

Proposed Framework for Performance Based Fire Engineering Design in the Next Generation New Zealand Building Code: Specification of Fire Scenarios

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Abstract

A comprehensive review of the New Zealand Building Code (NZBC) is being undertaken by the Department of Building and Housing, the New Zealand government agency responsible for administering the NZBC. This involves a complete review of its structure and content to match the requirements of the Building Act 2004. The performance-based concept is being retained, and strengthened with a hierarchy of statements ranging from overall goals to specific performance criteria, deemed-to-satisfy solutions and verification methods. It is currently proposed to adopt the 8-tier Inter-Jurisdictional Regulatory Collaboration Committee (IRCC) hierarchy.

This paper will focus on one of the possible changes affecting fire safety design in the new Building Code that would require performance based fire engineering designs to be assessed against a set of specified fire scenarios. Most building designs will need to be assessed against each fire scenario to ensure that a range of challenges to the building have been explored in the design.

Fire scenarios are a qualitative description of the fire and other conditions for which a proposed design is expected to meet the fire safety goals and objectives. The design fire is a quantitative description of the actual fire characteristics in terms of heat release rate, fire load and species production yields and will be described in another paper. A series of 9 fire scenarios have been identified. Some of the scenarios are based on those in NFPA 5000, but slightly modified. Scenarios for spread to neighbouring property, external vertical fire spread and interior surface finishes have been added and made explicit (compared to NFPA 5000).

The fire scenarios under consideration are:

- 1. Occupancy-specific fire scenarios and design events dependent on building use*
- 2. Fire located to block a primary means of escape*
- 3. A fire that starts in a normally unoccupied room that can potentially endanger a large number of occupants in another room*

4. *A fire that starts in a concealed space that can potentially endanger a large number of occupants in another room*
5. *Smouldering fire in close proximity to a sleeping area*
6. *Fire exposing a neighbouring property*
7. *Fire exposing external façade*
8. *Fire involving internal surface linings*
9. *Typical fire originating in the building with any one passive or active fire protection feature being ineffective (this may be accompanied by changes to acceptance criteria)*

The paper will discuss the proposed scenarios and how they fit within a proposed new framework for evaluating fire safety building designs for compliance with the New Zealand Building Code.