WHY ARE ESSENTIAL SAFETY MEASURES AND FIRE ENGINEERING IMPORTANT IN BUILDING DESIGNS AND FOR PRACTITIONERS

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Article based on presentation at Fire Australia 2024 (7 – 9 May 2024, Queensland)

Good afternoon and thanks for attending.

My part of this presentation will focus on the applicability of the Australian Fire Engineering Guidelines of the ABCB issued in 2021 to the topic today.

As you may know, the Australian Fire Engineering Guidelines, which attribution is to the Commonwealth of Australia and States and Territories 2021, published by the Australian Building Codes Board in July 2021 (which I will refer to as "the Guidelines"). I understand that it will possibly be reviewed this year again. The below is an extract or summary of the authors' views which have been expressed in those guidelines and some of my own views. I trust that this presentation will be useful in highlighting some of the key issues of fire engineering in building designs, especially for those of you who have not read the Guidelines from cover to cover.

The Preface of the Guidelines states that Part 1 provides "an insight to the issues that go beyond actual engineering, and a perspective on the role of engineering within the regulatory and non-regulatory systems. This portion…… is intended to link engineering practice with the state-and-territory-based legal and regulatory system of choice". It was "developed for use in the fire safety design of buildings." However there is a reminder that the "guideline is not mandatory or regulatory in nature and compliance with it will not necessarily discharge the user's legal obligations". It simply provides guidance. There is also a general disclaimer. Therefore, the fire engineering designer and engineer will need to use

their own experience and judgement in considering essential safety measures (“ESM’s”) and fire engineering design.

By way of further introduction, the Guidelines are divided into four parts, namely the “Introduction”, “Process”, “Methodologies” and “Philosophy and Intent”.

Part 1, the Introduction, states that the Guidelines are merely a tool for responsible fire engineering and not a recipe book. The regulatory system is about the mitigation of risk and the NCC is a performance–based Code. Compliance is achieved by the provision of a design that complies with a Performance Solution, a Deemed-to Satisfy Solution or a combination of both. Reference is then made to clause A2.2 of NCC Volume 1 (which I believe is now Part A2G2). It is stated that designers must carefully consider the relationship right between the DTS Provision and the Performance Requirements and the latter requirements may also be interrelated.

Reference is also made to the International Standards Organisation’s definition of fire (safety) engineering and the NCC, “which has the fire safety goals of life safety, facilitation of fire brigade intervention, and protection of other buildings, from a fire in a building.”

There is no doubt that fire engineering is evolving and that there has been an increased number of resources and developments over the last decade or so since the fire in the Lacrosse tower in Docklands. Some of these resources are referred to in the Guidelines (such as how various materials ignite, the manner in which fire develops, how structures react to fire etc). Building designers and practitioners have a duty of care to protect the occupants of buildings which they design and others, which I will refer to later. The reality is that when there is a fire, the design and actions of these professionals will be closely scrutinised when assessing the liability for a fire.

Some of the reasons given in the Guidelines and some of my own reasons for the importance of fire engineering in building designs are as follows:-

1. Project feasibility: fire engineering design can have significant construction cost implications.

2. Information: there will be other building professionals who will need to know the detailed design in order to perform their roles and functions.

3. Liaison: design documentation will be crucial to building professionals liaising with others e.g. the building owner, any intended tenant, fire services authorities, Councils, the fire engineer, the architect and various other building professionals.

4. NCC Performance Solutions: their use may lead to designs which are more functional and economical and vice versa.

5. Evaluation/analysis: Fire engineering studies cannot be effective or accurate unless there is a proper detailed design.

6. Identification: early design and testing may identify issues which require particular attention and change.

7. Alternative solutions: design documentation will need to be clear and detailed to present to the relevant building surveyor.

8. Building Permits: a relevant building surveyor will pay close attention to the fire engineering design prior to issuing a Building Permit.

9. Testing: initial testing may assist in determining which design would be the most appropriate, economical and functional design.

10. Building Use and Management: this can be affected depending upon the permitted fuel loadings, emergency evacuation procedures, housekeeping and other maintenance.

11. ESM's: design documentation should consider not only construction but the commissioning, operation and maintenance requirements of fire systems.

12. Insurance: the design may be seen as having an increased level of risk and therefore the insurance premium is likely to be higher (or lower with a reduced risk).

13. Prevent fires and mitigate their impact: good fire engineering and the use of reliable products and equipment will in all likelihood either prevent or minimise the impact of a major fire i.e. building and property damage, releasing hazardous materials into the environment etc.

14. Protection of Emergency Services Personnel: paths of ingress and egress, the location of and access to the fire panel and firefighting equipment and being able to establish the source(s) of the fire are essential to the safety of all of those involved in any fire incident.

15. Expedition: the better the design the more effective will be the ability to control a fire expeditiously.

16. Smoke: minimisation/control is crucial in the preservation of property and life.

17. Legal Liability: it would be fair to say that the legal liability of a design professional and building practitioner is not fixed and the classes of persons who may be able to make a claim against them is indeterminate. The duty of care can apply not only to the occupants and owner of a building but also possibly adjoining building owners and occupiers and possibly those who might be affected by a fire at a building e.g. the general community.

18. Arson: it is an interesting question as to whether fire engineering design should allow for the possibility of an arson attack given that in the case of shops, for example, the method of attack is largely the same i.e. a firebomb through the front glass window. Perhaps the duty of care does not extend that far at this stage, however various social and historical factors could be considered to determine whether a duty of care exists so as to impose an obligation upon a designer to allow for this event.

19. Uniqueness: Each building is different and one size does not fit all. The application of design principles will vary according to the building to be constructed and its intended use.

20. Consider hazards: the building itself or surrounding environment may contain various hazards for fire ignition and/or firefighting.

21. Change: it is not uncommon for the use of a building to change and therefore possible uses should be taken into account in the initial fire safety design.

As an aligned matter, there should be clear demarcation between various professionals as to who is responsible for what aspect of the building, including its design, the fire engineering, the testing of that design, the preparation of ESM's, building services, maintenance and the like.

As discussed above, there are a myriad of reasons as to why design documentation is so important to competent fire engineering and in turn, fire engineering being crucial to building construction.

I trust that the above is of assistance when considering building design and fire engineering.