



SFPE 2020 Performance-Based Design Conference & Expo Mar 11-13 2020 || Auckland, New Zealand

A comparison of regulatory compliance approaches to façade fire risk in a prescriptive (UAE) and performance-based (Australia) regulatory environment - The Good, the Bad and the Way forward

Mr. Faimeen F. Shah & Dr Amer Magrabi

Agenda

- Background
- Prescriptive compliance – United Arab Emirates (UAE)
- Prescriptive & performance-based compliance – Australia
- Summary & key recommendations
- Questions

Background

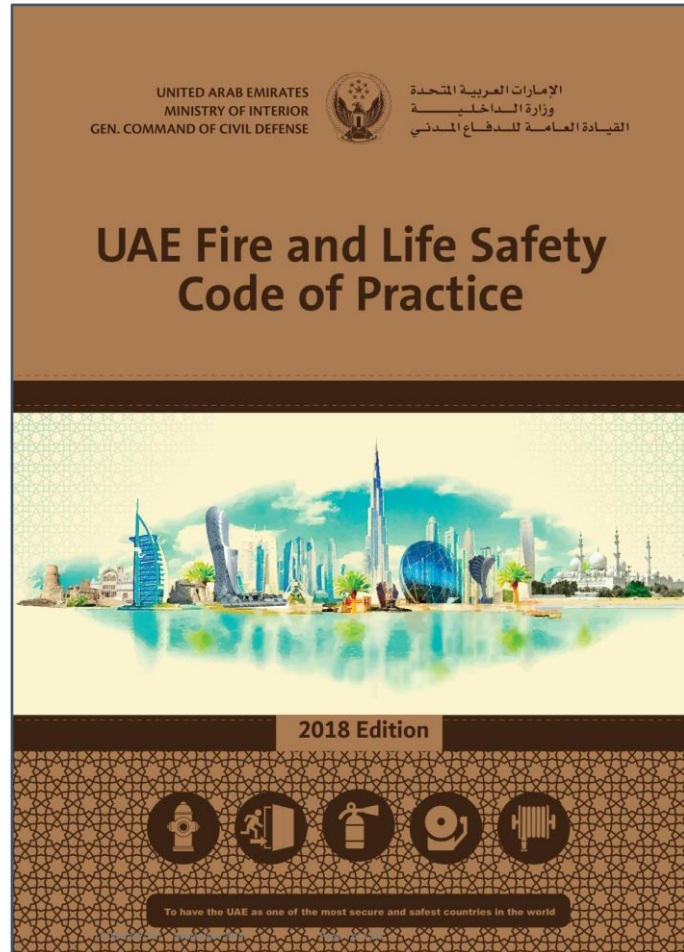
United Arab Emirates

- Numerous façade fires
- No fatalities but extensive property damage
- UAE Fire & Life Safety Code of Practice revised:
 - Annexures – 2012-2014
 - Major update – 2017
 - Last revision - 2018

Australia

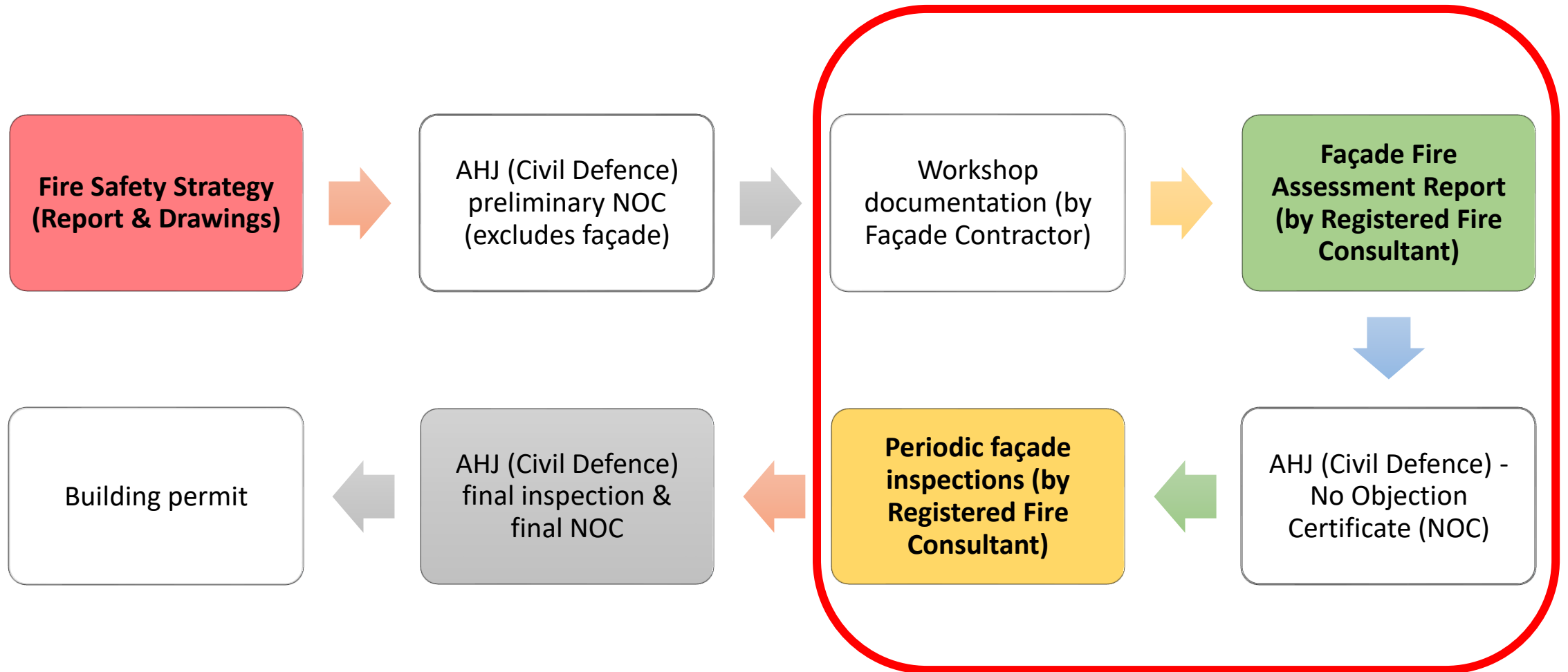
- Lacrosse, Melbourne - 2014
- Neo 200, Melbourne - 2019
- Cladding Bans – NSW, VIC, QLD
- BCA 2016 Amdt 1
- BCA 2019
- IEAust SFS Façade Practice Note 2019

UAE – Prescriptive compliance



- UAE Fire and Life Safety Code of Practice (2018 Editions)
- All buildings (unconditional)
- Façade fire assessment report
- Façade inspections
- Excludes existing buildings
- AHJ – Local Civil Defence

UAE – Approvals process



UAE – Key technical requirements

1) Reaction to fire test

Each component of the façade to be fire tested (exposed, without skin)



2) Full-scale assembly test

Façade system to be fire tested



3) Perimeter fire barrier

Certified and listed system to be provided at slab edge



4) Cavity fire barrier

Provided at each floor level & around façade openings



UAE – Key administrative requirements

Local Civil Defence **approved & certified:**

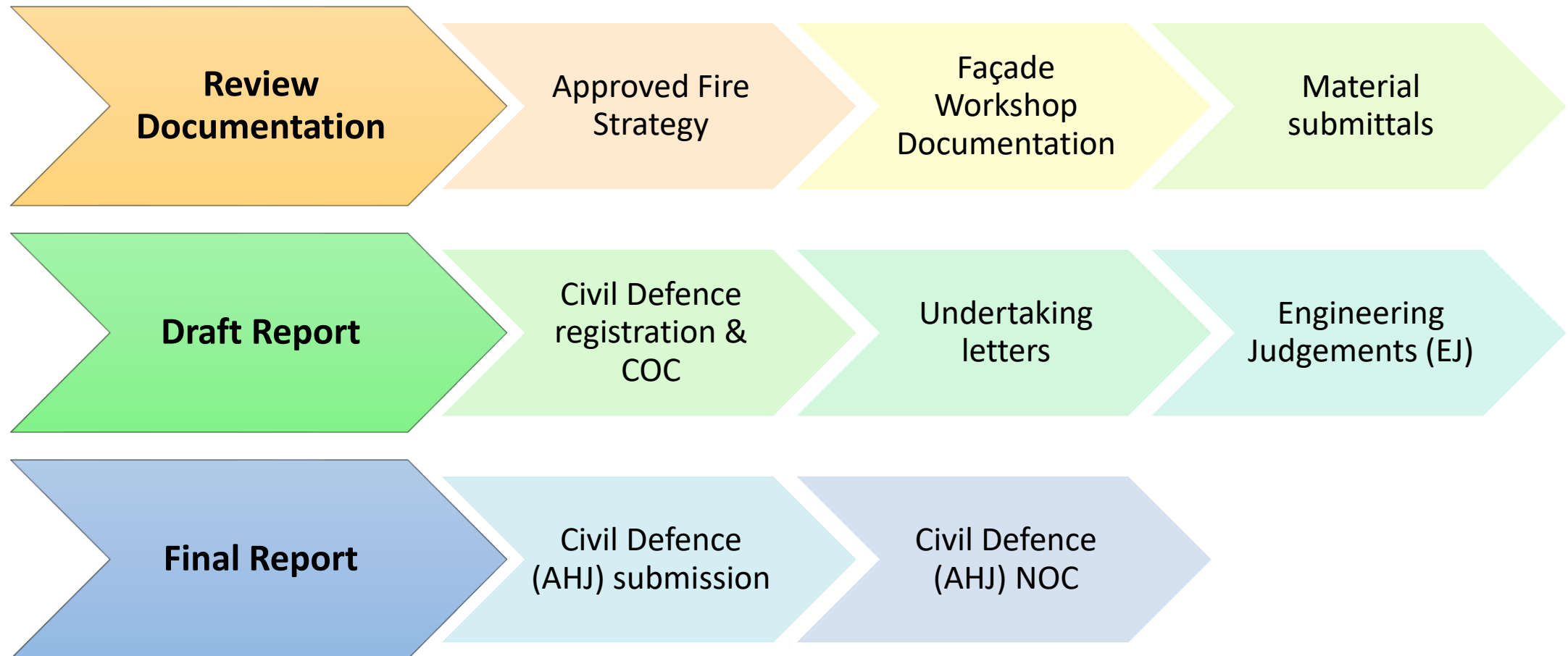
1. Façade contractor
2. Façade supplier/fabricator
3. Façade system



Fire consultant/engineer:

- Approved **House of Expertise** by Civil Defence
- Accredited to **ISO 17020** or **IAS AC291**
- Min. **5 years experience** in façade systems
- Ongoing **training and certification**

UAE – Façade Fire Assessment Report

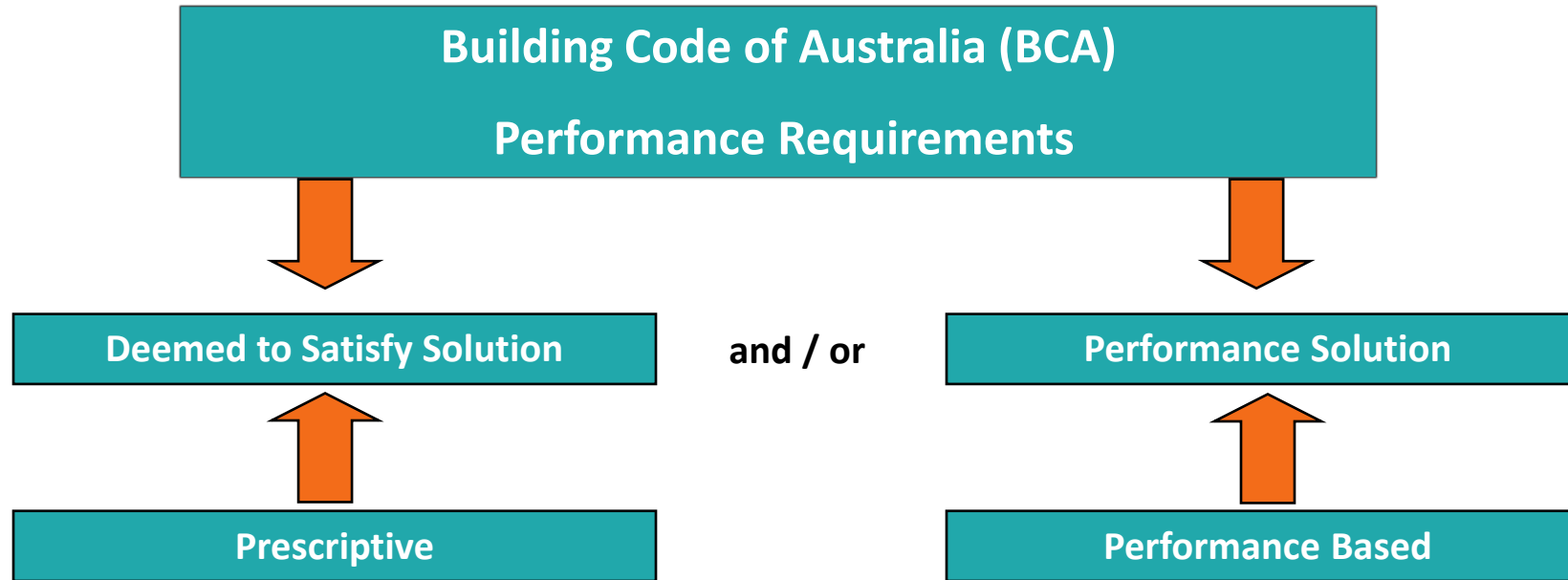


UAE – Façade Inspections

- **Frequency:**
 - **Facade & cavity fire barriers:** at least every 20% intervals of the total building height
 - **Perimeter fire barriers:** 1 destructive test every 152 linear meter (500 ft) as per ASTM E2393
- **Verify installation:** as per Façade Fire Assessment Report
- **Third party inspection accreditation:** ISO 17020 & IAS AC291



Building Compliance Pathways - Australia



External Fire Spread under the BCA

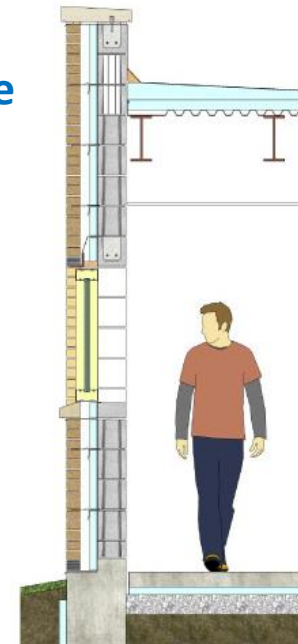
- BCA C1.9 – Non-Combustible Construction
- BCA C1.14 – Ancillary Elements
- BCA C2.6 – Vertical or Horizontal Spandrels
- BCA C3.16 – Construction Joints



C1.9 Non-combustible building elements

- (a) In a building *required* to be of Type A or B construction, the following building elements and their components must be *non-combustible*:
 - (i) *External walls* and *common walls*, including all components incorporated in them including the facade covering, framing and insulation.
 - (ii) The flooring and floor framing of lift pits.
 - (iii) *Non-loadbearing internal walls* where they are *required* to be *fire-resisting*.
- (b) A *shaft*, being a lift, ventilating, pipe, garbage, or similar *shaft* that is not for the discharge of hot products of combustion, that is *non-loadbearing*, must be of *non-combustible* construction in—
 - (i) a building *required* to be of Type A construction; and
 - (ii) a building *required* to be of Type B construction, subject to C2.10, in—
 - (A) a Class 2, 3 or 9 building; and
 - (B) a Class 5, 6, 7 or 8 building if the *shaft* connects more than 2 *storeys*.
- (c) A *loadbearing internal wall* and a *loadbearing fire wall*, including those that are part of a *loadbearing shaft*, must comply with *Specification C1.1*.
- (d) The requirements of (a) and (b) do not apply to the following:
 - (i) Gaskets.
 - (ii) Caulking.
 - (iii) Sealants.
 - (iv) Termite management systems.
 - (v) Glass, including laminated glass.
 - (vi) Thermal breaks associated with glazing systems.
 - (vii) Damp-proof courses.
- (e) The following materials may be used wherever a *non-combustible* material is *required*:
 - (i) Plasterboard.
 - (ii) Perforated gypsum lath with a normal paper finish.
 - (iii) Fibrous-plaster sheet.
 - (iv) Fibre-reinforced cement sheeting.
 - (v) Pre-finished metal sheeting having a *combustible* surface finish not exceeding 1 mm thickness and where the *Spread-of-Flame Index* of the product is not greater than 0.
 - (vi) *Sarking-type materials* that do not exceed 1 mm in thickness and have a *Flammability Index* not greater than 5.
 - (vii) Bonded laminated materials where—
 - (A) each lamina, including any core, is *non-combustible*; and
 - (B) each adhesive layer does not exceed 1 mm in thickness and the total thickness of the adhesive layers does not exceed 2 mm; and
 - (C) the *Spread-of-Flame Index* and the *Smoke-Developed Index* of the bonded laminated material as a whole do not exceed 0 and 3 respectively.

Entire Wall Non-combustible



Material Concessions



Bonded Laminates

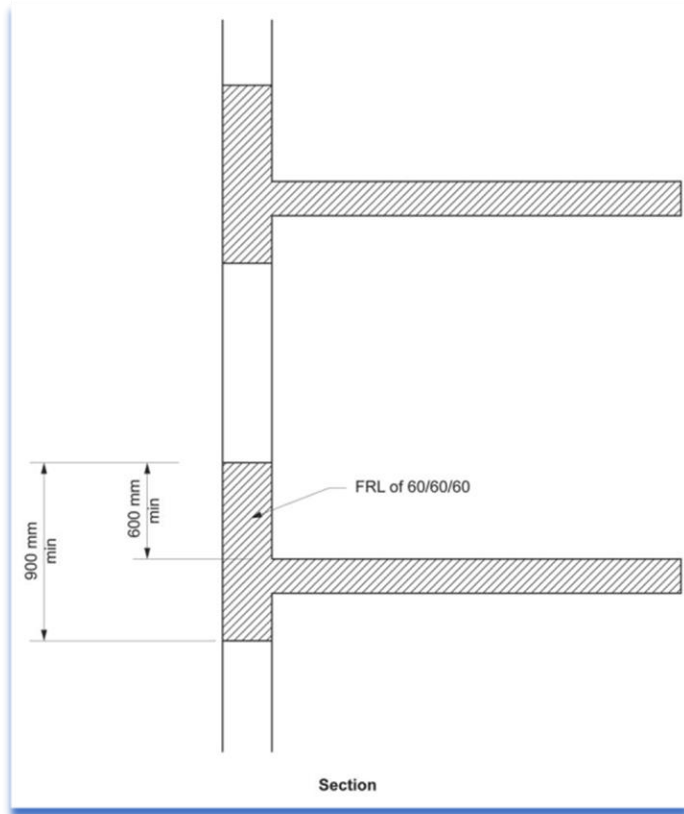
C1.14 Ancillary elements

An *ancillary element* must not be fixed, installed or attached to the internal parts or external face of an *external wall* that is *required* to be *non-combustible* unless it is one of the following:

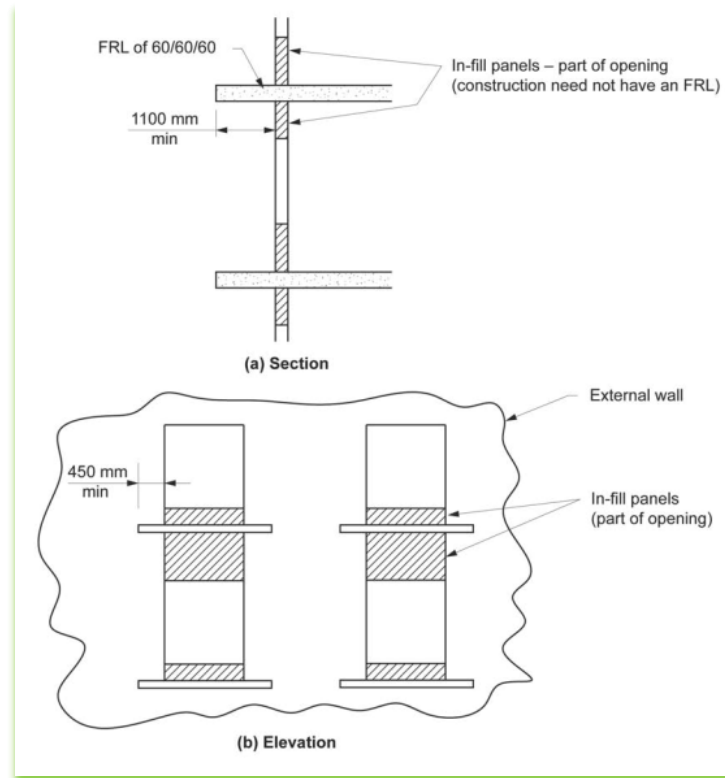
- (a) An *ancillary element* that is *non-combustible*.
- (b) A gutter, downpipe or other plumbing fixture or fitting.
- (c) A flashing.
- (d) A grate or grille not more than 2 m² in area associated with a building service.
- (e) An electrical switch, socket-outlet, cover plate or the like.
- (f) A light fitting.
- (g) A *required* sign.
- (h) A sign other than one provided under (a) or (g) that—
 - (i) achieves a *group number* of 1 or 2; and
 - (ii) does not extend beyond one *storey*; and
 - (iii) does not extend beyond one *fire compartment*; and
 - (iv) is separated vertically from other signs permitted under (h) by at least 2 *storeys*.
- (i) An awning, sunshade, canopy, blind or shading hood other than one provided under (a) that—
 - (i) meets the relevant requirements of Table 4 of Specification C1.10 as for an internal element; and
 - (ii) serves a *storey*—
 - (A) at ground level; or
 - (B) immediately above a *storey* at ground level; and
 - (iii) does not serve an *exit*, where it would render the *exits* unusable in a fire.
- (j) A part of a security, intercom or announcement system.
- (k) Wiring.
- (l) A paint, lacquer or a similar finish.
- (m) A gasket, caulking, sealant or adhesive directly associated with (a) to (k).



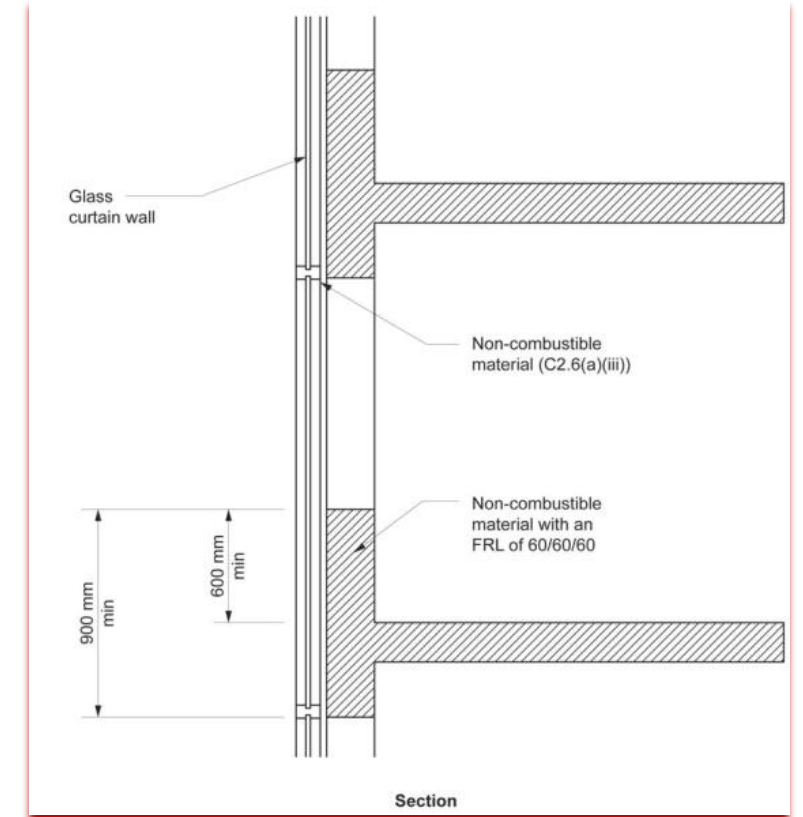
BCA C2.6 – Spandrel Separation



Vertical Spandrel



Horizontal Spandrel



Glass Curtain Wall

CV3 Fire spread via external walls

Compliance with CP2 to avoid the spread of fire via the *external wall* of a building is verified when—

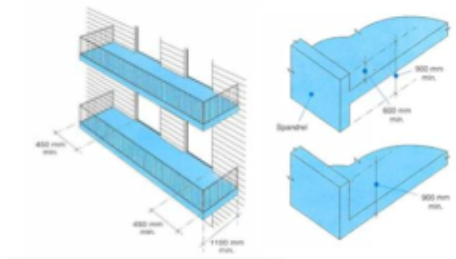
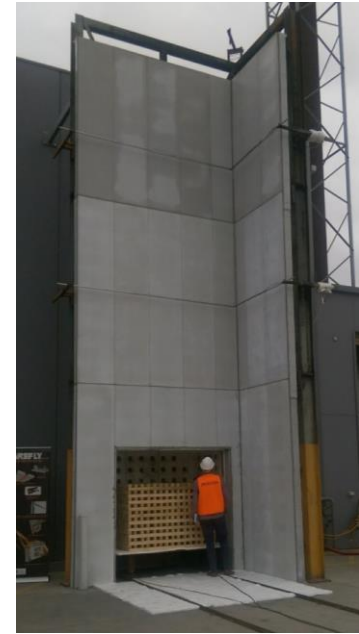
- (a) compliance with CP2(a)(iii) to avoid the spread of fire between buildings, where applicable, is verified in accordance with CV1 or CV2, as appropriate; and
- (b) the *external wall* system—
 - (i) has been tested for external wall (EW) performance in accordance with AS 5113; and
 - (ii) has achieved the classification EW; and
 - (iii) if containing a cavity, incorporates cavity barriers and these cavity barriers have been included in the test performed under (i) at the perimeter of each floor; and
- (c) in a building of Type A construction, the building is protected throughout by a sprinkler system (other than a FPAA101D or FPAA101H system) complying with Specification E1.5 and has—
 - (i) sprinkler protection to balconies, patios and terraces, and where overhead sprinkler coverage is not achieved alongside the *external wall*, sidewall sprinkler heads are provided at the *external wall* for the extent of the balcony, patio or terrace where overhead sprinkler coverage is not achieved; and
 - (ii) for a building with an *effective height* greater than 25 m—
 - (A) monitored stop valves provided at each floor level arranged to allow the isolation of the floor level containing the stop valve while maintaining protection to the remainder of the building; and
 - (B) the sprinkler system being capable of providing sufficient flow to serve the design area required by AS 2118.1 for the relevant hazard class on each floor level plus the design area required by AS 2118.1 for the floor level above, except where the former level is—
 - (aa) the floor level below the uppermost roof; or
 - (bb) any floor level that is wholly below ground; and
 - (d) in a building of Type B construction, the building is—
 - (i) a Class 5, 6, 7 or 8 building or Class 4 part of a building; or
 - (ii) a Class 2, 3 or 9 building that—
 - (A) is protected throughout by a sprinkler system (other than a FPAA101D or FPAA101H system) complying with Specification E1.5; or
 - (B) has any openings in *external walls* separated by a slab or other horizontal construction complying with C2.6(a)(iv) as if the building were of Type A construction.

Fire Test

Cavity Barriers

Sprinkler

Spandrels



Guidelines – Existing & New buildings

- IEAust Society of Fire Safety (SFS)
- **Queensland**
- Fire & Rescue NSW
- Victoria
- WA



Hon Richard Wynne MP

Minister for Planning

Minister's Guideline MG-14: Issue of building permits where building work involves the use of certain cladding products

This is a guideline issued by the Minister pursuant to section 188(1)(c) of the Building Act 1993 (Act). Municipal



Guide for the Assessment of Buildings with Combustible Cladding

Matters for consideration

September 2019

Guideline

For assessing buildings with combustible cladding

VERSION 3
NOVEMBER 2019



Government of Western Australia
Department of Fire & Emergency Services

DFES
Department of Fire & Emergency Services

DFES Built Environment Branch Guideline (GL) 17

Issued: June 2018
Valid: Controlled document
Authorised: Manager Built Environment Branch

GL-17: EXTERNAL WALLS AND CLADDING



ENGINEERS
AUSTRALIA
Society of Fire Safety

Society of Fire Safety Practice Guide
Façade/External Wall Fire Safety Design

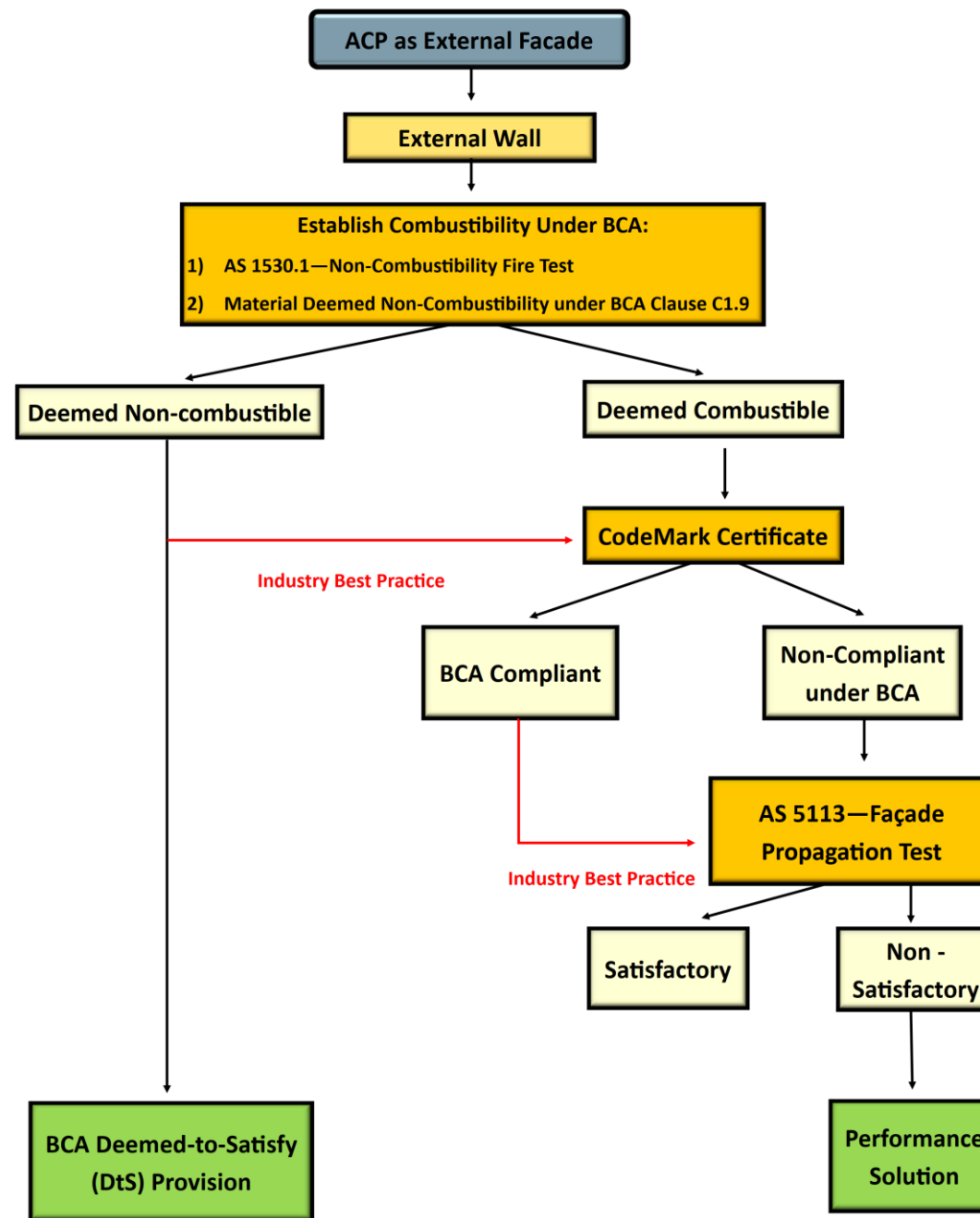


Building Product Safety Alert

Use of ACP and EPS as external wall cladding

March 2018

BCA ACP Assessment Methodology



Advantages

United Arab Emirates

- Provides a **minimum benchmark** for prescriptive compliance
- **Simple to apply, review and approve**
- **Consistent** approach and conclusions
- **Design review to site verification**
- Company & system **registration** mandatory

Australia

- **Prescriptive and Performance Options**
- Verification method and Performance approach allow **holistic approach** and tailoring to buildings fire strategy
- Mechanism to assess **existing buildings** and **new/innovative materials**
- Linked to the building **fire strategy**

Way Forward – Key Recommendations

- Difference between approach – **same as any other prescriptive vs performance-based design methodology**
- **Prescriptive design** (as per UAE approach) to be considered the minimum benchmark + **performance-based design** (as per Australian approach) applied to demonstrate compliance
- **Onsite verification to be mandatory** (as per UAE approach) including **ISO 17020 accreditation** and **third-party inspection of perimeter fire barriers** (as per ASTM E2393)
- **Minimum qualification** of fire engineer (PE, CPEng, etc.) with relevant façade expertise (**additional education on external fire spread req'd**)

Recap

- Background
- Prescriptive compliance – United Arab Emirates (UAE)
- Prescriptive & performance-based compliance – Australia
- Summary & key recommendations
- Questions

Kia Mihi (Thank You)

- **Mr Faimeen Shah**

- www.vortexfec.com

- f.shah@vortexfec.com

- **Dr Amer Magrabi**

- www.loteconsulting.com

- amer@loteconsulting.com



VORTEX FIRE



LOTECONSULTING