



Information Bulletin

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Consideration of emergency response
in Alternative Solutions

Version 1

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FIRE PROTECTION ASSOCIATION AUSTRALIA



Consideration of emergency response in Alternative Solutions

Leading and supporting a professional industry to minimise the impact of fire on life, property and the environment, for a safer community

1.0 Purpose statement

The purpose of this document is to increase awareness and consideration of the requirements for emergency plans and procedures when developing or implementing an Alternative Solution or fire safety engineering design.

In particular, this document highlights the importance of considering and documenting input parameters and design expectations that may affect occupant response in emergencies so that these variables can be taken into account when developing emergency plans and procedures for the facility.

Important:

This Information Bulletin covers emergency planning as within the scope of AS 3745-2010. That is, it is specific to emergency planning at the level of individual facilities and applies only to the human/life safety aspects of emergencies within facilities. It does not cover emergency planning in regards to facility operational incidents, community disaster management, business continuity, security management or major environmental impacts beyond the facility.

In particular, it does not cover bushfire. Where a building is located in a bushfire prone area, separate plans or sub-plans for bushfire need to be developed.

2.0 Audience

This Information Bulletin is primarily intended for fire safety engineers and others involved in the development or implementation of fire safety Alternative Solutions.

However, it may also be of interest to:

- (i) FPA Australia members.
- (ii) Building surveyors.
- (iii) Owners, occupiers, managers and employers of a building, workplace or structure that may be occupied by people (Facilities) that is subject to an alternative solution or fire safety engineering design.
- (iv) Members of Emergency Planning Committees (EPCs).
- (v) Other stakeholders in the fire safety and construction industry.

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3.0 Definitions

3.1 What is an alternative solution?

The Building Code of Australia (BCA)—now volumes 1 and 2 of the National Construction Code (NCC)—is referenced by legislation in each state and territory and sets out the Performance Requirements for the construction of buildings in Australia.

There are two ways to meet the BCA Performance Requirements:

- Comply with the Deemed-to-Satisfy Provisions—defined in the BCA as “provisions which are deemed to satisfy the Performance Requirements”. These are the traditional, prescriptive requirements of the BCA.

Or

- Develop an Alternative Solution—defined in the BCA as “a Building Solution which complies with the Performance Requirements other than by reason of satisfying the Deemed-to-Satisfy Provisions”.

Most Alternative Solutions that address the performance requirements of the BCA associated with fire safety are developed by fire safety engineers and are sometimes referred to as fire engineered solutions. It is these Alternative Solutions that address fire safety that are the subject of this Information Bulletin.

3.2 What are fire safety engineered designs?

Some facilities are not subject to BCA compliance requirements (government buildings, infrastructure, tunnels, ships, etc.) and in such situations the required fire safety performance requirements are set either by another regulator or simply the person or organisation in charge of the facility. In these situations, particularly where the required fire protection requirements are unknown or unique, a fire safety engineer may be engaged to develop a custom, engineered solution for the facility. This solution is referred to in this document as a fire safety engineering design.

4.0 Issue

Alternative Solutions and fire safety engineering designs often treat aspects of a facility’s design that affect occupant response. This impact may be direct or indirect, but in many cases the designer must qualitatively or quantitatively make an assessment of the expected occupant response and the systems and equipment that must operate to ensure occupant safety.

Despite this, FPA Australia members who specialise in developing and implementing emergency plans and procedures have reported instances where there is limited and inconsistent

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consideration of emergency plans and procedures in alternative solutions and fire safety engineering designs.

Alternative Solutions or fire safety engineering designs should consider including:

- (i) Sufficient consideration of emergency planning;
- (ii) Information about input parameters and design expectations for managing occupant response in an emergency—or which may affect occupant response in an emergency—so that these variables can be taken into account when developing subsequent emergency plans and procedures; and
- (iii) Appropriate reference to Australian Standard AS 3745-2010, *Planning for emergencies in facilities* and consistent use of terminology used by this standard that is commonly used by the industry.

5.0 Consideration of emergency planning

The International Fire Engineering Guidelines – 2005 (IFEG) provide guidance for the design of Alternative Solutions to meet the BCA Performance Requirements. However, these guidelines also include concepts and principles that may apply to other facilities not subject to BCA compliance requirements (such as tunnels and ships), where fire safety engineered designs may be developed.

The IFEG was produced through a collaborative venture between:

- National Research Council of Canada (NRC)
- International Code Council (ICC), United States of America
- Department of Building and Housing, New Zealand (DBH)
- Australian Building Codes Board (ABCB)

The IFEG was also endorsed by:

- The Australian members of the Australasian Fire Authorities Council (AFAC)
- Australian Institute of Building Surveyors (AIBS)
- The Institution of Engineers Australia (IEAust) Society of Fire Safety

The IFEG recognises that analysis of a fire safety system proposed for a facility should include consideration of a number of sub-systems as illustrated in Figure 1 below. Occupant Evacuation & Control and Fire Services Intervention are sub-systems that impact on emergency plans and procedures.

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Figure 1 – Fire safety sub-systems identified by the IFEG.

Note: Consideration of sub-systems E and F shown in Figure 1 above, should include application of knowledge regarding sub-systems A, B, C and D.

Clause 1.8.5 of the IFEG confirms that:

The emergency procedures for new buildings should be developed by, or with input from, the fire engineering team. For existing buildings, the existing emergency management plan may need to be modified to reflect the assumptions and the recommendations of the fire engineering study.

Accordingly, consideration and treatment of issues that affect emergency planning is considered by the IFEG and FPA Australia to be an important part of developing associated Alternative Solutions and fire safety engineering designs.

In addition to recognising Occupant Evacuation & Control and Fire Services Intervention as sub-systems worthy of analysis, the IFEG also details that design is only one element of the process for ensuring fire safety is achieved for the life of the building.

Life-cycle engineering is a concept whereby fire safety engineering plays a role throughout the various stages in the life-cycle of a building. Figure 2, below, illustrates the different stages at which the development and implementation of emergency plans and procedures—and the elements of a facility (including occupant characteristics) that impact on these plans and procedures—should be considered. It also identifies the outputs of this consideration.

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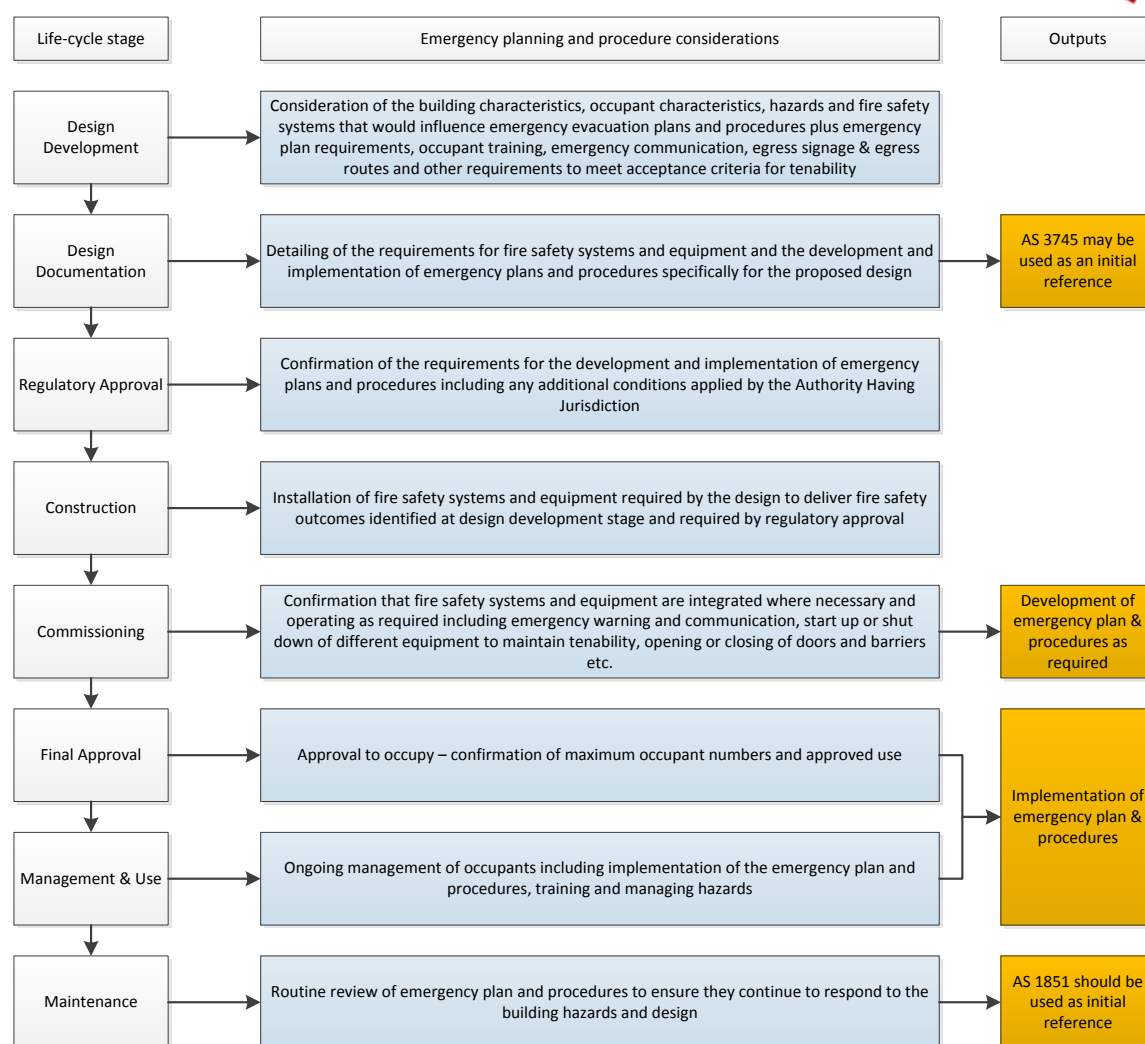


Figure 2 – Life-cycle consideration of emergency plan and procedures requirements

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6.0 Documenting input parameters & design expectations

When developing an emergency plan and procedures for a facility that is subject to an Alternative Solution or fire safety engineering design, it is critical that information about the related input parameters and design expectations that impact on emergency response is readily known.

Developers of emergency plans and procedures rely on this information being available to ensure emergency plans and procedures are appropriately tailored to, and supported by, the facility design.

The IFEG is a useful reference to identifying some of the input parameters that impact on emergency planning that are worthy of consideration when developing an Alternative Solution or fire safety engineering design. FPA Australia considers that these input parameters and associated design expectations should be documented in the design process.

Identification of this information will support the development of emergency plans in accordance with AS 3745-2010.

Table 1 below provides a summary of the input parameters that FPA Australia has identified from the IFEG that should be documented by individual Alternative Solutions or fire safety engineering design documentation to inform emergency plans and procedures.

Table 1 – Input parameters and design expectations to be documented to inform emergency planning and procedures

Building characteristics	<ul style="list-style-type: none"> • Building type and use • Number of floors • Geometry and connection of enclosures • Proximity to other buildings
Occupant characteristics	<ul style="list-style-type: none"> • Maximum number • Age • Gender • Mobility • State (Consciousness) • Hearing and visual ability • Speed of travel • Mental attributes • Level of assistance required • Training requirements • Expected familiarity with the building
Egress path design	<ul style="list-style-type: none"> • Number and type of exits • Location of exits • Geography and layout • Exit path signage and illumination

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Table 1 – Input parameters and design expectations to be documented to inform emergency planning and procedures (continued)

Evacuation plan features	<ul style="list-style-type: none"> • Extent of reference to and expected extent of adoption of AS 3745-2010 • Whether evacuation is controlled or uncontrolled • For controlled evacuations, what the evacuation type is (full, zoned or staged) • Extent of expected fire brigade intervention • Expected evacuation sequence • Required active and passive systems and equipment to facilitate safe evacuation and response • Design sequence of operation of installed fire safety systems and equipment required to assist evacuation • Training requirements • Nominated emergencies
Active and passive equipment	<ul style="list-style-type: none"> • Essential fire safety measures • Warning and intercommunication equipment • Start up or Shut down expectations • Integration and sequencing

7.0 Use and adoption of AS 3745-2010

AS 3745-2010, *Planning for emergencies in facilities* was published on 25 November 2010 superseding AS 3745-2002, *Emergency control organization and procedures for buildings, structures and workplaces*. An amendment to AS 3745-2010 (amendment 1) was published on 1 May 2014.

FPA Australia considers that AS 3745-2010 is the appropriate standard for development of emergency plans and procedures based on information regarding a facility's design.

The objective of the 2010 edition of AS 3745 was to make a greater distinction between emergency plans and emergency/evacuation procedures. It also includes expanded and revised sections (or paragraphs) covering

- Emergency plans
- Emergency response procedures
- Evacuation diagrams
- Emergency Planning Committee (EPC)
- Emergency Control Organization (ECO)
- Occupants with a disability
- Education and training

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This revision of the standard has led to greater emphasis on developing emergency plans that document the organisational arrangements, systems, strategies and procedures relating to the response and management of emergencies.

This includes:

- (a) Identification and analysis of potential emergencies
- (b) Provision for (or updating of) evacuation diagrams and emergency response procedures for each identified emergency, e.g. fire, smoke, medical emergency, internal emergency, external emergency

For both emergency plans and procedures, AS 3745-2010 Clause 3.3 identifies key considerations to be taken into account including:

- (a) The size and complexity of the facility
- (b) Fire engineered or life safety features of the facility
- (c) Security systems, procedures and protocols
- (d) The number and nature of occupants and visitors
- (e) The hours of occupancy

Accordingly, the type of information identified in Table 1, above, is critical to the quality of emergency plans and procedures.

Not addressing emergency planning and procedure requirements—or simply referencing compliance with AS 3745-2010 without documenting input parameters and design expectations—makes the development of emergency plans and procedures extremely difficult.

It is also important that Alternative Solutions and fire safety engineered designs adopt the terminology used by AS 3745-2010 to increase consistency. Examples of varying terms for emergency plans and procedures encountered include: evacuation instructions, fire orders, emergency evacuation strategy plans, tactical fire plans, evacuation plans and emergency evacuation plans.

Consistent use of AS 3745-2010 terminology will provide clearer expectations and increased acceptance of the requirements for emergency planning and procedure information.

8.0 Recommendations

FPA Australia recommends that designers of Alternative Solutions and fire safety engineered designs:

1. Consider occupant evacuation and control impacts through the design development phase.
2. Document the input parameters and design expectations that impact on the development of emergency plans and procedures.

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3. Reference AS 3745-2010 and use the terminology included in this standard when discussing emergency plan and procedure requirements for clarity and consistency including as a minimum:
 - (a) Emergency plan.
 - (b) Emergency response procedures.
 - (c) Evacuation diagrams.

9.0 References

- Fire Protection Association Australia Technical Advisory Committee for Emergency Planning (TAC/17).
- National Construction Code Series 2014 – Volume One, Building Code of Australia: Class 2 to Class 9 Buildings – Published by the Australian Building Codes Board.
- International Fire Engineering Guidelines 2005 Edition – Published by the Australian Building Codes Board.
- Australian Standard AS 3745-2002, *Emergency control organization and procedures for buildings, structures and workplaces* – Published by Standards Australia International Ltd.
- Australian Standard AS 3745-2010, *Planning for emergencies in facilities* (including Amendment 1 2014) – Published by Standards Australia International Ltd.

10.0 Disclaimer

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