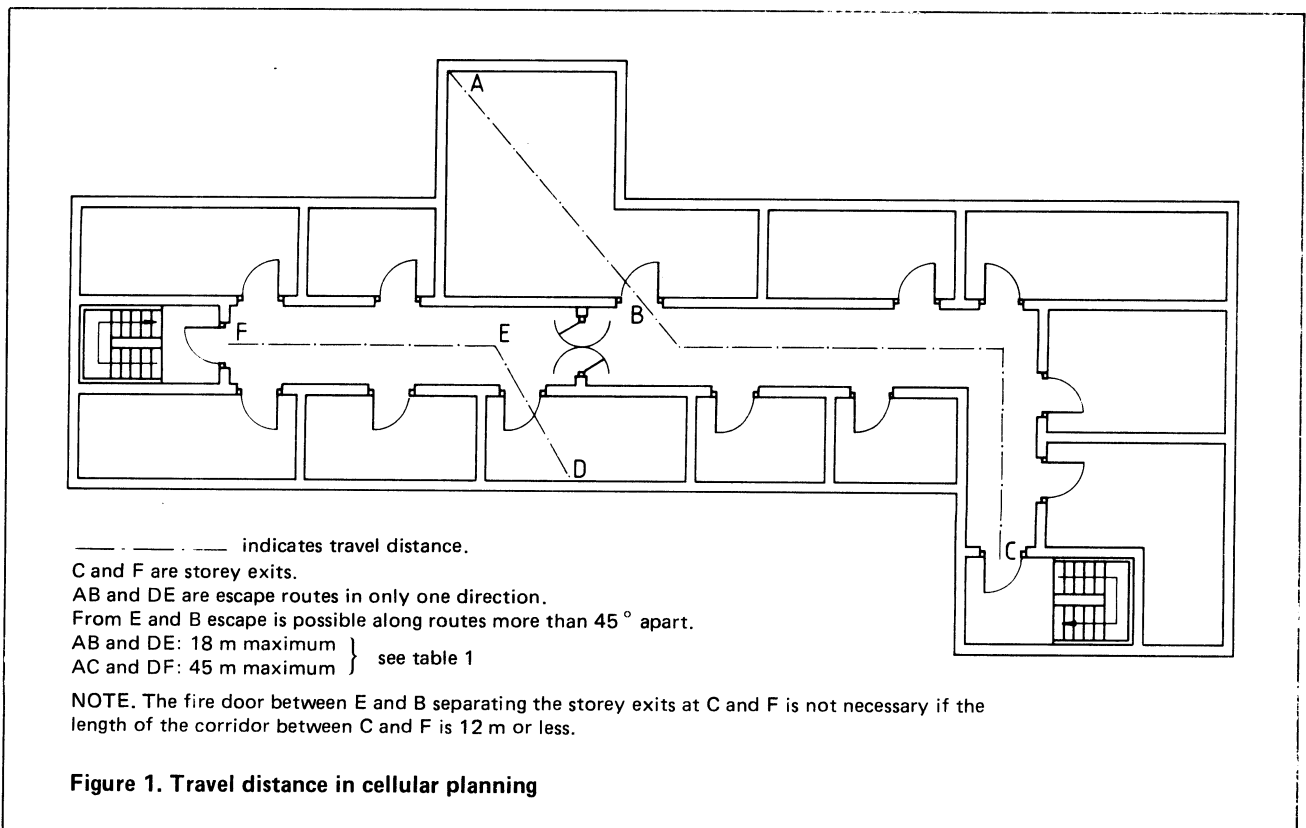
7.1.1 Commentary. For the purposes of certifying the fire precautions in a building, travel distances (see 2.21) are used. In designing a speculative building however, the use of direct distances (see 2.5) is normally adopted (see figures 1, 2 and 3). Although the building may have been designed on the basis of direct distances, before any floor space is subdivided or furnished the resultant travel distances should be checked so that in use they will not exceed the permitted travel distances.

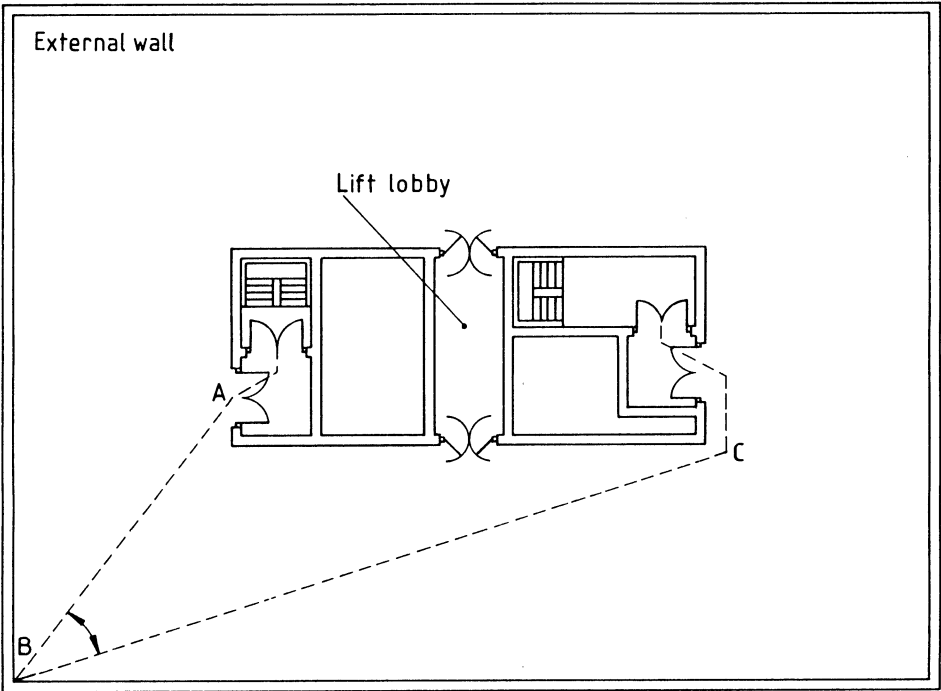
Where the occupants have no choice but to make their way along a single escape route, the travel distance needs to be very restricted. If escape is possible in more than one direction, the travel distance may be greater.

If escape is possible in two directions, these have to be significantly different directions, otherwise the routes will be close enough to become impassable at the same time. If two directions diverge by less than 45 ° and are not separated by fire-resisting construction, they are considered to provide escape in one direction only, and a situation in which this occurs is considered to be a dead end.

In the recommendations a limited distance from any point in a storey to the nearest storey exit has been adopted as the maximum. This is an arbitrary figure. The shorter the distance, the better, but it could not be said that a slightly greater distance would be so unsafe that it should under no circumstances be adopted. However, the maximum distance recommended should not generally be exceeded.

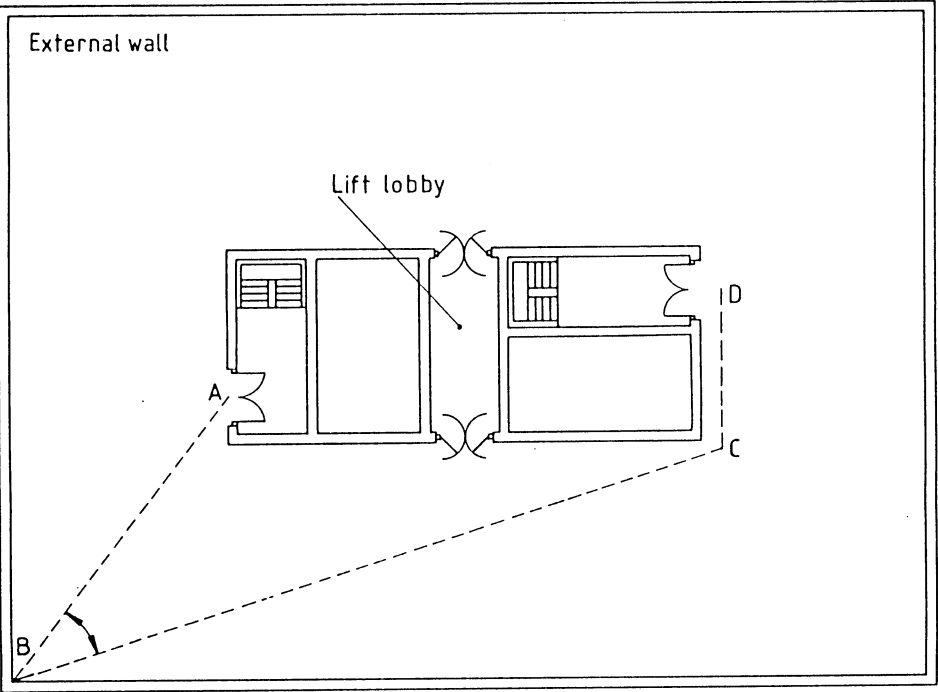
Table 1. Maximum permitted distances of travel in a storey*		
Available directions of escape	Maximum travel distance	Maximum direct distance (see note)
(a) All forms of planning except open spatial planning		
(1) In one direction only	18 m	12 m
(2) In directions less than 45 ° apart that are not separated by fire-resisting construction		
(3) In more than one direction, in directions 45 ° or more apart	45 m which may include up to 18 m with escape direction as in (1) or (2)	30 m which may include up to 12 m with escape direction as in (1) or (2)
(4) In more than one direction, in directions less than 45 ° apart but separated by fire-resisting construction		
(b) Open spatial planning, in directions either 45 ° or more apart or separated by fire-resisting construction (see 7.1.2(b))	45 m	30 m
*Additional limitations of travel within certain ancillary accommodation are given in 11.4.2 and table 8.		
NOTE. Direct distances are for design purposes only. The limitations on travel distance need to be met when the floorspace is subdivided or furnished.		





NOTE. The storey exit is the stairway door, unless the lobby is a firefighting lobby, in which case the storey exit is the lobby door.

(a) Central core with protected lobbies to protected stairways



(b) Central core without protected lobbies to protected stairways

----- indicates direct distance

AB: 12 m maximum when angle ABC is less than 45 °

Figure 3. Direct distance: central core with open storey planning

7.1.2 Recommendations. The following recommendations are applicable.

- (a) The escape routes from any storey should be of such a number and so situated that the travel distance from any point to the nearest storey exit does not exceed the appropriate limits set out in table 1.
- (b) Not less than two escape routes should be provided from every storey and working level comprising open spatial planning (see also 8.3.2 (b)).

7.2 Number of escape routes from a storey or room

7.2.1 Commentary. It is desirable that escape routes should be so planned that any person confronted by an outbreak of fire can turn away and make a safe escape (although for practical reasons, escape in one direction only is permitted in table 1 for short distances). Two exits do not increase safety if they are so placed that they both become inaccessible at the same time from one fire. The two exits should therefore be accessible in substantially different directions and if the routes to them are less than 45° apart and not separated by fire-resisting construction they should be considered to provide escape in one direction only; situations in which this occurs are also considered to be dead end situations (see figures 2 and 3).

However, if a fire occurs in a small room or storey it will have developed to such a small extent by the time the occupants become aware of it that they will normally be safe in making for a single exit door. This is only true if the room or storey contains no special fire risk, the population is not excessive and the room or storey so small (and therefore the travel distance so short) that the evolution of heat and smoke from the fire will not prevent them reaching the exit.

The number of exits from rooms and storeys has therefore to be considered separately in that a storey may require two or more exits but the individual rooms within that storey may possibly each be served by a single doorway entered from a corridor connecting alternative storey exits.

If the only escape route from a room (i.e. 'inner room') is by way of another room (i.e. 'access room'), an outbreak of fire in the access room may not immediately come to the notice of the occupants of the inner room and their escape may thereby be jeopardized. Because of this risk, an inner room is only permissible where adequate safeguards exist, including provision of early warning in the event of an outbreak of fire in the access room.

7.2.2 Recommendation. There should be not less than two escape routes available from any storey or room, except in the case of:

- (a) storeys and rooms in a building permitted to be served by a single stairway (see 8.2.2 (a));
- (b) a room where the travel distance, including the portion through the room, does not exceed that given in items (a) (1) or (a) (2) of table 1, i.e. 18 m;

(c) a room that is not likely to be used by more than 50 persons;

(d) an inner room where:

- (1) the escape routes are arranged to pass through not more than one access room, and the travel distance, including the portion through the access room, does not exceed the appropriate limit given in table 1; and
- (2) the access room is not an area of high fire risk and is in the control of the same occupier; and
- (3) at least one of the following applies:
 - (i) the enclosures between the inner and access rooms are not carried full height;
 - (ii) a vision panel is provided between the two rooms in a suitable position and is of a suitable size;
 - (iii) the access room is fitted with at least one smoke detector that operates an alarm in the inner room.

7.3 Width of exits and escape routes

7.3.1 Commentary. Every exit should be wide enough to enable the quick passage of all the occupants who may need to use it. In the case of small rooms or storeys no calculation is necessary because a 800 mm wide door would be sufficient. For corridors, etc., the width should not be less than the door width to the stairway or the width of the final exit as appropriate.

Except where a single exit is acceptable, one of the exits should be assumed to be obstructed by fire. Therefore in the case of two exits, each should be capable of letting all the occupants pass. Where three or more exits are provided, each exit in turn should be discounted in assessing the widths of the others.

The number of occupants for whom provision should be made may be known for certain areas, otherwise the numbers may be calculated from the floor space per person given in table 2; in that case the number of occupants of a room or storey can be calculated from

$$\frac{\text{area of room or storey (in m}^2\text{)}}{\text{floor space per person (in m}^2\text{)}}$$

If it is desired to occupy any office floor area to the maximum permitted under the Offices, Shops and Railway Premises Act 1963, calculations may be based on 4 m² per person, excluding stair enclosures, lifts and sanitary accommodation.

Whatever method is used for assessing the number of persons using a room or storey, the appropriate authority will need to be satisfied that adequate exits and widths of exits are provided for the number of persons actually using the premises when occupied. This is particularly important if a fire certificate is required.

The number of occupants of a building is the sum of the numbers of occupants of the storeys in the building.

Table 2. Suggested floor space factors

Description of room or storey	Floor space per person, excluding stair enclosures, lifts and sanitary accommodation
1 Coffee lounge, committee room, conference room, dining room, meeting room, restaurant, common room, lounge, reading room, staffroom, waiting room	m ² 1.0
2 Open plan offices	5.0
3 Library, other offices, kitchens	7.0
4 Storage accommodation, car park*	30.0
NOTE. These floor space factors are for guidance only and should not be taken as the only acceptable densities. * Alternatively, two persons per parking space.	

7.3.2 Recommendations. The capacity of exits or escape routes should be calculated in accordance with table 3. The capacity or aggregate capacity of exits and escape routes should be not less than the number of occupants of the storey. If two or more exits or escape routes are required, the capacity or aggregate capacity should be not less than the number of occupants of the storey when in turn the capacity of each exit or escape route is discounted. For the purposes of table 3, the width of a doorway is that of the leaf or leaves, and of a passage is between the sides at shoulder level.

Table 3. Capacities of escape routes within a storey and of any exit leading therefrom

Maximum number of persons	Width	Maximum number of persons	Width
	mm		mm
50	800	280	1400
110	900	300	1500
220	1100	320	1600
240	1200	340	1700
260	1300	360	1800
NOTE. Other values of width for a maximum number of persons greater than 220 may be obtained by linear interpolation or extrapolation.			

7.4 Corridors

7.4.1 Commentary. Corridors are not necessarily required for means of escape purposes. However, where provided,

the corridor should be completely enclosed in order to restrict the spread of smoke in the early stages of a fire. Where a corridor provides escape in one direction only, i.e. is a dead end, it is necessary for its construction to enable occupants to safely pass a fire in an adjacent room and reach an exit or protected stairway.

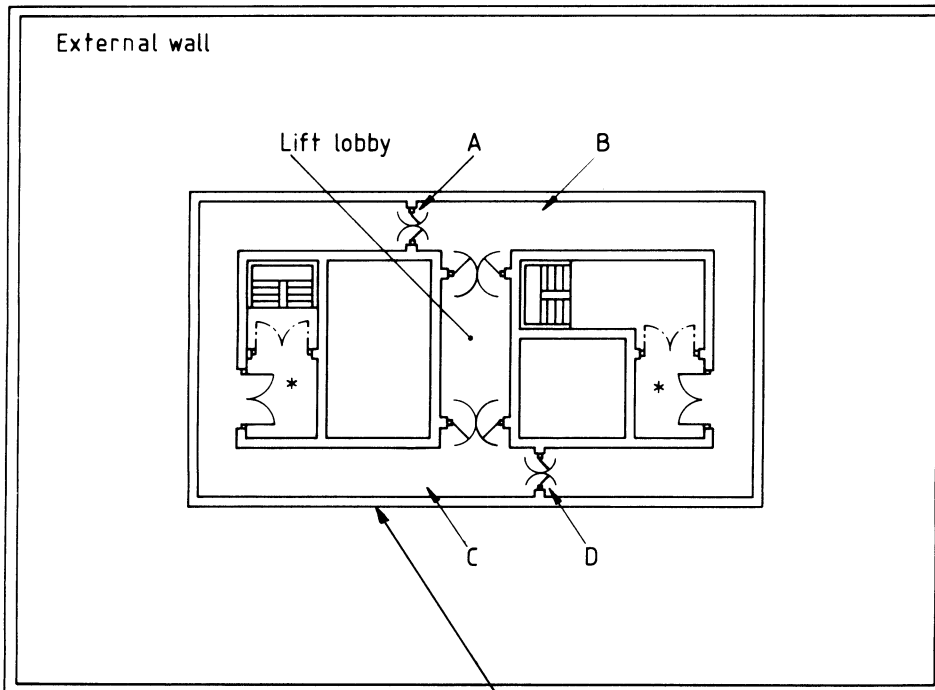
To prevent a corridor that connects alternative exits becoming smoke logged along its length, it is necessary to divide that corridor by the erection of a smoke control door and associated screen. Similarly, communicating corridors need to be separated so as to restrict the movements of smoke. The separating doorset should be located approximately midway between the two exits it is to separate. If there are doors serving the same room on both sides of the separating doorset (see figure 6 (a)) then these doors need to be self-closing. However, the location of the separating doorset in such corridors is not an arbitrary restriction on the length of undivided corridors, but should reflect the need to maintain the integrity of the means of escape.

7.4.2 Recommendations. The following recommendations are applicable.

- Corridor partitions should be carried up to the underside of the structural floor above, or to a suspended ceiling. All openings, other than to an enquiry or reception area, should be fitted with doors.
- Dead end corridors should be enclosed with fire-resisting construction and all doors within the enclosures should be fire-resisting and self-closing.
- Communicating corridors and dead-end corridors should be separated as indicated in figures 4 and 5 respectively. Corridors connecting alternative exits more than 12 m apart (measured along the centre line of the corridor) should be subdivided as indicated in figure 6. Any doors to the accommodation that would allow smoke to bypass the separating door should be provided with door closers complying with BS 6459 : Part 1.
- Recesses off corridors as shown in figure 7 or extensions of corridors beyond protected stairways as shown in figure 8 are not required to meet the recommendations of items (b) and (c) in respect of dead end situations unless:
 - the corridor is otherwise required to be in fire-resisting construction; or
 - the accommodation served is otherwise required to be separated from other parts of the building by fire-resisting construction.

7.5 Offices in different occupation

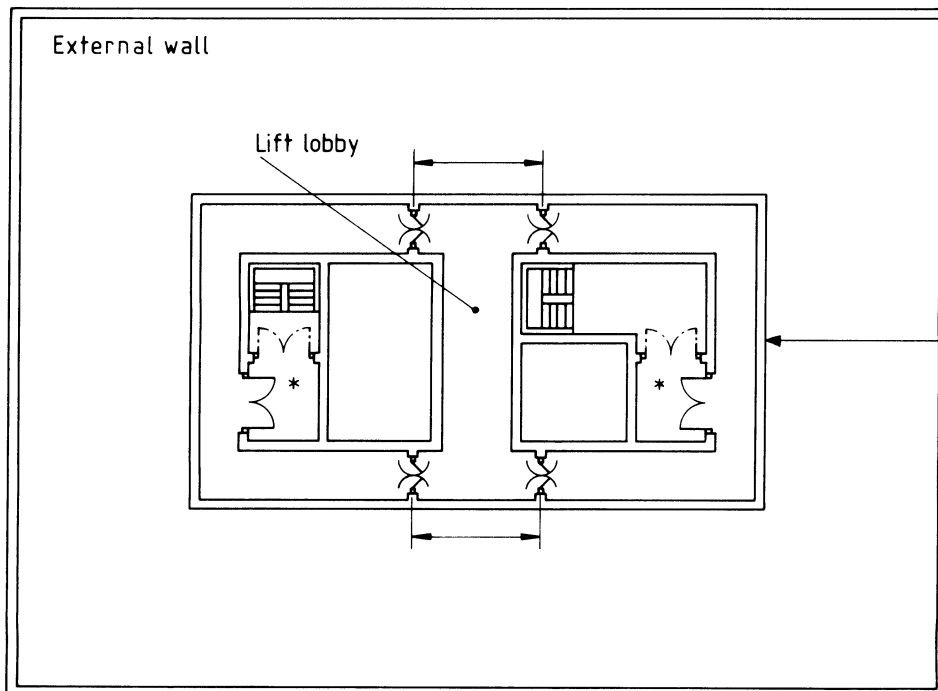
7.5.1 Commentary. The occupants in one tenancy may not become aware of an outbreak of fire in an adjacent, possibly empty, tenancy. Therefore it is essential that adequate safeguards exist in the planning of escape routes and there is structural fire separation between tenancies or provision of a fire detection and alarm system.



Two doors may be at A and D, or B and C, but not at A and C or B and D.

(a) Example 1

Doors to accommodation (not shown) may be placed anywhere in this wall.



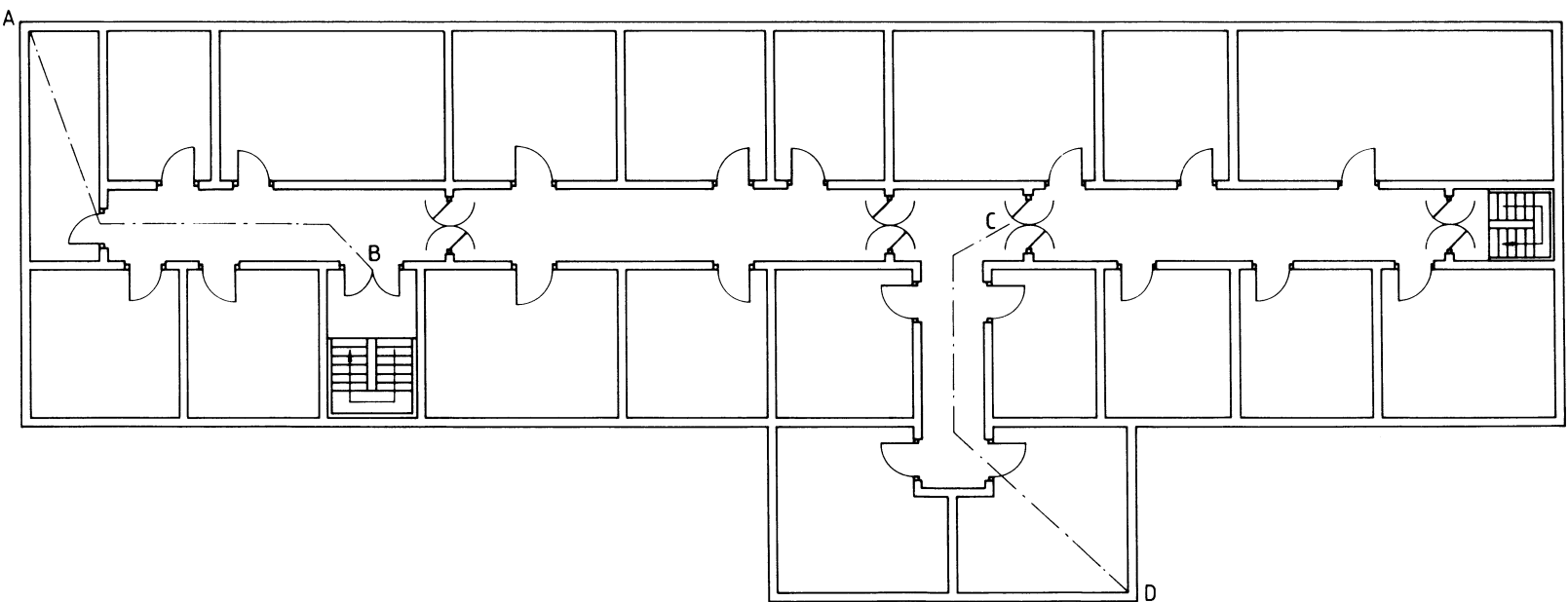
(b) Example 2

A corridor connecting both stairways should be divided both sides of the central core by doors arranged as indicated in (a) or (b).

*Stairways require lobby approach in buildings over 18 m in height (see 2.11).

Figure 4. Corridor layouts: central core

Doors to accommodation (not shown) may be placed anywhere in this wall except between the arrows.



AB and DC are dead ends.

Figure 5. Dead end corridors