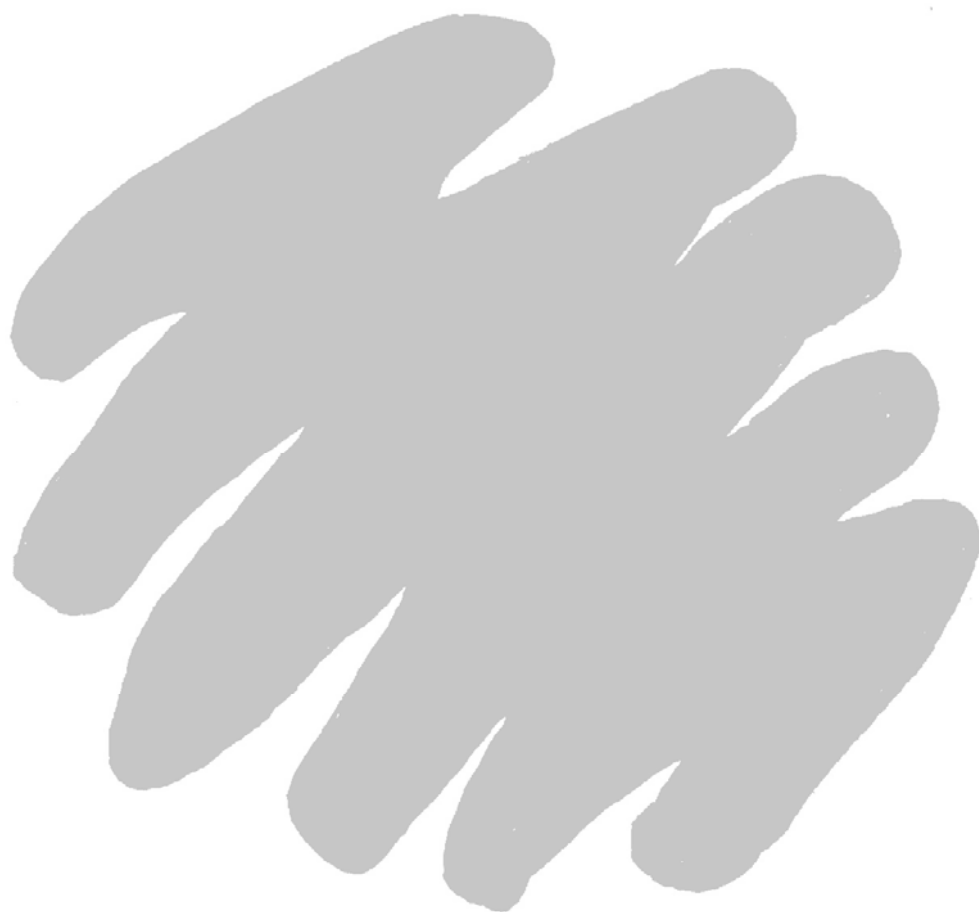
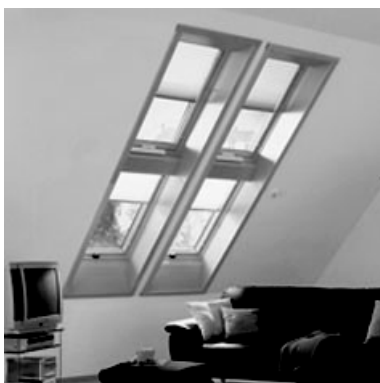


INCORPORATING
AMENDMENTS UP TO
& INCLUDING APRIL 2007

The Loft Shop
Guide to
**LOFT
CONVERSIONS
and the
BUILDING
REGULATIONS**

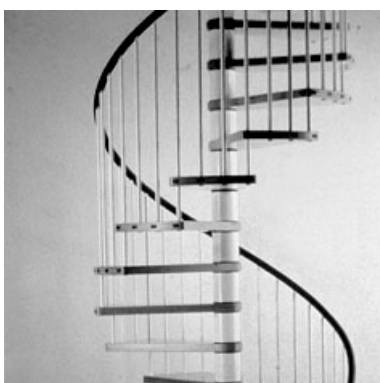




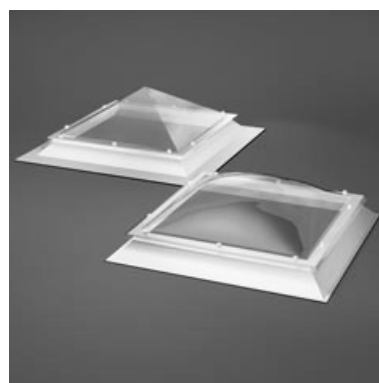
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1.0 INTRODUCTION

1.1 This guide considers the extension of a typical 2 storey dwelling into 3 storeys, by the addition of a 'Loft Conversion' within the existing roof space. The booklet is not intended to cover every aspect of the design, as its primary purpose is to highlight the basic construction considerations as they relate to the Building Regulations.

1.2 For the purpose of this booklet, it is assumed that the proposed conversion will not;

a) exceed 50m² in floor area

b) contain more than two habitable rooms in the new second storey

Note: If the proposal involves the conversion of a loft space above a bungalow, the fire safety provisions indicated in Section 4 may not all be applicable, other than the provision of linked smoke alarms and an alternative means of escape such as a dormer or roof window.

1.3 When considering a loft conversion, the relevant Planning Authority must be contacted to check whether an application is required under the Town and Country Planning Act. Building Regulation consent will *always* be required when a loft is converted into a habitable space.

1.4 The information contained in this document is the interpretation of The Loft Shop Limited and thus may not be the interpretation of any Local Authority Building Control Department, which under its powers may decide that a particular method of construction is unsatisfactory if, in the findings of the Building Control Authority concerned, it may be unsafe in construction or use. Accordingly the information contained in this document must not be regarded as anything more than helpful guidance, and it is important that it is read in conjunction with the appropriate Approved Documents, copies of which are available from The Loft Shop Limited. *(see also page 4, Note referring to App. Doc.B. Fire Safety)*



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2.0 THE BUILDING REGULATIONS

2.1 The Building Regulations were originally designed as a set of rules to be followed to ensure that when new building work, refurbishment or extension takes place, the work results in a structure that is safe to use and energy conscious.

In 1985 the Building Regulations were completely revised and published in the form of Approved Documents, each of which covers a specific aspect of the building as follows;

1 Approved Documents and amendments thereto are published by the Office of the Deputy Prime Minister (ODPM).

Publications are available from HM Stationery Office outlets and can also be viewed or downloaded from the internet by going to;
[www.odpm.gov.uk/building regulations](http://www.odpm.gov.uk/building%20regulations).

2 All references to the Approved Documents (in italic typeface in parenthesis) can be checked on the above website or at one of the larger Public Libraries.

3 References to BRE Digests can be checked online by going to either www.buildingcentre.co.uk or www.brebookshop.com

Approved Document A	Structure
Approved Document B	Fire safety
Volume 1: Dwellinghouses	
Volume 2: Buildings other than Dwellinghouses	
Approved Document C	Site preparation and resistance to contaminates and moisture
Approved Document D	Toxic substances
Approved Document E	Resistance to the passage of sound
Approved Document F	Ventilation
Approved Document G	Hygiene
Approved Document H	Drainage and waste disposal
Approved Document J	Combustion appliances and fuel storage systems
Approved Document K	Protection from falling, collision and impact
Approved Document L	Dwellings
L1.A: Conservation of fuel and power (New dwellings)	
L1.B: Conservation of fuel and power (Existing dwellings)	
Approved Document L	Buildings other than dwellings
L2.A: Conservation of fuel and power (New buildings other than dwellings)	
L2.B: Conservation of fuel and power (Existing buildings other than dwellings)	
Approved Document M	Access to and use of buildings
Approved Document N	Glazing
Approved Document P	Electrical safety
Approved Document for Regulation 7	

The Approved Documents aim to provide practical guidance on how to comply with the functional requirements of the Building Regulations. If a person can demonstrate compliance in a different way, then that should be acceptable. However the overall intention of the Approved Documents is to ensure that the building work is completed with proper materials, in a workmanlike fashion and to ensure a healthy, safe, energy conserving environment for the user. The Approved Documents are subject to on-going review and amendment.

The following text is based on all the known amendments up to and including April 2007.



DEFINITIONS

Aircrete blocks

A proprietary lightweight insulation block with exceptional strength made from sand, PFA cement, lime, aluminium powder and water.

Alternative escape

Escape routes sufficiently separated by either direction and space, or by fire-resisting construction, to ensure that one is still available should the other be affected by fire.

Boundary

The boundary of the land belonging to the building, or where the land abuts a road, railway, canal or river, or the centre line of that road, railway, canal or river.

Ceiling

A part of a building which encloses and is exposed overhead in a room, protected shaft or circulation space.

Circulation space

A space (including a protected stairway) mainly used as a means of access between a room and an exit from the building or compartment.

Dwellinghouse

A unit of residential accommodation occupied (whether or not as a sole or main residence) -

- a) by a single person or by people living together as a family
- b) by not more than six residents living together as a single household.

Escape route

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

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.

Fire door

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

Fire-resisting

The ability of a component or construction of a building to satisfy, for a stated period of time, some or all of the appropriate criteria specified in the relevant part of BS.478.

Habitable room

A room used, or intended to be used, for dwellinghouse purposes, including a kitchen but not a bathroom.

Imperforate

Any material without perforations or holes.

Notional boundary

A boundary presumed to exist between buildings on the same site.

Protected stairway

A stair discharging through a final exit to a place of safety (including any exit passageway between the foot of the stair and the final exit) that is adequately enclosed with fire-resisting construction.

Relevant boundary

The boundary which the side of the building faces, and/or coincides with, and which is parallel, or at an angle of not more than 80° to the side of the building. A notional boundary can be a relevant boundary.

Rooflight

A dome light, lantern light, skylight, ridge light, glazed barrel vault or other element intended to admit daylight through a roof.

Single-storey building

A building consisting of a ground storey only. Basements are not included in counting the number of storeys in a building.

Smoke alarm

A device containing within one housing, all the components, except perhaps the energy source, necessary for detecting smoke and giving an audible alarm.

Unprotected area

An area in relation to a side or external wall of a building that is -

- a) a window*, door or other opening
- b) any part of the external wall which has less than the relevant fire-resistance set out in App. Doc.B
- c) any part of the external wall which has combustible material more than 1mm thick attached or applied to its external face, whether for cladding or any other purpose. Combustible material in this context is any material which does *not* have a Class O rating.

* *Note.* Windows that are not openable and are designed and glazed to provide the necessary level of fire-resistance need not be regarded as an unprotected area.

11.13 RIGID BOARD INSULATION

Check that any rigid board insulation supplied for use in the rafter voids is a high-performance foam-based insulant and *not* the cheaper white polystyrene normally used for cavity wall insulation. The former is thermally twice as efficient and also allows increased height in the room. If in doubt contact your Building Control Department for advice.

11.14 FD20 SPECIFICATION FIRE DOORS

Check that the FD20 fire-resisting doors comply with the ratings in BS.476.Part 22. Two hinges would normally be provided for this rating. (see para. 4.28, page 9)

11.15 FLUES

Check the external outlets from flues on gas-burning appliances. These should be situated so as to allow the dispersal of combustion products, and the intake of clean air for balanced flues.

(Figure 29).

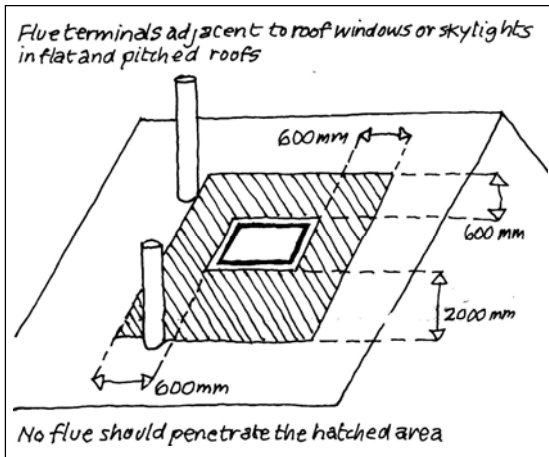


Figure 29

3.0 APPROVED DOCUMENT A - STRUCTURE

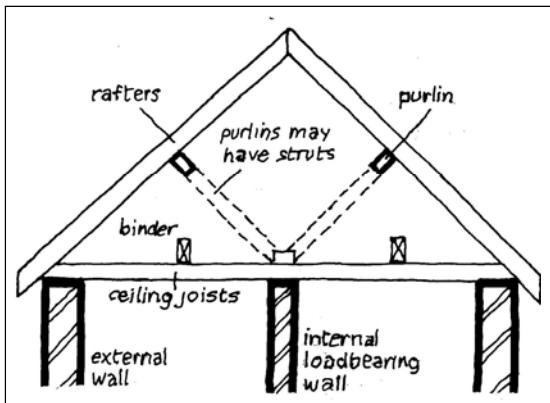


Figure 1

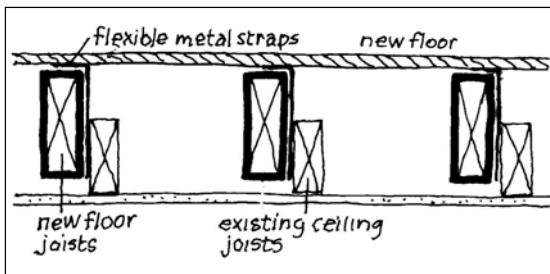


Figure 2

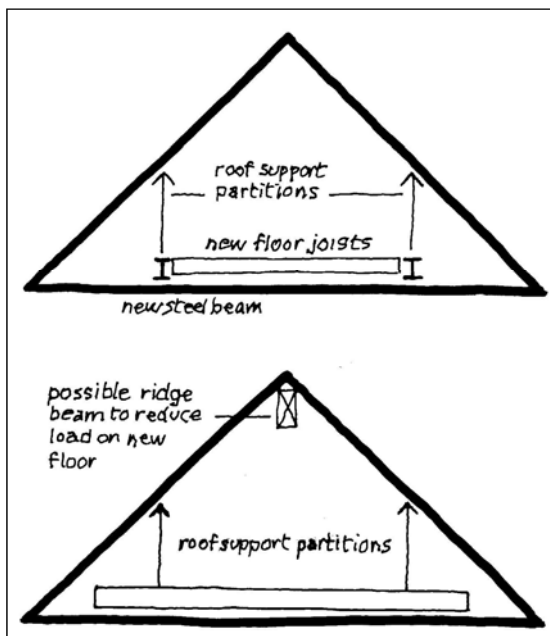


Figure 3

STRUCTURAL STABILITY

3.1 In assessing the structural stability requirements, it is essential to consider the existing roof construction, the new floor and the impact the alterations may have on the existing structure. For the purpose of illustration and discussion it is intended to concentrate on a typical 'cut' roof involving purlins, rafters and ceiling joists as shown in **Figure 1**.

Alteration to a trussed rafter roof (used since the 1960's) requires additional structural considerations and our advice is to consult a structural engineer early in the design process.

3.2 It is clearly advisable to construct the loft conversion with the minimum disruption to the existing roof structure. The position of the purlins is a prime factor in determining the extent of the clear unobstructed internal area available.

Figure 2 shows two typical arrangements. The existence of load-bearing walls at first floor level is an advantage in conversion work as they can provide support to any load-bearing elements transferred from the roof, wall partitions and the new floor.

3.3 In the majority of instances the existing joists will be inadequate to carry the imposed loading on the new floor construction.

A commonly used solution is to provide new floor joists fixed alongside the existing ceiling joists and spanning any available load-bearing supports as shown in **Figure 3**.

The new floor joists must also be capable of supporting the existing ceiling, particularly where binders are to be removed. Where the new floor joists have to carry any roof load, as shown in **Figure 2**, the floor joists need to be suitably designed. A structural engineer will be able to prepare the relevant calculations.

3.4 NEW FLOORS

Where the available height within the loft space is restricted, it is of benefit to restrict the depth of the new floor joists to a minimum. This can be achieved (a) by reducing the span of the joists where internal load-bearing walls permit, (b) by using a higher strength timber classification eg. SC4 instead of SC3, or (c) by reducing the spacing between the joists.

(see App. Doc. B. page 31, para 4.7)

3.5 When considering the minimum depth permissible for the new floor joists, choose the section that offers the greatest resistance to deflection. Although a lesser section at the limit of its load/span capability may be more economic and unlikely to fail structurally, serious damage may occur to a perfect plasterboard ceiling, due to deflection of the joists when they are fixed alongside and to the existing ceiling joists.



4.0 APPROVED DOCUMENT B. FIRE SAFETY – VOLUME 1. DWELLINGHOUSES (revised 2006)

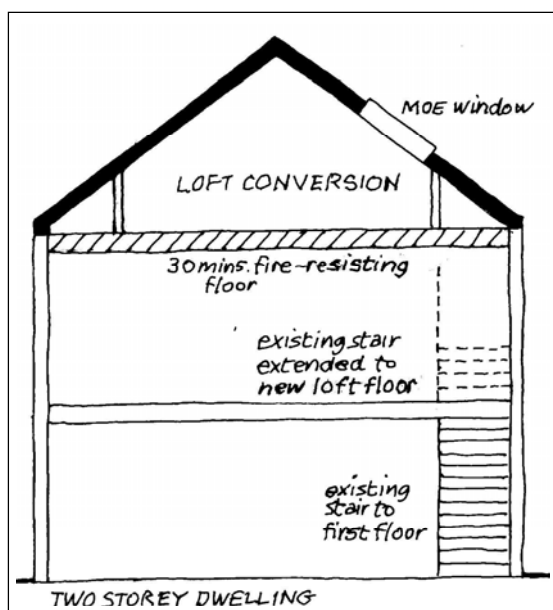


Figure 4.1

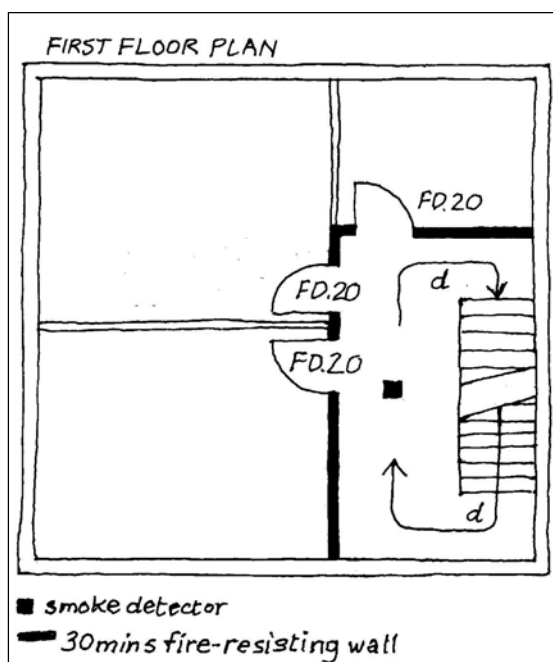


Figure 4.2

PLEASE NOTE -

CHANGES TO APPROVED DOCUMENT B - FIRE SAFETY.

Changes to the 2007 version of the Building Regulations are extensive and detailed. When changes of such a scale are implemented, it is difficult to produce a comprehensive explanation of the regulations, which have yet to be tested by Building Control Officers dealing with the application of the regulations to actual cases. Accordingly this part of the guide must be treated with a degree of caution until we can produce an experience-based commentary, perhaps in the early part of 2008.

You are also asked to take note of the qualifications referred to under paragraph 1.4 in the Introduction to this document. (page 1).

4.1 MEANS OF ESCAPE IN CASE OF FIRE

The addition of an extra storey to a dwellinghouse introduces a greater risk to the occupants of that new storey, in the event of fire, than to those on lower storeys. The Building Regulations therefore require additional measures to ensure a safe means of escape from the building. Approved Document B. Section 2. Means of Escape, illustrates different situations and how the regulations are to be applied. The two examples given here are for loft conversions to a single storey dwelling (A) and a two storey dwelling (B).

(For Loft Conversions see also App. Doc. B. page 23, para 2.20.b and notes.)

4.2 Example A. Escape from upper floors *not* more than 4.5m above ground level.

For example a loft conversion in a bungalow – (see App.Doc.B. page 17, para 2.4)

All habitable rooms in the upper floor of a single storey dwellinghouse should be provided with -

- (i) an escape (MOE) window (or external door) (see App. Doc. B, page 19, para. 2.8) **(Figures 6 and 7)** or
- (ii) direct access to a protected staircase.

4.3 Example B. Escape from a dwellinghouse with *one* floor more than 4.5m above ground level.

For example a conventional loft conversion in a two storey dwellinghouse – (see App. Doc. B. page 17, para 2.6.)

(Figures 4 and 5).

The dwellinghouse should have -

- (i) a protected stairway with 30mins fire-resistance, and FD.20 doors, leading directly to the final exit and outside the building. **(Figures 4 and 5)** or
- (ii) access to at least two escape routes leading to final exits and separated from each other by fire-resisting construction, **(Figures 4 and 5)** or
- (iii) the top storey should be separated from the lower storeys by fire-resisting construction and provided with an alternative escape route leading to its own final exit.



11.7 SLIDING HINGES

Check that the windows are not fitted with the 'slide-across' type of hinge, as although this facilitates easy cleaning, it may also reduce the effective opening size of the window below the minimum recommended ($0.33m^2$) (see para. 4.12, page 6).

11.8 ALIGNMENT OF WALLS

Check the alignment of load-bearing walls, as often they are offset between floor levels, resulting in existing floor joists taking considerable loads from walls above that bear on them. In this situation it will be necessary to ascertain whether the existing joists can support any additional loading imposed by the new loft conversion. We suggest that a structural engineer is consulted for any calculations that may be required by your local Building Control Department.

11.9 PARTY WALLS

Check the construction of party walls at roof level. Cavity walls or 225mm solid walls usually present few problems, but 100mm single skin walls can be a problem when beams or floor joists have to bear on them. Design solutions that avoid penetration of such walls should be adopted. Fire-proofing should be installed at roof level and at beam bearings. In many old terraced and semi-detached houses, the party walls do not extend above the ceiling line, in which case you should erect new party walls in the roof space to ensure adequate fire-resistance and sound insulation between the houses.

THE PARTY WALL etc. ACT 1996

If you intend to carry out building work that involves work on an existing wall or structure shared with another property, you must first find out whether that work falls within the Act. If it does then you must notify all the neighbours affected. Guidance to the Act can be found on the internet or from a Party Wall Surveyor.*

* Go to www.odpm.gov.uk, then Building Regulations, then Party Walls.

* Party Wall Surveyors can also be contacted via. www.rics.org.

11.10 SLIDING DOORS

Check for the existence of sliding doors to any rooms that open off the stair enclosure, and replace them with FD.20 hinged doors.

11.11 PLASTIC/NYLON HINGES

Check for the use of plastic hinges and door furniture and replace. The Building Regulations require all hinges on fire-resisting doors to have a melting point above 800°C. (see para. 4.28, page 9)
(see also App. Doc. B. page 66, note 3)

11.12 MINERAL/GLASS FIBRE QUILT

Check that the quilt specified or used for 30mins. fire-resistance to the new floor is mineral fibre and not fibreglass, as the former is non-combustible and therefore fire-retardant, whereas the latter is highly flammable in some product forms.



11.0 CHECKLIST

11.1 CHIMNEY FLUES

Check for the existence of chimney flues within the roof space. The position of any flues may prove critical to the design, because of the obvious fire risk, and it is *not* recommended to penetrate the masonry construction with the floor support beams or ridge beams etc.

Combustible material should be separated from a brick or blockwork chimney, by at least (a) 200mm from a flue, or (b) 40mm from the outer surface of the chimney. In addition metal fixings or timber beam hangers, should be at least 50mm from a flue. (**Figures 27 and 28**).

Flues should be checked to ensure that they are in sound condition and not leaking smoke or gases into the roof space. Any defects or leakage should be repaired by relining the flue and/or rendering the chimney wall. If the chimney is in a serious state of disrepair, the only solution may be to rebuild the chimney stack.

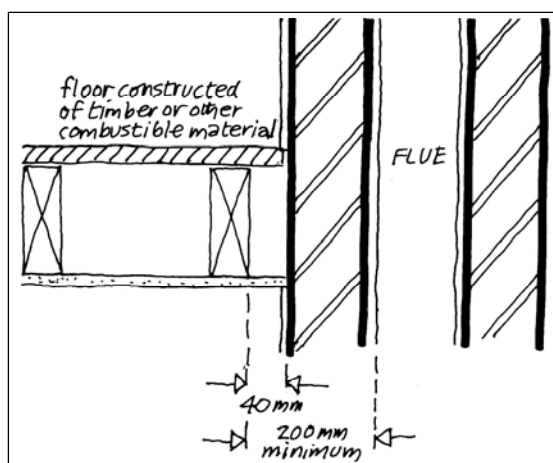


Figure 27.

11.2 HEADROOM OVER A STAIRCASE

Check that sufficient headroom exists over the area allocated for the new stair (**Figure 18 page 12**) and refer to *Problem Solving - page 14*. for a possible solution.

11.3 THROUGH ROOMS

Check whether any load-bearing walls, at ground floor level, have been removed to create a 'through room' situation. Where this is the case it will be necessary to ascertain the type of lintel/beam used to bridge to opening in the load-bearing wall, and establish its ability to support the additional load imposed by the new loft conversion. We suggest that a structural engineer is consulted for any calculations that may be required by your Building Control Department.

11.4 CONSERVATORIES

Check whether a conservatory or pitched roof extension exists below the point at which any new escape window is to be fitted. There are two reasons for this.

- (a) the conservatory/pitched roof extension may restrict the safe use of a ladder for escape purposes, and
- (b) translucent roof sheeting is incapable of supporting the weight of a person using it for escape purposes.

Note; Flat roof extensions may be more acceptable in this situation.

11.5 SOIL-VENT PIPES

Check that any new or existing soil-vent pipes terminate at least 900mm above any opening in the building (ie. a roof window or dormer window) which is within 3.0m of the pipe.

11.6 BAY WINDOWS

Check that existing lintels over bay windows are capable of supporting any extra loading imposed by the floor joists etc. We suggest that a structural engineer is consulted for any calculations that may be required by your local Building Control Department. If the existing arrangement is shown to be unsatisfactory then a replacement lintel will be required.

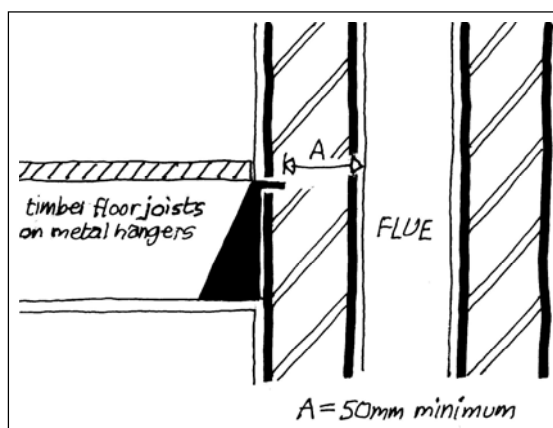


Figure 28.

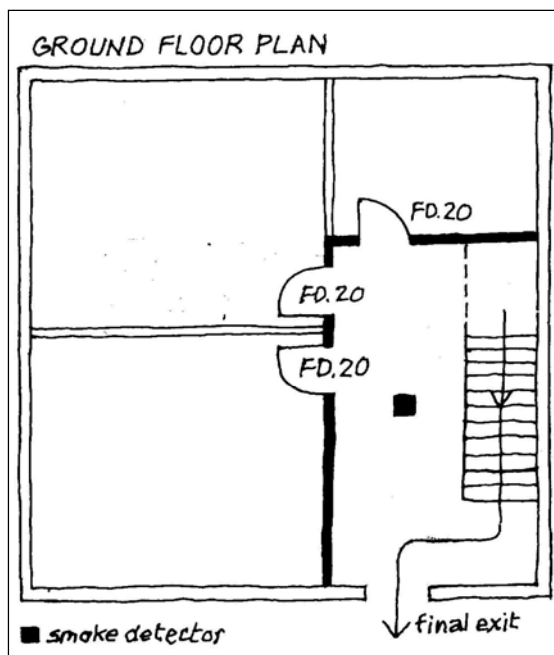


Figure 4.3

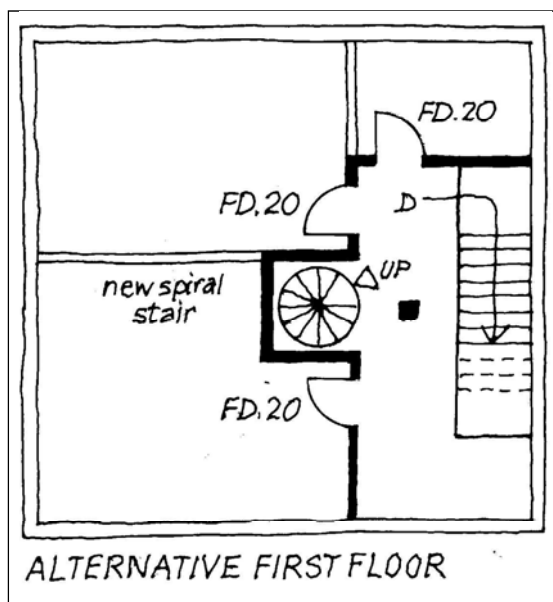


Figure 5.1

For Ground Floor plan see Figure 4.3

4.4 A single window may serve two rooms in a loft conversion, provided both rooms have separate access to a protected stairway. A communicating door between the two rooms should also be provided to gain access to the window without passing through the stair enclosure.

4.5 The arrangement for means of escape from a dwellinghouse with two or more floors more than 4.5m above ground level, requires more stringent regulations and these should be discussed with your local Building Control Department at the planning stage.

4.6 One of the principal requirements for a safe means of escape, is the discharge of the existing staircase at ground floor level. This should lead directly to the front entrance door within the existing hallway, or other exit to outside the building. However it is not uncommon to find layouts where the staircase discharges into a living area. In this instance it will be necessary to provide *two escape routes* at ground floor level, each leading to final exits and separated from each other by 30 mins fire-resisting construction with FD20 fire doors.

(see App. Doc. B. page 17, para 2.6 (a.ii))

Alternatively one protected escape route to a final exit may be acceptable provided that a sprinkler system is installed at every floor level. (Figure 5)

4.7 Having established a satisfactory arrangement at ground floor level, it is then necessary to consider how the escape route from the new loft conversion can be protected to provide a safe means of escape. The best method is to locate the escape stair in a fully protected enclosure, with 30mins fire-resistance, from the upper (loft) level down to the ground floor and the final exit. In addition all the doors to this stair enclosure, at each floor level (including the new loft conversion), should be fitted with FD20 doors.

(see note on hinges to fire doors, para. 4.28).

The floors may also need upgrading to 30mins fire resistance.

(Guidance is given under Structural Fire Resistance paras. 4.17 to 4.19)

4.8 The alternative method of escape has been deleted from the revised App. Doc. B (2006) and roof windows are no longer acceptable as an alternative means of escape, with reduced protection to the staircase and the use of doors with a self-closing device. (also para. 6.2, page 10)

(see App. Doc B, page 0, para f.iii).

4.9 Access to the new storey (loft conversion) from the first floor must also be considered. Generally this will be an extension of the existing staircase from the first floor landing level, but where space is restricted, the new staircase can be located as shown in the alternative layout, with the existing staircase from ground to first floor and a separate new circular stair in a 30mins fire-resisting enclosure giving access to the loft conversion. (Figure 5.)



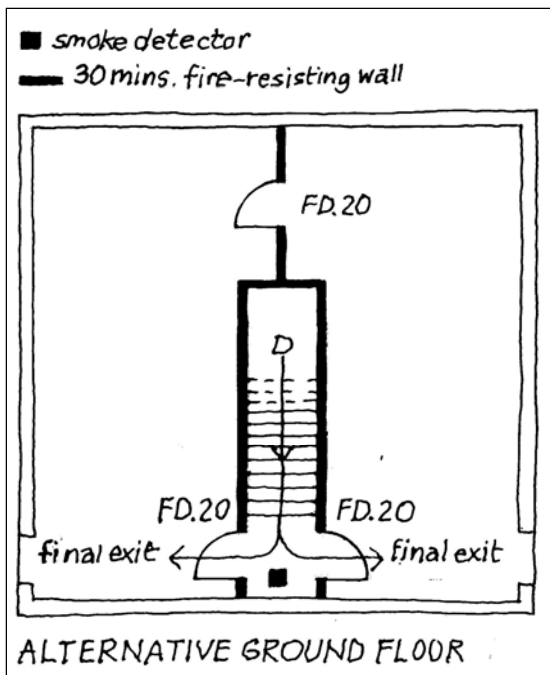


Figure 5.2

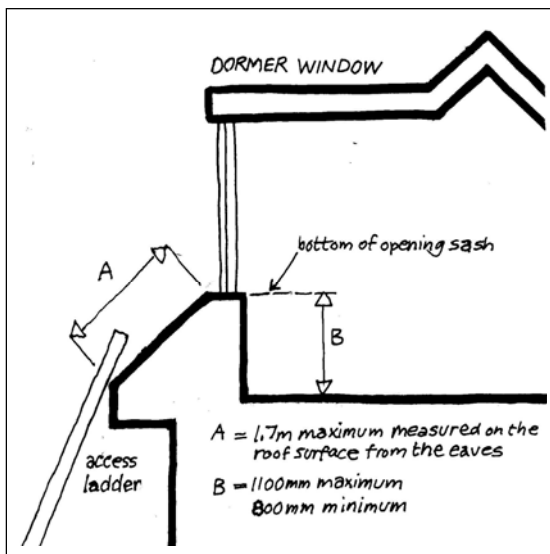


Figure 6

4.10 Where a new MOE window is fitted in a new loft conversion, it should be located so as to allow access by ladder from ground level, to rescue persons escaping from the building. Suitable pedestrian access must therefore be provided for the ladder and consideration given to the position of all existing extensions at ground level, which may affect where the ladder could be positioned.

The external access to roof windows and dormer windows is illustrated in **Figures 6 and 7**.

4.11 EMERGENCY EGRESS WINDOWS AND EXTERNAL DOORS - (App. Doc. B. page 19, para. 2.8)

In the new document, MOE roof windows are no longer accepted as an alternative means of escape, where the dwellinghouse has a 30 mins.fire-resisting stair enclosure. (see 4.8 above)

However as a window will be required for light and ventilation, it can also serve as an additional means of escape.

Where an MOE window is provided (**Figures 6 and 7**) it should conform to the relevant Building Regulation, with an unobstructed opening size of $0.33m^2$. Both the height and the width should not be less than 450mm. (for example a window size 450 mm wide x 735 mm high = $0.33m^2$)

(see App. Doc. B. page 19, para, 2.8a)

4.12 NOTES

Note 1. Refer to para. 6.2, page 10 for the method of calculating window ventilation area.

Note 2. An escape window must be designed so that it will remain in the 'open' position without being held by the person making their escape.

(App.Doc.B. page 19, para 2.8, Note 3)

The bottom of the openable part of the window should *not be more* than 1100mm above the floor. App. Doc, K, specifies a minimum guarding height of 800mm, except for roof-windows where the bottom of the window may be 600mm above the floor.

(**Figures 6 and 7**)

(see App. Doc. B. page 19, para 2.8.b and Note 1).

Note 3. Locks, with or without removable keys) and window stays, may be fitted to MOE windows provided that the stay is fitted with a release catch, which may be child resistant.

(see App. Doc. B. page 19, para 2.8. note 2)

4.13 For the purposes of the Building Regulations, lifts, portable ladders, throw-out ladders, fold-down ladders and chutes, are not acceptable as means of escape.

(see App.Doc.B. page 13, para B.1.vi)

Note; The Regulations do not prohibit the use of the above items as *additional* features, provided there is compliance with the relevant regulations regarding means of escape.

4.14 SINGLE MOE WINDOW

In a two-room loft conversion a single MOE window can serve two adjoining rooms, provided each room has its own access to the escape staircase. A connecting door between the two rooms should be provided for access to the escape window, when the other window cannot be reached from the ground for escape purposes.

(**Figures 6 and 7**, and Ventilation para. 6.2)

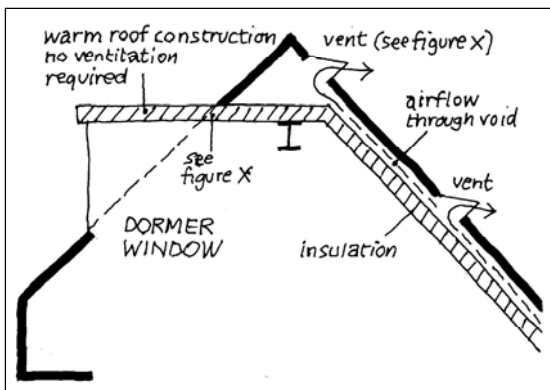


Figure 24.

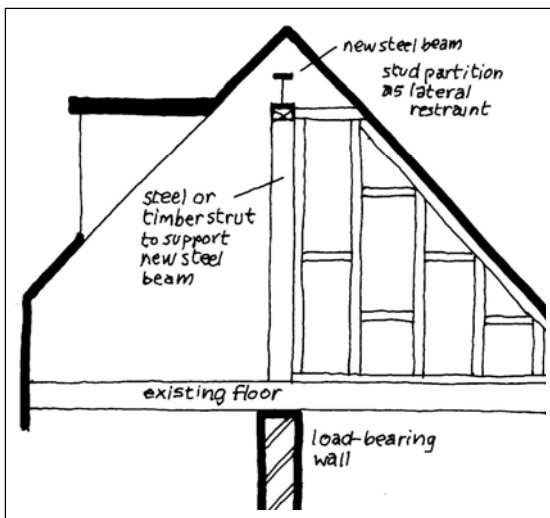


Figure 25.

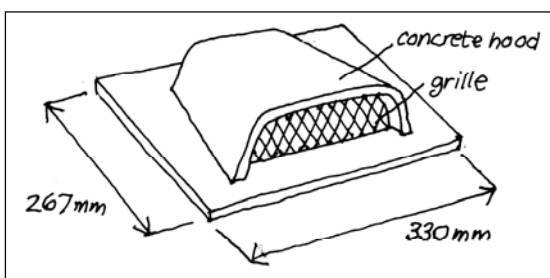


Figure 26.

10.6

Problem - The junction between a flat-roofed dormer window and the ridge of the house is in some cases difficult to ventilate in accordance with the Building Regulations.

Solution - Provide a 'warm' roof construction to the dormer window, which will dispense with the requirement to ventilate the joist voids in this section of the roof. The existing part of the pitched roof can be ventilated by means of slate or tile roof vents at the ridge and eaves. (**Figure 22, page 13, and Figure 24**).

Note; Warm roof construction is achieved by placing the layer of insulation across the top of the roof joists, creating a warm roof void which will not be subject to condensation and therefore requires no ventilation.

10.7

Problem - A steel or timber beam is often required at the ridge level, but the point of bearing coincides with the chimney flue.

Solution - This situation often occurs in large dormer window designs where a ridge beam is normally a structural requirement. Reference to the Checklist item on chimney flues (para, 11.1, page 16) will indicate that combustible material and metal fixings should be separated from a brick or blockwork chimney, and this requirement generally precludes an easy solution to the problem of beam support. An answer can be found if the property possesses a central load-bearing masonry wall, on which a suitable vertical metal or timber post can bear. This post can then accept the load from the ridge beam provided it is separated from the flue in accordance with the guidance given in Approved Document B, and forms part of a studwork wall suitably nogged and fixed at both rafter and the new floor level. This will ensure lateral stability is maintained within the structure as shown in **Figure 25**. We recommend that a structural engineer is consulted for any calculations that may be required by your local Building Control Department.

Note; A beam supporting only the roof structure (ie. at ridge level) does NOT require fire-proofing to the 30 mins. standard.

10.8

Problem - Ventilation is required in a plain tile roof.

Solution - Ventilator roof tiles are available for slates and most types of concrete interlocking tiles, but due to the small size of plain tiles, it is often assumed that this method cannot be used.

In reality there are several proprietary methods of ventilating plain tiled roofs (dependent on the type and finish of the tile) and the major tile manufacturers should be contacted for details of their individual solutions. **Figure 26** illustrates a typical plain tile ventilator.



10.0 TYPICAL PROBLEMS AND SOLUTIONS

10.1

Problem - Insufficient headroom exists over the landing at the top of the new loft stair.

Solution - The obvious answer is to construct a small dormer window over the landing. A far more economical solution which will gain approximately 150mm of headroom, is to install a roof window over the landing area. This will also provide natural light, but may need to be fixed shut if the centre pivot type is used.

10.2

Problem - Existing fascia board is fixed directly against the wall providing no soffit for eaves ventilation.

Solution - Provide an adequate number of slate or tile ventilators, allowing an interchange of air to the triangular void formed by the rafters, ceiling joists and vertical stud walls.

10.3

Problem - A 100mm diameter soil vent pipe is obstructed by the new structure.

Solution - It may be possible to use an air admittance valve to solve this problem, making it possible to terminate the vent pipe within the roof space. However some Local Authorities will not permit these to be used and in such cases the vent pipe can be reduced to 50mm diameter in order to negotiate the restriction. The term 'vent' pipe refers to the dry section of the soil pipe above the uppermost sanitary fitting.

10.4

Problem - Lack of cross ventilation to the roof where jack rafters abut the hip rafters.

Solution - If the area involved is very small it may not be considered necessary, for health and safety reasons, to provide ventilation in this area of the roof, provided the remainder of the roof is adequately ventilated. However, subject to the advice of a qualified person, some through ventilation can be achieved by drilling holes in the neutral axis of the hip rafter. (Figure 23.)

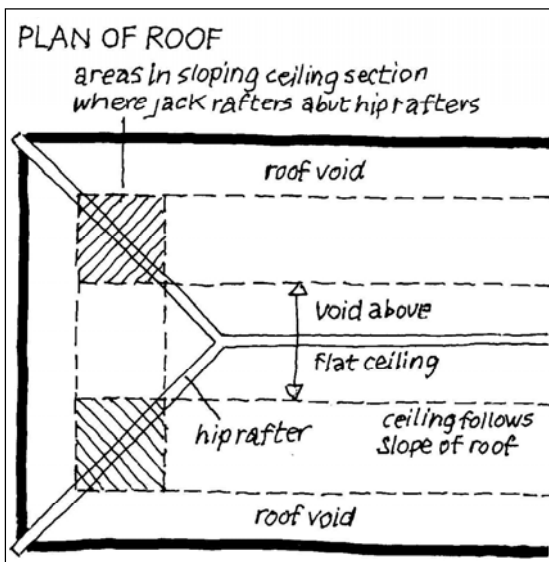


Figure 23

10.5

Problem - The junction between a flat roof dormer window and the ridge of the house is, in some cases, difficult to ventilate in accordance with the Building Regulations.

Solution - Provide a 'warm' roof construction to the dormer window, which will dispense with requirement to ventilate the joist voids in this section of the roof.

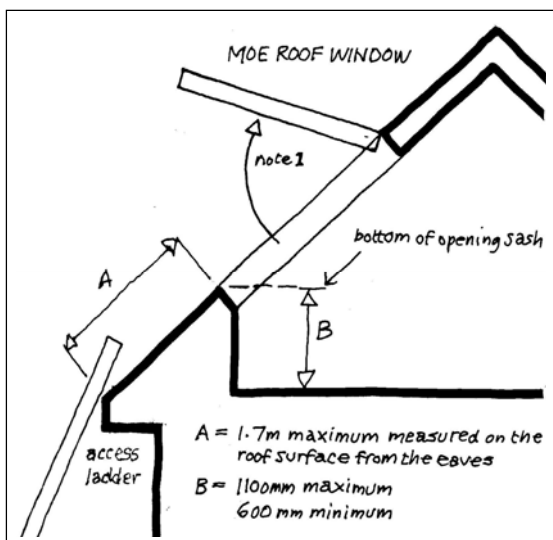


Figure 7.

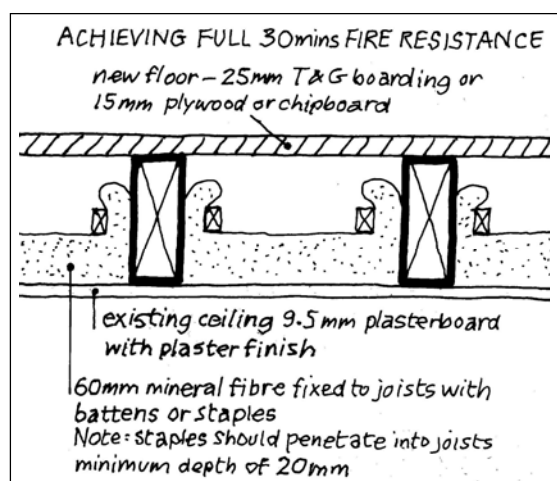


Figure 8.

* see note.3, page 2.

4.15 SMOKE DETECTORS

A smoke detector and alarm system will improve the fire safety standards in a dwellinghouse. The system should be interlinked and mains wired, with a smoke detector in the stair enclosure on *each floor level*. (**Figures 4 and 5**). Smoke detectors and alarm systems should conform to BS.5839-6:2004, with a stand-by power supply. Contact your local Building Control Department for advice on suitable systems.

(see App. Doc. B. page 16, para 1.15)

4.16 SURFACE SPREAD OF FLAME

The Building Regulations control the performance of finishes used in the construction of walls, floors and ceilings. The choice of materials and surface finish can significantly affect the spread of flame in a fire, although they may not be the first to be ignited.

(see App. Doc. B., page 59, Tables A1 to A8)

The traditional finish of plaster to walls and ceiling is adequate, but if more unconventional finishes are required, then contact your local Building Control Department for advice.

STRUCTURAL FIRE RESISTANCE.

4.17 FLOOR CONSTRUCTION

The construction of a new floor in a loft conversion, requires a minimum 30mins. fire resistance. This can also be achieved by upgrading the existing floor construction, using one of several methods given in the Building Research Establishment Digest 208. 1988. Further information can be obtained from your local Building Control department.

Figure 8 illustrates an acceptable design solution based on the information in BRE Digest 208.* Any variations in floor and ceiling finishes which deviate from BRE Digest 208, should be discussed with your local Building Control Department.

4.18 FLOORS IN LOFT CONVERSIONS

Both old and new floors must have a full 30 mins fire-resistance. However provided that the following conditions are met, the existing floor may have a modified 30 mins fire-resistance, but *only if over rooms* and not circulation areas.

- (a) only one storey is being added
- (b) the new storey contains no more than 2 habitable rooms
- (c) the total floor area of the new storey does not exceed 50m²

(see App. Doc. B. page 31, para 4.7)

See Section 5, para 5.1. for requirements for sound insulation to the floor.

4.19 STRUCTURAL STEEL OR TIMBER

Structural elements in the new loft conversion, such as timber or steel beams to support the new floor, will also require 30mins fire-resistance. This can be achieved by providing an imperforate 30 mins ceiling below all steelwork, or by encasing all three sides of the steel beams (**Figure 9**) or by the use of intumescent paint on the surfaces of all structural steel.



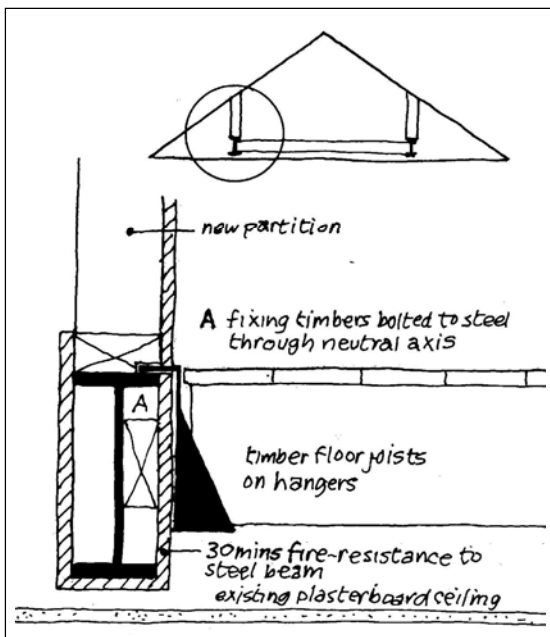


Figure 9.

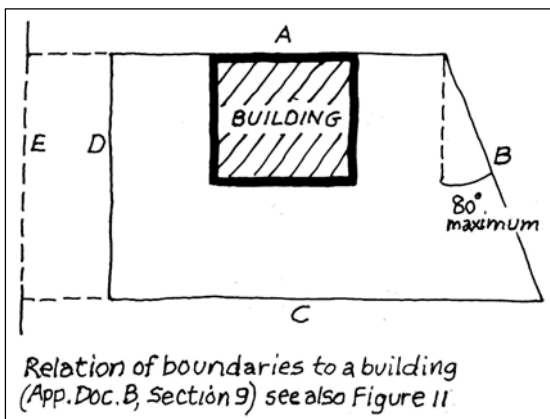


Figure 10.

4.20 EXTERNAL FIRE SPREAD

To satisfy the requirements for external spread of fire. One method is to install roof windows in preference to dormer windows, as these are less likely to catch fire than the timber construction in a dormer window. However where the pitch of the roof is less than 70°, the roof and any dormer window will not be subject to the requirements for space separation.

(see App.Doc. B., page 44, para. 9.1)

4.21 DORMER WINDOWS

The construction of a dormer cheek (or external wall) must give the relevant period of fire-resistance (30mins) if within 1 metre of the property boundary. The structure will require fire-resistance on both sides, by the addition of fire-resistant board lining within the cheek construction.

For example - a dormer cheek within 1 metre of the property boundary, clad with concrete or clay tiles or slates, will also require the use of a 30mins fire-resistant board, both internally and externally, to protect the timber frame. (see para. 4.22)

4.22 DORMER ROOFS

For a pitched roof, the use of natural or fibre-reinforced cement slates, concrete tiles and clay tiles will satisfy the requirements. For a flat roof, a built-up bituminous felt system will have adequate performance if the surface is finished with bitumen-bonded stone chippings to a depth of 12.5 mm. (designation AA (National class) or B-roof-(t4) (European class)).

4.23 SEPARATION BETWEEN BUILDINGS

The separation between buildings is important in restricting the spread of fire across the open space. Where any part of an external wall does not;

- (a) achieve the relevant period of fire-resistance (in this case 30mins), or
- (b) has a combustible surface material. Then those parts are referred to as 'unprotected areas'.

For the purpose of dormer windows within loft conversions, the relationship between 'unprotected areas' and the building boundary, become critical when the distance is less than 1 metre. This may occur when the dormer 'cheek' (side wall) or window faces the boundary.

A wall is treated as facing a boundary, if it is parallel to it or makes an angle with it of 80° or less. (Figures 10 and 11)

(see App. Doc. B. page 45, para 9.7 et seq.)

(see also BRE Report BR.187;1991 External fire spread; Building separation and boundary distances.)

4.24 UNPROTECTED AREAS.

Small 'unprotected areas' can be discounted if they are within one metre of the property boundary, and provided they are not more than 1m² in total area, and separated from each other by at least 4 metres. The regulations concerning external walls of dwellings and the method of calculating 'unprotected' areas, are given in the Approved Documents.

(see App. Doc. B. page 43, paras 8.3, 8.4)

* see note.3, page 2.

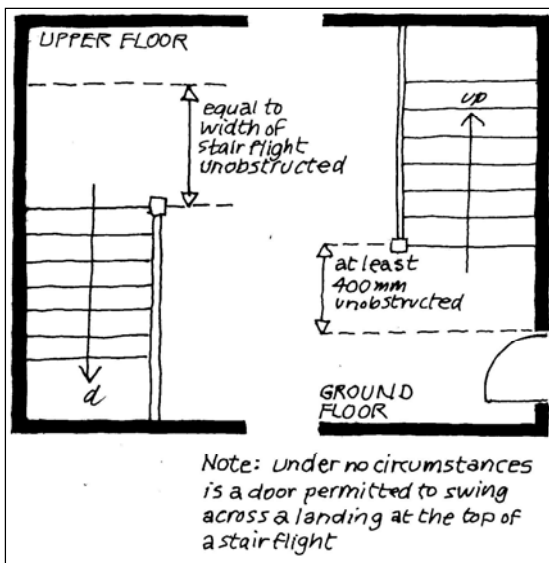


Figure 20.

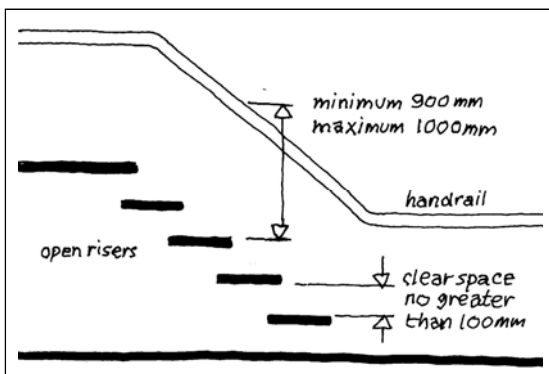


Figure 21

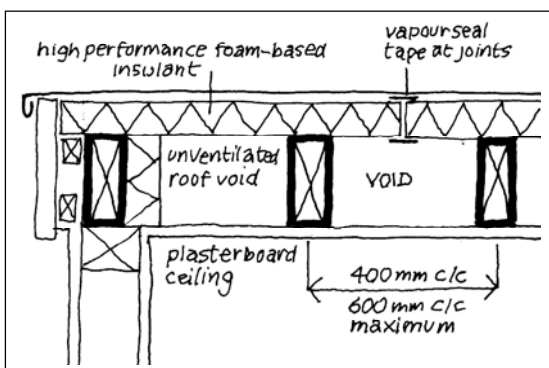


Figure 22

Handrails should be positioned at a height between 900mm and 1000mm from the 'pitch' line drawn through all the nosings of the treads in any straight flight of stairs. (Figure 21).

7.10 BALUSTRADES

All stairs and landings require guarding, if a drop of more than 600mm is involved. To prevent children from being trapped, balusters should be fitted so that a 100mm sphere cannot pass between them or through any other opening in the guarding. Guarding should be positioned with a minimum height of 900mm and should *not* be climbable. In practice vertical balusters are the generally accepted method of compliance.

8.0 APPROVED DOCUMENT L1- DWELLINGS

L1B; CONSERVATION OF FUEL AND POWER (EXISTING DWELLINGS)

8.1 THERMAL INSULATION

Provision must be made for insulating the roof, including the pitched sections and the new internal walls, to prevent heat loss within any new loft conversion.

8.2 ROOF INSULATION

As mentioned in para 6.6 the use of a high performance insulant to the pitched roof section allows greater flexibility in providing effective cross-ventilation and also increased height in the room. The recommended U-values are - 0.16 W/m²K for pitched roofs with the insulation at ceiling level, and 0.20 W/m²K for flat and pitched roofs with integral insulation. (see App. Doc. L1.B, Section 2, page 22, Table 4.)

8.3 For flat roofs, a 'warm roof' construction can be used. A vapour control layer should be provided immediately below the insulant and laying on the roof deck.

(Figure 22 and also Problem Solving para. 10.5)

8.4 INTERNAL WALL INSULATION

This is usually satisfied by the provision of a glass- fibre or similar insulation held in place within the timber studwork by plasterboard faced with a polythene vapour barrier.

9.0 APPROVED DOCUMENT P - ELECTRICAL SAFETY

9.1 Most loft conversions will include electrical installations, which are subject to the Building Regulations. There are two methods of ensuring compliance.

- follow the technical standards in Approved Document P. and your local Building Control Department will inspect and test the electrical installation together with all other aspects of the work; or
- if the work is carried out by an electrician registered under the Competent Persons Scheme, they may self-certify their work and notify the local authority of their certification



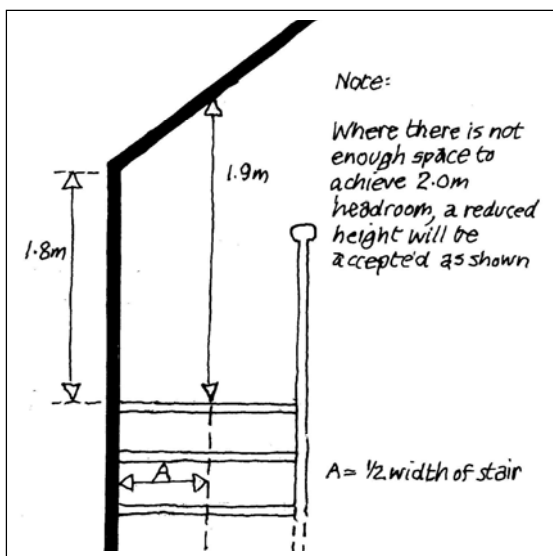


Figure 18.

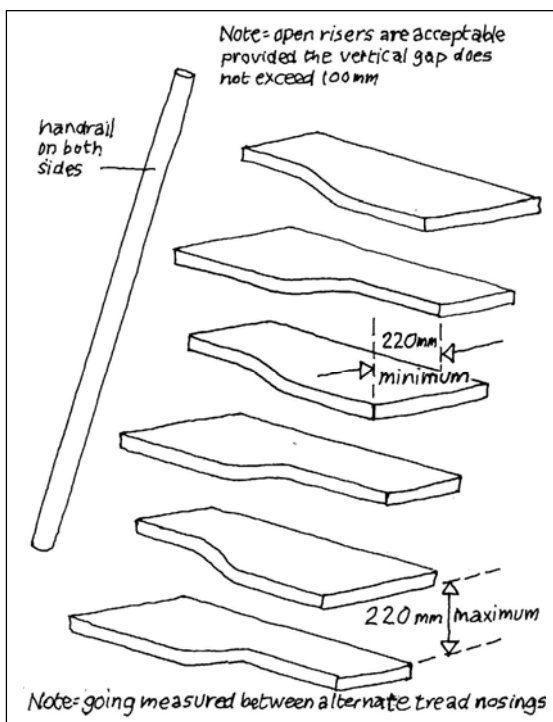


Figure 19

7.3 HEADROOM

Where space permits, a clear headroom of 2 metres should be provided above the 'pitch line of the stair. (Figure 17).

However where there is not enough space to achieve this height, as in some loft conversions, a headroom of 1.9m at the centre of the stair width, reducing to 1.8m at the side will be acceptable.

(Figure 18).

7.4 WIDTH OF STAIRS

The width of the stair should ensure the safe passage for people, particularly when evacuating the building in the event of fire.

Although not specifically controlled by the Building Regulations, the recommended minimum width of a stair should be 800mm.

However a reduced width of 600mm will be acceptable if access is only to one habitable room.

Note. A bedroom and en-suite bathroom is accepted as a single room provided there is an additional WC elsewhere in the dwelling.

7.5 ALTERNATING TREAD STAIRS

This type of stair has a pattern of alternately handed treads with part cut away, but which relies on user familiarity for safe use. This type of stair should be used *only* in one straight flight as access to a single habitable room within the loft conversion, if there is not enough space to accommodate a traditional stair as described in para. 7.2.

Alternating stair treads should be uniform in size with parallel nosings and slip-resistant surfaces. A handrail *must* be provided on each side of the stair. (Figure 19).

7.6 LANDINGS

A landing should be provided at the bottom and top of the stair, with the width and length being at least the width of the stair. A door may swing across a landing space at the bottom of the stair provided it leaves a clear space of at least 400mm across the full width of stair.

(Figure 20).

7.7 FIXED LADDERS

A fixed ladder may also be used to provide access to a single room in a loft conversion, if a traditional stair cannot be accommodated due to insufficient space (without alterations) in a dwelling. The ladder may not be retractable and *must* have a handrail on each side. Your local Building Control Department will advise.

7.8 SPIRAL AND HELICAL STAIRS

Spiral stairs are also acceptable provided they meet the rise and going constraints given in para. 7.2. Spiral stairs, like alternating tread stairs, offer a reduced *going* which may be acceptable when space is limited, provided the stair serves only one habitable room.

(Figure 5, page 5)

7.9 HANDRAILS

A single handrail is required on a stair less than 1m wide, unless two handrails are required as stated in paras. 7.6 and 7.7.



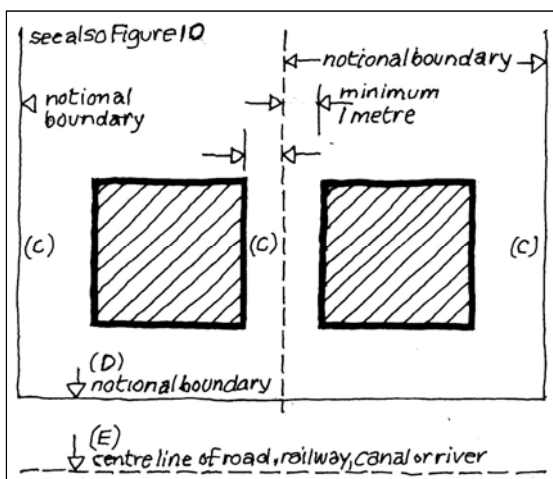


Figure 11

4.25 If an external wall has the appropriate fire-resistance (in this case 30mins) but has a combustible material more than 1mm thick on the exterior surface, then that wall is counted as an 'unprotected area' equal to half the actual area of the combustible material. For example - If a dormer cheek of $1.8m^2$, within 1 metre of the property boundary (C, D) is clad with timber boarding, then the 'unprotected' area is $1.8 \times 50\% = 0.9m^2$, and is therefore satisfactory as stated in para. 4.24. (Figure 11).

4.26 CAVITY BARRIERS

Loft conversions in buildings with a floor more than 4.5m above ground level, should be provided with a cavity barrier between the loft rooms and the protected stairway. (see App. Doc. B, page 21, para.2.14)

4.27 ROOFLIGHTS

Thermoplastic rooflights with a TP(a) or Class 3,TP(b) rating may be used. (see App. Doc. B, page 28, Table 2)

Rooflights made of unwired glass at least 4mm thick are accepted as having an AA designation (National class), or B.roof - (t4)

(European classification)

(see App. Doc. B, page 50, para.10.8)



4.28 FIRE DOORS

All fire doors in a protected stairway enclosure must be at least FD20 rating when tested to BS.476-22;1987 or E20 when tested to the relevant European Standard.

(see App. Doc. B, Appendix B, page 66 and Table B1, page 67)

Hinges for fire doors should have a melting point above 800°C, for example brass, aluminium, steel and bronze.

(see App. Doc B, page 66, para.3.)

Fire-resisting doors in a protected enclosure do *not* now need to be fitted with a self-closing device.



5.0 APPROVED DOCUMENT E - RESISTANCE TO THE PASSAGE OF SOUND

5.1 FLOORS

The creation of rooms in the roof will provide a noise source that did not previously exist, above existing rooms. It is therefore necessary to provide a new floor structure with reasonable sound insulation properties. Approved Document E gives guidance on construction. Most loft conversions will have a timber floor with floor decking, minimum 20 mm thick, and minimum mass per unit area of $15 kg/m^2$, ceiling of one layer of plasterboard of minimum mass per unit area of $10 kg/m^2$, plus an absorbent layer of mineral wool, minimum thickness 100 mm with a density of $10 kg/m^3$, laid in the cavity between the floor joists.

All the above are acceptable solutions.

* see note.3, page 2.

Note. Electrical cables give off heat when in use and precautions may be needed when they are covered by thermally Insulating materials. See BRE Digest BR.262* - Section 2.3 - Thermal insulation; avoiding risks.



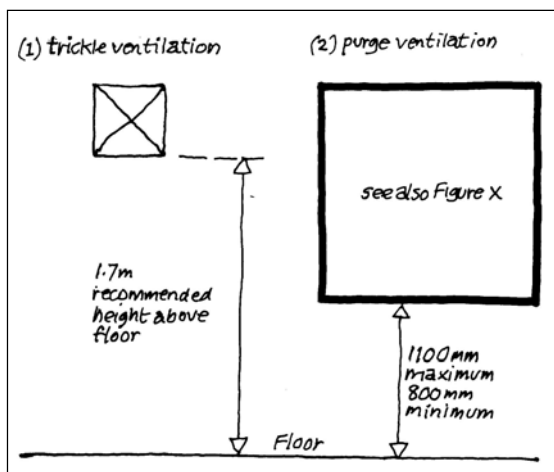


Figure 12.

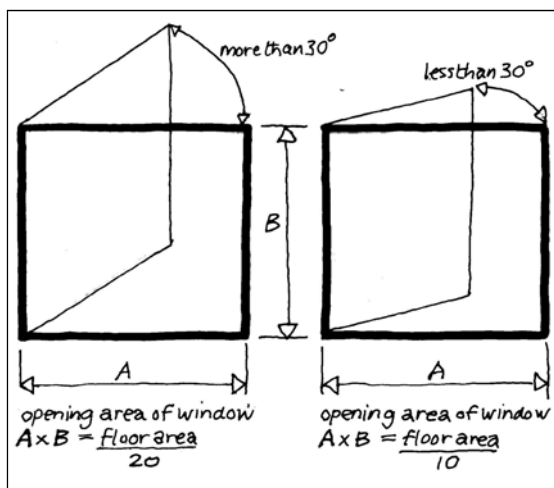


Figure 13.

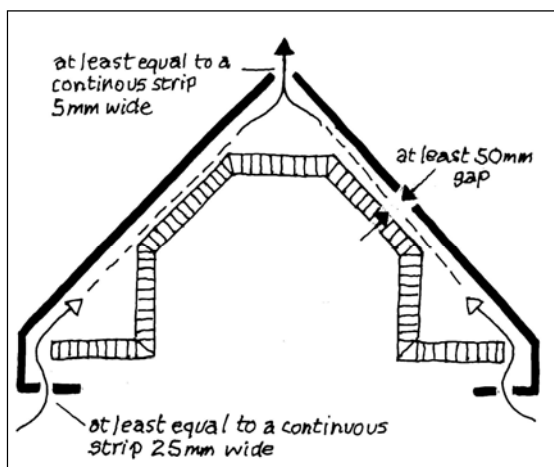


Figure 14.

5.2 WALLS

If the loft conversion contains a bedroom with a wall separating it from other rooms, then that wall must provide a reasonable degree of sound insulation. Approved Document E gives guidance on construction. Internal walls of masonry or aircrete block, with plasterboard or plaster finish to both sides, minimum mass per unit area of 120kg/m^2 (Type C) or $75\text{--}90\text{kg/m}^2$ (Type D). Both types are satisfactory, but will need extra support due to the weight.

Walls (Type A) timber framed with minimum 75mm between linings, or metal framed with minimum 45mm between linings, plus two (or more) layers of plasterboard of minimum mass per unit area of 10kg/m^2 .

Walls (Type B) timber or metal framed, as above - but with only one layer of plasterboard, plus an absorbent layer of unfaced mineral wool quilt, minimum thickness 25mm and minimum density 10kg/m^3 suspended in the cavity. All the above are acceptable solutions.

Various proprietary sound-insulating partitioning systems, may also be satisfactory, but first check with the manufacturers.

(see App. Doc. E. (2003) Section 5, paras. 5.17, 5.18, 5.19, 5.20, 5.23 and Note)

6.0 APPROVED DOCUMENT F - VENTILATION

6.1 The formation of a habitable room in a loft conversion requires the provision of both 'purge' ventilation and background or 'trickle' ventilation. In addition, if the conversion involves the installation of a shower, bathroom or kitchen, then 'mechanical ventilation' will also be required. Bath/WC accommodation can be included within the 'single room' criteria, provided there is an additional WC elsewhere in the dwelling. The guidance given below indicates ways of meeting the requirements, although other solutions are available - e.g. 'Passive Stack Ventilation, details of which can be obtained from your Building Control Department.

6.2 HABITABLE ROOMS

Rooms used as bedrooms and living rooms, require a combination of 'purge' ventilation and 'trickle' ventilation. The regulations can be met by a window with a clear opening area equal to either 1/10th or 1/20th of the floor area as follows -

- a hinged window (and roof window) that opens *more than* 30° , or a sash window, must have a clear opening size equal to 1/20th of the floor area of the room.
- a hinged window (and roof window) that opens *less than* 30° , must have a clear opening size of 1/10th of the floor area of the room. (Figure 13)

(see App. Doc. F. page 38, windows)

Trickle ventilation of 8000mm^2 can be provided by an open/shut ventilator built into the window frame, or separately as air-bricks or similar ventilation devices. (Figures 12 and 13)

For the method of calculating total ventilation requirements, reference should be made to the Approved Documents.

(see App. Doc. F. Section 1, pages 10, 11)



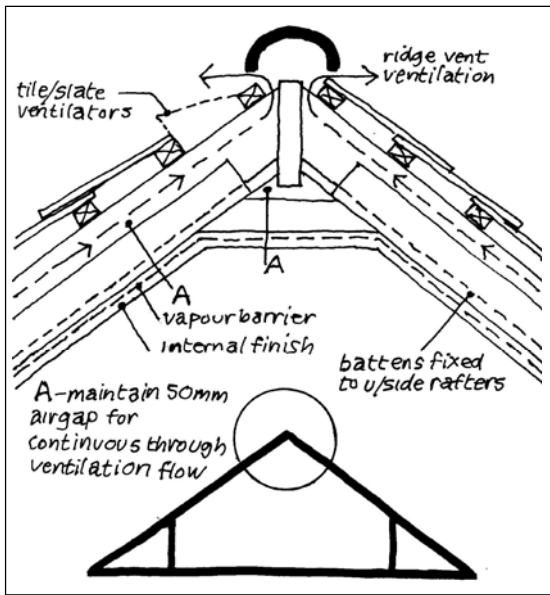


Figure 15.

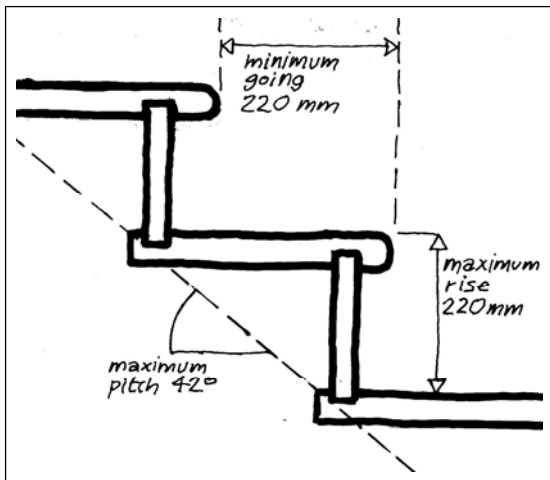


Figure 16.

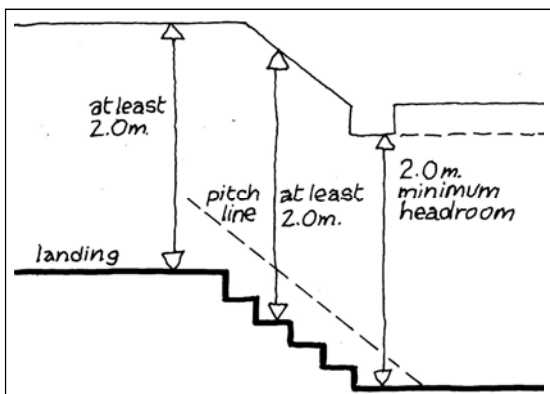


Figure 17.

6.3 BATHROOMS

If a bathroom is proposed, then mechanical ventilation to the external air is required, with an extract rate of at least 15 litres/sec. Also an over-run of 15 minutes is required if the bathroom does not contain an opening window. However if a window is available, the mechanical extract is still required, but in lieu of the fan over-run, an opening window (no minimum size) and 4000mm² background 'trickle' ventilation should be provided.

6.4 ROOF VENTILATION

The roof void above a loft conversion will require ventilation on two opposite sides to promote cross-ventilation and prevent the build-up of excessive condensation. (Figure 14)

6.5 Where the new ceiling follows the pitch of the existing roof, two important design features should be included.

- the provision of ventilation at both the eaves and ridge level, to promote a flow of air above the roof insulation, and
- a minimum 50mm airspace between the insulation and the roof covering.

Note. In older premises, where no roofing felt exists, your local Building Control Department may waive the ventilation requirement in view of the considerable air movement that occurs naturally in unfelted slate or tile roofs.

6.6 The second criteria (6.5.b), the 50mm air-gap, often causes problems due to the thickness of insulation required to achieve the required thermal performance, and the depth of the existing rafters. Figure 15 shows a typical method of overcoming this problem, using a high performance insulant with battens fixed to the underside of the existing rafters.

7.0 APPROVED DOCUMENT K. (Part K1) - STAIRWAYS, RAMPS AND GUARDS

7.1 STAIRCASE ACCESS

When a new storey is proposed within a dwellinghouse, permanent access must be provided, which ideally will take the form of a traditional staircase similar to that which provides access from ground to first floor. In certain instances access can be arranged via a fixed ladder or alternating tread stair subject to approval by your local Building Control Department. (see also para 7.6)

7.2 TRADITIONAL STAIRCASES

If a traditional flight of stairs is proposed, the parameters for the 'rise', 'going' and 'pitch' are laid down as follows. (Figure 16.)

- maximum rise = 220mm
- minimum going = 220mm
- maximum pitch = 42°

The relationship between the *rise* and the *going* should be - $2 \times \text{RISE} + \text{GOING} (2R + G) = \text{between } 550\text{mm and } 700\text{mm}.$





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