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# NCC 2016, Vol One, Amendment 1

Submission to Australian Building Codes Board

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## Introduction

Engineers Australia welcomes the opportunity to contribute to the Australian Building Codes Board (ABCB) out-of-cycle amendment to the National Construction Code (NCC), known as NCC 2016, Volume One Amendment 1.

Engineers Australia is the peak body of the engineering profession. It is a member-based professional association with individual members across the nation and across all engineering disciplines. Established in 1919, Engineers Australia is a not-for-profit organisation constituted by Royal Charter to advance the science and practice of engineering for the benefit of the community.

This submission has been prepared through the support of the organisation's *Society of Fire Safety (SFS)*. More information about the SFS is available on the Engineers Australia website via:

<https://www.engineersaustralia.org.au/Communities-And-Groups/Technical-Societies>

## Introductory comments on the proposed amendments

Providing feedback has been challenging because AS 2118.1 2017, *Automatic fire sprinkler systems - General systems*, is a referenced standard and is not available to the general public as part of the request for feedback. As such our submission may not be a complete assessment of the proposed Amendment as this key document is not available. With this in mind, the process is seriously flawed and consideration should be given to restart the public consultation process when all required and referenced information is publicly available. This is a critical factor as we have no means of understanding the holistic effect of changes in AS 2118.1 to our overall building fire safety strategy. The CV3 also ignores the existing advantages offered by systems in AS 2118.6 2012, *Automatic fire sprinkler systems Combined sprinkler and hydrant systems in multistorey buildings*, where all hydrant flow and pressure is available and will divert to operating sprinkler heads until fire brigades "get to work".

Notwithstanding the above, this submission contains significant comments.

Also, it should be noted that we recognise some of our comments are based on existing wording in the NCC and we are taking this opportunity to comment on them as well. For example, as the amendment references certain existing sections, we have commented on those existing sections that are part of the amendment. There is no sense amending only a limited section that certain stakeholders feel is important and at the same time ignore related sections that are poorly written, obscure, incorrect, or do not represent accepted safe practice.

Finally, we note that not all the changes proposed in the amendment are editorial in nature and that some are not policy neutral. The lack of information regarding the effect and magnitude of this lack of policy neutrality to be of great concern as it has the potential for decreasing public safety or increasing the cost of construction or both. In addition, the use of AS 5113 2016, *Fire propagation testing and classification of external walls of buildings*, as part of the proposed new verification method, without modifying the acceptance criteria, may be a restraint of trade and possibly a violation of Australia's international treaty obligations, as no aluminium product has been shown to pass this test due to the 2-kilogram debris field component of the acceptance criteria.

The claim that the new verification method is equivalent to the Deemed to Satisfy (DtS) provisions is unproven and unjustified. This is clearly just an opinion with no refereed papers, documents, appropriate sensitivity studies, etc. Using such an ad hoc approach to modify such an important part of the Building Code of Australia (BCA) is inappropriate and shows a lack of engineering rigor that is a requirement for any major change in legislation.

Further comments on specific sections of the proposed NCC 2016, Vol One, Amendment 1 are provided in the following sections.

## A1.1 Definitions

Changing the definition of Loadbearing has a significant impact on the policy neutrality of the proposal as well as public safety. The existing definition can be found in the construction literature dating back to the early 1950s. Clearly, a wall that supports an attachment (or proposed new item, an ancillary element), has a more important function than one that only supports itself. The wall supporting the ancillary element must remain intact during a fire to prevent that ancillary element detaching or collapsing and potentially falling on escaping occupants or, more likely, responding fire fighters. We are concerned that this may have a significant Workplace Health and Safety (WHS) impact on fire brigade intervention. The ABCB is encouraged to demonstrate that such WHS consequences will not materialise.

## A2.1 Suitability

“Constructed in an appropriate manner” should be further clarified; without doing so it is open to such broad interpretation that everything the phrase is applied to becomes meaningless. Perhaps the correct wording should be “Every part of a building must be constructed to achieve the relevant performance requirements of the NCC, using compliant materials, products, and forms of construction and designs being fit for the purpose for which they are intended.”

## A2.2 Evidence of suitability

There is a lack of consistent wording of the criteria for each type of certificate; this will lead to confusion in an already challenging system. Specifically:

- A2.2(iii) – A certificate by a certification body may undermine the value of a CodeMark Certificate of Conformity unless a scheme is developed. This will lead to further confusion and will have an unknown impact on the policy neutrality of the amendment.
- A2.2(vi)(B) should continue and include ... *have been relied upon* in relation to evidence established in A(i) to A(v) above. This is to have basis to the other forms of documentary evidence rather than just being a material safety data sheet or advertising document.

## Specification C1.1

2.4 – The use of the phrase “must not reduce the fire-resistance of that part or increase the risk of spread of fire” is vague and too open to interpretation as to what constitutes an increased risk of fire spread. Part of the problem is that only an Accredited Testing Authority (ATA) can evaluate a Fire Resistance Level (FRL) and therefore only such a laboratory can determine if there is a reduction in the fire-resistance of the part in question. It is unclear if it is the intent of C2.4 that an ATA be used. Engineers Australia recommends that, if not, it certainly should be the intention.

3.1 – It is no longer appropriate that we simply spell out masonry and concrete when there are other acceptable products like cement and steel composite boards that have an equal performance. Fundamentally, it isn't clear why certain sections have been included in the amendment when so many others need updating; and not including them has little basis in engineering.

4.1 Subclause (i): The preamble paragraph is poorly written and it becomes ambiguous. It leads to two opposing interpretations. Depending upon how it is read, the Class 9a health-care building and the Class 9b building could be either included or excluded from the requirement. This is an editorial issue but has a technical connotation.

4.1 Table 4: There is inconsistency between the fire resistance level requirements for loadbearing and non-loadbearing parts. The only difference that must exist between the two should only be in terms of structural adequacy. There is no valid technical reason for assigning different integrity or insulation requirements to walls that are load-bearing or non-load bearing for similar distance from a fire-source feature. Either the non-load-bearing must be made more stringent in integrity and insulation to match the load bearing, or the load bearing be made less stringent in integrity and insulation to match the non-load bearing. It is recognised that the anomaly has been in the BCA since 1990 at least, and it is suspected it would date back to the days when the “Fire Resistance” concept was

“translated” to FRLs. However, the fact that the anomaly has existed for a long time does not reduce the need to make appropriate changes now.

## C1.9 Non-combustible building elements

C1.9 should provide confirmation that Clause C1.10 is a concession for C1.9 where the internal lining of an external wall can be combustible but must comply with fire hazard indices.

It is recommended that C1.9(d) include (ii) an insulation material that complies with C1.10

(a) (i) & (iii) is unwarranted prejudice against timber stud fire rated partitions with no justification. This can be resolved through the addition of a point (iv) “Timber stud fire rated partitions are deemed to be non-combustible for the purpose of this clause.”

(a)(ii) The “flooring and floor framing of lift pits” should be clarified so that it clearly only relates to lift pits and not to other flooring within a building. We suggest one might say “Lift pits: flooring and floor framing.”

(a)(iii) The key property of a fire resisting wall is its fire resistance, not whether or not it is combustible. Significant fire resistance cannot be achieved with combustible construction therefore this clause is redundant and results in unnecessary expense.

(d)(i) Even sarking materials that comply with C1.10 can present an unacceptable risk. This is especially concerning as the recent BRE BS8414 testing series (Fire test report: DCLG BS 8414 test no.1 – 7) shows that any combustible insulation installed behind an Aluminium Composite Panel (ACP) results in failure to comply with the large scale British test BS8414 (similar in these tests to the results expected in AS 5113). What is not clear is how much combustible material results in this failure. As there are non-combustible sarking, this clause is unnecessary and simply addresses commercial interests rather than an engineering need. If a combustible sarking is to be used, it should be justified by a certificate of conformity or a performance solution rather than a redefinition of what is and is not combustible. The NCC DtS should be a minimum requirement rather than an endorsement of inappropriate industry practice.

(e)(vi) This clause remains problematic as it continues to permit up to 2 mm of combustible adhesive. The typical aluminium composite panel with polyethylene (PE) core is a 4 mm core, yet one can argue that the PE is simply an adhesive holding together two aluminium lamina. Reducing this core to 2 mm would not make it non-combustible and is unlikely to make it fire safe or limit the spread of fire. The wording should be altered to clearly indicate that any adhesive for which this clause applies must be used to hold each lamina together and not be a lamina in and of itself.

## C1.10 Fire hazard properties

Even though C1.9 describes combustible products that are deemed non-combustible, the reality is that many of these products can burn and contribute to a fire. As a result, C1.10 should be required to apply to all such products. That is, C1.10 needs to clearly state that non-combustible materials or linings must comply with C1.10.

## Verification Method CV3

From the NCC A1.1, a verification method is defined as a test, inspection, calculation or other method that determines whether a Performance Solution complies with the relevant Performance Requirements. As such evidence needs to be provided that any proposed verification method meets this standard. No evidence supporting this has been shown. The Verification Method (VM) needs to be calibrated against both DtS solutions and Performance Solutions by practicing fire safety engineers to show that it meets the stringent requirement set forth by the NCC definition. Such calibration must be published in the engineering and scientific refereed literature if one is to have any confidence in its veracity and to ensure it is not simply someone’s wishful thinking. The Australian Standard development process is robust and involves the input of a wide range of industry and professional experts, but is not a substitute for the sort of analysis that can be achieved through the much wider process of academic examination and review of the data and issues.

In addition, CV3 contains only prescriptive solutions, therefore CV3 is a tick the box exercise and requires no engineering evaluation. As such the prescriptive solutions do not belong in a Verification Method but should be included as DtS Provisions. CV1 and CV2 require engineering evaluation, CV3 doesn't and is a change in form and intent and therefore not appropriate.

As a result, it appears it would be better to incorporate wording in the DtS provisions of the BCA that were a better reflection of Clause C3.5 of the Australian Uniform Mutual Building Code (AUMBC).

Nonetheless, our comments follow.

- The performance criteria within AS 5113 relating to continuous flaming on the ground and the mass of debris must be removed because, to the best of our knowledge to date, no aluminium cladding product, DtS or otherwise, has been shown to comply with this criterion. This egregious requirement is not consistent with the cladding criteria in any other part of the world and possibly violates Australian international trade treaties.
- If the external wall system complies with AS 5113, additional fire safety measures such as sprinklers and cavity barriers are not needed as the performance of the cladding in a fire has been demonstrated. If cavity barriers are needed they should have been tested in AS 5113.
- Other cavity barrier methods that provide a tested FRL should not be excluded if an engineering evaluation demonstrates that there is no undue risk from doing so.
- The design criteria for the sprinkler system should be justified before adoption in the NCC. As the standard is not currently available to the public, it is inappropriate to include the criteria in the CV3.
- It is inappropriate to conclude that items deemed non-combustible when tested in accordance with AS 1530.1 are equivalent to items deemed non-combustible under C1.9 as this violates the laws of nature. One can say that CV3 considers that the risk of flame spread in such items is small in both cases and for purposes of CV3 may be treated the same.
- Without having access to AS 2118.1 2017 we have no means of understanding why CV3 shouldn't refer to AS 2118.6 systems, where the hydrant flow and pressure is available for operating sprinkler heads prior to brigade intervention. This factor was critical in the outcome of the Lacrosse fire. Ignoring AS 2118.6 limits the utility of CV3. A better approach would be to add wording to CV3 that consideration should be given to an enhanced automatic sprinkler system, and then leave the details to the engineer who has the best knowledge of what's needed to comply with our performance objectives.

## Conclusion and contact details

To discuss the contents of this submission in greater detail, please contact the Engineers Australia National Manager for Public Affairs, Jonathan Russell, on (02) 6270 6565 or at [jrussell@engineersaustralia.org.au](mailto:jrussell@engineersaustralia.org.au).



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