Section 2: Fire

Colin Hird

Head of Fire, Structure & Certification

Jim McGonigal

Technical Author Section 2: Fire

Building Standards Division

The Scottish Government

Section 2: Fire

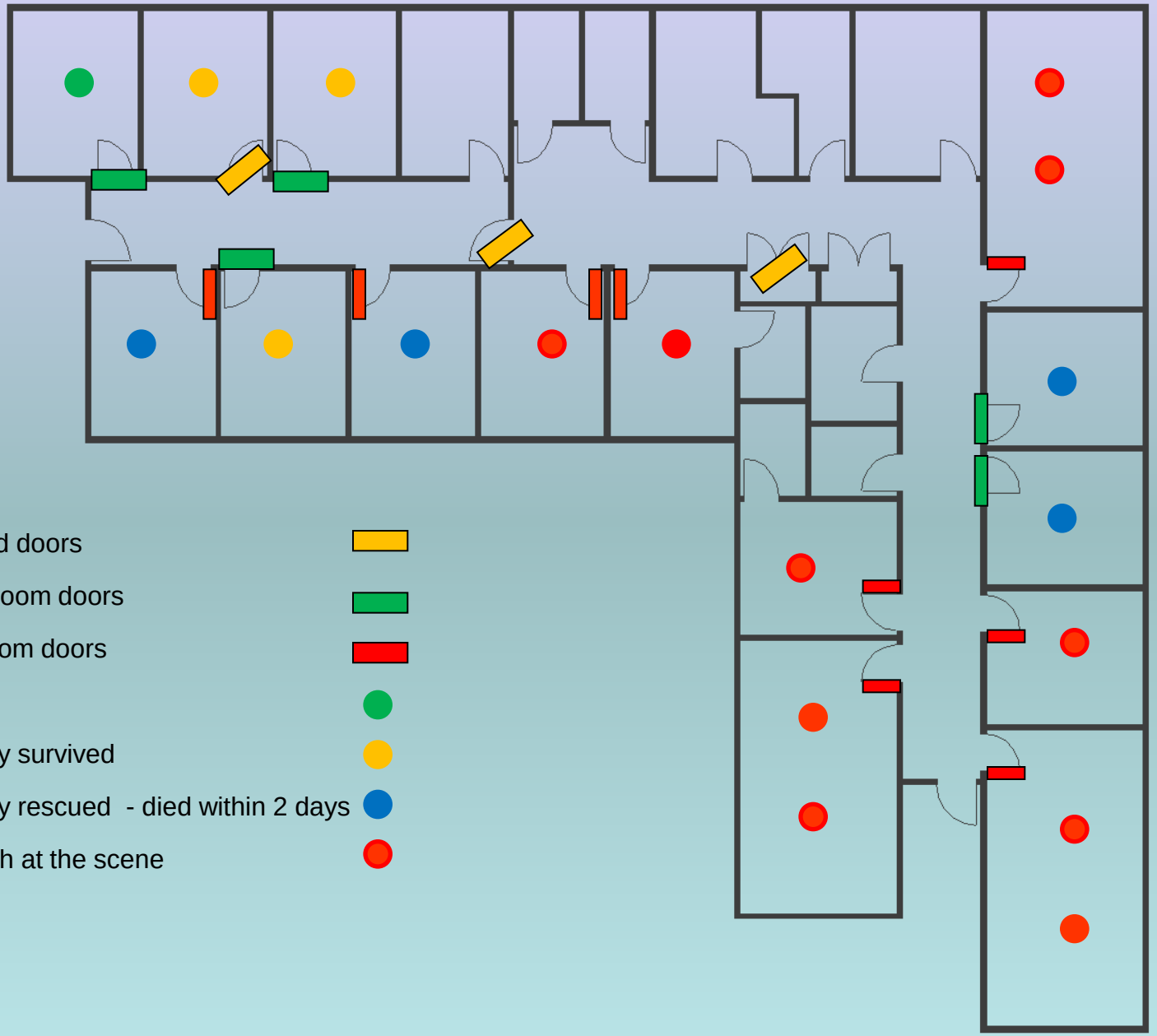
- Case studies
- Building Standards & Fire Engineering
- Hot topics -1
  - Whisky –Bonded Warehouses
  - Sprinklers in Dwellings
  - Contractor Fire Safety Awareness

15:00 - COFFEE

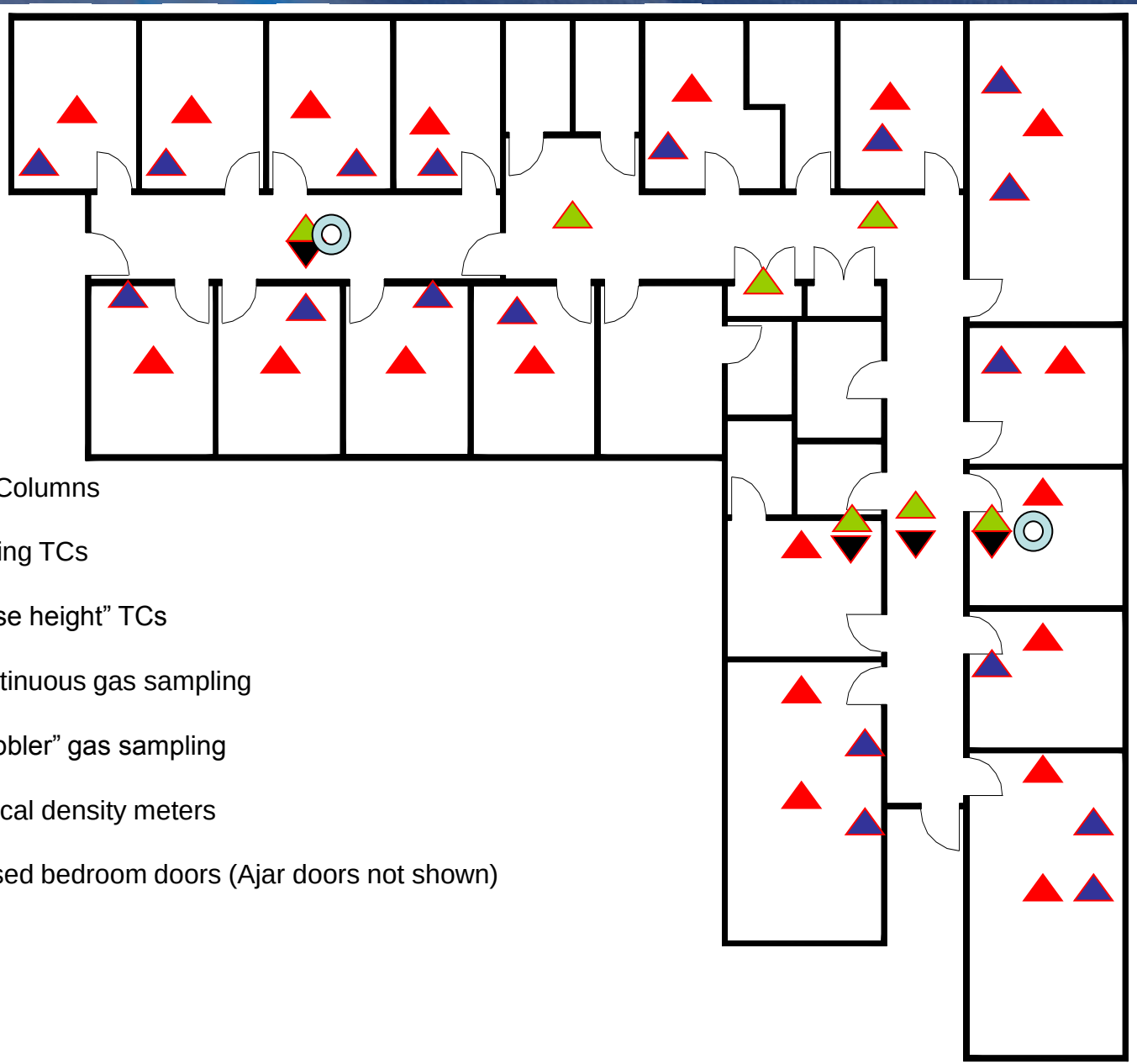
- Hot Topics -2
  - Schools
  - Hospitals
  - MVHR – Inner rooms – Lighting Diffusers

The Scottish Government

Design and construction - 3



Instrumentation schematic: Tests 1 and 2



TC Columns

Ceiling TCs

“Nose height” TCs

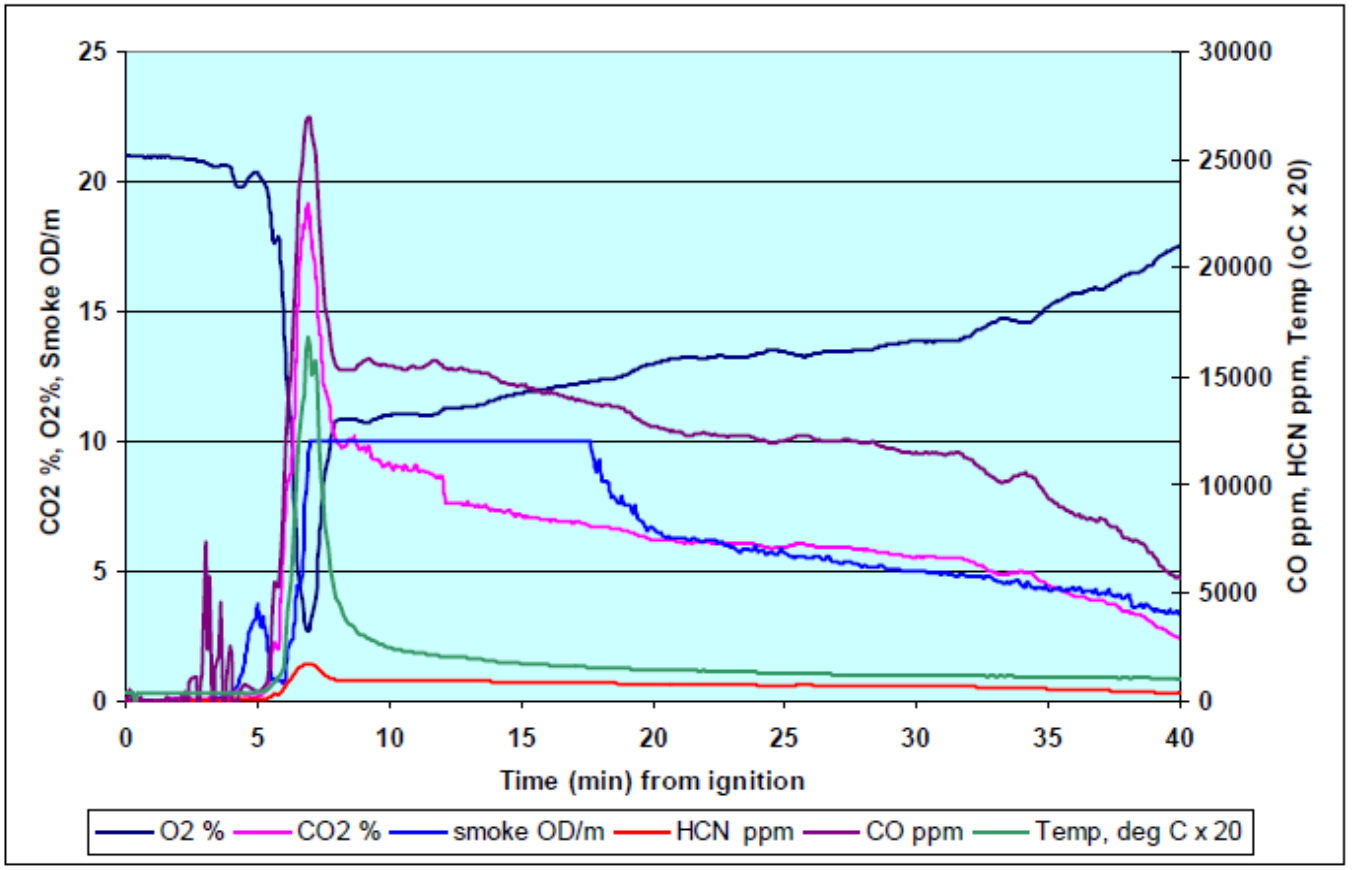
Continuous gas sampling

“Bubbler” gas sampling

Optical density meters

Closed bedroom doors (Ajar doors not shown)

Conditions in the fire corridor at head height



C.S. TODD & ASSOCIATES LTD.
Fire Protection Consultants

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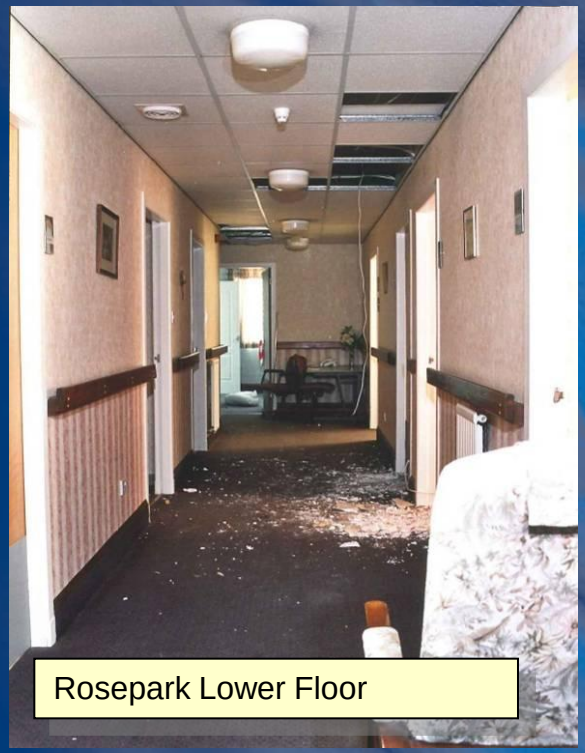
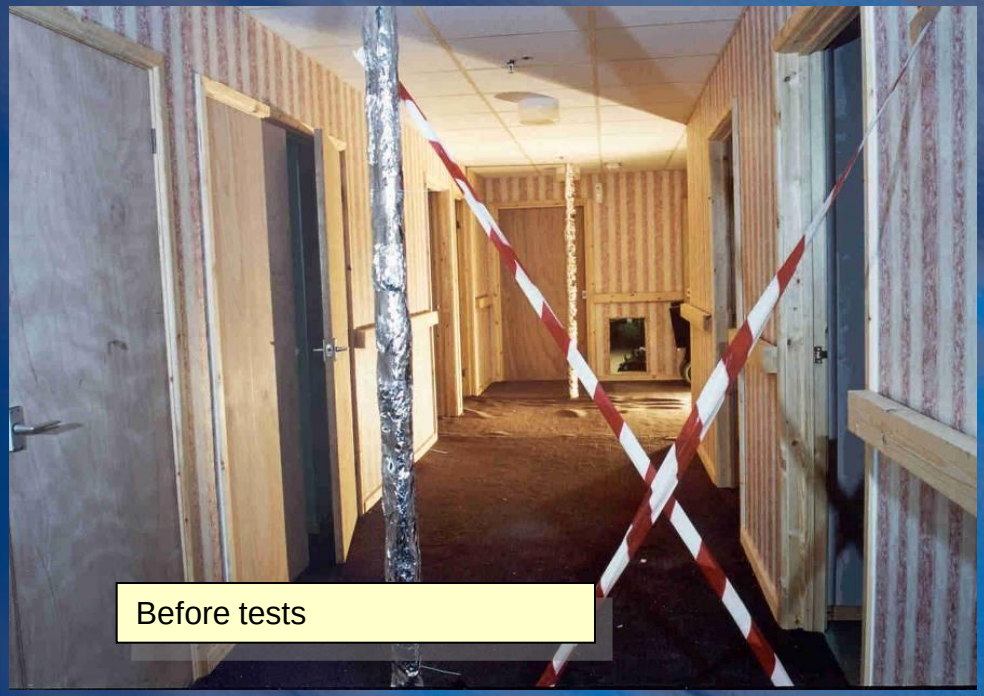


Rosepark Lower Floor

Rosepark upper floor after fire

Reconstruction – before test

Reconstruction - After Test

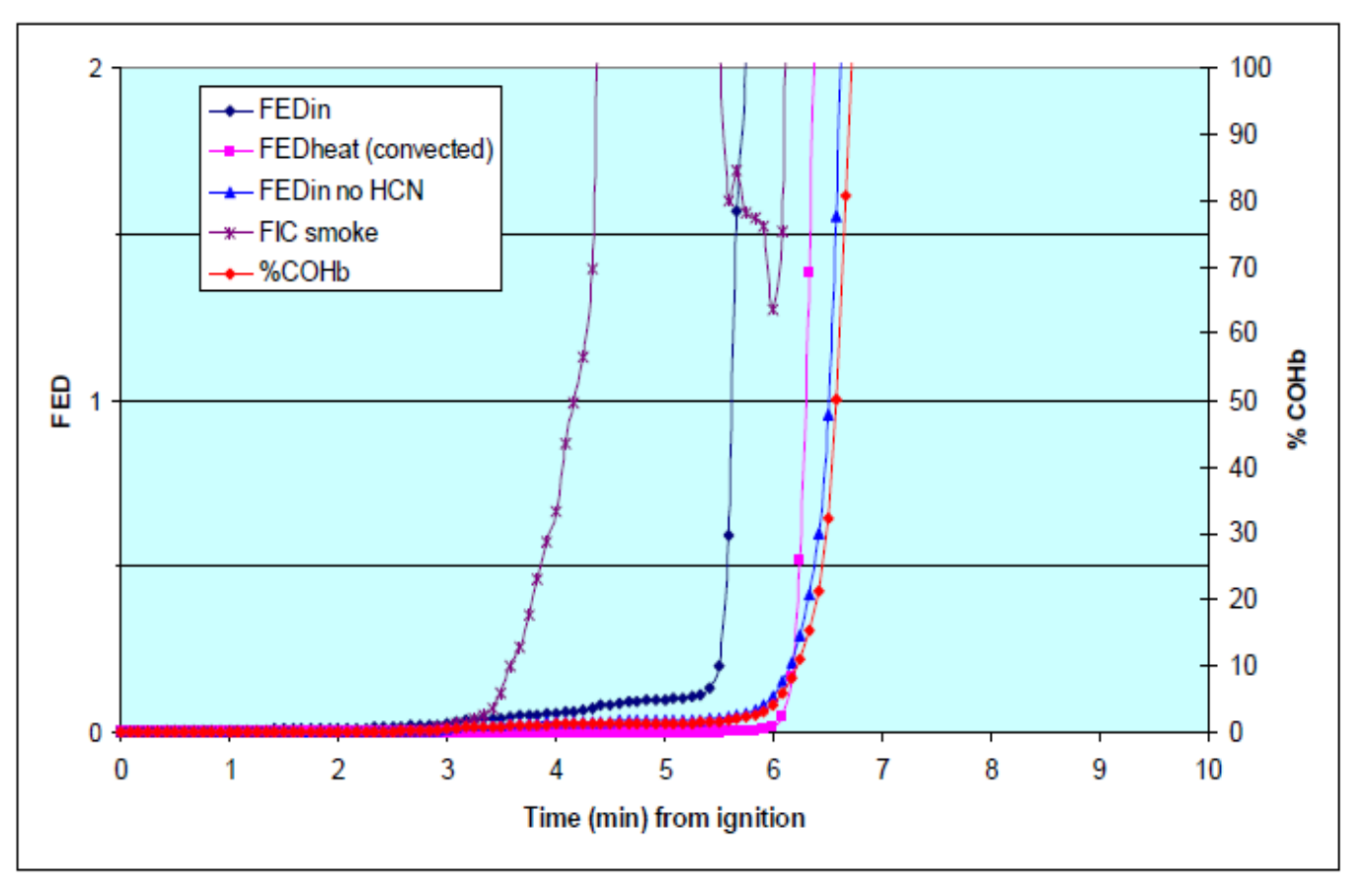

Before tests


Test 1 Reconstruction


Test 2 - Sprinklers


Test 3 – Fire doors

Predicted times to death



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Fire Protection Consultants

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Prescriptive codes

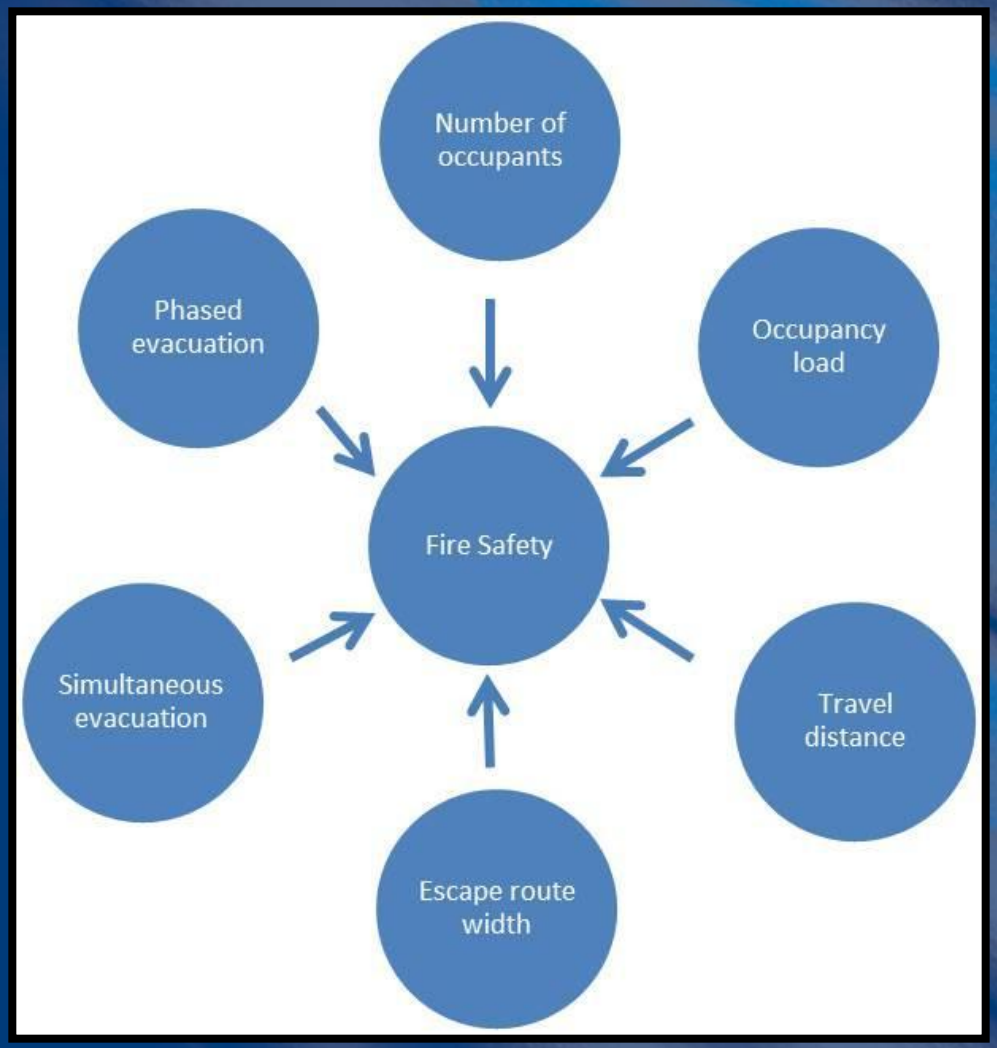
- A prescriptive approach is the minimum legislative requirements for life-safety.

- Unknown level of property and environmental protection

Recommended travel distance will not be more than 32m

The Scottish Government

Satisfy Standard

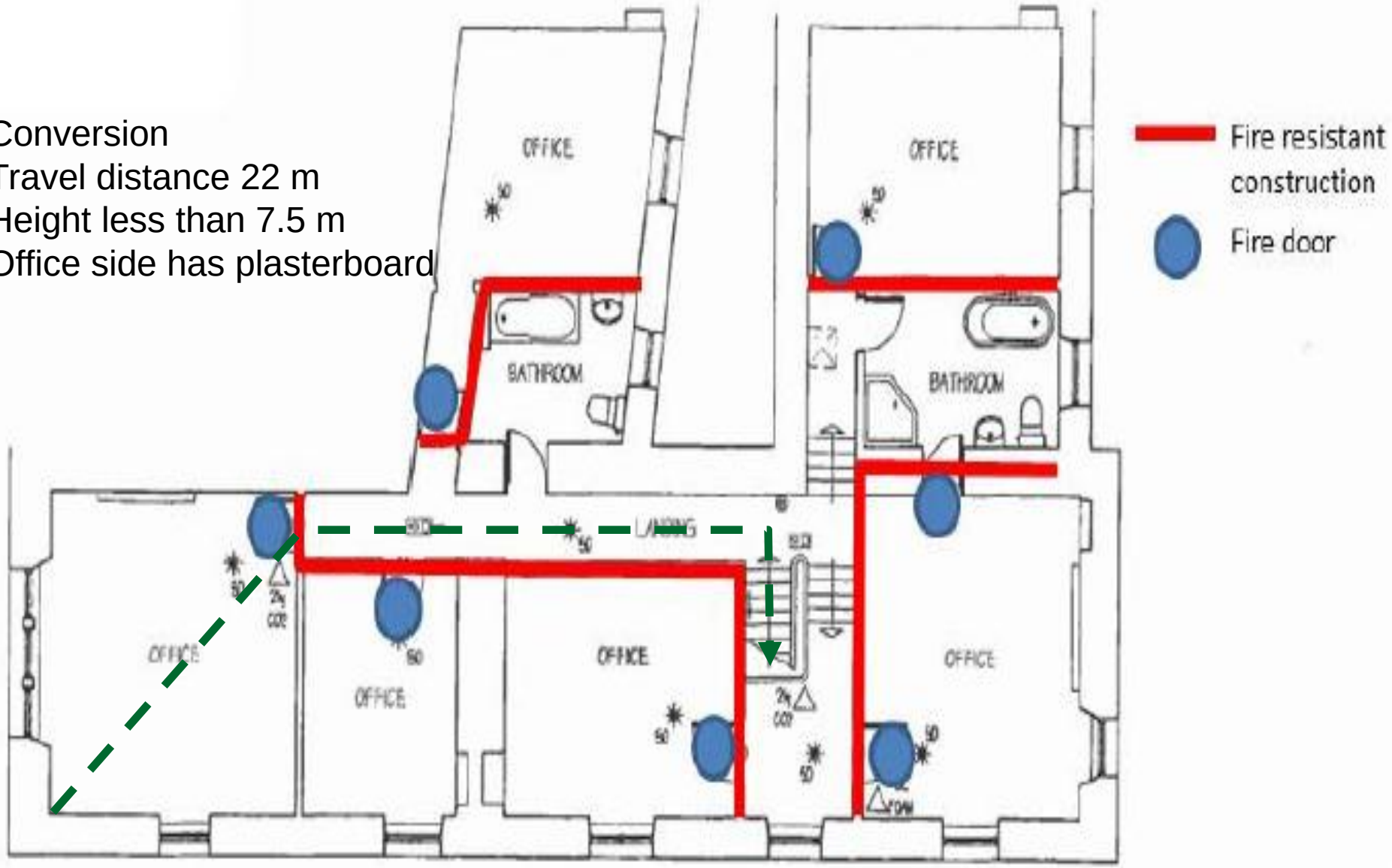


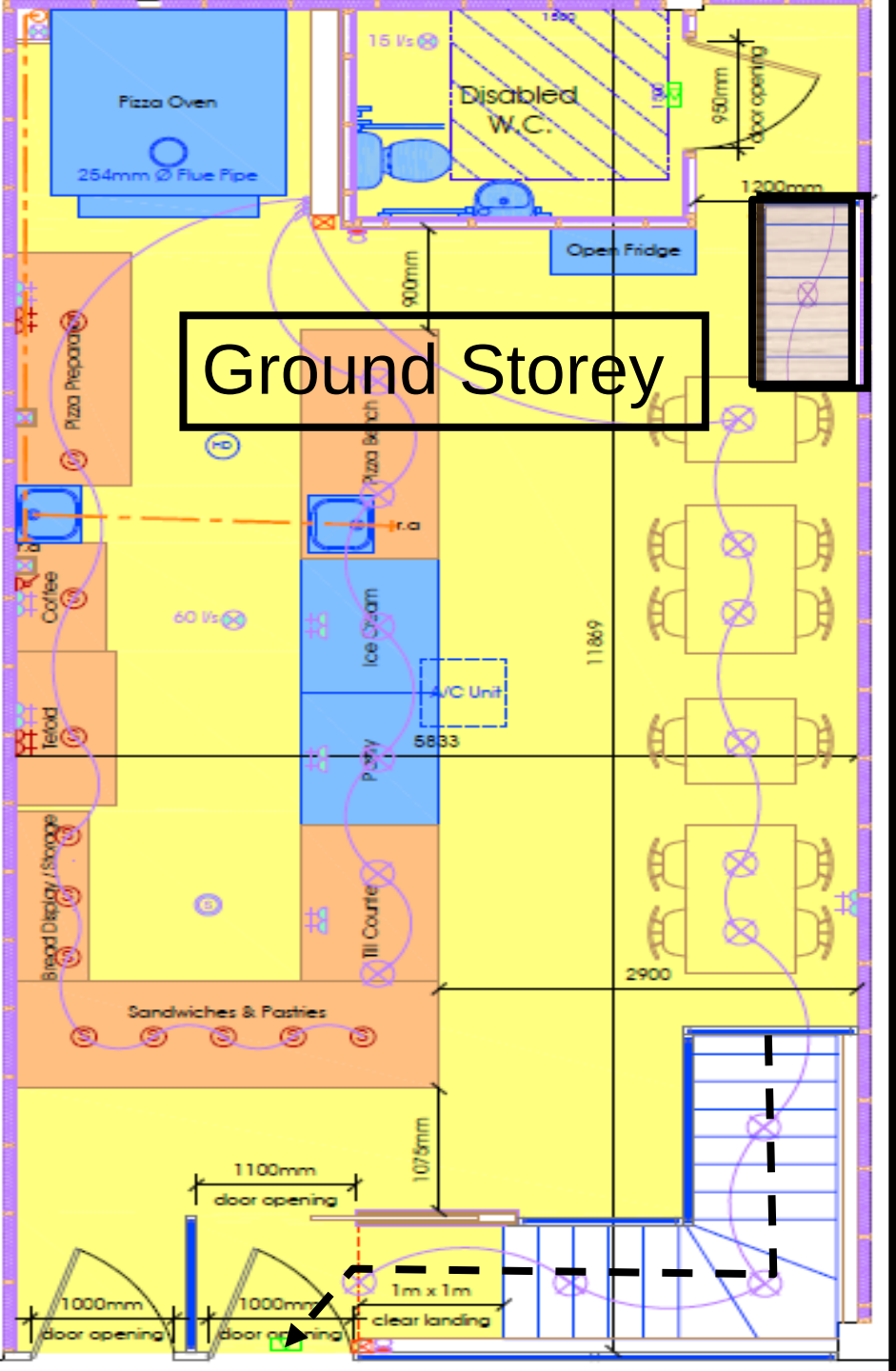
Every building must be designed and constructed in such a way that in the event of an outbreak of fire within the building, the occupants, once alerted to the outbreak of the fire, are provided with the opportunity to escape from the building, before being affected by fire or smoke

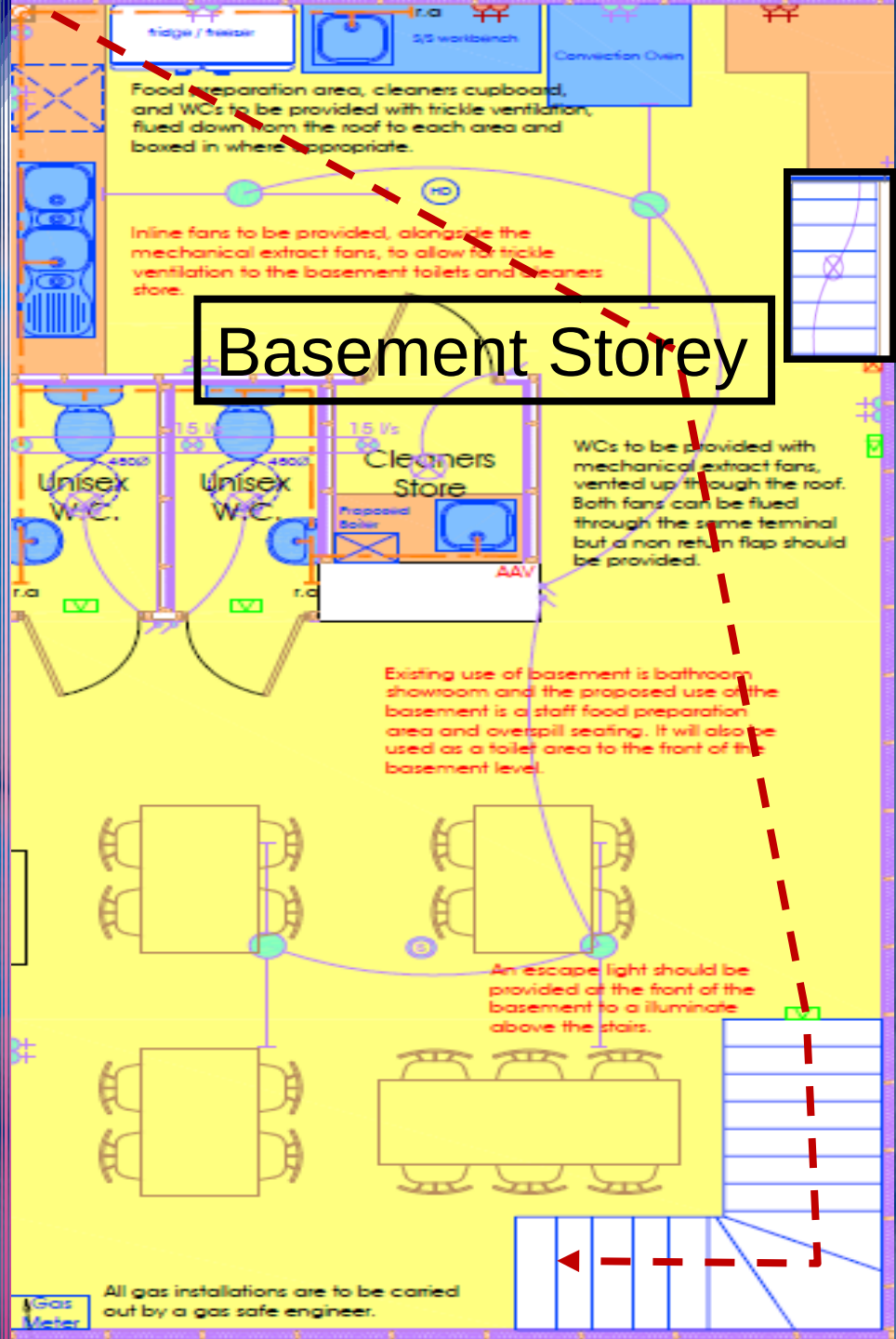
The Scottish Government

Case Study 1 – Extended Travel Distance

Conversion
Travel distance 22 m
Height less than 7.5 m
Office side has plasterboard




Ground Storey
Pizza Oven
254mm Ø Flue Pipe
Disabled W.C.
15 l/s
950mm door opening
1200mm
Open Fridge
900mm
Pizza Preparation
Pizza Bench
r.a
Coffee
60 l/s
Ice Cream
A/C Unit
11869
5833
Telfod
Pastry
Bread Display / Storage
Till Counter
2900
Sandwiches & Pastries
1075mm
1100mm door opening
1000mm door opening
1000mm door opening
1m x 1m clear landing


Basement Storey
Fridge / freezer
r.a
S/S workbench
Convection Oven
Food preparation area, cleaners cupboard, and WCs to be provided with trickle ventilation, flued down from the roof to each area and boxed in where appropriate.
Inline fans to be provided, alongside the mechanical extract fans, to allow for trickle ventilation to the basement toilets and cleaners store.
15 l/s
Unisex W.C.
Unisex W.C.
Cleaners Store
Proposed Boiler
AAV
r.a
WCs to be provided with mechanical extract fans, vented up through the roof. Both fans can be flued through the same terminal but a non return flap should be provided.
Existing use of basement is bathroom showroom and the proposed use of the basement is a staff food preparation area and overspill seating. It will also be used as a toilet area to the front of the basement level.
An escape light should be provided at the front of the basement to a illuminate above the stairs.
Gas Meter
All gas installations are to be carried out by a gas safe engineer.

Case Study 2 – Escape from Basement Cafe

At least 2 storey exits should be provided from:

- a basement storey at a depth of more than 4.5m; or a basement storey which is intended to be used by members of the general public (other than a basement storey providing access only to sanitary accommodation).

The Scottish Government

Case Study 3 – Corridors

Recommendations:

- not more than 10m travel distance inside protected lobby where only one escape route

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Defend in place - 1

- Fire broke into protected lobby
- 60 mins FR Sc Door in high rise flats

The Scottish Government

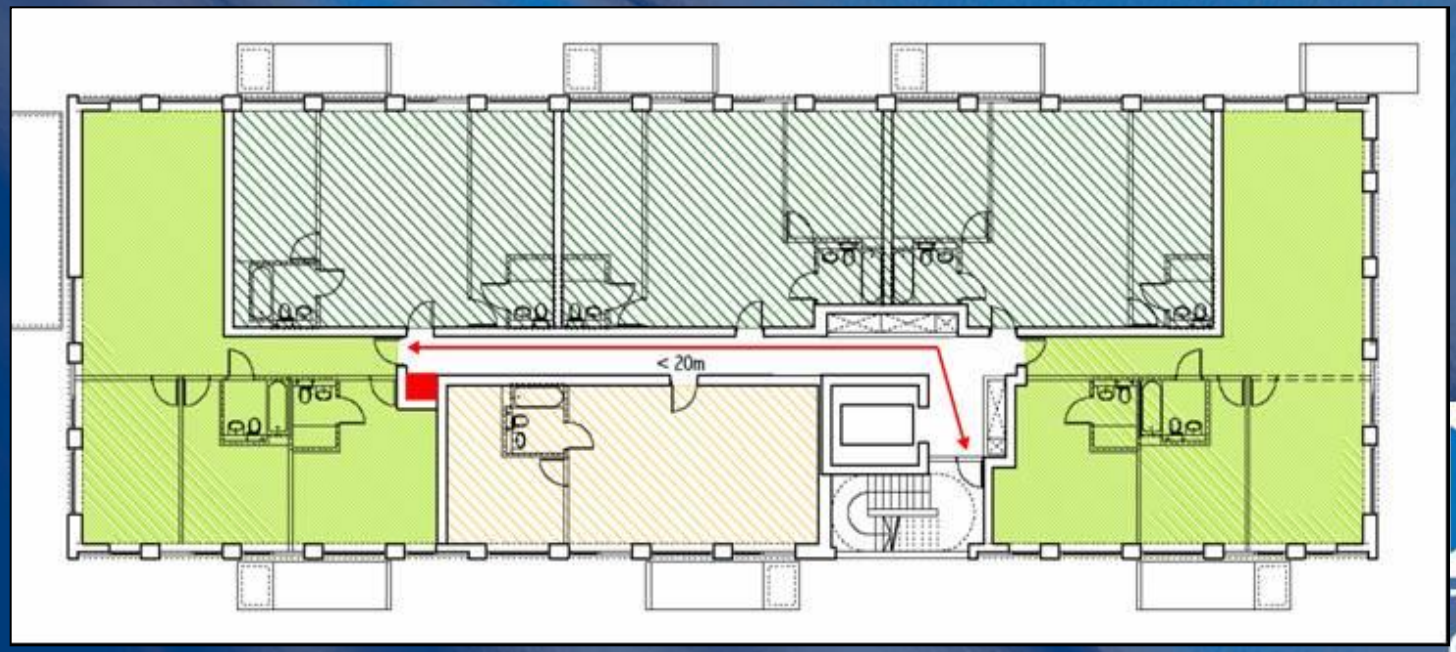
Defend in place - 2

- Safe refuge within adjoining dwellings

The Scottish Government

Corridor Smoke Venting - 1

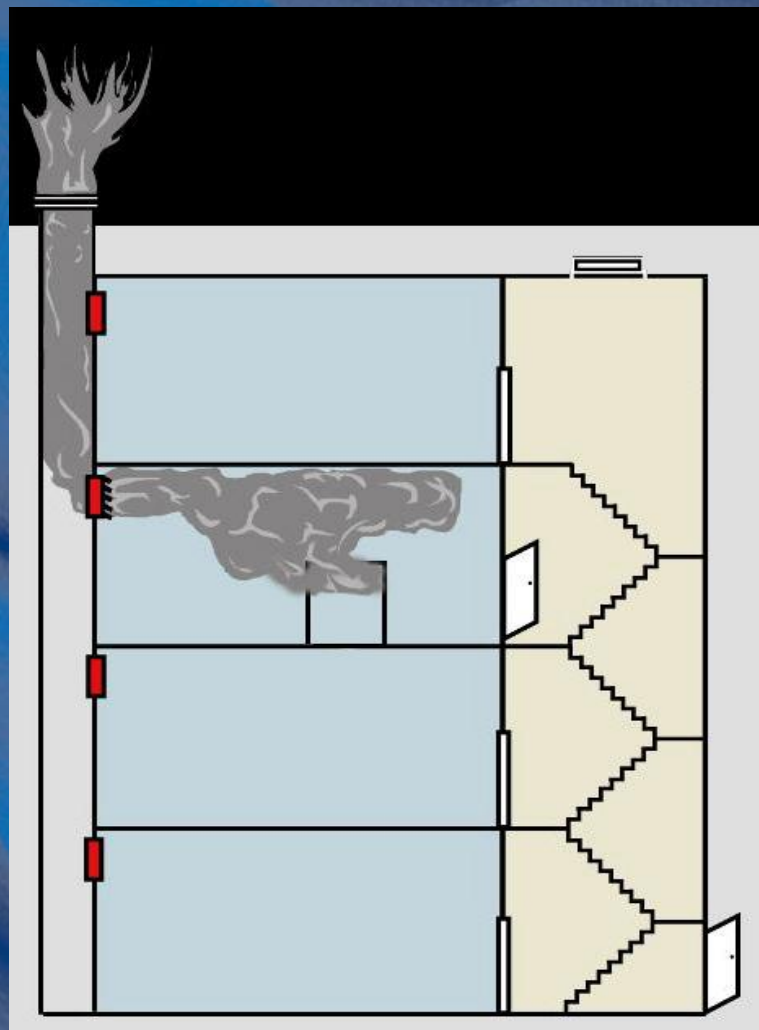
- Escape distances up to 20m
- Sprinklers
- Detection
- Single mechanical shaft



The Scottish Government

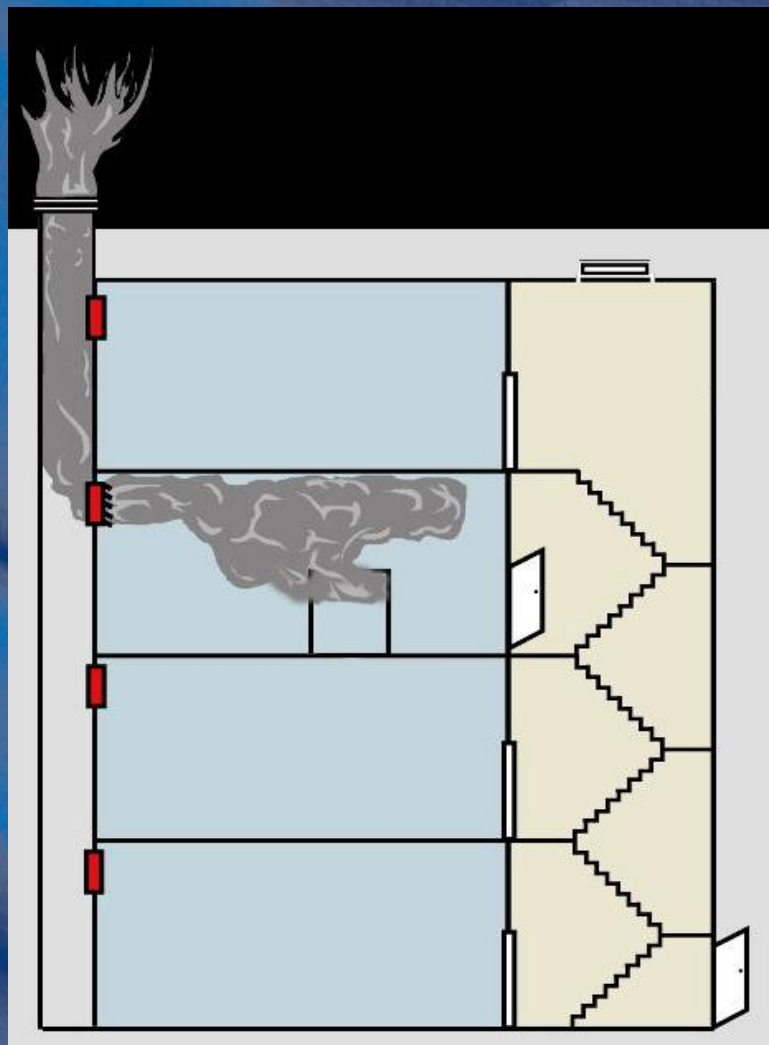
Corridor Smoke Venting - 2

- **0.6 sq m shaft**
  - A vent/damper provided into the shaft from each corridor at each level
  - Each vent approximately 0.8m² in (free) area
- **Fan at the top of smoke shaft**
  - fan comprises of duty and standby
  - rated to 300 deg C for two hours
  - extract rate between 3-5m³/s



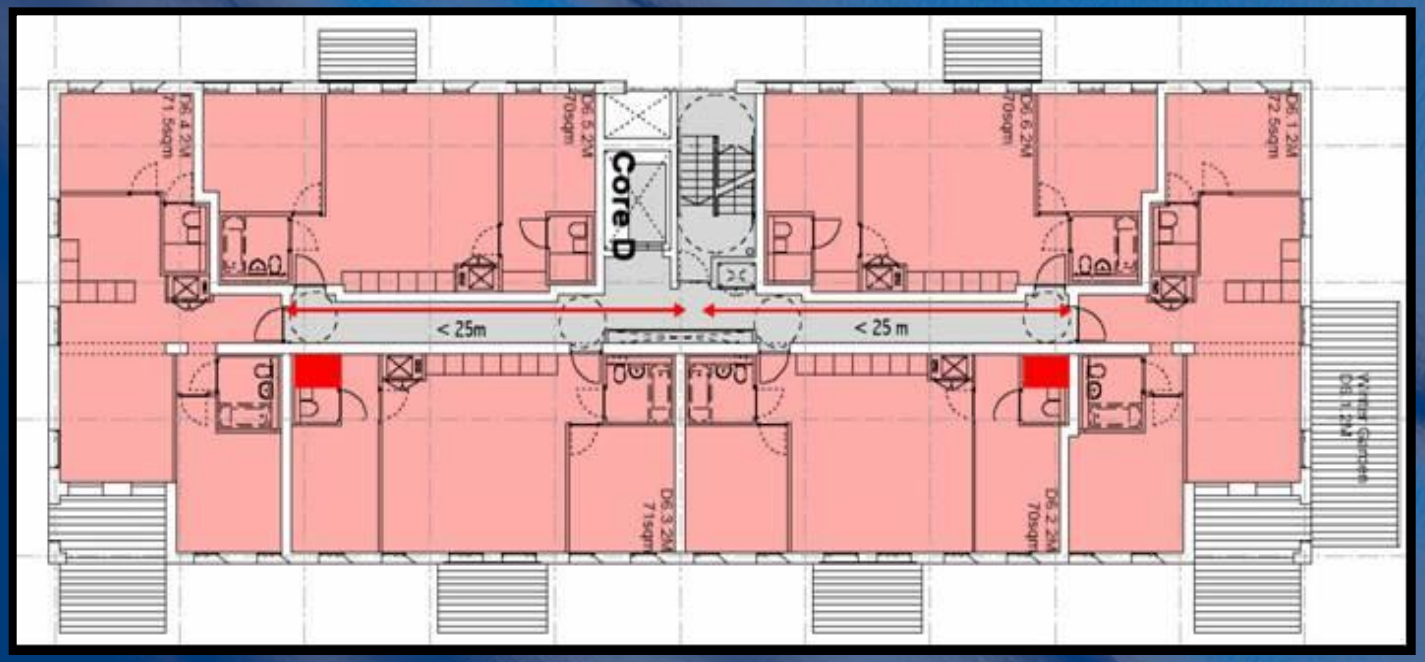
Corridor Smoke Venting - 3

- **1m² inlet AOV in the stair (or additional inlet shaft where there are longer travel distances)**
  - General principle is to push smoke away from the stair towards the extract point.
- **Smoke detection in corridors**
  - Causes the local vent and inlet vent to open automatically. All other vents remain closed.



Corridor Smoke Venting - 4

- Escape distances up to 25m
- Sprinklers
- Detection
- Two inlet / extract mechanical smoke shafts
  - Reversible fans depending on location of fire



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Building Standards & Fire Engineering

- Mandatory Requirements
- Follow guidance in Section 2
- Acceptable Solutions
- Alternative Solutions
- Asking the right questions
- Appropriate Knowledge
- Summary of questions to ask

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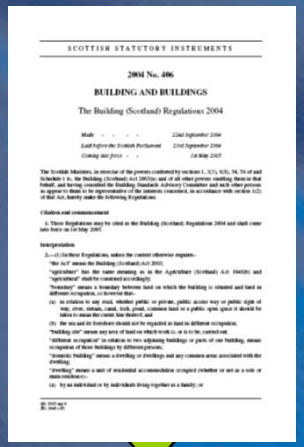
Fire Safety Design Hierarchy

Regulation


SCOTTISH STATUTORY INSTRUMENTS

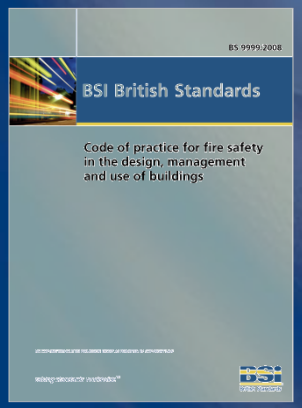
2004 No. 406

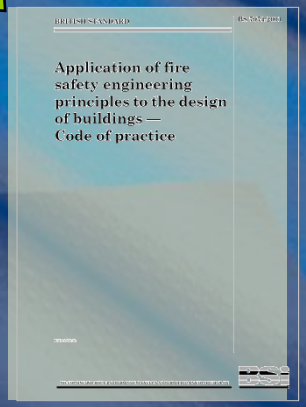
BUILDING AND BUILDINGS

The Building (Scotland) Regulations 2004

Approved Guidance

Alternative Guidance





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Standards 2.1 – 2.15

- ***"Every building must be designed and constructed in such a way that in the event of an outbreak of fire within the building, ……."***

Purpose is:

- To aid means of escape and fire fighting
- Provide stability to structure during fire
- Limit number of people affected by fire
- Limit area of building affected by fire.

Conventional Approach

2.5 mins escape time?

For means of escape how important is:

- Rate of fire growth
- Ceiling height
- Sprinklers
- Fire Detection
- Smoke control etc.
- Human behaviour

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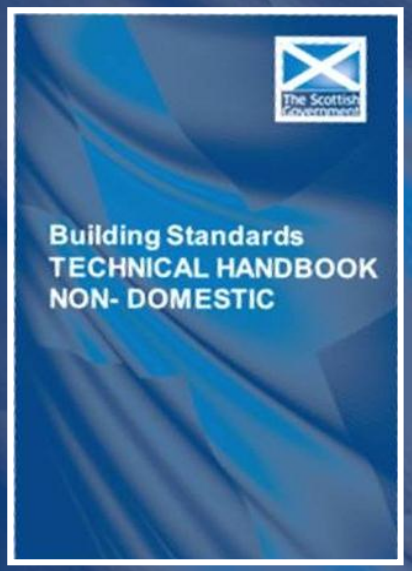


ALTERNATIVE SOLUTIONS

Bespoke and efficient solutions

Provide flexibility

Promotes Innovation

Support sustainability & longevity

Best for more complex buildings

Proof of safety, not assumed safety

PRESCRIPTIVE CODES

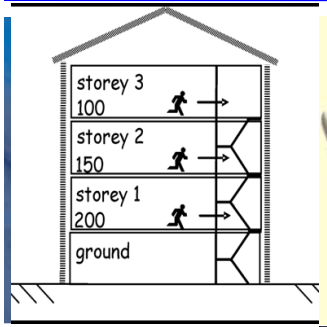
Based on historical negative events

Inflexible

Do not keep up current trends

Have a ‘one size fits all’ approach

Best used for simple buildings



Why Use Performance Based Design?

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What is Fire Engineering?

Fire Safety Engineering is a recognised method of achieving adequate fire safety in a building.

It takes into account the entire fire safety engineering package and is sometimes the only viable method of achieving a satisfactory standard of fire safety in large or complex buildings.

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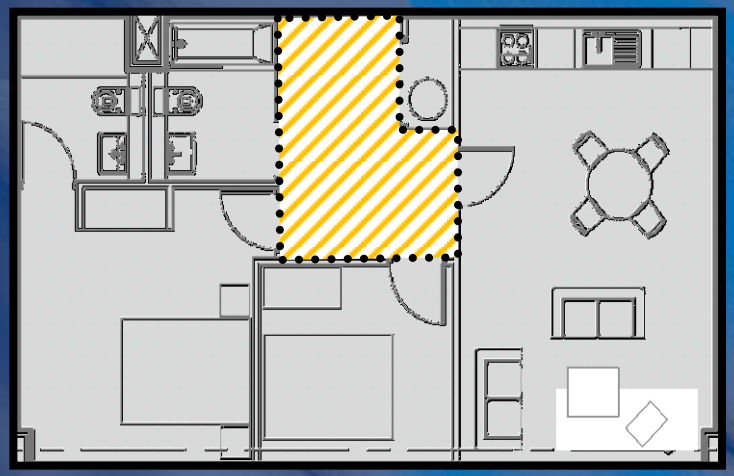
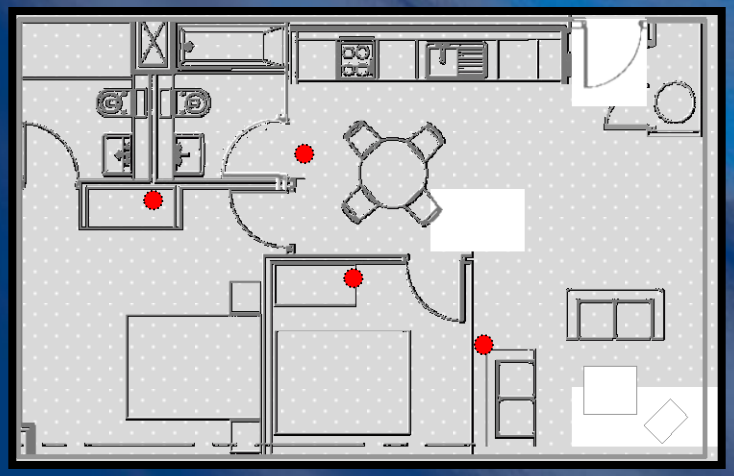
Open Plan Apartments





Acceptable Solutions - 1

Create Modern ‘Loft’ Style Living Apartments

- **Remove Protected Entrance Hall**
- **Sprinkler Protection**

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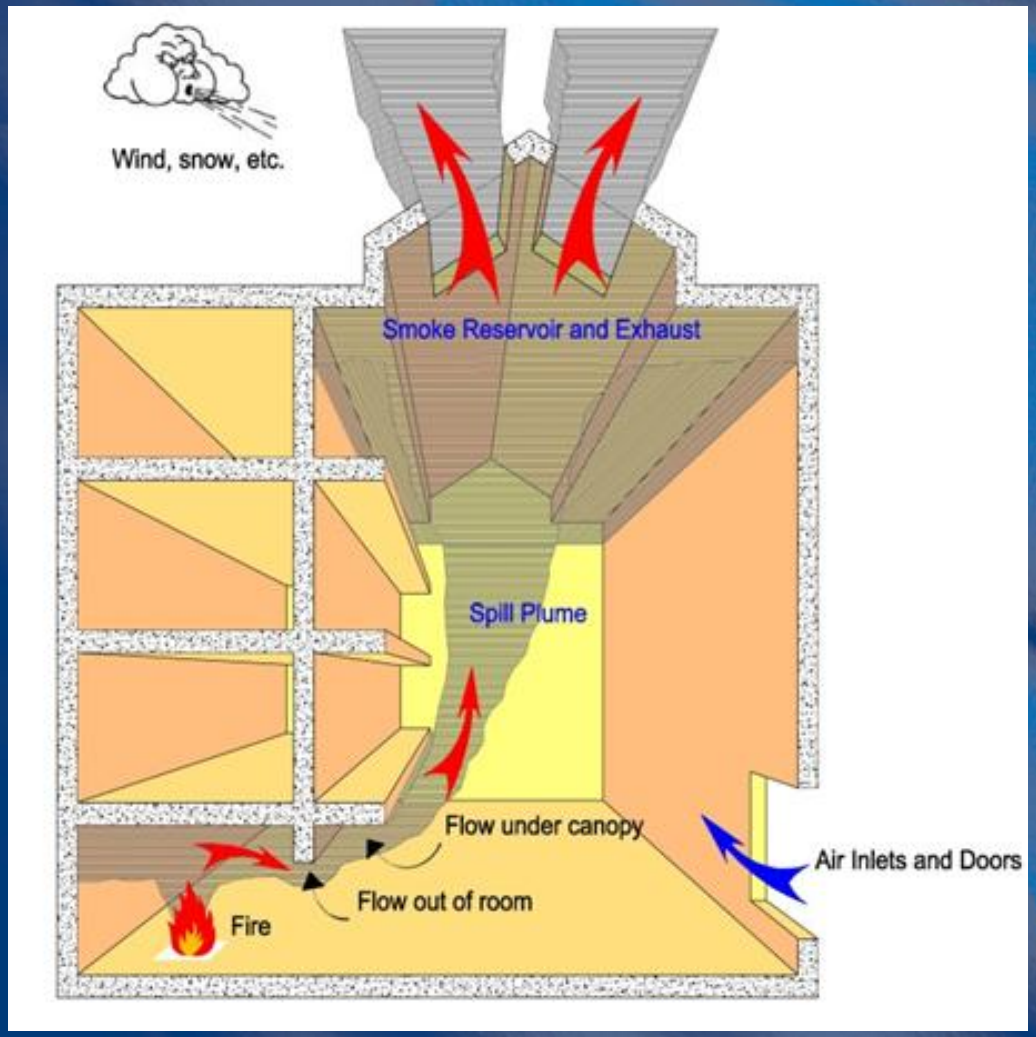
Shopping Centres



Acceptable Solutions - 2

Fire engineered solution allows:

- **Compartmentation unlimited**
- **Removal of separating wall**
- **Reduced escape widths**
- **Increased travel distance**

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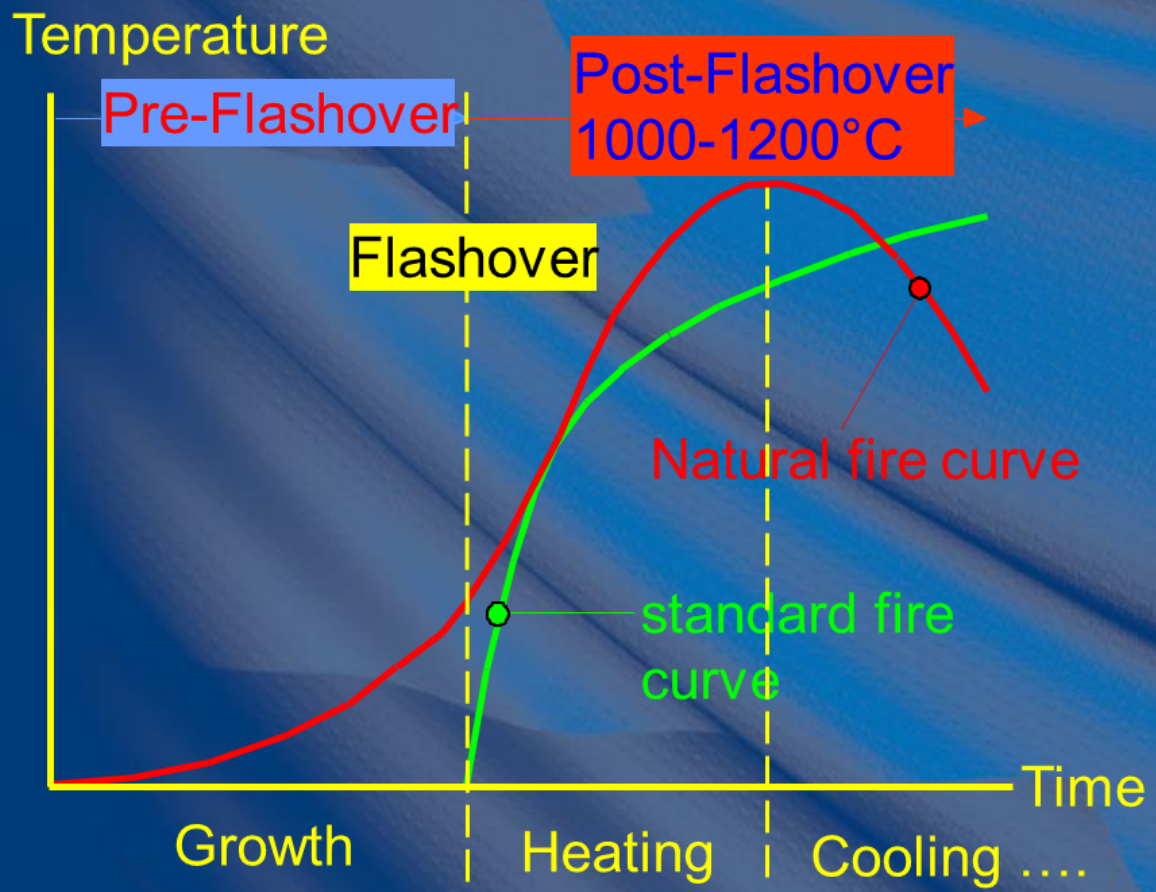
Alternative Solutions - 1



Fire engineered can be used to justify:

- **Extended travel distance**
- **Reduction in escape routes**
- **Reduction in Fire protection**
- **Defend in place**
- **Horizontal evacuation**
- **Use of escape lifts**

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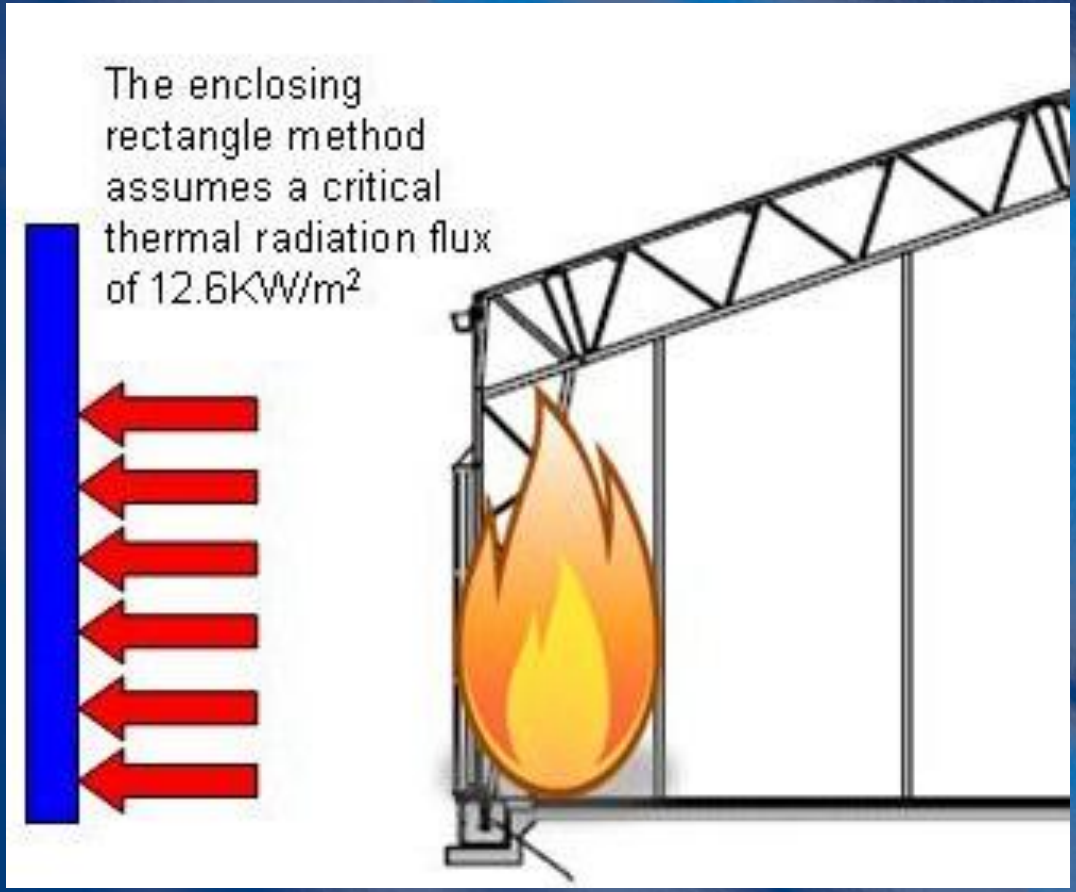
Boundary protection



Indoor soccer centre was considered to close to boundary.

Alternative Solutions - 2

Fire engineered solution resulted in:

- **No structural fire protection**
- **No boundary protection**
- **Considerable savings made project viable**

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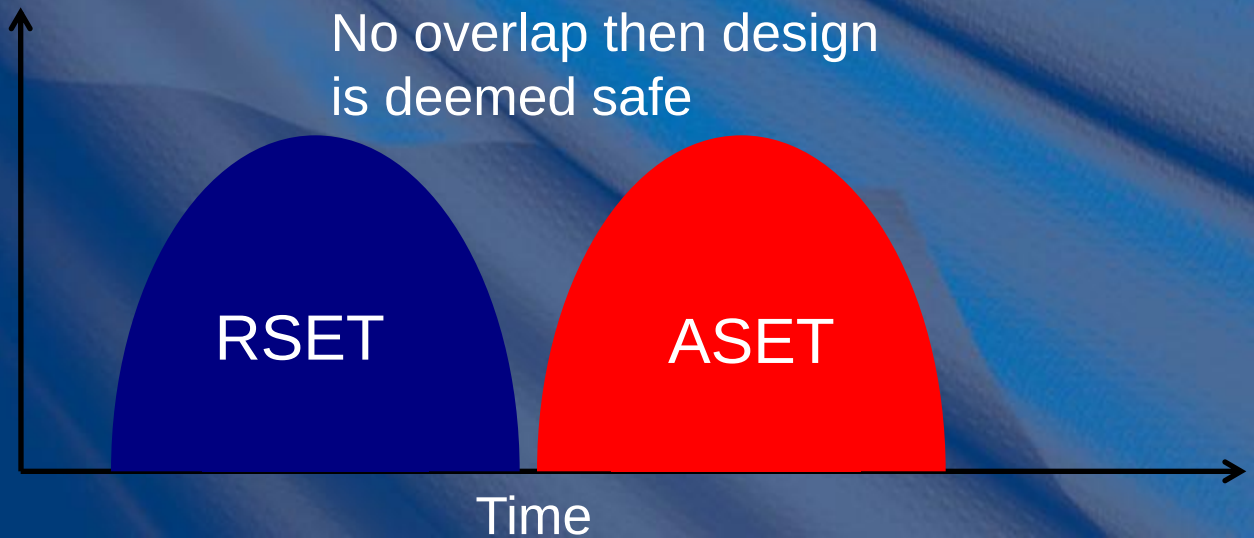
Alternative Solutions - 3

- **RSET represents the time taken to safely escape**
  - **Detection time**
  - **Response time**
  - **Movement time**

- **ASET represents the time available to safely escape**
  - **Time for the smoke to become hazardous**
  - **Radiation**
  - **Structural collapse**



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Alternative Solutions - 4

Alternative Solutions

- Smoke Control Systems
- Structural Fire Protection
- Fire Suppression Systems
- Compartmentation

- **Does the design satisfy the standards?**
- **Should a peer review be undertaken**
- **Appropriate knowledge, training and expertise**
- **What design fire should be used**

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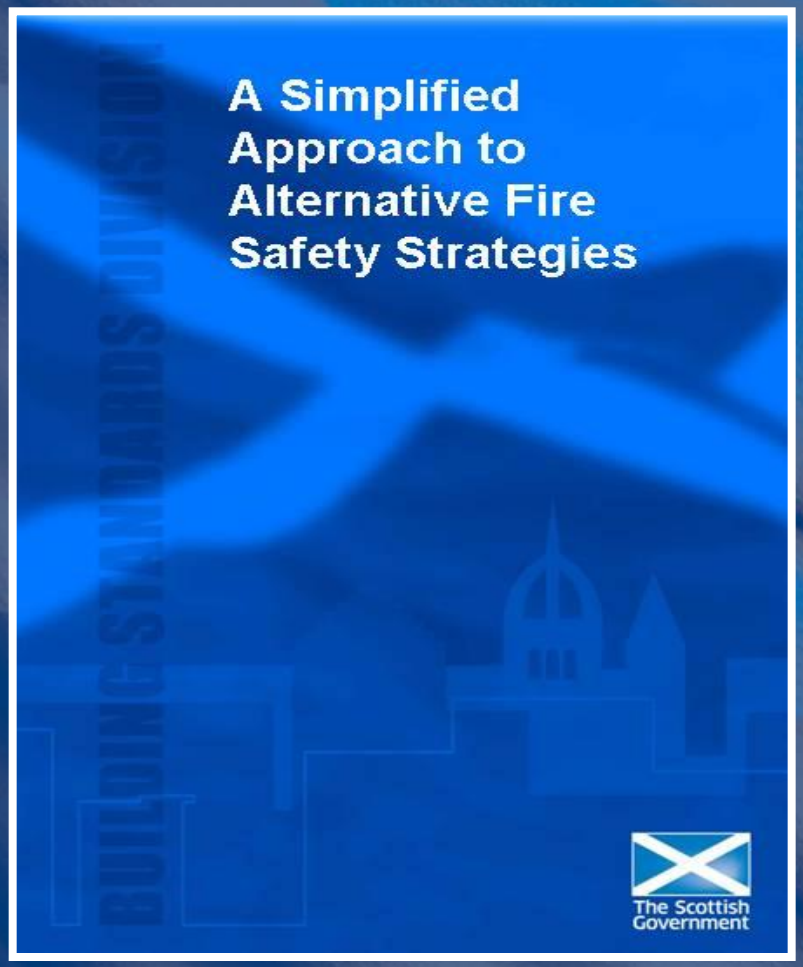
Alternative Guidance



Alternative Solutions - 5

- **Domestic < 18m – sprinklers in lieu protected lobbies**
- **Offices – extended TD**
- **Care homes – day rooms**
- **Sequence of escape**
- **Lifts for means of escape**

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Procedure

1. Has adequate documentation been provided?
2. Have the objectives been clearly stated i.e. life safety, property protection, sustainability?
3. Has "plausible" in terms of "reasonable" criteria been established and understood by the verifier?
4. Has the assumptions been explained in sufficient detail?
5. Are there any management assumptions?

Documentation requirements

6. Has the relevant certification been provided? (Automatic fire suppression systems, automatic fire alarm and detection systems, smoke control systems, smoke curtain tests etc)
7. Does the documentation include all relevant records, criteria, test reports, and source document references?
8. Do drawings show the important details?
9. Is there sufficient explanation of the reasons for decisions made in the design process?
10. If a continuing requirement has been

- Has adequate documentation been provided?
- Is it clear that the standards have been satisfied?
- Has a factor of safety been applied?
- Has every design been signed off by an appropriately qualified or experienced person?
- Is the compliance check being carried out by appropriately qualified staff?

Desig

11. Ha be
12. Is sa
13. An
14. An cle su
15. Ha pr including the construction phase?
16. Has a factor of safety been applied?
17. Has the need for a reasonable worst case scenario/sensitivity analyses been considered?
18. Is the type and purpose of each fire safety measures, (both passive and active) stated?
19. Does acceptance of completion depend on commissioning and/or acceptance of tests?
20. Has the allowance for "safety margins" been made clear? (The designer should not assume that the design will be implemented perfectly).

this framework document.

25. Calculations are outwith the scope of this framework document.

Asking the right questions

The Scottish Government

Dark Arts

Engineering Calculations

Appropriate Knowledge

- Fire engineering is complex
- Often subjective
- Based on scientific theory / practice
- Engineering judgement
- Case specific

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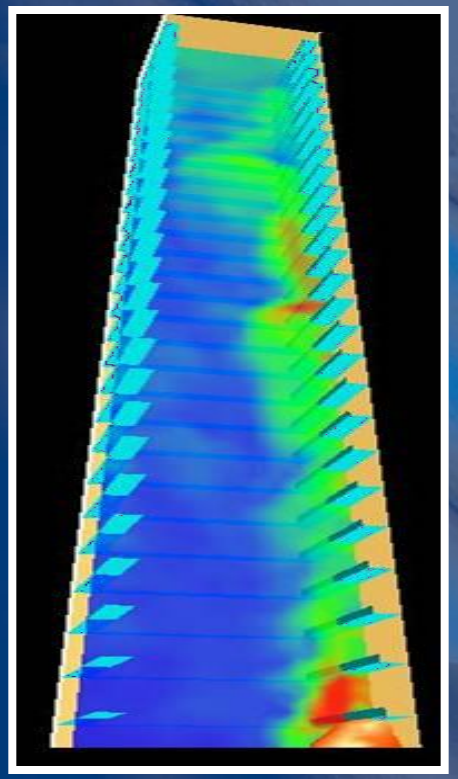
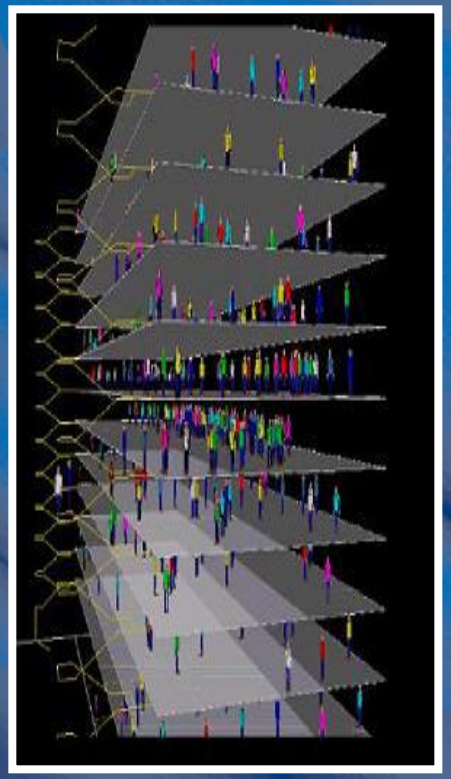
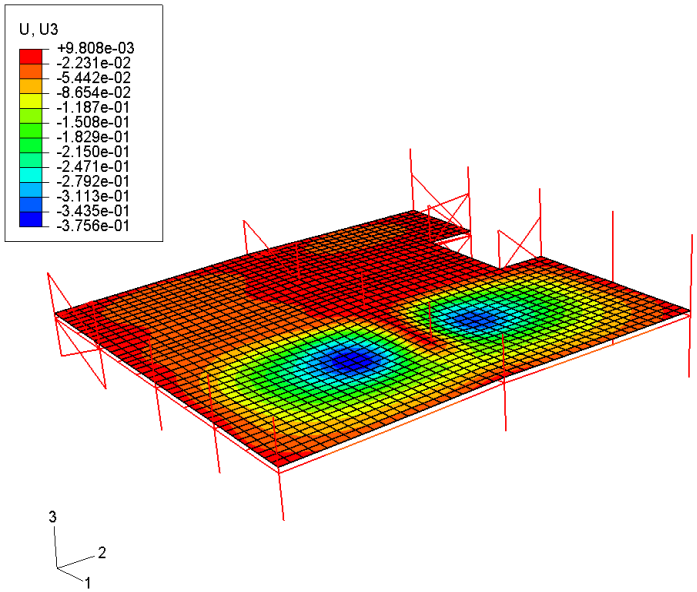
Advanced Computational Analysis







- **Escape**
- **Structural fire protection**
- **Fire spread**
- **Rationalisation of smoke vents**

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Does the design satisfy the Standards?

Appropriate knowledge, training and expertise to be aware of the hazards and risks involved.

Understand the principles of fire engineering, rapid fire growth, passive and active fire protection.

CFD review

Identify Key Fire Engineering Challenges?

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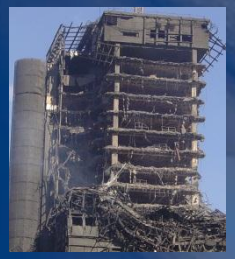
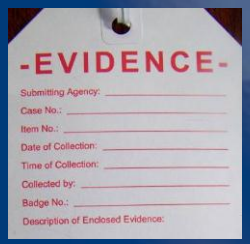
Should a peer review be undertaken of any fire engineered design?



What design fire should be used- worst, worst credible fire?

Sustainable development?



Proof based approach

Peer Review

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Any questions?

www.scotland.gov.uk/bsd

The Scottish Government

Scottish Building Standards

Current Hot Topics - 1

Colin Hird / Jim McGonigal

The Scottish Government

Introduction

- Whisky warehouses
- Sprinklers in dwellings
- Fire Safety awareness

The Scottish Government

Whisky Warehouses

- Background
- Building Standards
- Sprinkler standards
- STAS / Technical Bulletin

The Scottish Government

Background

- 4.5 Billion GVA to Scottish Economy
- >40% increase in exports to South America and Asia
- BS EN 12845 including Annex G
- Liaison with LABSS and SFRS
- Ministerial View
- COMAH (HSE) and SEPA requirements

The Scottish Government

Building Standards - life safety?

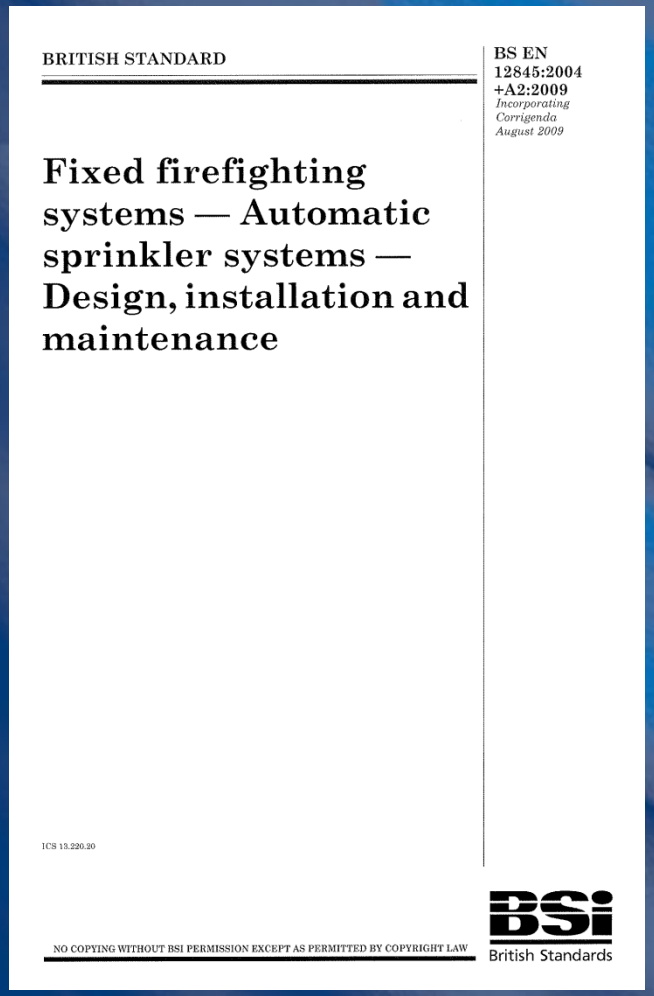
- Standard 2.1 Compartmentation
  - 1000m^2 unsprinklered
  - 2000m^2 sprinklered

Standard 2.6 Spread to neighbouring buildings

- Table B may be used instead of table A if sprinklered

The Scottish Government

LPC Rules, incorporating BS EN 12845



BRITISH STANDARD

BS EN 12845:2004 +A2:2009
Incorporating Corrigenda August 2009

Fixed firefighting systems — Automatic sprinkler systems — Design, installation and maintenance

ICS 13.220.20

BSI British Standards

2.1.2 Automatic fire suppression

Where it is intended to install automatic fire suppression systems, guidance can be obtained in the following publications:

- LPC Rules for Automatic Sprinkler Installations 2009, Incorporating BS EN 12845

- RISC Authority – insurer expert groups
- Published by FPA
- Part 1: BS EN 12845
- Part 2: Technical Bulletins
- Part 3: Supplementary Info

The Scottish Government

BS EN 12845 Annex G

G.6 Spirit based liquors in wooden barrels

Barrels may be stored to a height not exceeding 4,6 m with ceiling sprinklers only. For greater storage heights intermediate sprinklers shall be installed in accordance with Category III/IV requirements. In both cases the ceiling sprinklers shall be installed to give a density of spray of 15 mm/min over an area of operation of 360 m^2.

NOTE 1 Drainage or bunding should be provided to limit the spread of liquid spills.

NOTE 2 For the purposes of this standard, spirituous liquor is defined as that containing more than 20% alcohol.

The Scottish Government

TB 201 – Suitable sprinkler components and services

Loss Prevention Standard

LPS 1048 -1: Issue 4.1

Requirements for the approval of Sprinkler System Contractors in the UK and Ireland

TB201.3 SUITABLE SPRINKLER SERVICES

Sprinkler systems within the United Kingdom shall be contracted by either a:

(i) certified sprinkler installer or supervising body assessed to LPS 1048, Section 3 and certified to ISO 9001;

or

(ii) registered supervised sprinkler installer assessed to LPS 1048, Section 5;

or

(iii) sprinkler installer, either certified or registered and supervised to schemes equivalent to (i) or (ii) above.

- or (iii) equivalent to LPS 1048
- LPCB Red Book
- Recognise own professional limitations

The Scottish Government

Appendix 1 - List of acceptable installation standards and publications referred to:

A1.1 Installation Standards

For the purpose of this scheme document, Installation Standard will mean, as appropriate, the current documents including the latest revisions of:

a) LPC Rules for Automatic Sprinkler Installations (version 1), incorporating BS 5306: Part 2: 1990 - Specification for sprinkler systems, with LPC Technical Bulletins that are in force at the time, or

b) For Life Safety systems only, BS 5306: Part 2: 1990, incorporating LPC Technical Bulletins 1, 2 and 20, providing no other Technical Bulletins are used to carry out the design, or

c) LPC Rules for Automatic Sprinkler Installations (version 2), incorporating BS EN 12845 - Fixed fire fighting systems – Automatic sprinkler systems – Design, installation and maintenance, with LPC Technical Bulletins that are in force at the time, or

d) For Life Safety systems only, BS EN 12845, incorporating LPC Technical Bulletins 201 and 202, providing no other technical bulletins are used to carry out the design, or

e) BS 9251 - Sprinkler systems for residential and domestic occupancies – Code of practice, or

f) NFPA 13 (excluding 13D and 13R), or

g) FM Global Property Loss Prevention Data Sheets (excluding Residential Data sheets).

Note: Hybrid and individualised corporate or institutional specifications are not acceptable to LPCB for the purpose of certification.

If a Contractor wishes to certificate to another standard or set of installation standards they should contact the LPCB.

- Appendix 1 – List of acceptable installation standards
- If a contractor wishes to use another standard they should consult LPCB
- Recognise own level of competence

The Scottish Government

Table C.1 — Stored products and categories (*continued*)

Milk powder	II	In bags or sacks
Office material	III	
Paints	I	Water based
Paper	II	Sheets stored horizontally
Paper	III	Mass < 5 kg/100 m^2, (e.g. tissue paper), rolls stored horizontally
Paper	IV	Mass < 5 kg/100 m^2, (e.g. tissue paper), rolls stored vertically
Paper	III	Mass ≥ 5 kg/100 m^2, (e.g. newspaper), rolls stored vertically
Paper	II	Mass ≥ 5 kg/100 m^2, (e.g. newspaper), rolls stored horizontally
Paper, bitumen coated	III	
Paper, pulp	II	Rolled or baled
Paper, waste	III	Special measures may be necessary, such as an increased area of operation.
Pillows	II	Feather or down
Rags	II	Loose or baled
Resins	III	Excluding flammable liquids
Roof felt in rolls	II	Horizontal storage
Roof felt in rolls	III	Vertical storage
Rope synthetic	II	
Shoes	II	≤ 5 % by mass of plastic
Shoes	III	With plastic > 5 % by mass
Soap, water soluble	II	
Alcohol	I	≤ 20 % degree proof of alcohol
Alcohol	III	> 20 % degree proof of alcohol only in bottle others see Annex G

- BS EN 12845 Category
- Cat I < 20 % alcohol
- Cat III > 20 % alcohol
- Ethanol 70% proof before maturation
- 40% proof post maturation

The Scottish Government

Storage configuration

Table 2 — Limitations and protection requirements for different storage configurations

Storage Configuration	Layout limitations	Protection in addition to sprinklers at ceiling or roof	Applicable table notes:
ST1	Storage shall be confined to blocks not exceeding 150 m^2 in plan area for C III and IV.	None	2, 3
ST2	(A1) Aisles between rows shall be not less than 2,4 m wide. (A1)	None	2
ST3	Storage shall be confined to blocks not exceeding 150 m^2 in plan area.	None	2
ST4	Aisles separating rows are equal or greater than 1,2 m wide.	Intermediate sprinklers are recommended.	1, 2
	Aisles separating rows are less than 1,2 m wide.	Intermediate sprinklers are required.	1
ST5	Either the aisles separating rows shall be no less than 1,2 m wide, or storage blocks shall be no more than 150 m^2 in plan area.	Intermediate sprinklers are recommended.	1, 2
ST6	Either the aisles separating rows shall be no less than 1,2 m wide, or storage blocks shall be no more than 150 m^2 in plan area.	Intermediate sprinklers are required or, if this is impossible, continuous full height vertical bulkheads with Euroclass A1 or A2 or an equivalent in existing national classification systems shall be fitted longitudinally and transversely within each shelf.	1, 2

NOTE 1 When the ceiling is more than 4 m above the highest level of stored goods, intermediate levels of in-rack sprinklers should be used.

NOTE 2 Storage blocks should be separated by aisles no less than 2,4 m wide.

NOTE 3 Storage should be confined to blocks not exceeding 150 m^2 in plan area for C I and C II.

- ST1 – free standing or block palletised storage
- 150m^2 max in plan area for C III/ IV
- 2.4m between aisles

The Scottish Government

Block stacking – no racking system

Table 4 — Design criteria for HHS with roof or ceiling protection only

Storage configuration	Maximum permitted storage height (see NOTE 1) m				Design density mm/min	Area of operation (wet or pre-action system (see NOTE 2) m²
	Category I	Category II	Category III	Category IV		
ST1 Free standing or block stacking	5,5 6,5 7,6	4,1 5,0 5,9 6,7 7,5	2,9 3,5 4,1 4,7 5,2	1,6 2,0 2,3 2,7 3,0	7,5 10,0 12,5 15,0 17,5	260
			5,7 6,3 6,7 7,2	3,3 3,6 3,8 4,1 4,4	20,0 22,5 25,0 27,5 30,0	300
ST2 Post pallets in single rows ST4 Palletized racks	4,7 5,7 6,8	3,4 4,2 5,0 5,6 6,0	2,2 2,6 3,2 3,7 4,1	1,6 2,0 2,3 2,7 3,0	7,5 10,0 12,5 15,0 17,5	260
			4,4 4,8 5,3 5,6 6,0	3,3 3,6 3,8 4,1 4,4	20,0 22,5 25,0 27,5 30,0	300
ST3 Post pallets in multiple rows ST5 and ST6 Solid or slatted shelves	4,7 5,7	3,4 4,2 5,0	2,2 2,6 3,2	1,6 2,0 2,3 2,7 3,0	7,5 10,0 12,5 15,0 17,5	260

NOTE 1 The vertical distance from the floor to the sprinkler deflectors, minus 1 m, or the highest value shown in the table, whichever is the lower.

NOTE 2 Dry and alternate systems should be avoided on High Hazard storage especially with the more combustible products (the higher categories) and the higher storage. Should it nonetheless be necessary to install a dry or alternate system, the area of operation should be increased by 25 %.

- E.g. 7 barrel high (7.2m)
- Design density
- 27.5mm/min
- Area of operation – 300m² wet
- Add 25% if dry therefore AO =375m²

The Scottish Government

BS 5306 : Part 2 : 1990

UDC 614.842.6:614.844.2

British Standard

Fire extinguishing installations and equipment on premises

Part 2. Specification for sprinkler systems

Installations et matériels d'extinction dans les bâtiments
Partie 2. Systèmes à eau du type sprinkleur — Spécifications

Feuerlöscheinrichtungen und -geräte in Gebäuden
Teil 2. Sprinkleranlagen

BSI STANDARDS

- BS 5306-2 withdrawn
- No longer supported by BSI
- LPCB - can continue to be used for extensions to existing BS 5306-2 installations

The Scottish Government

BS 5306-2 (Category)

Table 2. High-piled storage hazards showing typical examples in goods categories

Category I	Category II	Category III	Category IV
carpets	baled cork	bitumen-coated or wax-coated paper	offcuts and random pieces of foamed plastics or foamed rubber
clothing	baled waste paper	cellulose nitrate	rolls of sheet foamed plastics or foamed rubber
electrical appliances	cartons containing alcohols in cans or bottles	esparto (loose)	
fibreboard	cartons of canned lacquers which dry by solvent evaporation	foam plastics and foam rubber products, with or without cartons, other than those specified in category IV	
glassware and crockery, in cartons	chipboard	flammable liquids in combustible containers*	
groceries	flammable liquids in non-combustible containers*	rolled asphalt paper (vertical storage)	
metal goods, in cartons	linoleum products	rolled pulp and paper (vertical storage)	
textiles	palletized whisky stocks		
all forms of paper storage not listed under categories II or III			
ordinary combustible			

*Excluding aerosol dispensers which are a special case.

The Scottish Government

BS 5306-2

Table 1. Classification of stacked goods and limitations on storage methods

Type (and storage method)	Goods category reference (see 5.1 and table 2)	Maximum storage height for protection by roof or ceiling sprinklers only		Limitations (ordinary and high hazard)	Design density and stack height given in
		Ordinary hazard Group III	High hazard		
		m	m		
S1 free standing or block stacking	I	4.0	7.6	None	table 8
	II	3.0	7.6		
	III	2.1	7.2		
	IV	1.2	4.4		

The Scottish Government

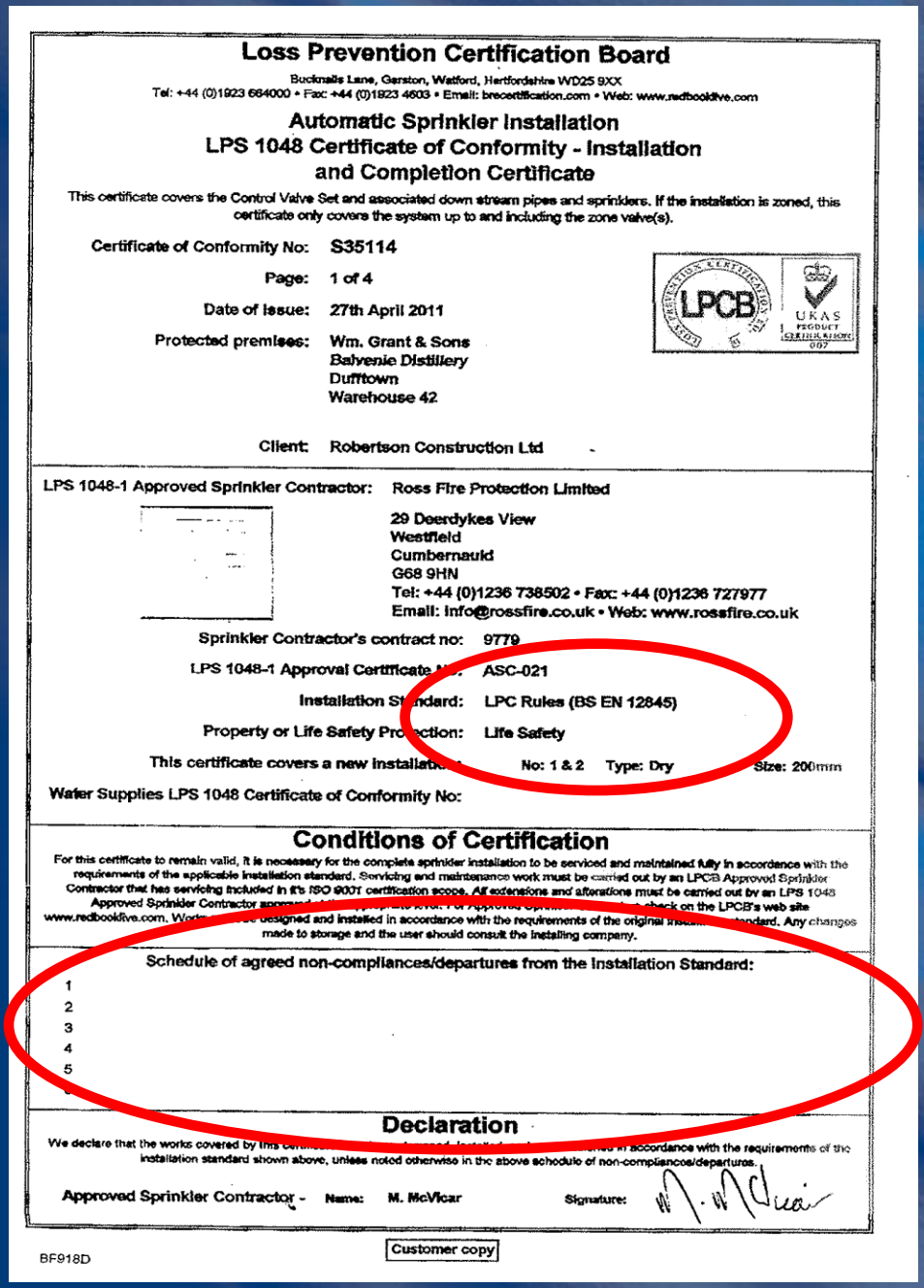
BS 5306-2 (design density and AO)

Table 8. Minimum design density and AMAO for high-piled storage hazards (goods), storage types S1 and S4 roof or ceiling sprinklers

Category I S1 only		Category II S1 only		Category III S1 and S4		Category IV S1 only		Minimum design density	AMAO	
Stack height		Stack height		Stack height		Stack height			Wet pipe, pre-action and recycling systems	Dry pipe and alternate systems
more than	not more than	more than	not more than	more than	not more than	more than	not more than			
m	m	m	m	m	m	m	m	mm/min	m^2	m^2
0	5.3	0	4.1	0	2.9	0	1.6	7.5	260	325
5.3	6.5	4.1	5.0	2.9	3.5	1.6	2.0	10.0	260	325
6.5	7.6	5.0	5.9	3.5	4.1	2.0	2.3	12.5	260	325
–	–	5.9	6.7	4.1	4.7	2.3	2.7	15.0	260	325
–	–	6.7	7.5	4.7	5.2	2.7	3.0	17.5	260	325
–	–	–	–	5.2	5.7	3.0	3.3	20.0	300	375
–	–	–	–	5.7	6.3	3.3	3.6	22.5	300	375
–	–	–	–	6.3	6.7	3.6	3.8	25.0	300	375
–	–	–	–	6.7	7.2	3.8	4.1	27.5	300	375
–	–	–	–	–	–	4.1	4.4	30.0	300	375

NOTE. Class S4 includes only category III goods (see table 1).

The Scottish Government



Loss Prevention Certification Board

Bucknalls Lane, Garston, Watford, Hertfordshire WD25 9XX
Tel: +44 (0)1923 664000 • Fax: +44 (0)1923 4603 • Email: breccertification.com • Web: www.redbooklive.com

Automatic Sprinkler Installation
LPS 1048 Certificate of Conformity - Installation and Completion Certificate

This certificate covers the Control Valve Set and associated down stream pipes and sprinklers. If the installation is zoned, this certificate only covers the system up to and including the zone valve(s).

Certificate of Conformity No: S35114

Page: 1 of 4

Date of Issue: 27th April 2011

Protected premises: Wm. Grant & Sons
Balvenie Distillery
Dufftown
Warehouse 42

Client: Robertson Construction Ltd

LPS 1048-1 Approved Sprinkler Contractor: Ross Fire Protection Limited

29 Deerdykes View
Westfield
Cumbernauld
G68 9HN
Tel: +44 (0)1236 738502 • Fax: +44 (0)1236 727977
Email: info@rossfire.co.uk • Web: www.rossfire.co.uk

Sprinkler Contractor's contract no: 9779

LPS 1048-1 Approval Certificate No: ASC-021

Installation Standard: LPC Rules (BS EN 12845)

Property or Life Safety Protection: Life Safety

This certificate covers a new installation No: 1 & 2 Type: Dry Size: 200mm

Water Supplies LPS 1048 Certificate of Conformity No:

Conditions of Certification

For this certificate to remain valid, it is necessary for the complete sprinkler installation to be serviced and maintained fully in accordance with the requirements of the applicable installation standard. Servicing and maintenance work must be carried out by an LPCB Approved Sprinkler Contractor that has servicing included in it's ISO 9001 certification scope. All extensions and alterations must be carried out by an LPS 1048 Approved Sprinkler Contractor appropriate level. For Approved Sprinkler Contractors check on the LPCB's web site www.redbooklive.com. Work should be designed and installed in accordance with the requirements of the original installation standard. Any changes made to storage and the user should consult the installing company.

Schedule of agreed non-compliances/departures from the installation Standard:

1
2
3
4
5

Declaration

We declare that the works covered by this certificate have been installed in accordance with the requirements of the installation standard shown above, unless noted otherwise in the above schedule of non-compliances/departures.

Approved Sprinkler Contractor - Name: M. McVicar Signature:

BF918D

Customer copy

- Commissioning Certificate
- List standard used
- And any deviations

The Scottish Government

Non-compliances / departures

Issue: 4.1	LOSS PREVENTION STANDARD	LPS 1048-1
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Non-compliance

(a) Listed on LPS 1048 Certificates of Conformity

A departure from the installation standard listed on the LPS 1048 Certificate of Conformity as a non-compliance. The definitions of minor and major are as follows:

Minor - A departure from the installation standard that will not reduce the effectiveness of the sprinkler protection to control or extinguish a fire.

Major - A departure from the installation standard that will significantly reduce the effectiveness of the sprinkler protection to control or extinguish a fire.

Note – a number of minor non-compliances may when taken together constitute a major non-compliance.

If the Contractor is unsure if a non-compliance is either minor or major, they should consult with LPCB before a commitment is made to issue a Certificate of Conformity.

The Scottish Government

Summary

- Is Scotland open for business?
- LPC Rules incorporating BS EN 12845
- TB 201 – Appendix , List of acceptable alternatives
- TB 201 – LPS 1048 contractors or equivalent
- Consult the SFRS
- If unsure, talk to BSD, LPBC etc

The Scottish Government

Sprinklers in Dwellings

- **Welsh Proposals**
- **Cost benefit analysis**
- **New versus existing**
- **Trade offs**
- **Properties covered**

Llywodraeth Cymru
Welsh Government

The Scottish Government

Fire will find you out

Build Right

Contractor Fire Safety Awareness

- Members & Aims
- FRS Scottish Government,
- Insurance Industry And
- Fire Safety Industry
- DIY & Contractors
- To raise awareness
- Inform
- Educate
- One stop shop

The Scottish Government

COFFEE

The Scottish Government

Scottish Building Standards

Current Hot Topics - 2

Colin Hird / Jim McGonigal

The Scottish Government

Introduction

- Schools
- Hospitals
- MVHR
- Inner rooms
- Lighting diffusers

The Scottish Government

School Projects

- Community Campus
- Schools?
- 2 and 3 storey central social spaces
- Sufficient flexibility in guidance?

The Scottish Government


Classrooms accessed from
balconies overlooking space


Fire engineered approach?

Single Bed Hospitals

Current Guidance

In a residential building, where any corridor escape route serves sleeping accommodation it should be constructed of walls providing a short fire resistance duration and any door in the wall should be a suitable self-closing fire door with a short fire resistance duration.

The Scottish Government

Fire Hazard Rooms

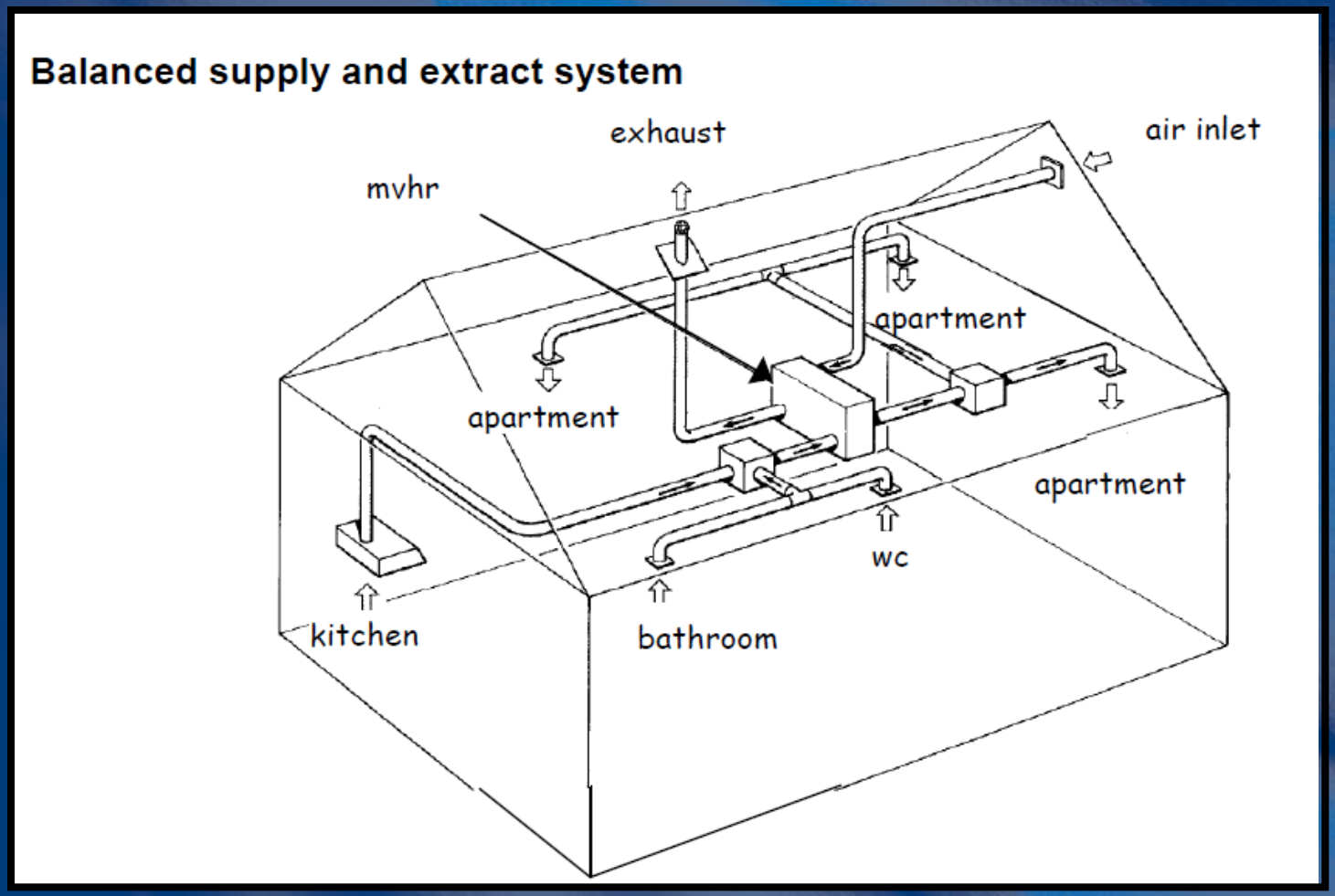
In order to contain a fire in its early stages, the following rooms are considered to be hazardous and should be enclosed by walls providing a short fire resistance duration:

bedrooms where they are used by:

- elderly people, or
- those suffering with mental illness, or
- people with learning difficulties

The Scottish Government

MVHR



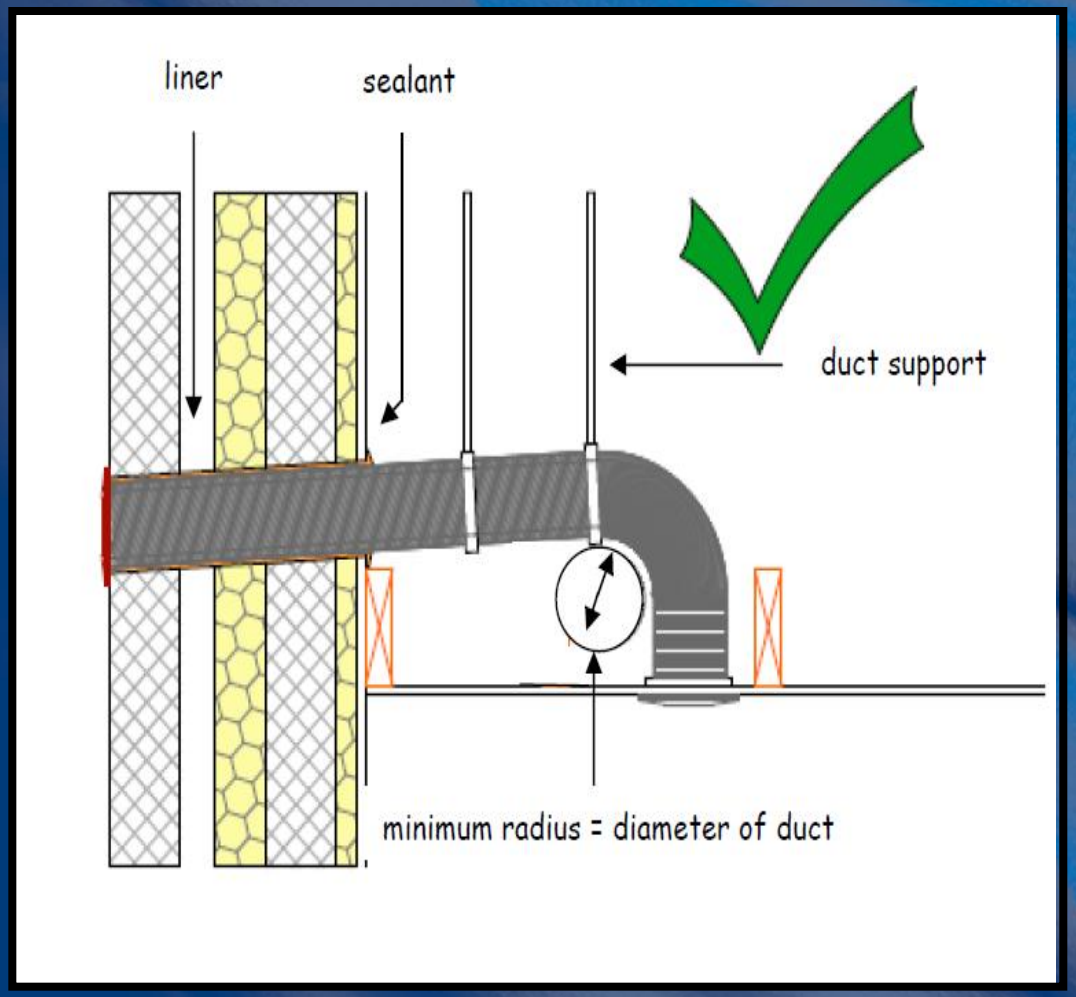
The Scottish Government

MVHR - GUIDANCE

Ducted heating or ventilation systems should not transfer fire and smoke from the room of fire origin to the remainder of the dwelling.

The Scottish Government

Preventing the transfer fire and smoke



- Dampers
- Isolate system
- Rated ductwork
- Switch off power

The Scottish Government

Inner rooms – Smoke detection

The guidance recommends, ‘every inner room and adjoining access room should be provided with an additional smoke alarm to give the occupants early warning’.

The Scottish Government

Inner rooms – Latest Research

Research carried out by the University of Strathclyde's Centre for Forensic Science and Derbyshire Fire & Rescue Service has identified that domestic smoke detectors may not always wake children in the event of a fire. 80% slept through smoke detector alarms and only seven of the children woke during any of the tests.

The Scottish Government

Internal Linings – Lighting Diffusers

Internal linings

2.5 Every building must be designed and constructed in such a way that in the event of an outbreak of fire within the building, the development of fire and smoke from the surfaces of walls and ceilings within the area of origin is inhibited.

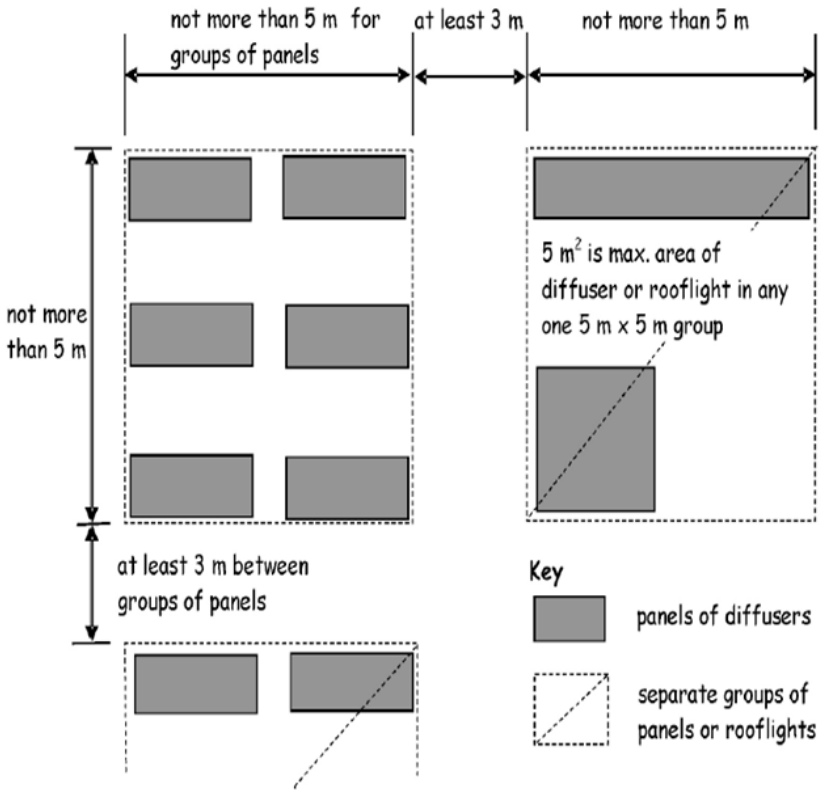
The Scottish Government

Current Guidance

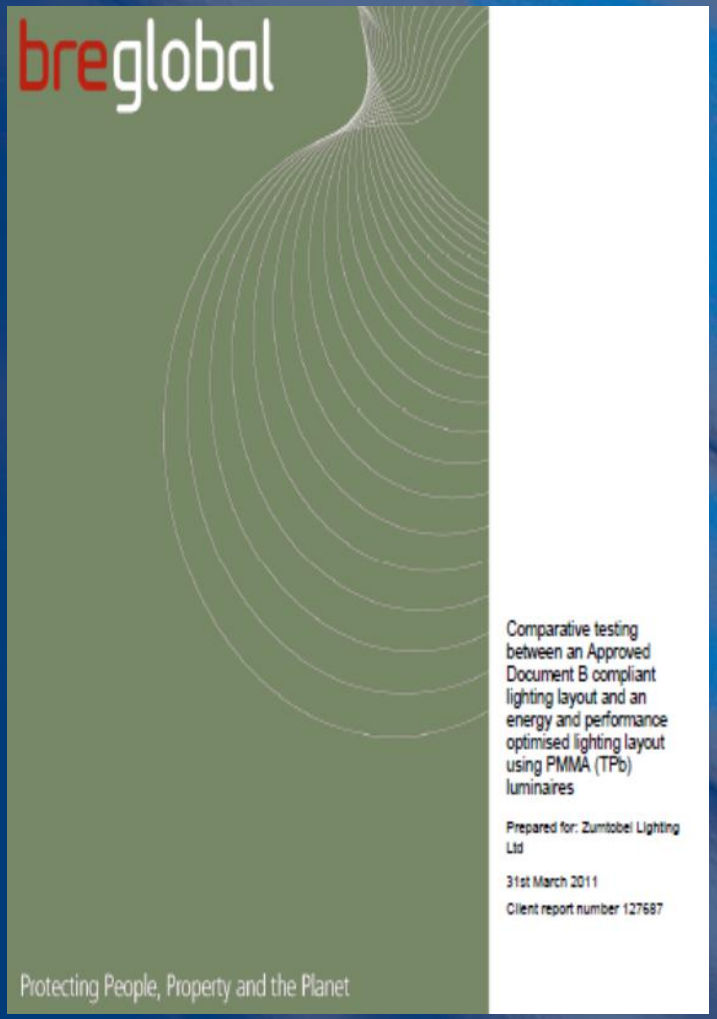
Table 2.5 Thermoplastic rooflights and light fittings with diffusers

	Protected zone or fire-fighting shaft	Unprotected zone		Room	
Classification of lower surface	Any thermo-plastic	TP(a) rigid	TP(a) flexible and TP(b)	TP(a) rigid	TP(a) flexible and TP(b)
Maximum area of each diffuser panel or rooflight (m^2)	Not advised	No limit	$5m^2$	No limit	$5m^2$
Maximum total area of diffuser panels or rooflights as a percentage of the floor area of the space in which the ceiling is located (%)	Not advised	No limit	15%	No limit	50%
Minimum separation distance between diffuser panels or rooflights (m)	Not advised	No limit	3m	No limit	3m

Figure 2.1 Layout restrictions on thermoplastic rooflights and light fittings with diffusers



Internal Linings – Research



2012 consultation on changes to the Building Regulations in England

Thermoplastic Lighting Diffusers
Lighting technology has changed considerably and requirements for energy efficiency have become more stringent.

The Scottish Government

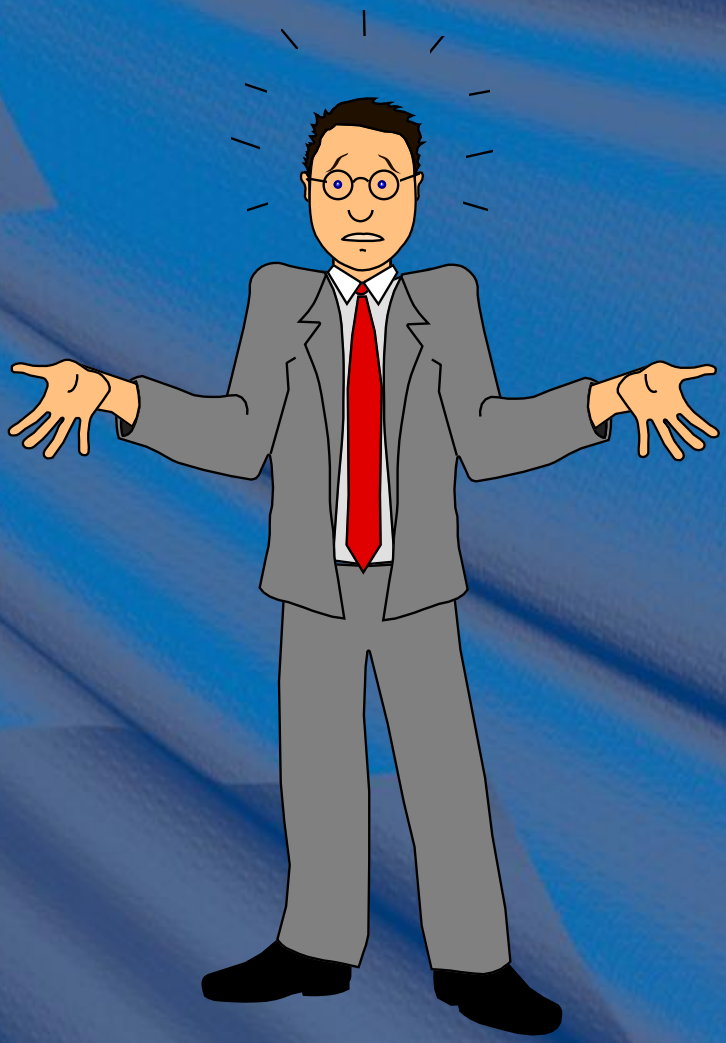
Internal Linings – Benefits

Benefits

The proposed changes to the guidance on spacing of TPb diffusers will allow designers to achieve the desired light level with slightly less units.

The Scottish Government

QUESTIONS?



The Scottish Government