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AGUS SCILEANNA AND SKILLS
Planning & Building Unit

Supplementary Guide For Design Teams

Fire Strategy in Schools

1st Edition, February 2014

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1. INTRODUCTION

1.1 Purpose of this Document

This document provides guidance to Design Teams and School Authorities on fire safety issues. It was prepared following consultation with the National Directorate for Fire and Emergency Management Department of the Environment, Community and Local Government and Chief Fire Officers' Association.

1.2 Background

The Department of Education and Skills has forecasted an increase of over 45,050 primary pupils and 24,900 post-primary pupils by the start of the 2017/18 school year. In order to meet the needs of the growing population of school going children, over the next few years, 40 new schools will be established and extensions will be required to a significant number of existing schools. Due to the large school sizes required, a number of these schools are expected to be multi-storey buildings. The Department currently issues guidelines to Design Teams in relation to school design. However, it is imperative that school accommodation will be available over the coming years to meet the population needs and hence the Department is seeking to minimise the delivery programme timelines. Furthermore the delivery of some of this capital programme will increasingly be devolved to other agencies external to the Department. It is therefore important to bring clarity to certain technical requirements which may be interpreted differently by the professionals designing these buildings. The goal for all concerned is to reach a greater level of certainty that the designs presented are based on agreed consistent principals for adequate fire safety in schools design and construction, that will in turn ensure that the necessary Statutory Certification is obtained with minimal delays incurred in the building control process as required in Part B of the Building Regulations.

1.3 Application of this supplementary guidance

The document is applicable to primary and post primary school building projects. With regard to special schools it is recommended that designers should consult closely with the fire authority as the nature of the children attending these schools may present additional issues to be addressed with regard to child safety, evacuation etc.

1.4 Initial Consultation

The importance of consultation between Design Teams and the statutory authorities is a central part of this process. All applications should be preceded by dialogue at sketch scheme stage on the acceptable approach to be adopted for any given design and application. Nevertheless, it is anticipated that if Design Teams follow this supplementary guidance set out by the Department of Education and Skills in conjunction with other relevant documentation this should minimise requests for clarifications from the local authorities.

1.5 Other Relevant Guidance Documents

The following guidelines should be read by Design Teams in conjunction with the 2006 edition of the Building Regulations Technical Guidance Document B (Fire Safety) and BB100. This is currently being updated by the Department of the Environment and is the subject of a consultation process with relevant bodies. Note that in the absence of the updated document fire officers are using the current Technical Guidance Document B in association with BB100 when assessing Fire Safety Certificate applications for schools, taking note of the additional property protection measures contained in BB 100. Although 'Building Bulletin 7: Fire and the design of educational buildings', 1976, no longer applies to new buildings as it has been replaced in the UK by 'Building Bulletin 100', it is the standard to which most schools have in the past been designed and upgraded. Since the building regulations are not retrospective, it may continue to provide useful advice on existing buildings.

For ease of reference relevant section headings in the 2006 edition of the Building Regulations Technical Guidance Document B (Fire Safety), are noted in this document and the supplementary guidance contained within this document should be read in conjunction with the Guidance Document B.

1.6 Further Information

For further advice on these or any other matter, please contact:

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2. DESIGN GUIDANCE

Use of this guidance.

All of the following sections are to be read in conjunction with the most up to date editions of relevant guides and codes. The purpose here is to emphasise certain aspects of the sections contained in TGD B 2006 with reference to school building projects. Where a section is not referenced this does not mean that that section is not relevant to schools and the recommendations of TGD Part B 2006 and other relevant codes must be considered.

A reference to a technical specification is to the latest edition (including any amendments, supplements or addenda) current at the date of publication of this Technical Guidance Document and other relevant standards. However, if this version of the technical specification and other relevant standards is subsequently revised or updated by the issuing body, the new version may be used as a source of guidance provided that it continues to address the relevant requirements of the Regulations and other relevant standards.

TGD B Section 1.1.6 (iii)

It is noted that Fire Authorities are aware that the following UK document was withdrawn in 1997 “Department of Education and Science (UK) Building Bulletin 7, Fire and the design of educational buildings”. Reference instead is being made to BB7’s successor BB100. BB100 contains additional recommendations for property protection in schools, the provision of sprinklers, construction of compartment walls and floors, etc. This has arisen from statistics indicating that approximately 60% of all school fires in the UK are started intentionally. Consequently some of the recommendations of the BB100 are aimed at reducing the social and economic impacts of a fire. The sprinkler risk assessment in BB 100 refers to property protection due to arson. The provision of sprinklers in Irish schools is generally unnecessary due to the fact that the prevalence of arson, which drove the property protection requirement in the UK, is not an issue to the same extent in Ireland. Life Safety is the primary basis of TGD Part B 2006 and the Fire Safety Certificate process.

TGD B Section 1.2.3.1 Inner Rooms

Where lockers line a corridor, any rooms off the corridor should be regarded as inner rooms with the corridor treated as the access room. As per BB100 4.3.2.6 the occupant capacity of the inner room should not exceed 60.

TGD B Section 1.2.3.2 Open Connections between Floors

In schools of two or more stories the provision of an opening between floors in the form of voids or atria is very desirable for a number of reasons, floor connectivity, way finding/circulation, natural lighting and ventilation, passive supervision, and to facilitate accommodation stairs. Where a particular design includes the provision of voids in the building it is prudent to discuss the appropriate fire strategy for this building with the statutory authority to avoid any delays in obtaining statutory approvals which would ultimately impact on the required program delivery date.

For school buildings containing an atrium void connecting 3 or more stories the following guidance is not appropriate and annexes B and C in BS 9999 should be consulted.

In school buildings with a void connecting 2 storeys, with one of the storeys being at ground level, the proximity of exits from rooms to these voids or atria needs careful consideration. Where there is only a single escape route from a room it should not be less than 5m from any open connection between floors unless it is leading away from the opening. However, where the separation distance is not achieved it may be possible to design the voids or atria using an alternative approach to fire safety as per TGD B section 0.2. Any proposals for a fire engineering solutions should be discussed at an early stage with the relevant Fire Authority.

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Examples of some alternative fire engineering approaches that may be considered for discussion with the Fire Authority are:-

- The voids are enclosed full height in smoke retarding (but not fire resisting) glazing or automatic drop curtains compliant with ISEN 12101-1-2005; or
- Where the separation distance is not met and the provision of a suitable glazed fire screen cannot be readily provided an alternative design which can be considered is escape through an adjoining room. However, where this approach is adopted the alternative means of escape shall only be permitted to pass through one adjoining room and the exit from that adjoining room must be to a separate compartment or a protected corridor; or
- A smoke ventilation system is provided to ensure that a 2 metre high smoke clear layer is maintained above the floor level on the highest balcony. In addition, any rooms on the storey below and within the same compartment as the balcony should be separated from the access space by construction achieving minimum 30 minutes fire resistance integrity.

The above suggested approaches are not exhaustive. Other methods might exist by which an equivalent level of fire safety can be achieved. It is advised to discuss all such measures in advance with the Fire Authority. The Design Team should inform the Board of Management of the measures that have been agreed so that these can be incorporated in the school's safety statement. Where the Board of Management is not the client on the building project, the Design team must ensure that the client is informed and that these measures are documented in the safety file to be handed over to the school authorities on completion.

In all cases, automatic fire detection to IS 3218 2009 or as subsequently updated should be provided.

Where the only escape route from a room is via a balcony, the room should be regarded as an inner room, with the balcony regarded as the access room (see 1.2.3.1). However the inner room recommendations of BB100, limits the occupancy to 60.

TGD B Section 1.2.5.1 Cloaks in School Corridors

Cloaks, for storage of clothes and bags, should not form part of or be open to escape routes unless storage is in non-combustible lockers. To prevent unauthorised storage over-head lockers of bags and other combustibles, the lockers should have sloping tops or be fully recessed into the wall.

TGD B Section 1.2.5.3 Subdivision of corridors

In schools, in the case of open connections between storeys, corridors connecting the balcony area and storey exits should be separated from the void space by self-closing fire doors (and any necessary associated screens).

TGD B Section 1.4.4.1 Construction of Escape Stairways

With regard to the reference to Technical Guidance Document K, all stairways shall be designed as Public to the optimum dimensions set out in Table 1 - Technical Guidance Document K. For Primary Schools - Rise 150mm, Going 300mm and pitch 27 degrees. For Post Primary – Maximum Rise 165mm, Going 300 and pitch 30 degrees. Open risers should not be used. In Primary Schools a second handrail at 600mm above the pitch line of the stairs should be provided for children on all stairs, as per BS 8300:2009 which recommends the use of a lower handrail in buildings designed principally for children and states structural guarding should be provided of sufficient height to prevent a child from falling if they climb on the handrail. At least one stairs should be suitable for ambulant disabled people (See Part M 2010 and TGD M for details) and it should also comply with the optimum rise and going and pitch set out above.

TGD B Section 1.4.7 – Final Exits

In schools, where a ground floor storey exit shares a final exit with a stair via a ground floor lobby, the width of the final exit should be sufficient to enable a maximum evacuation flow rate equal to or greater than that from the storey exit and stair combined (see figure 6). This can be calculated from the following formula:

$$W = ((N/2.5) + (60S))/80$$

Where:

W = width of final exit, in metres

N = number of people served by ground floor storey exit

S = stair width in metres

Note: Where the number of persons (N) entering the lobby from the ground floor is more than 60 then the distance from the foot of the stair, or the storey exit (D), to the final exit should be a minimum of two metres. Where this cannot be achieved then the width of the final exit (W) should be no less than the width of the stair plus the width of the storey exit.

TGD B Section 1.4.7 – Final Exits

In order to cover the issue of damage to panic bolt door ironmongery on emergency exit doors in everyday use one should ensure that where emergency exit doors have the additional use of day to day exit to and entrance from playgrounds etc. the ironmongery on the doors should reflect this greater usage. One solution used on a pair of double rebated doors is to install a panic device on the lazy/dead door leaf and a thumb turn operated lock on the other, therefore the door with the thumb turn lock can be used for day to day usage and in the event of an emergency the panic device on the lazy / dead door leaf when pushed will release both doors. With regard to special schools it is recommended that designers should consult closely with the fire authority as the nature of the children attending these schools may present additional issues to be addressed with regard to child safety, evacuation etc.

TGD B Section 1.4.9.1 Evacuation Lifts.

Given the disabled refuge provision in fire stairwells, and the controlled management of schools, Evacuation lifts are not necessary in schools. In special schools it is recommended that designers should consult closely with the fire authority as a number of children attending these schools may present additional issues to be addressed with regard to evacuation.

TGD B Section 1.4.9.2 Fire Protection of Lift Installations Generally.

Occasionally a lift in a school might be a feature machine-room-less lift, which rises within a large volume such as an atrium. Normally lifts in schools will be contained within the enclosures of a protected stairway or enclosed with fire resisting construction.

TGD B Section 1.4.14. Schools

All school building projects should be provided with an automatic fire detection system. The provision of an automatic fire detection system should be assessed by reference to IS 3218 2009

To facilitate the need of people with disabilities communication systems will be required from disabled refuges in fire stairwells. To facilitate the effective evacuation of people from refuges in schools, an emergency voice communication (EVC) system should be provided. It is essential that the occupants of each refuge are able to alert other people that they are in need of assistance and for them to be reassured that their presence in the building is known.

The EVC system should comply with BS 5839: Part 9: 2003 and consist of Type B out-stations which communicate with a master station located in an appropriate place (e.g. adjacent to the fire alarm control panel).

TGD B Section 1.4.15 provisions for people with disabilities.

Guidance for the provision of means of escape for people with disabilities is contained in BS 9999.

TGD B Section 1.4.16 First-Aid Fire-Fighting Equipment

Hose reels are not recommended in schools.

TGD B Section 2.0.2

In schools floor coverings should comply with the performance requirements of a 'low radius of effects of ignition' as defined in BS 5287:1976.

TGD B Section 2.2.1 Notice boards in schools

Notice boards are an essential means of conveying information in schools and are located in classrooms as well as in the common circulation areas. Notice boards can present a means of surface spread of flame and therefore the use of notice boards should be limited.

Designers should note BB 100 in this regard and any proposed deviation from this should be discussed and agreed with the Fire Safety Officer in the context of the overall Fire Safety Certificate application. The following: could be considered for discussion-

- Notice boards in escape routes should not be more than 2.4m in width, with minimum 3m spacing between notice boards on the same wall.
- A notice board should not be provided facing another notice board across a corridor.
- Notice boards in central atria or voids linking one or more storeys should be fitted with glass covers which are normally kept locked.
- Notice boards should not be provided in dead end corridors unless covered by a suitable material (e.g. glass or polycarbonate) and normally kept locked.
- The requirement to limit the incidence of paper notices, posters, artwork etc. to the designated notice boards must be carefully monitored by the School Authorities to ensure that this specific fire safety measure is met.

Display cabinets in central atria or voids linking one or more storeys should be in hardwood or non-combustible framing, with toughened or laminated glass enclosures, and should be used only to display items having a non-combustibility or limited combustibility rating.

Compartmentation

Table 1: Maximum dimensions of compartments within schools as per BB 100.

Floor area of any one storey in the school or any one storey in a compartment (m²)

In multi storey schools

In single storey schools

Not sprinklered – 800

Not Sprinklered – 800

Sprinklered – 2000

Sprinklered – no limit

Fire Safety Management & Maintenance

All schools are required to keep a Fire Safety Register and a Fire Safety Manual. Where particular management and maintenance issues arise as a result of a particular approved design solution, it must be addressed in the school's Fire Safety Manual, and the Design Team must ensure that the Client is made aware of the Board of Management's obligations in this regard.

Dangerous Substances and places of special fire hazard

Designers should refer to BB100 with regard to areas that potentially require additional protection such as boiler rooms, laboratories, chemical stores etc.

Flammable liquids, gases and other potentially dangerous substances (for example, those for use in laboratories) in use should be limited to small quantities (not exceeding amounts necessary for teaching activities) and handled with extreme care. Storage should be in labelled suitable containers in designated suitable storage areas.

Temporary and re-locate able buildings.

The siting of any temporary buildings will need to be discussed with the local authority so that access for fire fighting is not compromised. These should be treated as any other building with regard to space separation using the notional boundary concept to set the appropriate distances for property protection.

3. APPENDIX

Guide to Design Teams in relation to issues to be addressed in Fire Safety Management in hand-over documents to schools.

Statutory Obligations

The main legislation relating to fire safety in buildings in Ireland is the Fire Services Act, 1981 and 2003 Section 18(2) of the Act places a duty on persons having control over premises to which the section applies.

Guidance on fire safety management is contained in the *Code of Practice for the Management of Fire Safety in Places of Assembly*, published by the Department of the Environment (1989). (Reference in the Code to the public may be considered to include, in the case of schools, pupils and students, as well as parents and other visitors to schools.) Refer also to the NDA publication *Promoting Safe Egress and Evacuation of People with Disabilities* ISBN: 978-1-870499-18-7.

Further guidance on fire safety management is contained in the UK Department for Education and Employment - *Fire Safety in Schools* – First published 2000.

ISBN 0 11 271040 9 Available free to download at:

<https://www.education.gov.uk/publications/eOrderingDownload/Fire%20Safety%20Guide.pdf>

S.I. No. 299 of 2007 Safety, Health and Welfare at Work (General Application) Regulations. Note in particular Part 2: Workplace and Work Equipment: Chapter 1 – Workplace: 13. Fire Detection and fire fighting.

All schools are required to keep a Fire Safety Register and a Fire Safety Manual. Where particular management and maintenance issues arise as a result of a particular approved design solution, it must be addressed in the school's Fire Safety Manual. The Design Team must ensure that the Client is made aware of the Board of Management's obligations in this matter.

In particular some items to note with reference to schools include:

Smoking

Smoking and careless disposal of smokers' materials are common causes of accidental fires.

Smoking in school buildings is prohibited under the provisions of the Public Health (Tobacco) Act, 2002, as amended in 2004.

Additionally, it is the policy of the Department of Education and Skills that smoking should not be permitted on school grounds.

Cloaks

Cloaks, for storage of clothes and bags, should not form part of or be open to circulation spaces unless storage is in non-combustible lockers. To prevent unauthorised storage over-head lockers of bags and other combustibles, the lockers should have sloping tops or be fully recessed into the wall.

Multi-Level Spaces

Where a school building includes one or more central atria or voids linking storeys, and where the only escape route from any room on the upper storey is via a balcony in the atrium or void, strict controls should be in place to avoid unnecessary combustible materials in the atrium or void.

Clothing or other combustible materials, such as art or craft work, sports equipment, displays, decorations, Christmas trees, stationery, refuse or waste should not be stored or displayed in these spaces.

Lockers, or clothes hooks or hangers should not be located in these spaces.

Seating in these spaces should not exceed three square metres in plan, which, when tested in accordance with I.S.254:1983 will pass the smouldering cigarette test and Ignition Source Grade No. 7 test. Such seating shall additionally comply with the recommendations in section 2 of *Code of Practice for Fire Safety of Furnishings and Fittings in Places of Assembly*, issued by the Department of the Environment (1989).

Floor coverings at ground floor in these spaces should comply with the performance requirements of 'low radius of effects of ignition' as defined in BS 5287:1976.

Notice boards in these spaces should be no more than 2.4m in width, with minimum 3m spacing from other notice boards on the same wall. Notice boards should be fitted with glass covers which are normally kept locked.

Display cabinets in these spaces should be in hardwood or non-combustible framing, with toughened or laminated glass enclosures, and should be used only to display items having a non-combustibility or limited combustibility rating (as per definition in Appendix A of *Building Regulations 2006, Technical Guidance Document B, Fire Safety*, issued by the Department of the Environment and Local Government (2006).

Displays

There may be displays for national days, Halloween, Christmas, or other celebrations or events. There may also be other displays on an ongoing basis. These displays could contain large amounts of paper and decorations (such as paper chains, large posters, etc.) and present a significant fire load. Additionally, students' or pupils' art or craft work may be displayed.

Large displays or Christmas trees should not be located in circulation spaces (including corridors, lobbies and stairway enclosures) or multi-level spaces. These should be located in adjacent multi-use spaces such as sports halls or adjacent reception areas.

Hanging displays, such as bunting or Christmas decorations, are acceptable, where they are of limited size and located remote from sources of ignition, such as electrical equipment.

Displays should not be located in stairways.

Displays should be kept away from curtains, doors and heat sources. Displays should not obstruct escape routes, fire notices, fire alarm call points, fire fighting equipment, emergency lights or exit signs.

Notice Boards

Notice boards can present a means of surface spread of flame and therefore the use of notice boards in particular in circulation areas should be limited.

A notice board should not be provided facing another notice board across a corridor.

Notice boards in central atria or voids linking one or more storeys should be fitted with glass covers which are normally kept locked.

Notice boards should not be provided in dead end corridors unless covered by a suitable material (e.g. glass or polycarbonate) and normally kept locked.

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The requirement to limit the incidence of paper notices, posters, artwork etc to the designated notice boards must be carefully monitored by the School Authorities to ensure that this specific fire safety measure is met.

Display cabinets in central atria or voids linking one or more storeys should be in hardwood or non-combustible framing, with toughened or laminated glass enclosures, and should be used only to display items having a non-combustibility or limited combustibility rating.

Dangerous Substances

Flammable liquids, gases and other potentially dangerous substances (for example, those for use in laboratories) in use should be limited to small quantities (not exceeding amounts necessary for teaching activities) and handled with extreme care. Storage should be in labelled suitable containers in designated suitable storage areas.

Community or Assembly Use

When school buildings are used for assembly, recreation or community use or events, suitable arrangements, including staffing arrangements, should be in place to ensure fire safety.

Where those in control during such use or events are not the normal school management, they should be informed of the duty for fire safety on the premises of persons having control over the premises, and given written information on the fire safety programme, including prevention of outbreaks of fire, emergency procedures, the position of telephones, escape routes, fire alarms, fire fighting equipment, etc.

Guidance on fire safety management is contained in the *Code of Practice for the Management of Fire Safety in Places of Assembly*, published by the Department of the Environment (1989).

In cases of community, recreation or assembly use or events, persons on the premises may not be familiar with the layout of the building. The number of persons admitted to the school, or to the area in use, should not be such as to give rise to overcrowding.

Care should be taken to ensure that persons are not permitted to enter areas other than those to which they are intended to have access, except when a fire or other emergency requires them to do so to escape from the building.

The premises should be inspected on each occasion immediately after those present for such use or events have vacated them, to remove any potential fire hazard.