Role of Fire Protection Professionals at Design Stage

LEADS TO THE QUESTION WE ARE GOING TO DISCUSS TODAY:

IMPORTANCE OF DEVELOPER AND DESIGN TEAMS EARLY ENGAGEMENT WITH FIRE PROTECTION PROFESSIONALS

Brian Cassey's photo of Cairns burns survivor Carol Mayer will be exhibited in space for the Portrait of Humanity project.(Supplied: Brian Cassey)

It took Brian Cassey several years to pluck up the courage to ask Carol Mayer if he could take her portrait.

The award-winning photographer first met Mayer in 2011 for a newspaper story detailing how she survived a house fire that left her with burns to 85 per cent of her body.

How this haunting portrait of a Queensland burns survivor won worldwide acclaim

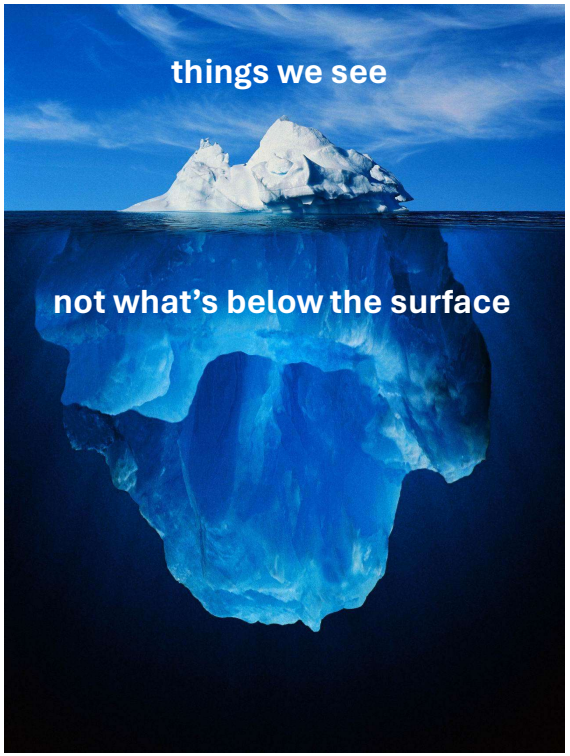
A photograph of an Australian burns survivor is among 200 Portraits of Humanity that will be exhibited in space and transmitted through the universe in binary code.

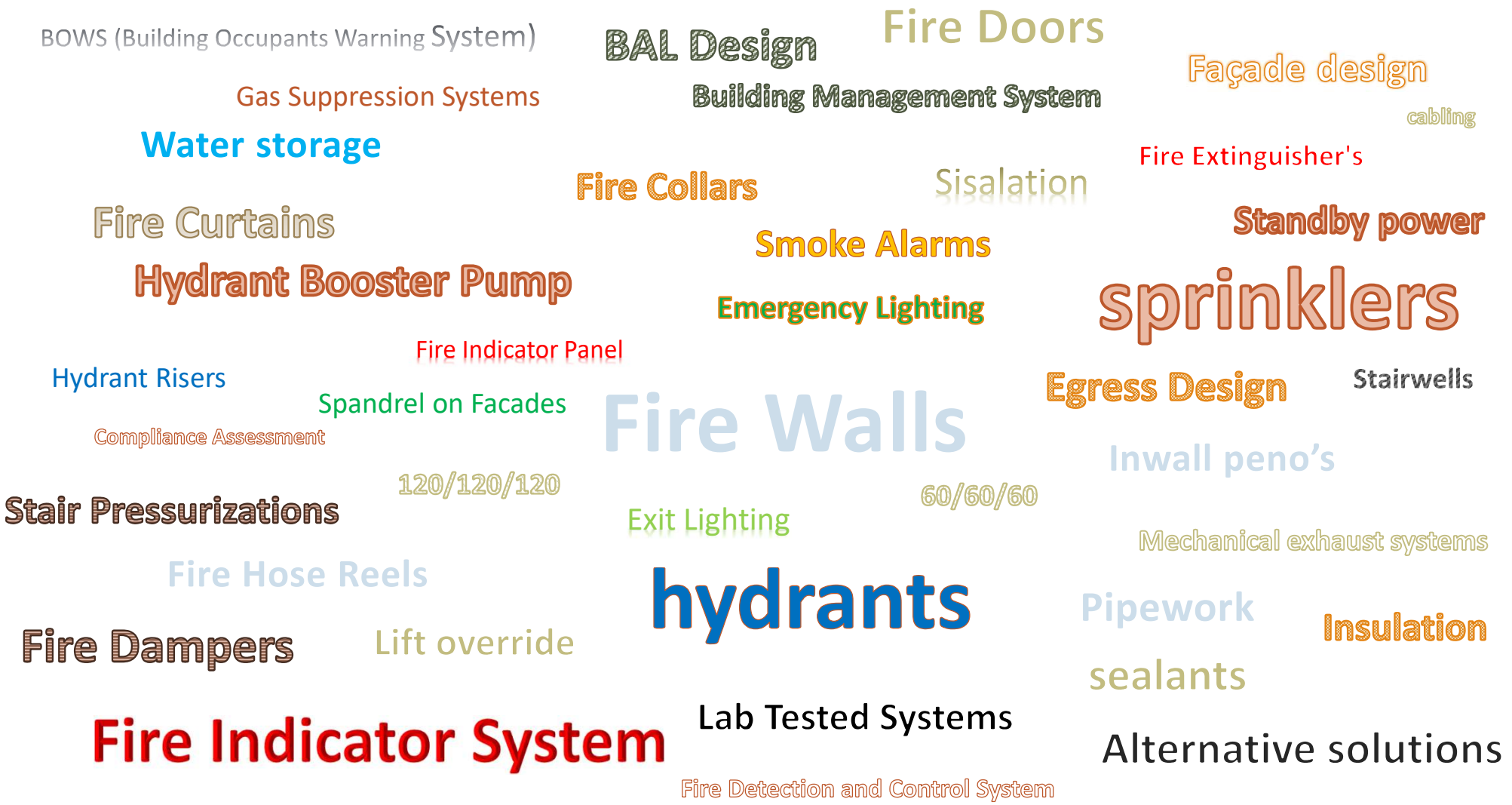
ABC Jun 12, 2020

WHAT IS FIRE

Fire is the rapid oxidation of a material in the exothermic chemical process of combustion, releasing heat, light, and various reaction products. At a certain point in the combustion reaction, called the ignition point, flames are produced. The flame is the visible portion of the fire. Flames consist primarily of carbon dioxide, water vapor, oxygen and nitrogen. If hot enough, the gases may become ionized to produce plasma. Depending on the substances alight, and any impurities outside, the color of the flame and the fire's intensity will be different.
Wikipedia

Do the building occupants see beyond the surface





What are the building elements encompassing Fire Protection during construction?

Who's At The Design Table

Structural Engineer

Electrical Engineer

Hydraulic Engineer / Consultant

Builder

Architect

Façade Engineer

Section J
(Energy Efficiency)

Certifier / Building Surveyor

Mechanical Engineer

Civil Engineer

Fire Engineer ???

Assessment Authority (Fire Brigade) ????

Who's at your design table?

Designers Responsible for Which Areas of Fire Protection Elements

Architect / Developer

Overall Design Concept

BAL (Bushfire Attack Level)

Façade Design/ Spandrel on Façade

(unless there is a specific Façade Designer)

Egress Design (Size and location)

Nomination of Walls and Ceilings F/R

Fire Doors

Statutory Signage

Hydraulic Engineer / Consultant

Water Storage

Hydrants

Pipework

Hydrant Risers

Hydrant Booster Pump

Fire Collars

Fire Hose Reel Location

Do you think the Architect is focused on Fire Protection Elements as a specific focus?

Designers Responsible for Which Areas of Fire Protection Elements

Structural Engineer

Building Design for End User Load and Fire Compartmentation to Comply with NCC

Stairwells and Escape Corridors

Façade Design (unless there is a specific Façade Designer)

Spandrel on Façade

Fire Wall Structural Design

Floor Structural Design to required FRL

Fire Doors (FRL)

Fire Services Engineer

Fire Sprinklers

Fire Suppression System

Fire Hydrants

Booster Pump Systems

Fire Engineer

Alternative Fire Solution where DTS cannot be applied

Review of Façade Design

Designers Responsible for Which Areas of Fire Protection Elements

Electrical Engineer

Smoke alarms / Exit Lighting

Lift Override (in conjunction with Lift Supplier)

Fire Indicator System & FIP

Fire Detection and Control System

Emergency Lighting

Building Management System

Building Occupants Warning System

Fire Collars / Cabling

Standby Power

Mechanical Engineer

Gas Suppression System

Stair Pressurization

Mechanical Smoke and Exhaust Systems

Fire Dampers and Smoke Damper

Insulation

Do you think the Electrical and Mechanical Engineer is focused on Fire Protection Elements?

Structural & Architectural Trades Responsible for Which Areas of Fire Protection Elements

Structural Trades

Blocklayer

Firewalls & Spandrel on Facade

Sealant

Fire Doors

Stairwells

Concretor / Reinforcing (FCR Trade)

Firewall / Spandrel on Façade

Penetrations

Stairwells

Sealant

Architectural Trades

Internal PBD Walls and External Cladding

Firewalls / Fire Rated Shafts / Ceiling

Sealant

In wall peno's

Fire Doors

Insulation & Sisalation

Door Supplier

Fire Doors and Frames

Fire Shutters

Fire Curtains

Insulation

Electrical and or Fire Contractor

Electricians

Smoke alarms

Exit Lighting

Emergency Lighting

Building Management System

Fire Collars / Cabling

Standby Power

Fire Contractor

Fire Indicator System & FIP

Fire Detection and Control System

Building Occupants Warning System

Fire System Cabling

Standby Power Switch Off Override

Lift Override (in conjunction with Lift Supplier)

Fire Extinguishers

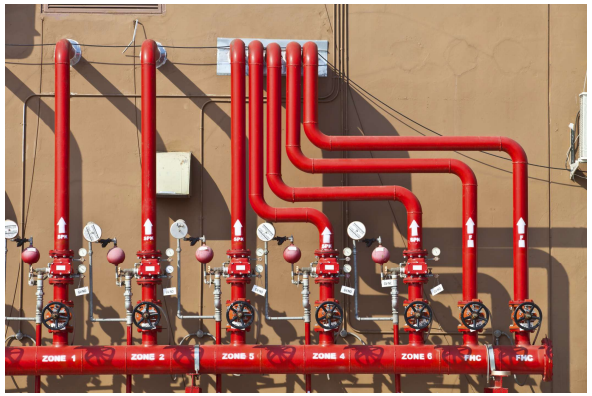
Do Electrical Engineers at the table fully understand these works therefore you feel that the design input is adequate?

Plumbing and or Fire Contractors

Water Storage

Water Supply

Fire Collars



Hydrants

Fire Hose Reel

Pipework

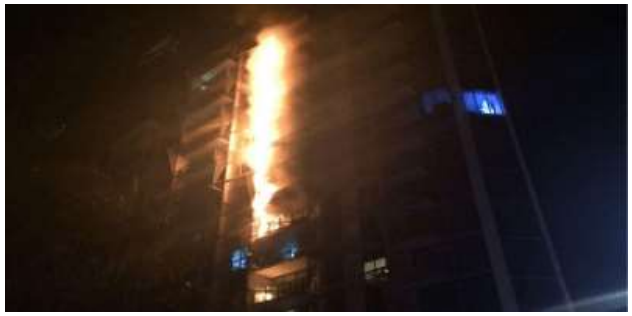
Sprinklers

Hydrant Risers

Hydrant Booster Pump

Do the Consultants/Engineers at the table fully understand the works and you feel their design input is adequate?

Why are we even discussing this topic?



“Flames spread rapidly up the external wall cladding at the Lacrosse building in Melbourne in November 2014. More than four years on, the combustible panels *were* still in use”.

Source: MFB

WHY ????

You might be surprised to learn that still the ABS doesn’t classify Fire Protection in its own right as an industry

Comparative Statistic of RPEQ (Registered Professional Engineers Qld)

Area of engineering	RPEQs	Practising	Non-practising
Building services		309	8
Electrical		3,755	123
Fire		15	0
Fire safety		183	4
Mechanical		3,613	108
Structural		2,663	57
Not used in the comparison was Civil		**7,469**	**216**

Building Services 3%

Electrical 36%

Fire & Fire Safety Engineers 2%

Mechanical 34%

Structural 25%

NCC 2022 Volume Two - Building Code of Australia Class 1 and 10 buildings

NCC 2022 Volume Three - Plumbing Code of Australia

Part B4 Fire-fighting water services

8 Pages

Reference to Fire Protection in Part 1 NCC 2022
Section A – Governing Requirements
Total 43 Pages - Fire Protection Ref: 15 Pages

Specification 1
Fire-resistance of building elements
7 Pages

Specification 2
Descriptions of elements referenced in Specification 1
6 Pages

35%

Specification 3
Fire Hazard Properties
2 Pages

Reference to Fire Protection in Volume 1 NCC 2022

Section C – Fire Resistance

Total 67 Pages - Fire Protection Ref: 67 Pages

Part C2
Fire Resistance and stability
8 Pages

Specification 8
Performance of external walls in fire
2 Pages

Specification 5
Fire-resisting construction

Specification 12
Fire doors, smoke doors,
Fire windows and shutters
2 Pages

Specification 13
Penetrations of walls, floors and ceilings by services
6 Pages

Specification 7
Fire hazard properties
5 Pages

Part C1
Fire Resistance
7 Pages

Part C4
Protection of Openings
7 Pages

Specification 10
Fire-protected Timber

Specification 6
Structural tests for lightweight construction
4 Pages

Specification 9
Cavity barriers for Fire Protected Timber
2 Pages

100%

Specification 1
Smoke-proof walls in health-care and residential care buildings
2 Pages

Part C3
Compartmentation and separation
8 Pages

Reference to Fire Protection in Volume 1 NCC 2022

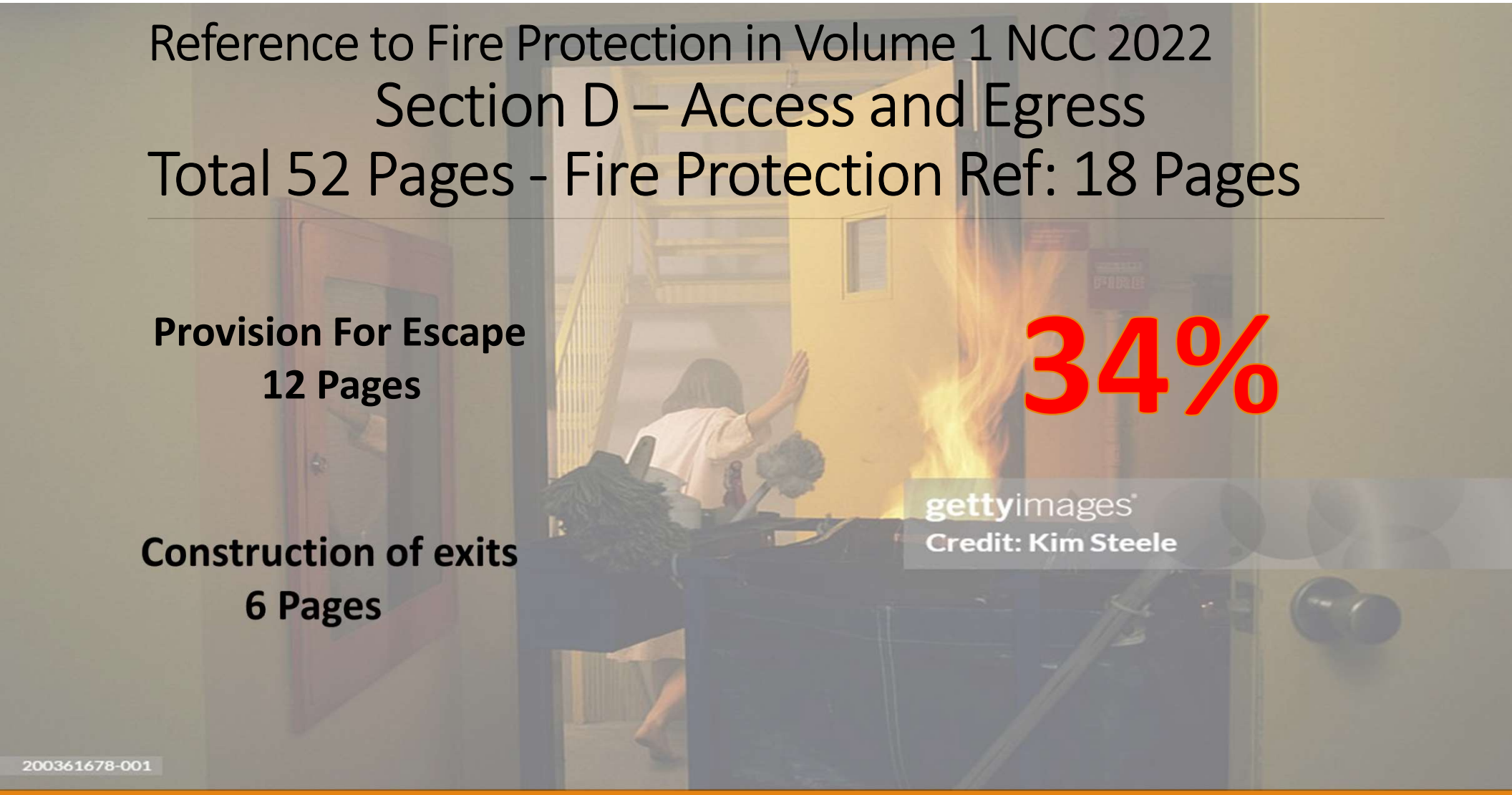
Section D – Access and Egress

Total 52 Pages - Fire Protection Ref: 18 Pages

Provision For Escape
12 Pages

Construction of exits
6 Pages

34%



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Reference to Fire Protection in Volume 1 NCC 2022
Section E – Services and Equipment
Total 65 Pages - Fire Protection Ref: 60 Pages

Part E2
Smoke hazard management
11 Pages

Part 3E
Lift installations
8 Pages

Specification 17
Fire Sprinkler systems
3 Pages

Specification 22
Smoke-and-heat vents
1 Page

Specification 23
Residential fire safety systems
4 Pages

Part E1
Fire fighting equipment
9 pages

Specification 19
Fire control centres
3 Pages

Specification 21
Smoke exhaust systems
4 Pages

Specification 24
Lift Installations
2 Pages

Specification 25
Photoluminescent exit signs
1 Page

92%

Specification 20
Smoke detection and alarm systems
5 pages

Specification 18
Class 2 and 3 Buildings
Not more than 25m
In effective height
3 pages

Part E4
Visibility in an emergency,
Exit signs and warning systems
5 Pages

Reference to Fire Protection in Part 1 NCC 2022 Section G

Total 34 Pages - Fire Protection Ref: 20 Pages

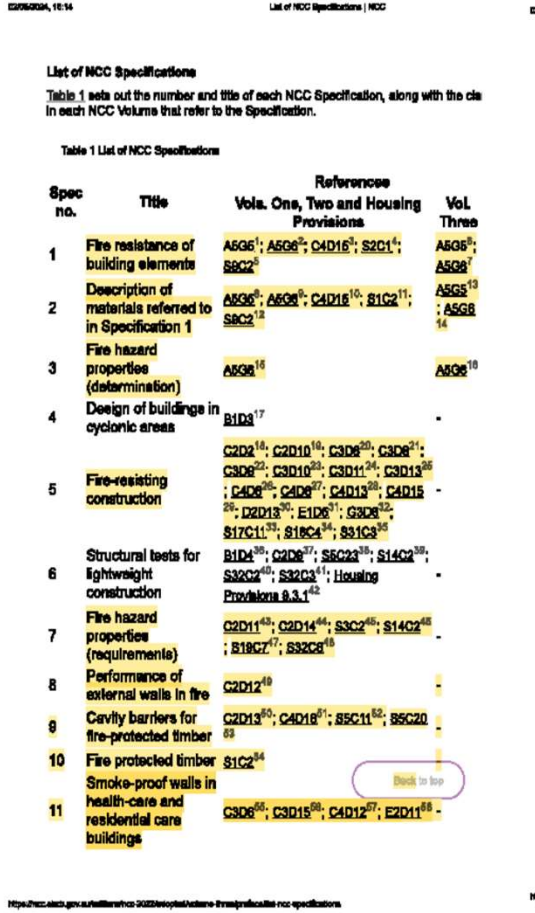
Part G5
Construction in bushfire prone areas
6 Pages (Section G)

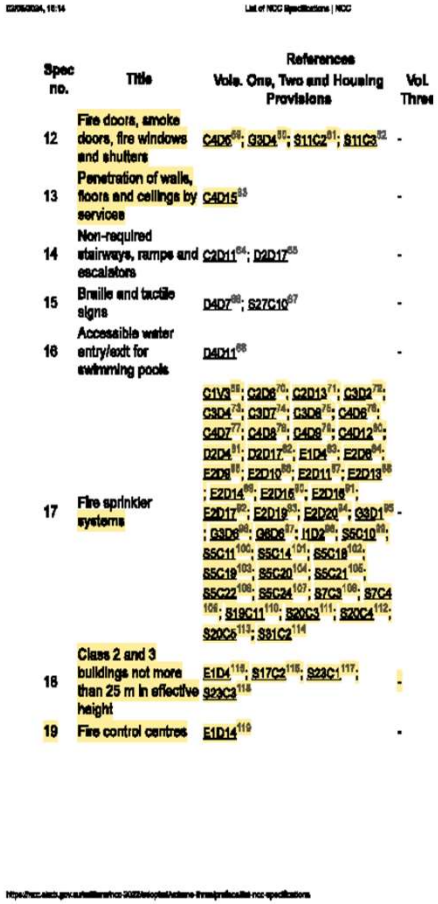
Specification 43
Bushfire protection for certain Class 9 Buildings
7 Pages (Section G)

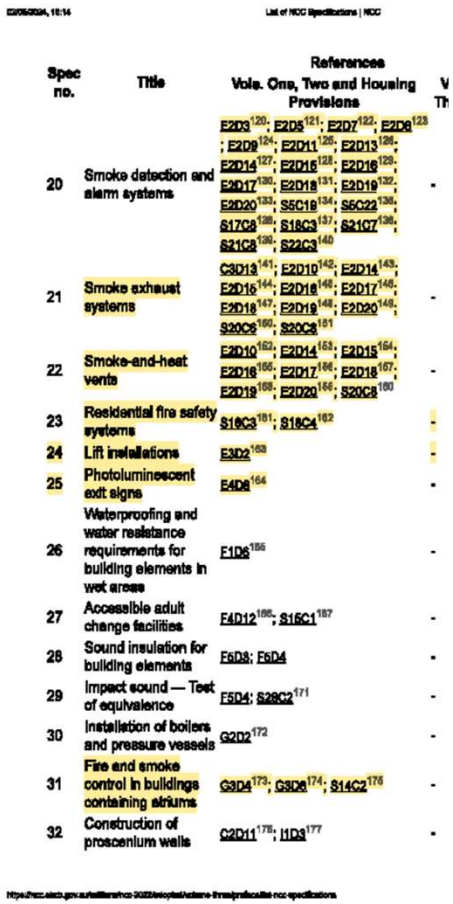
59%

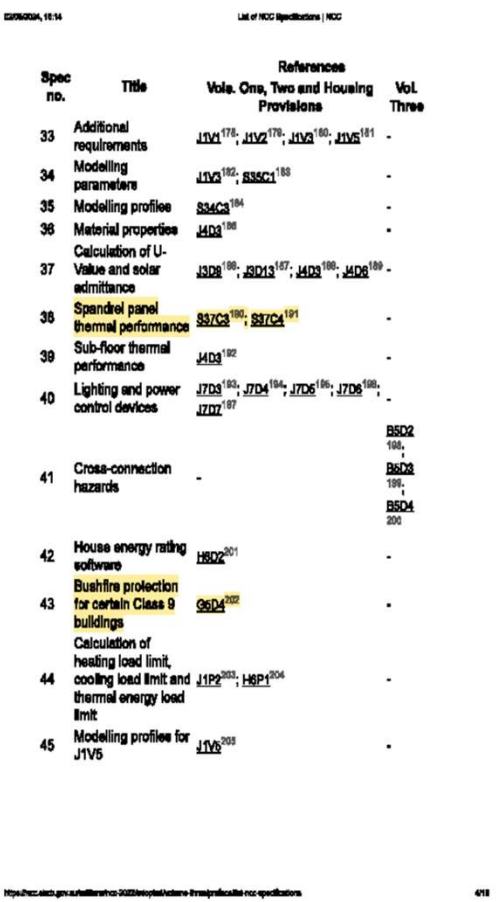
Specification 31
Fire and smoke control systems in buildings containing atriums
7 Pages (Section G)

Specifications in NCC Pertaining to Fire Protection









List of NCC Specifications

Table 1 sets out the number and title of each NCC Specification, along with the cla in each NCC Volume that refer to the Specification.

Table 1 List of NCC Specifications

Spec no.	Title	References Vols. One, Two and Housing Provisions	Vol. Three
1	Fire resistance of building elements	A5G5[1]; A5G6[2]; C4D16[9]; S2C1[4]; S8C2[5]	A5G5[5]; A5G8[7]
2	Description of materials referred to in Specification 1	A5G6[8]; A5G8[9]; C4D16[10]; S1C2[11]; S8C2[12]	A5G5[13]; A5G8[14]
3	Fire hazard properties (determination)	A5G6[16]	A5G6[16]
4	Design of buildings in cyclonic areas	B1D3[17]	-
5	Fire-resisting construction	C2D2[18]; C2D10[19]; C3D6[20]; C3D8[21]; C3D9[22]; C3D10[23]; C3D11[24]; C3D13[25]; C4D6[26]; C4D8[27]; C4D13[28]; C4D15[29]; D2D13[30]; E1D6[31]; G3D8[32]; S17C11[33]; S18C4[34]; S31C9[35]	-
6	Structural tests for lightweight construction	B1D4[36]; C2D6[37]; S6C23[38]; S14C2[39]; S32C2[40]; S32C3[41]; Housing Provisions 9.3.1[42]	-
7	Fire hazard properties (requirements)	C2D11[43]; C2D14[44]; S3C2[45]; S14C2[46]; S19C7[47]; S32C8[48]	-
8	Performance of external walls in fire	C2D12[49]	-
9	Cavity barriers for fire-protected timber	C2D13[50]; C4D16[51]; S5C11[52]; S5C20[53]	-
10	Fire protected timber	S1C2[54]	-
11	Smoke-proof walls in health-care and residential care buildings	C3D6[56]; C3D15[58]; C4D12[57]; E2D11[55]	-

Spec no.	Title	References Vols. One, Two and Housing Provisions	Vol. Three
12	Fire doors, smoke doors, fire windows and shutters	C4D6[59]; G3D4[60]; S11C2[61]; S11C3[62]	-
13	Penetration of walls, floors and ceilings by services	C4D15[63]	-
14	Non-required stairways, ramps and escalators	C2D11[64]; D2D17[65]	-
15	Braille and tactile signs	D4D7[66]; S27C10[67]	-
16	Accessible water entry/exit for swimming pools	D4D11[68]	-
17	Fire sprinkler systems	C1V3[69]; C2D6[70]; C2D13[71]; C3D2[72]; C3D4[73]; C3D7[74]; C3D8[75]; C4D6[76]; C4D7[77]; C4D8[78]; C4D8[79]; C4D12[80]; D2D4[81]; D2D17[82]; E1D4[83]; E2D6[84]; E2D8[85]; E2D10[86]; E2D11[87]; E2D13[88]; E2D14[89]; E2D15[90]; E2D16[91]; E2D17[92]; E2D19[93]; E2D20[94]; G3D1[95]; G3D6[96]; G6D6[97]; H1D2[98]; S5C10[99]; S5C11[100]; S5C14[101]; S5C18[102]; S5C19[103]; S5C20[104]; S5C21[105]; S5C22[106]; S5C24[107]; S7C3[108]; S7C4[109]; S19C11[110]; S20C3[111]; S20C4[112]; S20C6[113]; S31C2[114]	-
18	Class 2 and 3 buildings not more than 25 m in effective height	E1D4[115]; S17C2[116]; S23C1[117]; S23C3[118]	-
19	Fire control centres	E1D14[119]	-

Spec no.	Title	References Vols. One, Two and Housing Provisions	V Th
20	Smoke detection and alarm systems	E2D3[120]; E2D5[121]; E2D7[122]; E2D8[123]; E2D9[124]; E2D11[125]; E2D13[126]; E2D14[127]; E2D15[128]; E2D16[129]; E2D17[130]; E2D18[131]; E2D19[132]; E2D20[133]; S5C19[134]; S6C22[135]; S17C8[136]; S18C3[137]; S21C7[138]; S21C8[139]; S22C3[140]	-
21	Smoke exhaust systems	C3D13[141]; E2D10[142]; E2D14[143]; E2D16[144]; E2D18[145]; E2D17[146]; E2D18[147]; E2D19[148]; E2D20[149]; S20C6[150]; S20C8[151]	-
22	Smoke-and-heat vents	E2D10[152]; E2D14[153]; E2D15[154]; E2D16[155]; E2D17[156]; E2D18[157]; E2D19[158]; E2D20[159]; S20C8[160]	-
23	Residential fire safety systems	S19C3[161]; S18C4[162]	-
24	Lift installations	E3D2[163]	-
25	Photoluminescent exit signs	E4D6[164]	-
26	Waterproofing and water resistance requirements for building elements in wet areas	F1D6[166]	-
27	Accessible adult change facilities	F4D12[186]; S15C1[187]	-
28	Sound insulation for building elements	F6D8; F6D4	-
29	Impact sound — Test of equivalence	F5D4; S28C2[171]	-
30	Installation of boilers and pressure vessels	G2D2[172]	-
31	Fire and smoke control in buildings containing atriums	G3D4[173]; G3D6[174]; S14C2[176]	-
32	Construction of proscenium walls	C2D11[178]; H1D3[177]	-

Spec no.	Title	References Vols. One, Two and Housing Provisions	Vol. Three
33	Additional requirements	J1V1[178]; J1V2[179]; J1V3[180]; J1V5[181]	-
34	Modelling parameters	J1V3[182]; S35C1[183]	-
35	Modelling profiles	S34C3[184]	-
36	Material properties	J4D3[188]	-
37	Calculation of U-Value and solar admittance	J3D8[188]; J3D13[187]; J4D3[188]; J4D6[189]	-
38	Spandrel panel thermal performance	S37C3[190]; S37C4[191]	-
39	Sub-floor thermal performance	J4D3[192]	-
40	Lighting and power control devices	J7D3[193]; J7D4[194]; J7D6[195]; J7D6[196]; J7D7[197]	-
41	Cross-connection hazards	-	B5D2[198]; B6D3[199]; B5D4[200]
42	House energy rating software	H6D2[201]	-
43	Bushfire protection for certain Class 9 buildings	G6D4[202]	-
44	Calculation of heating load limit, cooling load limit and thermal energy load limit	J1P2[203]; H6P1[204]	-
45	Modelling profiles for J1V5	J1V5[205]	-

The documents above highlighted in yellow relate directly to Fire Protection Systems

NCC 2022 Volume One – Building Code of Australia Class 2 to 9

Total Pages
501

180 Pages dedicated to Fire Protection Elements

35.9%

These figures exclude all individual state and territories amendments and clarifications; definitions and referenced documents

RECAP - What are the building elements encompassing Fire Protection during construction?

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What do you recognise as fire protection elements encompassed in a construction project?

ⓘ Start presenting to display the poll results on this slide.

Who's At The Design Table

Structural Engineer

Electrical Engineer

Hydraulic Engineer / Consultant

Builder

Architect

Façade Engineer

Section J
(Energy Efficiency)

Certifier / Building Surveyor

Mechanical Engineer

Civil Engineer

Fire Engineer ???

Assessment Authority (Fire Brigade) ????

Who's at your design table?

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Do you think the Architect and Engineers at the Design Table are focused on Fire Protection Elements as a specific focus?

ⓘ Start presenting to display the poll results on this slide.

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From the stats presented today, and your knowledge of the industry, has your view changed or been reinforced on Fire Protection Professionals (FPP) needing to be at the Design Table?

ⓘ Start presenting to display the poll results on this slide.