

DIAGRAMS

The diagrams included in this Code are :

Diagram 1 : Protection of Adjoining Buildings

Diagram 2 : Examples of Structural Arrangements in relation to Fire Resistance of Lift Doors

Diagram 3 : Openings at the External Walls of Staircases/Lobbies

Diagram 4 : Separation between Staircases Lobbies from the General Accommodation

Diagram 5 : Vertical Barrier at Escalator

Diagram 6 : Vertical Barrier at Atrium

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TABLE A

WALLS CONSTRUCTED WHOLLY OF NON-COMBUSTIBLE MATERIALS

Construction and Materials	Minimum thickness in mm (excluding plaster) for period of		
	4 hrs.	2 hrs.	1 hr.
SOLID CONSTRUCTION			
Solid bricks of clay, concrete or sand lime without plaster	225	225*	100
Reinforced concrete -			
(a) containing not less than 1 per cent of vertical reinforcement	180	100	75
Concrete cover to main reinforcement	25	25	15
(b) containing less than 1 per cent of vertical reinforcement	240	160	120
Concrete cover to main reinforcement	25	25	25
HOLLOW BLOCK CONSTRUCTION			
Clay blocks (outer web not less than 13 mm thick) of 2 cells not less than 50 per cent solid finished with 13 mm gypsum plaster on each side		100	100
Concrete blocks of one cell in wall thickness not less than 50 per cent solid finished with 13 mm gypsum plaster on each side			190

* Where finished with 13 mm gypsum plaster on each side, the thickness may be reduced to 100 mm.

TABLE B
WALLS NOT CONSTRUCTED WHOLLY
OF NON-COMBUSTIBLE MATERIALS

Construction and Materials	Minimum thickness of finish in mm on each face for period of	
	2 hrs.	1 hr.
SOLID CONSTRUCTION		
Wood wool slabs - complying with BS 1105 -		
(a) 50 mm minimum thickness with gypsum plaster finish		13
(b) 75 mm minimum thickness with gypsum plaster finish	13	6
Gypsum plaster board in cores not less than 19 mm thick in section not more than 1.2 m wide supported top, bottom and sides in steel channels or a timber framework, with gypsum plaster finish		10
HOLLOW CONSTRUCTION		
Steel or timber framing with facings on each side of -		
(a) Portland cement plaster, Portland cement-lime plaster or gypsum plaster on metal lathing		19
(b) 2 layers of 10 mm thick gypsum plaster board with gypsum plaster finish		Nil
(c) 13 mm thick gypsum plaster board with gypsum plaster finish		6
(d) 19 mm thick gypsum plaster board with gypsum plaster finish		Nil

TABLE C
FLOORS AND LANDINGS

Construction and Materials	Minimum thickness in mm for period of		
	4 hrs.	2 hrs.	1 hr.
SOLID REINFORCED CONCRETE CONSTRUCTION			
Thickness of concrete	170	125	100
Concrete cover to all reinforcement -			
simply supported	55*	35	20
continuous	45*	25	20
SOLID PRESTRESSED CONCRETE CONSTRUCTION			
Depth including screed	170	125	100
Concrete cover to all steel -			
simply supported	65*	40	25
continuous	55*	35	20

* Reinforcement consisting of expanded metal lath or a wire fabric not lighter than 0.5 kg/m² with 2 mm diameter wire at not more than 100 mm centres or a continuous arrangement of links at not more than 200 mm centres should be incorporated in the concrete cover at a distance not exceeding 20 mm from the face.

TABLE D
STEEL COLUMNS AND BEAMS

Construction and Materials	Minimum thickness of protection in mm for period of		
	4 hrs.	2 hrs.	1 hr.
SOLID PROTECTION			
Columns and hangers (mass per metre not less than 45 kg)			
(a) Concrete not inferior to Grade 20 and reinforced in accordance with the Code of Practice for the Structural Use of Steel	75	50	50
(b) Solid bricks of clay, concrete or sand lime	75	50	50
Beams (mass per metre not less than 30 kg)			
Concrete not inferior to Grade 20 and reinforced in accordance with the Code of Practice for the Structural Use of Steel	75	50	50
HOLLOW PROTECTION			
Columns and hangers (mass per metre not less than 45 kg)			
(a) Solid bricks of clay, concrete or sand lime reinforced in every horizontal joint with steel binding wire not less than 2.5 mm in thickness or steel mesh weighing not less than 0.5 kg/m ² .	115	50	50
(b) Portland cement plaster, Portland cement-lime plaster or gypsum plaster on metal lathing.			19
(c) Gypsum plaster on 10 mm gypsum plaster board with 1.6 mm diameter wire binding at 100 mm pitch			13
(d) Gypsum plaster on 19 mm gypsum plaster board with 1.6 mm diameter wire binding at 100 mm pitch		13	7
Beams (mass per metre not less than 30 kg)			
(a) Portland cement plaster or Portland cement-lime plaster on metal lathing			19
(b) Gypsum plaster on metal lathing		22	16
(c) Gypsum plaster on 10 mm gypsum plaster board with 1.6 mm diameter wire binding at 100 mm pitch			13
(d) Gypsum plaster on 19 mm gypsum plaster board with 1.6 mm diameter wire binding at 100 mm pitch		13	7

In this Table -

"hollow protection" means there is a void between the protective material and the web of the steel section, such hollow protection to columns should be effectively sealed at each floor level.

"solid protection" means casing which is bedded close to the steel without any intervening cavities and with all joints in that casing made full and solid.

TABLE E
REINFORCED CONCRETE COLUMNS AND BEAMS

Construction and Materials	Minimum overall size of column in mm for period of		
	4 hrs.	2 hrs.	1 hr.
REINFORCED CONCRETE COLUMNS AND HANGERS			
(a) Fully exposed columns and hangers	450	300	200
Concrete cover to main reinforcement	35	35	25
(b) 50 per cent exposed of columns and hangers	350	200	160
Concrete cover to main reinforcement	35	25	25
(c) One face exposed of columns and hangers	240	160	120
Concrete cover to main reinforcement	25	25	25
REINFORCED CONCRETE BEAMS			
Width of beam	280	200	200
Concrete cover to main reinforcement -			
simply supported	80*	50*	30
continuous	60*	40	30
PRESTRESSED CONCRETE BEAMS			
Width of beam	280	200	200
Concrete cover to tendons -			
simply supported	90*	70*	30

* Reinforcement consisting of expanded metal lath or a wire fabric not lighter than 0.5 kg/m² with 2 mm diameter wire at not more than 100 mm centres or a continuous arrangement of links at not more than 200 mm centres should be incorporated in the concrete cover at a distance not exceeding 20 mm from the face.

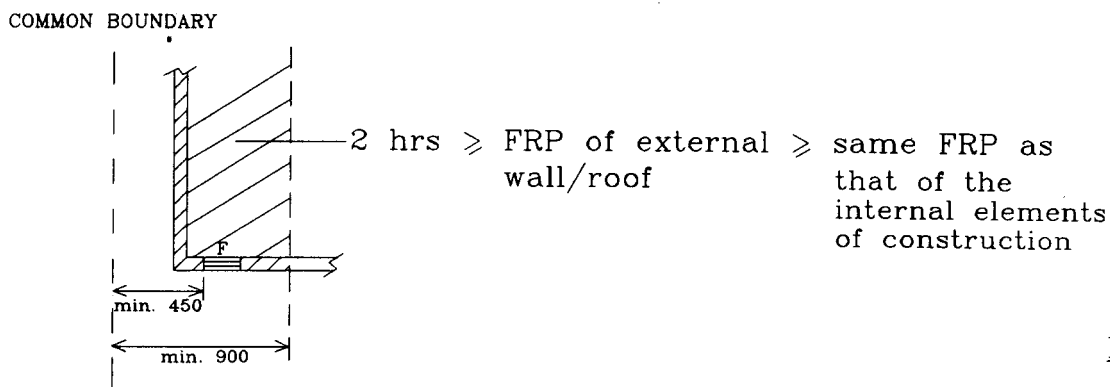
TABLE F
STAIRS

Construction and Materials	Minimum thickness in mm for period of		
	4 hrs.	2 hrs.	1 hr.
Reinforced concrete construction -			
Thickness at waist of slab	170	125	95
Concrete cover to all reinforcement	55*	35	20

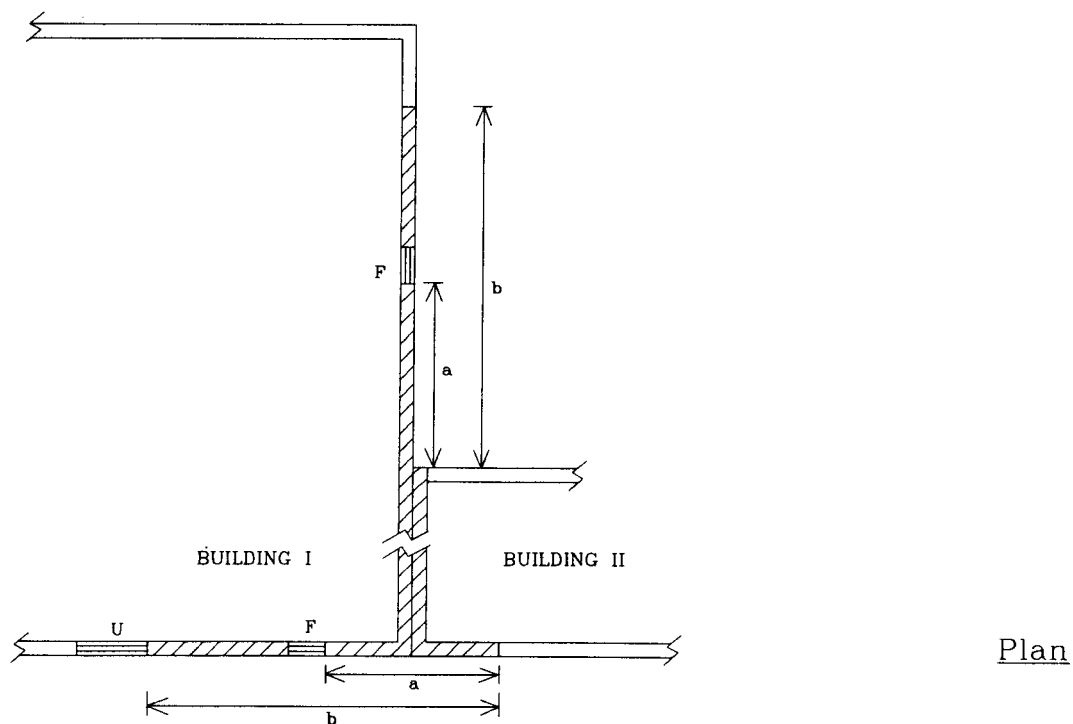
* Reinforcement consisting of expanded metal lath or a wire fabric not lighter than 0.5 kg/m² with 2 mm diameter wire at not more than 100 mm centres or a continuous arrangement of links at not more than 200 mm centres should be incorporated in the concrete cover at a distance not exceeding 20 mm from the face.

Diagram 1 : Protection of Adjoining Buildings (see para.7)

Example (a) : Building with adjoining site



Example (b) : Buildings within the same site



2 hrs \geq FRP of external \geq same FRP as that of the wall/roof internal elements of construction

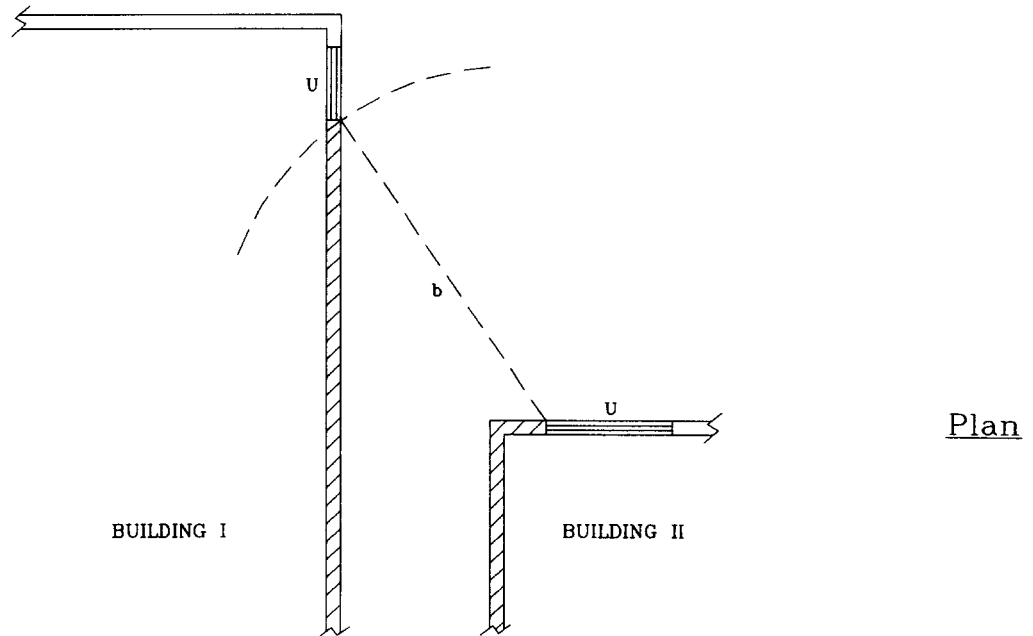
F fixed lights complying with para. 7.2/7.4

U unprotected openings

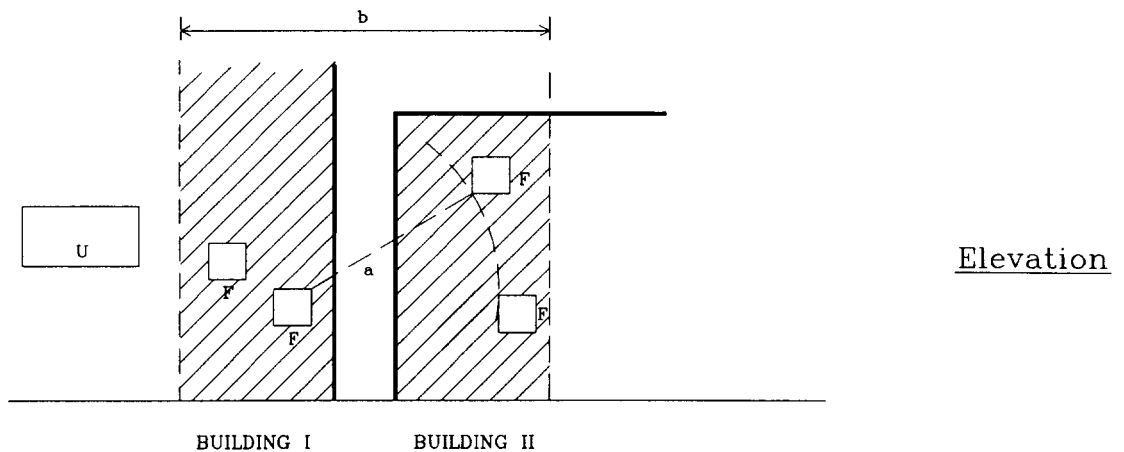
a min. 900mm

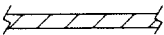
b min. 1800mm

Example (c) : The minimum distance between unprotected openings of two buildings

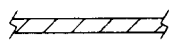
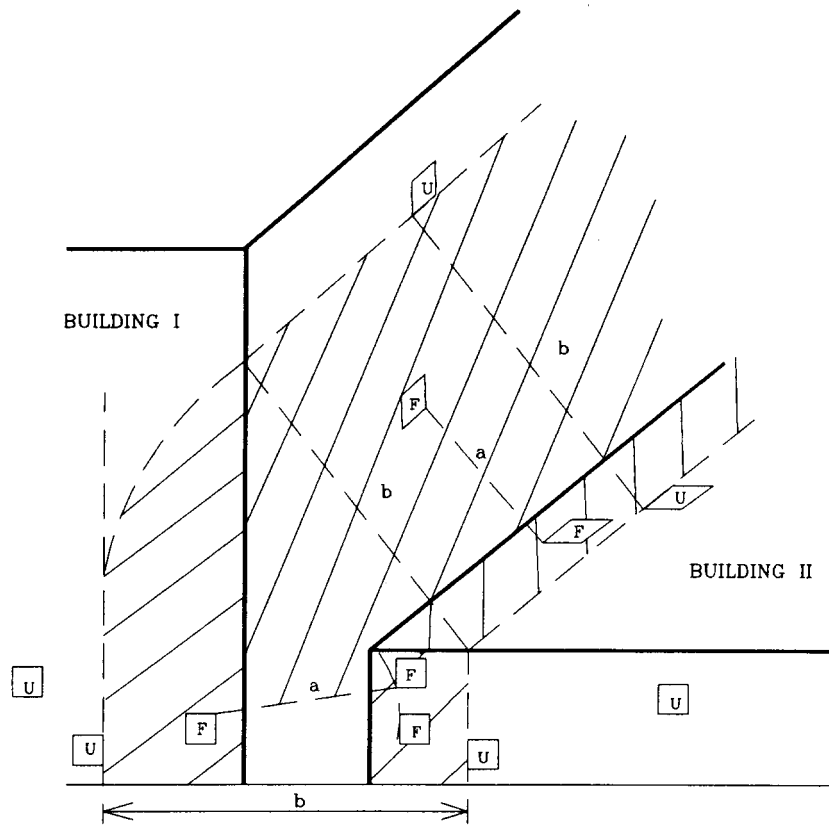


Example (d) : The minimum distance between unprotected and protected openings of two buildings



- | | |
|---|---|
|  | 2 hrs \geq FRP of external \geq same FRP as that of the wall/roof internal elements of construction |
| F | fixed lights complying with para. 7.2/7.4 |
| U | unprotected openings |
| a | min. 900mm |
| b | min. 1800mm |

Example (e) : The three-dimension diagram illustrates the minimum distance between unprotected and protected openings of two buildings



2 hrs \geq FRP of external wall/roof \geq same FRP as that of the internal elements of construction

F fixed lights complying with para. 7.2/7.4

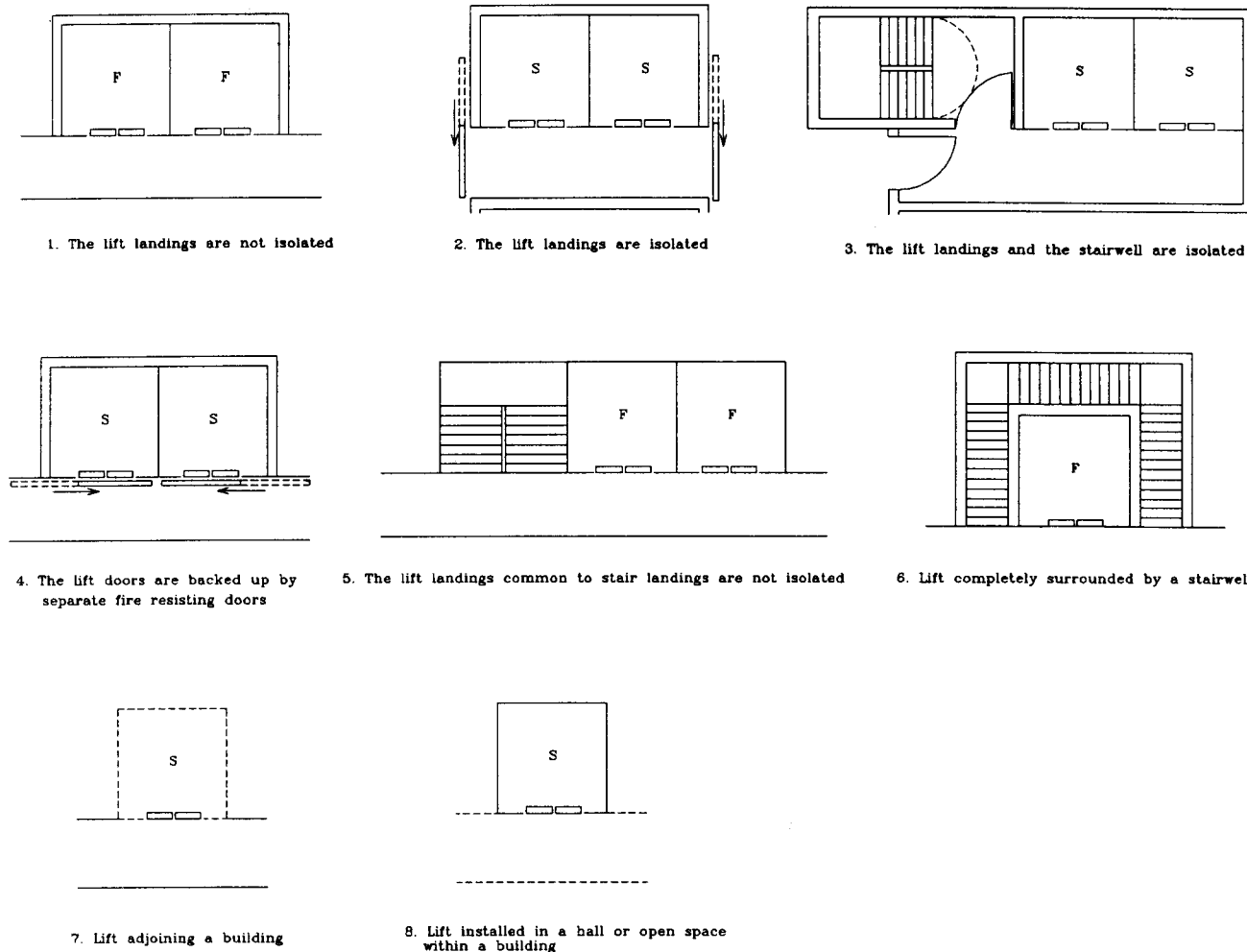
U unprotected openings

a min. 900mm

b min. 1800mm

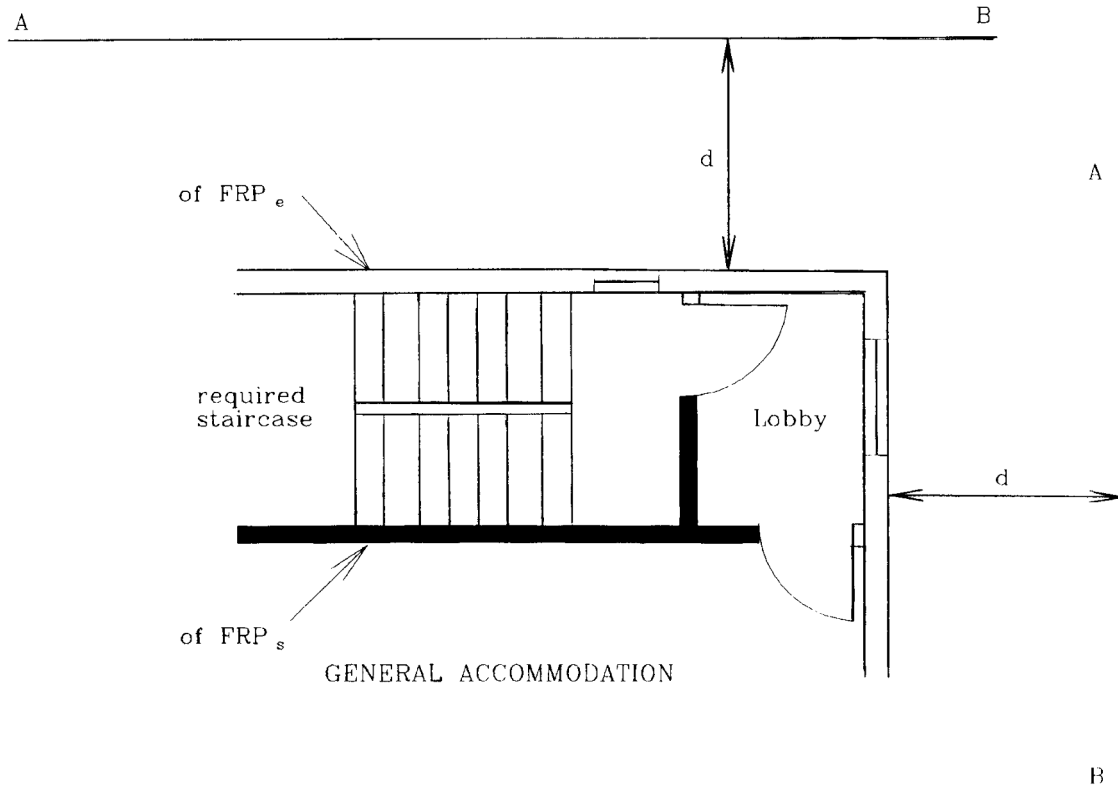
Diagram 2 : Examples of Structural Arrangements in relation to Fire Resistance of Lift Doors.

[see para. 11.2]



- Notes :
- (1) S=lift doors required to satisfy criteria for integrity only,
F=lift doors required to satisfy criteria for integrity and insulation.
 - (2) The walls of the well and the doors (apart from the lift) are shown with a double line when they are fire resistant, without prejudging their degree of resistance.
 - (3) In the case of a structural arrangement not shown in this diagram, the choice of the type of door should be made by comparison.

Diagram 3 : Openings at the External Walls of Staircases/Lobbies.
(see para. 11.7)



- AB :
- i) opposite side of a street,
 - ii) common boundary with an adjoining site,
 - iii) any other external wall of $FRP < FRP_e$ or unprotected opening of the same building,
 - iv) any other building on the same site.

External wall may be unprotected if $d > 6m$

External wall with $FRP_e \geq FRP_s$ if $d \leq 6m$

Openings : i) $d \leq 6m$ ó fixed light with $FRP \geq 1/2 FRP_e$;

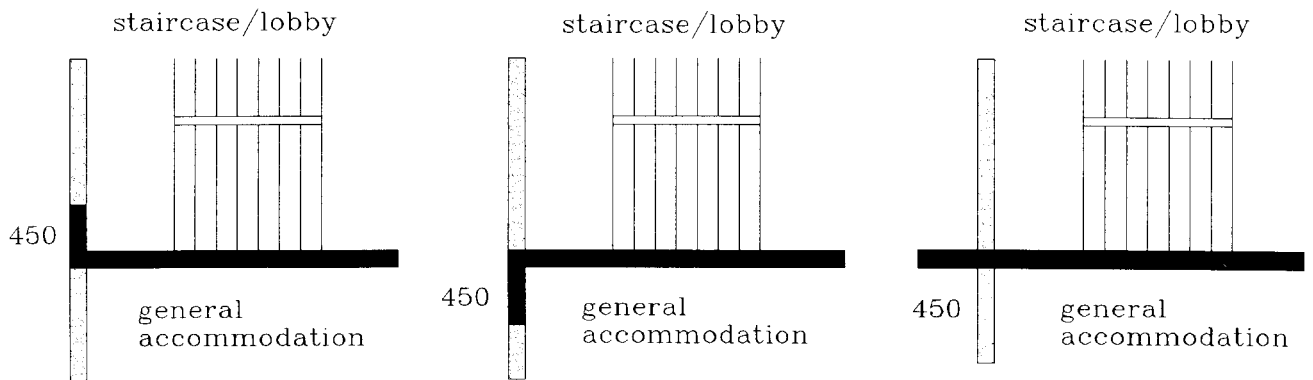
ó door with $FRP \geq 1/2 FRP_e$ for :

*discharge point at G/F

*roof level

ii) $d > 6m$ ó unprotected

Diagram 4 : Separation between Staircases/Lobbies from the General Accommodation
(see para. 11.8)



External wall with FRP_e



Wall separating the staircase or lobby from the rest of the building with FRP_s

where FRP_s > FRP_e

Diagram 5 : Vertical Barrier at Escalator (see para. 12.1)

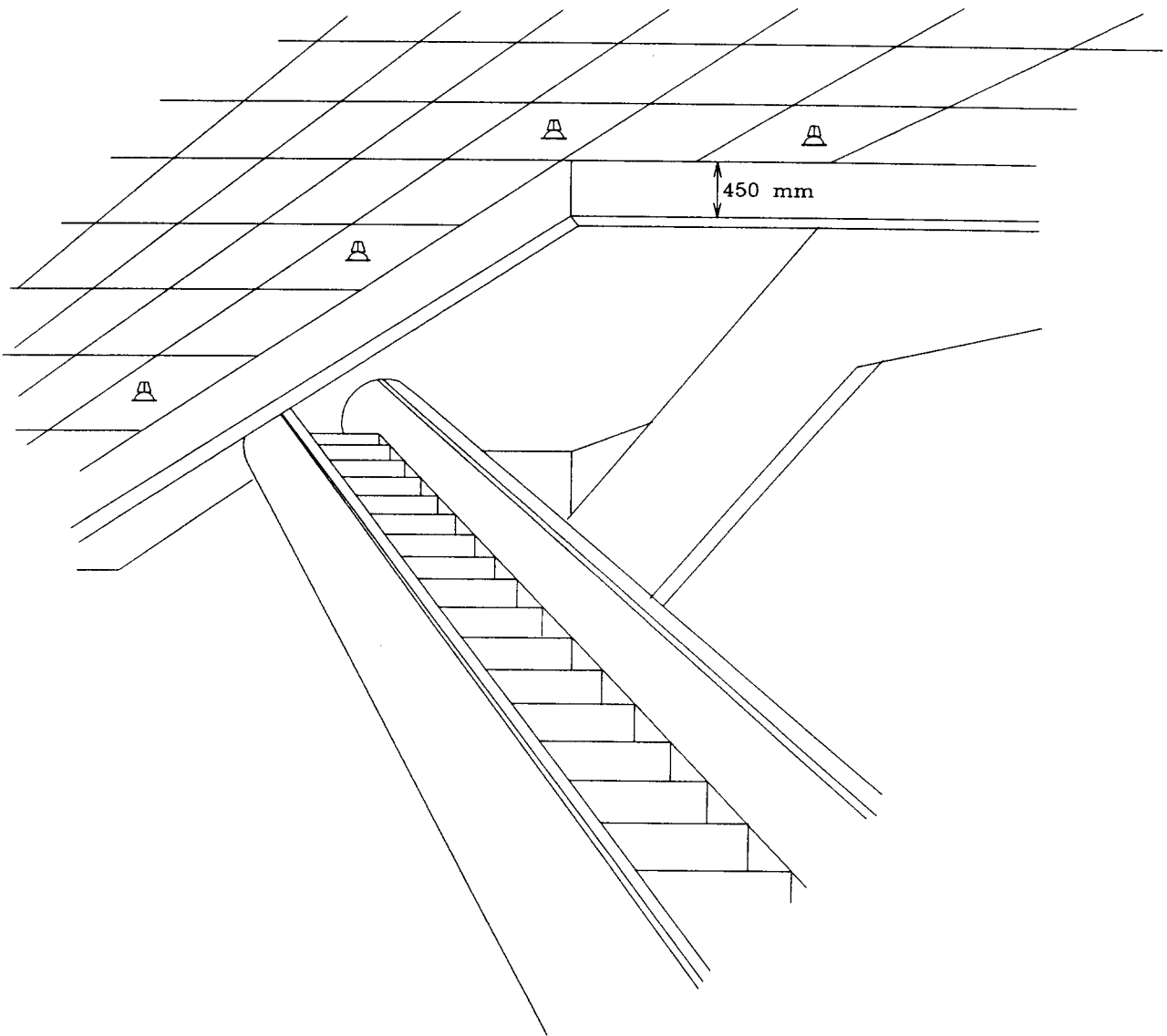


Diagram 6 : Vertical Barrier at Atrium (see para. 12.1)

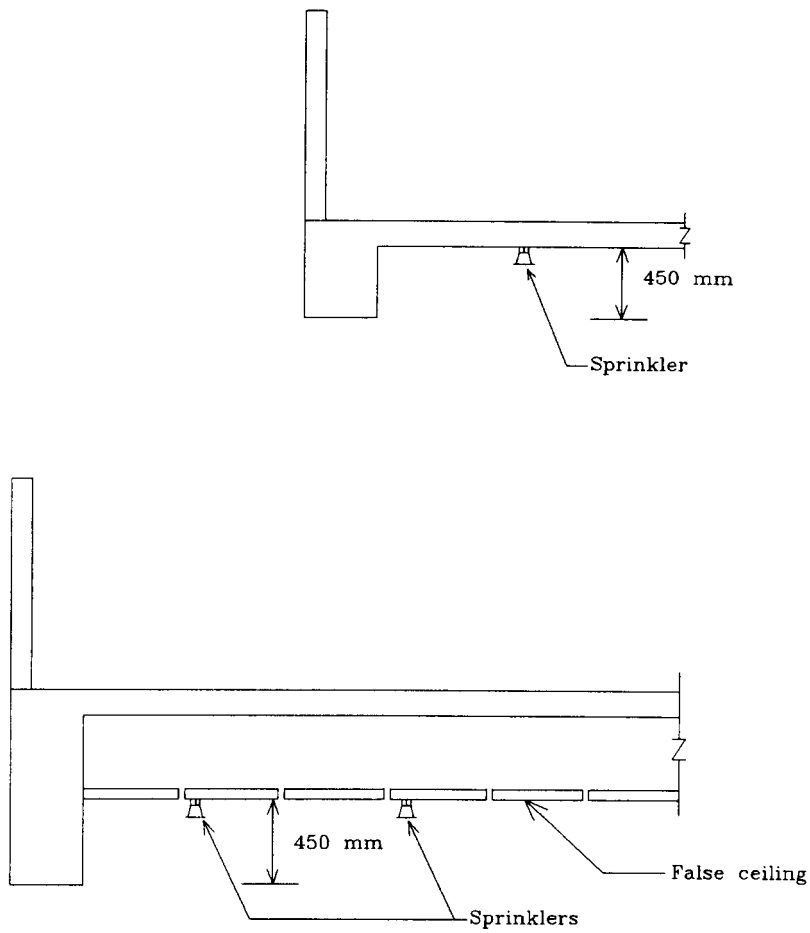
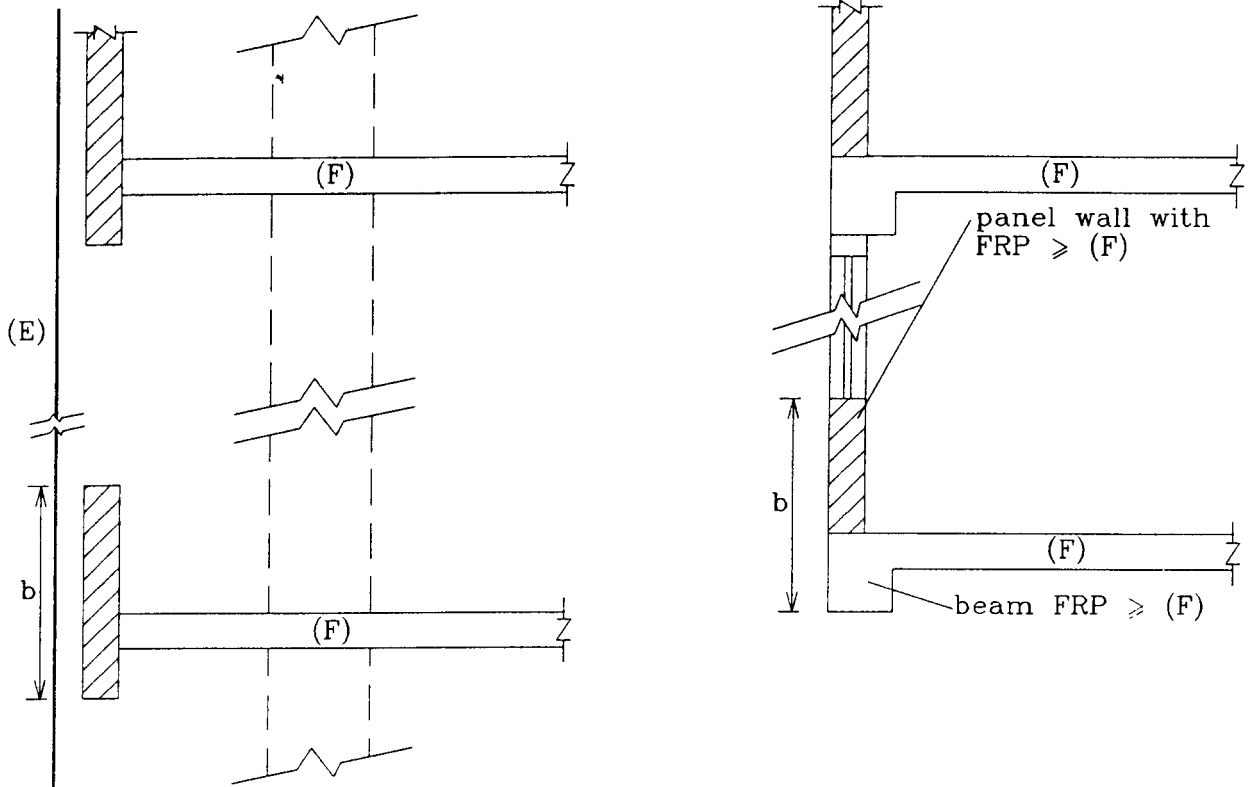
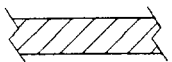


Diagram 7 : Protection against Spread of Fire by Spandrels
(see para. 12.3)



(F) intervening floor



spandrel of non-combustible materials having $FRP \geq$ that of (F)

$b \geq 900$ mm

(E) external wall (e.g. curtain wall) with no FRP or $FRP <$ that of (F)