Improving structural Performance Solutions

What are the proposed changes?

We are proposing changes to Volume One and Two of the NCC to improve the robustness of Performance Solutions for structural components of buildings.

The changes include:

- New minimum levels of reliability which must be achieved when demonstrating compliance of structural components through a Performance Solution (B1P1(2) in Volume One and H1P1(2) in Volume Two).
- Absorbing Performance Requirement B1P2 into new Performance Requirement B1P1(4) in Volume One for structural resistance.
- Amending the Structural Reliability Verification Method to account for combinations of actions, rather than only individual actions (B1V1 in Volume One and H1V1 in Volume Two).
- Removing Expert Judgement as an Assessment Method for structural Performance Solutions (A2G2).

More detail on the proposed changes to NCC Part B are in Table 1 and Table 2. Review the Structure examples calculations demonstrating the main steps to determine the level of reliability of structural components, using the proposed NCC 2025 B1V1 method.

Why are these changes proposed?

Performance-based NCC

The National Construction Code (NCC) is a performance-based code containing Performance Requirements. To comply with the NCC, a solution must achieve compliance with the Governing Requirements and the Performance Requirements, which are the mandatory requirements of the NCC.

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Practitioners can develop Performance Solutions to meet the Performance Requirements of the Code. This allows them to determine the most effective and innovative way to demonstrate compliance for their particular building.

We are working to increase the competent use of the Performance Requirements to support industry innovation. Quantification is one of the components to this initiative. Rigorously quantifying the Performance Requirements will provide objective levels of Performance for practitioners to target. This will encourage both increased use of Performance and competency when practitioners develop Performance Solutions. This will also help ensure a level playing field and reduce the risk of misinterpretation.

Related to this, many stakeholders have expressed a desire to reduce subjectivity and increase robustness in safety-critical areas such as structural safety, to ensure the desired level of public safety is achieved.

Structural quantification framework

As part of our ongoing work to quantify the Performance Requirements, we propose introducing a new structural quantification framework for the next edition of the NCC. This framework is primarily focused on setting minimum performance levels for components made of new and innovative materials as well as alternative forms of construction.

This will enhance practitioner's confidence that the Performance Solutions they develop meet the minimum requirements of the NCC.

Expert Judgement

Expert Judgement is an NCC Assessment Method that allows the judgement of an expert (someone that has relevant qualifications and experience) to determine whether a Performance Solution complies with the Performance Requirements. What is defined as an expert for the purposes of this Assessment Method may differ between jurisdictions (e.g. airports and national parks).

To increase the robustness of building solutions in safety-critical areas, such as structural safety, and reduce subjectivity, we are proposing to remove the Expert Judgement Assessment Method in Part A of the NCC to demonstrate compliance for structural safety Performance Solutions.

The aim is to prevent practitioners from setting levels of public safety solely at their own discretion and this will help produce more robust outcomes, leading to improved occupant safety.

The Expert Judgement Assessment Method will remain available for Performance Solutions to other parts of the NCC, which remain unaffected.

How were the changes developed?

We have collaborated with key stakeholders and academics to determine the best way to quantify the Performance Requirements and improve structural Performance Solutions.

The structural Performance Requirements in Part B1 of Volume One and Part H1 of Volume Two have been quantified in terms of a reliability index for individual components. This gives a relative measure of confidence that the structural component will perform its function in a satisfactory manner.

The reliability index values have been derived from analysis of existing NCC referenced structural design standards for steel, concrete, timber, masonry and cold-formed steel. Each of these standards deliver slightly different reliability indices for different components and failure characteristics. The minimum values which have been included in the NCC are set to a level within the range of typical values across the referenced standards, to include the most common outcomes. These values are proposed to form the minimum requirements of the NCC.

Who has been involved?

We consulted with members of our peak technical committee, academic institutions, the Building Codes Committee (BCC) and the following key stakeholders:

- Engineers Australia (EA)
- Consult Australia (CA)
- Australian Institute of Building Surveyors (AIBS)
- Australian Institute of Architects (AIA)
- Building Products Industry Council (BPIC)
- Standards Australia committee representatives
- Master Builders Australia (MBA)
- Property Council of Australia (PCA)
- Insurance Council of Australia (ICA)

What are the impacts?

Practitioners undertaking structural Performance Solutions will need to utilise the quantification framework to demonstrate compliance with the Performance Requirements. The existing Deemed-to-Satisfy (DTS) Provisions that are based on the Australian Standards for structural design are likely to remain the preferred option for components made of masonry, concrete, steel, composite steel and concrete, aluminium and timber.

Practitioners undertaking Performance Solutions for structural components will no longer be able to use the Expert Judgement Assessment Method. It means practitioners must use the quantification approach to set reliability indices. However, it will not prevent practitioners from applying their own professional judgement, which remains feasible under other Assessment Methods or when using Evidence of Suitability outlined in Part A5 where appropriate.

These amendments will improve the robustness of Performance Solutions and will give users of the NCC greater certainty they are meeting the Performance Requirements.

More information and relevant links

We've proposed similar changes to improve fire safety Performance Solutions.

- Understanding the NCC Assessment Methods
- Increased and competent use of performance
- Structure examples calculations

To read the full details of the changes, please review the NCC 2025 Volume One and Two, the Housing Provisions Standard PCD and Section A.

Want to provide feedback?

Responses to the Public Comment Draft are invited until **11:59 PM AEST Monday 1 July 2024**.

In line with the ABCB's process for undertaking public consultation, comment will only be accepted through the ABCB's online Consultation Hub.

To access the Public Comment Draft and response form:

1. Download the NCC volume(s) you wish to view and provide comment. You can also download the *supporting information* PDF for detailed information on the more significant/complex changes.
2. Download the response form.

Once you've reviewed the draft, complete the response form, and include your feedback on the suggested changes to the NCC.

To submit your comments:

1. Enter our Public Comment Draft consultation hub.
2. Start by agreeing to the privacy statement.
3. Let us know if you'd like your submission published publicly.
4. Enter your contact details.
5. Upload your completed form in .doc format (please make sure each file is under 25MB) and submit.

Table 1 Proposed changes to Part B1 of Volume One for the next edition of the NCC

Clause Number (NCC 2022)	Clause Number (next edition)	Proposed changes
B1P1(1)	B1P1(1)	• Minor editorial change
	B1P1(2) (New)	• The required minimum values are proposed for inclusion in new tables in NCC Volume One: Table B1P1a, B1P1b and B1P1c. Separate values are given based on Importance Level and the type of load combination which applies
B1P1(2)	B1P1(3)	• Updates to clause numbering and reference to new clause B1P1(2)
	B1P1(4) (New)	• Proposed to include requirements for the structural resistance of materials and forms of construction
B1P2		• Proposed to absorb the requirements into new Performance Requirement B1P1(4)
B1P3	B1P2	• Updates to clause numbering
B1B4	B1P3	• Updates to clause numbering
B1V1	B1V1	• Updates to clause description • Amendments proposed to account for combinations of actions. Users adopt the actions and combinations set out in the relevant part of the AS/NZS 1170 series of standards

Table 2 Proposed changes to Part H1 of Volume Two for the next edition of the NCC 2025

Clause Number (NCC 2022)	Clause Number (next edition)	Proposed changes
H1P1(1)	H1P1(1)	• Minor editorial change
	H1P1(2) (New)	• The required minimum values are proposed for inclusion in new tables in NCC Volume Two: Table H1P1a, H1P1b and H1P1c. Separate values are given based on Importance Level and the type of load combination which applies
H1P1(2)	H1P1(3)	• Updates to clause numbering and reference to new clause H1P1(2)
H1P1(3)	H1P1(4)	• Proposed to amend requirements for the structural resistance of materials and forms of construction
H1P1(4)	H1P1(5)	• Updates to clause numbering
H1V1	H1V1	• Amendments proposed to account for combinations of actions. Users adopt the actions and combinations set out in the relevant part of the AS/NZS 1170 series of standards