Fire Exits and Escape Routes in Church Buildings

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A Church Growth Trust Briefing Paper

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1.0 Scope and purpose of this document

This document deals with fire exits and escape routes within places of assembly, the definition of which under Building Regulations includes places of worship.

The information given assumes that the building is a simple single storey place of worship and therefore does not include requirements regarding staircases, number of staircases, protection of staircases, external escape staircases or escape over flat roofs. If the building has more than one storey then the information given here will still be relevant, but extra provisions will apply. It is also assumed that the building includes no sleeping accommodation (e.g. no overnight sleeping by youth groups, caretaker etc) and is not used primarily by disabled persons (although disabled persons may be amongst the users of the building).

The information given here only applies to places of worship or assembly. Different standards apply to buildings used as offices, nurseries, shops, storage etc and this document is therefore not relevant to those types of building, even if they are owned or operated by a church.

The standards quoted in this document are those which would apply to a new place of worship being constructed today and are based on current Building Regulations Approved Document B: Fire Safety. They are not intended to be a full commentary on the Approved Document. As the title of this document indicates, it covers Fire Exits and Escape Routes. However Part B also covers other matters concerning fire safety which are not covered by this document. These include fire alarm and detection systems, internal and external fire spread, fire resistance, escape lighting, escape signage and access for fire-fighting.

If churches have some knowledge of the current requirements for new buildings they may be better informed when they carry out their fire risk assessments.

If carrying out refurbishment, where desirable, opportunity could be taken to improve or upgrade fire exits and escape routes to standards as close as practicable to the current standards for new buildings.

2.0 Legislation and guidance

2.1 General Legislation and Guidance

Projects involving new buildings or alteration/extension of existing buildings will be subject to a Building Regulations application. Regarding fire safety, Approved Document B of the Building Regulations will apply. Part B is one of the most complex sections of the Building Regulations and is constantly being updated to improve standards. The Building Regulations application will normally be dealt with by a church's architect or design consultant, who should be familiar with the Regulations and design accordingly. During the process of the Building Regulations application, copies of the plans will be passed to the Fire Officer (usually the local Fire Service) by Building Control for checking and comment.

For churches who have not undertaken extensions or alterations requiring Building Regulations approval, there is the danger that they can be kept in a time warp. Whilst the buildings would have complied with Building Regulations or By-Laws at the time of their construction, church buildings have not been required to update to current standards.

Unlike premises such as hotels or offices, churches have not been required to have a fire certificate and so they have not been subject to annual inspections by the Fire Officer, who granted such certificates and gave advice. The possible exception is if a church required an entertainment licence, because they let out their premises for concerts, plays, etc. Such churches would be subject to regular visits from the Fire Officer, but then the Officer would only be inspecting the parts of the building to be used for entertainment and not other areas such as the main worship area.

In October 2006 the Regulatory Reform (Fire Safety) Order 2005 came into force which directly affects churches. This legislation requires them to carry out a risk assessment and to regularly review it. More detailed information regarding this is given in a separate Church Growth Trust briefing paper. For most churches who had not had building work undertaken since construction of the original building the introduction of the Regulatory Reform Order was the first time they had been formally required to review fire safety issues.

2.2 Do we need to change our building now?

Any new building works would need to comply with current Building Regulations and, in some cases, this may require alterations or improvements to sections of the existing building, such as additional fire doors or improvements on the alarm system. However, if no building works are currently proposed, there is no requirement under Building Regulations to keep updating your building to meet the current Building Regulations.

Although there is no requirement under the Building Regulations to change buildings, the introduction of the Regulatory Reform (Fire Safety) Order 2005 places an obligation on churches to carry out a risk assessment and to regularly review it. If your risk assessment shows that certain physical aspects of the building (e.g. its layout or escape routes) are substantially lacking then this places a responsibility on the church to remedy the situation. This is a self-assessment situation and responsibility. As such it is not regularly policed by the enforcing authorities. However, if a serious event were to take place and, if no risk assessment had been undertaken, or if it had been undertaken but no action taken regarding risks identified, the enforcing authorities would not be likely to take a favourable view of the situation.

3.0 The definition of fire doors

Fire doors, together with their frames, seals and ironmongery are intended to prevent the passage of fire and/or smoke in a building. They are usually fitted with a closing device either normally to keep them in the closed position or to ensure they close when fire breaks out. They have different ratings with regard to fire resistance, such as 30 minutes, 1 hour etc.

The doors which form a final exit out of the buildings are often mistakenly referred to as fire doors, but this is incorrect. They should be referred to as escape doors, fire exit doors or final exit doors.

4.0 Calculating the number of occupants

The minimum widths of doorways and corridors along an escape route, including the final exit, depend upon the number of people using them. The number of people can also affect how many escape routes or exits are required.

It is therefore important to work out the maximum capacity of persons the room could accommodate, rather than the number of persons who may normally attend meetings in that room.

If a church building has fixed seating, it is relatively easy to work out the capacity of the room, based upon the number of seats. Do not forget to include those not in the main seating area, such as ministers, speakers, worship group or choir, who may be leading services from a platform.

For many church buildings the current trend may be to use entirely loose seating or perhaps loose seating to supplement fixed seating when required. If this is the case, one way of calculating the loose seating capacity is to physically lay out chairs in the room, observing requirements for width of gangways etc to establish the maximum seating capacity of the room.

It would not be appropriate to say that a room only occupies 50 persons because that is the number of persons normally attending meetings when the room could physically accommodate more. Neither would it be appropriate to say a room accommodates only 50 persons because the church only owns 50 chairs, where the room could accommodate more. In this case an exercise in trial layouts can be undertaken to establish how many seats could be accommodated if the church had ownership of more chairs.

Either of the two above methods of establishing occupancy levels, either by fixed seating or layout of loose seating, would be the most logical method of establishing the potential room occupancy. However, where the room is a multipurpose room or an additional room to the main worship area, there is often not a regular seating layout. In these cases the maximum number that the room can accommodate for other purposes, such as youth groups, special events where persons are not seated in the conventional meeting arrangement, parties or fund-raising sales, have to be taken into account for Building Regulations purposes and the worst case scenario or maximum occupancy levels has to be assumed.

Under Building Regulations, in the absence of seating numbers, this is calculated on floor area and floor space factors. The floor space factors given in the Building Regulations vary according to the type of building or use of the room and there is some discrepancy or room for interpretation with regard to floor space factors according to the usage of the room.

For assembly halls the factor is 0.5m² per person. Therefore a hall of 50m² would be assumed to accommodate 100 people and a hall of 75m² would be considered as accommodating 150 people.

For committee rooms, conference rooms and similar meeting rooms the factor is 1m² per person. So a room of 25m² would be assumed to accommodate 25 people.

For most small chapels of up to say 130 occupants the factor of 1m² per person is probably the most appropriate for normal worship services and will probably be confirmed by setting out loose seating to suit a conventional service. However the level of likely occupancy may increase if seating in the conventional manner is not employed for other events.

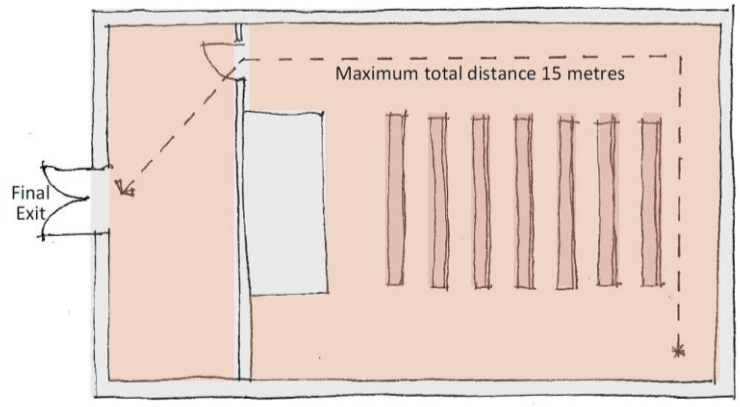
In summary, if the church building has fixed seating or has an established loose seating layout to fill the room, then this number of seats would normally serve to establish the likely occupancy of the room. If the room has loose/movable seating and may be used for other purposes than just worship then it may be appropriate to consider using floor space factors to calculate the maximum occupancy.

5.0 Maximum travel distances

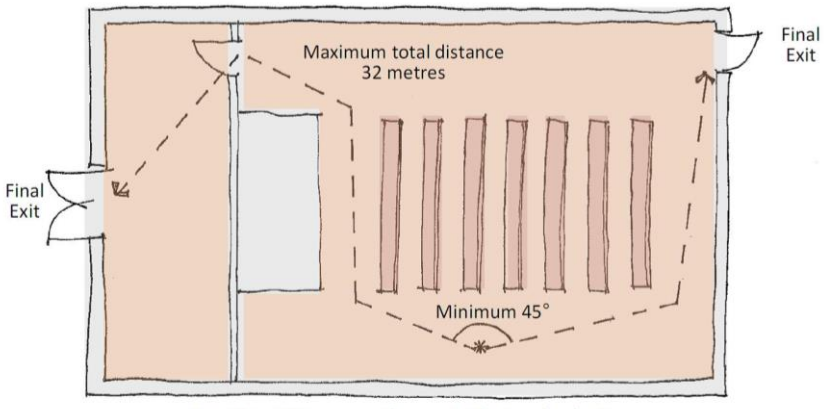
The Building Regulations prescribe maximum travel distances for different types of building. The travel distance is the actual distance to be travelled by a person to reach an exit from a storey or, in the case of a single storey building the maximum travel distance to reach a final exit. Measurements therefore have to be taken along the line of the actual route to be travelled; so, if there is fixed seating, this should be measured along the route of the established aisles and passageways, not diagonally across a room. Note that the measurement is the exit from the storey or final exit, not just the exit of a room e.g. the travel distance may typically include the traverse across a room to the room exit and the travel down a corridor to the final exit.

For places of assembly, areas with seating in rows should have a maximum travel distance of 15m where escape is available in one direction only. If there is a choice of more than one direction (e.g. two separate exits from one room) the maximum travel distance can be increased to 32m.

Maximum travel distances



With one final exit for a room for up to 60 persons



For 61 to 600 persons there must be two final exits

For there to be considered a choice of more than one direction two escape routes must be at least 45 degrees apart.

In other areas, where the seating is not in rows, permitted travel distances can be greater, at 18m for escape in one direction or 45m where there is a choice of more than one direction.

In many instances there will only be escape in one direction for the first part of the journey (e.g. only one exit out of the room before arriving at a corridor where there may be a choice of travel direction). In these instances the first part of the route must be within the maximum distance for escape in one direction and the total distance to the final exit must be within the maximum distance for escape in more than one direction.

In all but the smallest church premises the limit on travel distances will govern how many final exits are required and where they are to be positioned. For instance, if there is no other final exit, other than the main entrance door, the maximum travel distance from anywhere in the building to the main entrance should not exceed 15m if the seating is in rows.

6.0 Inner rooms

Inner rooms are those which cannot directly access an escape route or corridor and they do not have separate external escape door (i.e. where those escaping would first have to pass through another room before reaching the exit or a safe corridor). The room through which an inner room is served is called the access room. Inner rooms present two particular additional risks in terms of fire safety.

Firstly the occupants of the inner room become trapped if fire breaks out in the access room or it becomes filled with smoke. Windows are not acceptable as a final exit from the building.

Secondly it may take occupants of an inner room longer to become aware of the outbreak of fire or to hear any alarm, if they are one room removed from the main area of the building. This risk can be reduced by installing an improved fire alarm and detection system. Typically a fire detection system for church buildings may not require detectors in every room and in small building an automatic detection system may not be required at all. With regard to inner room situations an improved fire alarm and detection system could typically include sensors outside the room and sounders inside the inner room to give improved and advance warning of the outbreak of fire. It is also always advisable that doors to inner rooms should be fitted with vision panels so that occupants are aware of any activity or incident in the access room.

The Building Regulations therefore only permit inner rooms under the following strictly controlled conditions:

- In the case of church premises, the occupancy of the inner room is limited to 60 persons;
- The inner room cannot be used for sleeping accommodation;
- The inner room should be accessed directly off the access room, not via a corridor, lobby etc;
- The escape route from the inner room should not pass through more than one access room;
- The travel distance from any point in the inner room, through the access room and to the final exit should not exceed the maximum prescribed travel distances;

- The access room through which the escape route passes should not be a place of special fire hazard (e.g. a kitchen) and should be under the control of the same occupier of the building.

In addition the Regulations also require that one of the following arrangements should be made:

- The enclosing walls or partitions of the inner room should be stopped at least 500mm below the ceiling (i.e. there should be a gap between the top of walls and the ceiling); or
- A vision panel of not less than 0.1m² is installed in the door or partition; or
- The access room is fitted with an automatic fire detection and alarm system.

7.0 Escape routes

7.1 The minimum number and choice of escape routes

The number or position of escape routes or final exit doors will usually be governed by the maximum travel distances described above. However the Building Regulations contain some additional requirements regarding the number of escape routes required from a room or storey.

For up to 60 persons, one escape route is satisfactory, provided the minimum travel distances can be achieved. For 61 to 600 persons there must be at least two escape routes. For over 600 people there must be at least three escape routes.

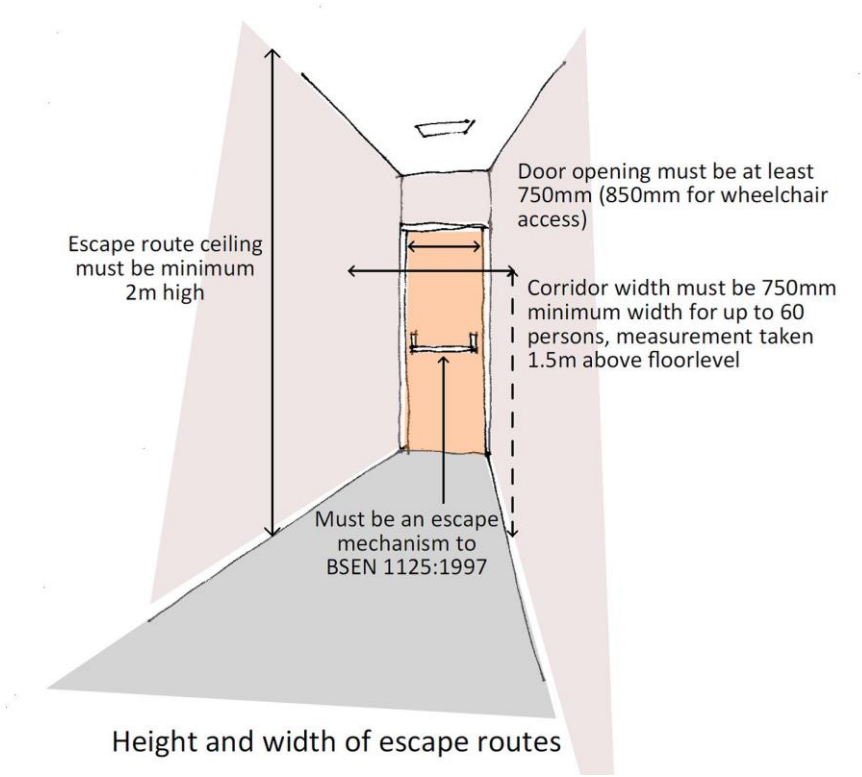
This means that rooms accommodating over 60 persons must have at least two exit doors, even if the required travel distances could be met by using only one exit door.

There is little value in having a choice of escape routes if both are likely to be disabled at one time. For this reason there has to be an angle of at least 45 degrees between the two routes. Also for example two separate doors out of one room, which are 45 degrees or more apart, would be on no value if they both led onto the same section of corridor or the same foyer, as an incident in the corridor or foyer could disabled both escape routes at the same time.

7.2 Height and width of escape routes

All escape routes must have a minimum headroom of 2m except at doorways, where a slightly lower headroom is permitted (most imperial sized doors have a height of 1.981m, most metric doors have a height of 2.04m).

The minimum clear width of an escape route (i.e. corridor, door opening etc) is determined by the number of persons using it as calculated from the occupancy levels described previously. Note that some escape routes and doorways may serve more than one area and occupancy levels may need to be added together if more than one room exits through one escape route (e.g. If Room A has 150 persons and Room B has 100 persons, the width of the escape route from the point where the two escape routes combine must be suitable for 250 persons).

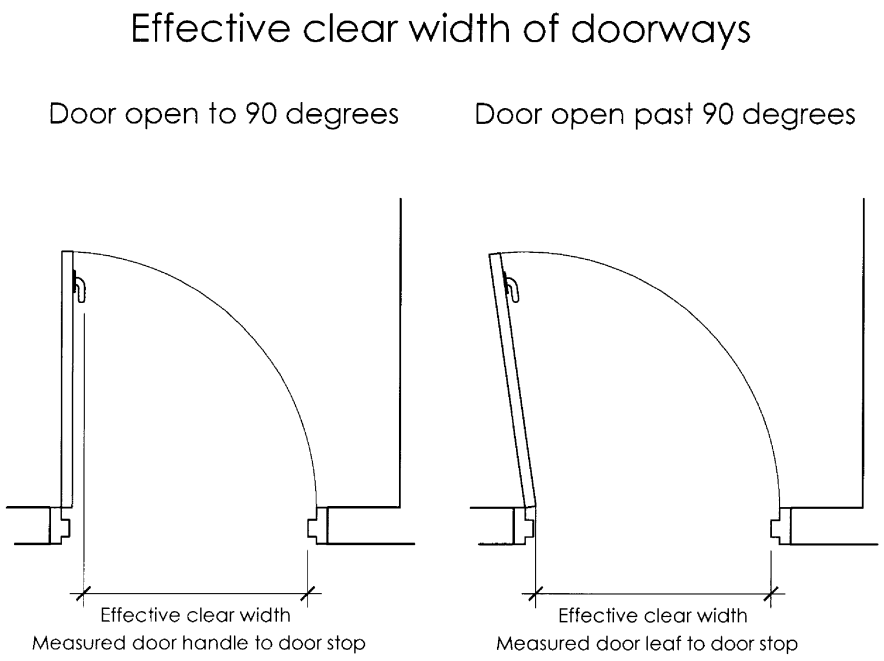


Height and width of escape routes

Building Regulations require the following minimum widths:
Up to 60 persons: 750mm;
Up to 110 persons: 850mm;
Up to 220 persons: 1050mm;
Over 220 persons the minimum clear width is calculated at 5mm per person.

For corridors the minimum clear width is from wall finish to wall finish at 1.5m above floor level.

For doorways the clear width is measured between the door leaf in the open position and the door stop of the frame. If the door does not open beyond 90 degrees, then the projection of any door handle will also have to be taken into consideration.



Note that the smaller widths of 750 or 850mm for escape purposes referred to above may need to be wider for other reasons, such as disabled access (refer to the separate Church Growth Trust briefing paper "Corridors and internal doors in church buildings").

7.3 Protection of escape routes

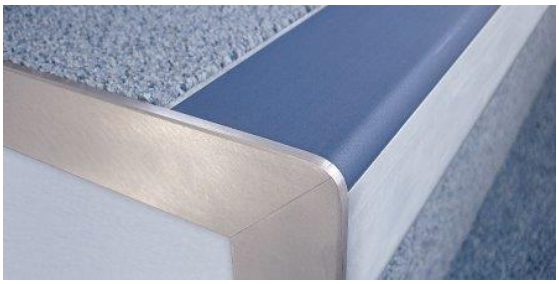
Escape routes will normally be protected by enclosures, such as partitions, walls, doors etc along the route to the final exit. The Building Regulations indicate that 30 minutes fire protection is generally sufficient for means of escape in most circumstances.

For new buildings this will usually mean that any doors and frames opening off the escape route will have 30 minute fire resistance and will be fitted with closing devices and smoke seals. The exception to this would be doors serving toilet areas which are generally perceived as being of fire risk. For older properties it can be quite common that existing doors and frames have very low fire resistance and it may be worth considering replacing them with fire resisting doors and frames if refurbishment is being undertaken. Upgrading to fire resisting doors will also usually improve sound insulation.

The need for 30 minutes fire resistance for doors and partitions/walls also imposes restrictions on the extent of glazed panels installed in them and the type of glass used.

7.4 Steps on escape routes

Single steps on escape routes may cause falls and should only be used where they are prominently marked.



If there is a flight of steps it is usually a requirement to create a refuge area in a safe place. A refuge area is an area of 0.9m x 1.4m where someone using a wheelchair can park and await assistance without obstructing the escape route for others.

7.5 Capacity of escape routes

If a room or area has more than one escape route it has to be assumed that one of the escape routes could be disabled by a fire and that any remaining escape routes have satisfactory capacity.

If for example a room holds 150 persons and has two escape routes and one of them is disabled by a fire, then the remaining escape route should have sufficient capacity to accommodate all 150 persons. Any corridors or doorways along the remaining escape route should therefore have the minimum clear widths required to serve 150 persons. If a room or area has three escape routes and one is disabled then the other two routes, between them, need to be able to accommodate the number of persons occupying the area.

8.0 External escape routes

External escape routes should meet the minimum clear widths as indicated above, including the width of the paved surface. If the escape route is through an external gate, then the clear width of the gateway also needs to be taken into account.

An external escape route is often placed immediately alongside the building. This presents a hazard to those using the escape route if fire should break out through unprotected areas, such as window openings or door opening which are not fire-rated and thus compromise the escape route. Final exit or escape doors opening out on to the escape route can also present the hazard of collision with those using the external escape route.

Ideally external escape routes should be located at least 1.8m away from the building. If this is not practical and they are located within 1.8m of the building the wall should be of fire-

resisting construction up to at least 1.1m above the paving level. This gives those using the escape route the opportunity to pass below the fire risk at low level. In practice this means that any window sills need to be at least 1.1m above the paving and any external doors need to be of fire-resisting construction.

9.0 Doors on escape routes, including final exit doors

9.1 Direction of opening

The door of any doorway or exit on an escape route should, if reasonably practicable, be hung so as to open in the direction of escape and should always do so if the number of persons expected to use it in case of fire exceeds 60.

All doors on escape routes should open to at least 90 degrees.

A door which opens towards a corridor should be sufficiently recessed to prevent its swing from encroaching on the effective width of the corridor (i.e. the corridor should still satisfy the minimum width required for the corridor when the door is in the fully open position).

9.2 Latches and locks

The time taken to negotiate a closed door can be critical in escaping. Doors on escape routes, both within the building and at the final exit, should be readily openable.

Ideally they should not be fitted with a latch, lock or bolt but, if this is necessary, they should be fitted with simple fastenings which can be readily operated from the side from which people will be making an escape (e.g. lever handles). The device should be:

- Readily apparent;
- Not require the use of a key to operate it; and
- Not require having to manipulate more than one mechanism.

Doors fitted with simple push plates would be preferable as they are faster and easier to open than doors fitted with lever handles. However remember that doors fitted with push plates will also require some resistance to prevent them flying open (e.g. an overhead closer).

Door fitted with push plates

Door fitted with lever handles

The previously well established policy of having a key in a break-glass box next to the final exit is no longer considered acceptable, as the operation takes too long to implement. There are also known instances where churches have had the key stolen, with the thieves returning at a later date and using the key to gain access. As there was no forced entry, and access was gained by key, the insurers refused to pay out.

The Regulations acknowledge that it may be necessary to introduce measures to prevent or restrict unauthorized access into the building outside of normal operating hours. However, the measures left in place should ensure that any persons, who may remain inside, either intentionally after the building is closed for general access or unintentionally by being locked inside, can still escape.

With regard to locking main entrance doors the most common solution is to fit a dead lock fitted with a lock barrel, which requires a key to operate it from outside, but with a thumb-turn fitted on the inside of the barrel, so that the lock can be withdrawn without using a key. These barrels commonly come in two profiles; oval (as illustrated below) and euro profile. Both types of cylinder fit into a dead lock casing fitted in the door, with the appropriate profile ready to receive the lock barrel.

Traditional double lock barrel with lock fitted each end

Requires key operation from both sides

Lock barrel with thumb-turn fitted to one side.

Only requires key operation from outside. The lock can be released by turning the knob from inside

Barrel locks with thumb turn are commonly available from most reputable lock manufacturers, but high security versions are also available, such as the DTEC range by Union, which may be more appropriate for main entrance or external doors.

A cylinder rim night latch (commonly called a Yale latch – but other makes are available) will be familiar to most residential householders. It is similar in operation in that it requires a key to gain access from outside but can be opened from inside with a thumb turn. However these are not so robust with regard to security as they are fixed to the face of the door, not within the door body, and are therefore not approved by most insurers who require a dead lock.

In church buildings it may be necessary to secure certain internal doors against unauthorized access (e.g. in connection with child protection policies for crèche facilities or children's activities, church office etc). Again the principle of a dead lock, operated by key from outside and thumb-turn from inside, as described above, could be considered, but if the door is fitted with a lever handle as well, rather than just a push plate, that would require operation of two mechanisms; the lever handle being one and the thumb-turn being the other.

Another option therefore is to use a mortice escape sashlock, such as the Union L2C26 illustrated below. Other models are available from other manufacturers.

Union L2C26 mortice escape sash lock illustrated above.
This particular lock uses euro-profile lock barrels.

Visually these look no different to a normal lever handle arrangement with a lock below.

In practice on the outside the lever operates the latch action and the lock below requires a key to throw or withdraw the bolt, as would be the case for normal sash locks. However, on the inside, operating the lever simultaneously opens the latch and retracts the dead lock bolt all in one action.

Note that these mortice escape sash locks do not usually comply with BS EN 1125 (check with manufacturer), so they are not suitable for use on final exits (see next section) or on escape routes serving more than 60 persons.

Mortice escape sash locks are manufactured by many reputable lock manufacturers, but will not normally be available at DIY outlets. They often have to be ordered as left or right hand.

If electrically powered locks are used in the building, then they should be fitted with a simple push-button type control on the side from which escape is made, so they can readily be unlocked in case of emergency. In addition they must automatically return to the unlocked mode if the fire alarm is activated or if there is a loss of power. It is therefore not advisable to use such locks on the main entrance without detailed discussion with the manufacturer or installer. There could arise the situation which is not a fire situation, but where there is a power cut when the building is unoccupied and the lock could return to the unlocked mode and present a security problem.

9.3 Panic Bars

In cases of places of assembly, which includes church buildings, the Regulations require that doors on escape routes from rooms with an occupancy of more than 60 persons should either not be fitted with a lock latch or bolt or should be fitted with panic fastenings in accordance with BS EN 1125:1997.

When escape doors are in pairs, one distinct advantage of panic fastenings is that both doors are immediately released when the panic hardware is activated, rather than having one leaf immediately released and the second leaf only released if it is unbolted.

Some consider that panic bolts used on final exit doors do not offer the best in terms of security and are often considered the weak point of security by intruders. The regulations acknowledge that, in some instances, it is desirable to fit additional locks for use only when the building is not in use. In these cases the emphasis for the safe use of the locks must be placed upon management procedures (i.e. a management procedure to be in place that, every time the building is opened up, for whatever purpose, be it a small meeting, small group/committee, rehearsal or practices, or the main activities or worship, the locks to the escape doors are opened up). In practice this is likely to be difficult to ensure the policy is activated at all times.

With places of assembly it is important that the fastenings are suitable for use by persons who have no training in emergency procedures and who may therefore panic. This compares to other types of building where staff or regular occupants may have received such training.

The devices which accord with BS 1125 are intended to give safe and quick egress from the building with minimum effort and by people who have no previous knowledge of how to operate the device, as may be foreseen in a panic situation. In the worst case scenario where there is a surge of people pushing toward the final exit, the bar operation is likely to cause the door to open even if nobody intentionally presses the bar.

Devices manufactured under BS 1125 all include a horizontal bar to operate the lock and are the type required by the Building Regulations for use in places of assembly.

There are similar devices, often called panic latches, which are operated by a small push pad. These are covered by a separate British Standard BS EN 179. Although they operate in a similar manner, they are considered only suitable for trained personnel and therefore not appropriate for use in places of assembly.

Door fitted with panic bar.

Panic latch.
Less visually intrusive but not generally accepted as suitable for places of assembly.

Both panic bars and panic latches can be connected to either rods which form a bolt into the top and bottom of the frame (more secure in respect of external intrusion) or a simple horizontal latch (less visually intrusive but less secure).

Some may consider panic hardware to be visually unattractive, particularly in main worship areas, rather than in corridors. This can be true of basic models, but it is worth researching various manufacturers and finishes. Some panic hardware is visually more attractive than the basic models and can be supplied in a variety of finishes and styles, whilst still complying with the British Standard. Those which are more attractive or less visually intrusive are usually more expensive than the basic model, but can be worth consideration.

Do not be tempted to cover the final exit doors, with their panic hardware, with a decorative curtain or hanging. Even if it can readily be swept to one side it can still cause a significant delay in escaping as well as disguising the location of the exit to those not familiar with the building.

10.0 Additional information

The Building Regulations 2010:
"Approved Document B; Fire Safety: Volume 2 Buildings other than dwelling houses"
170 pages. ISBN: 978 1 85946 489 2

Available free to download from the Planning Portal
www.planningportal.gov.uk/buildingregulations/approveddocuments/

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