STRUCTURAL ENGINEERING SOCIETY
NEW ZEALAND

Building for Climate Change

Submission to Ministry of Business, Innovation and Employment

11th October 2020

Executive Summary

SESOC is supportive of the MBIE consultation document for the whole-of-life embodied carbon emissions reduction framework and endorse the broad objective of ensuring the Building and Construction Sector play their part in New Zealand reaching net zero carbon emission by 2050.

With reference to the specifics of our submission;

- SESOC supports the linking of seismic resilience to sustainable building design shown through LCA.
- SESOC supports the promotion of efficient design outcomes (in a materials usage sense) – but not at the expense of quality structural design.

SESOC would like to be actively involved in helping MBIE shape the detail of the proposals and believe we have an important role to play in any subsequent implementation phases.

Introduction

The New Zealand Structural Engineering Society (SESOC) is a collaborating technical society of Engineering New Zealand, with a membership of approximately 2700, most of whom are practising structural engineers. The majority of our members will be directly affected by this proposed reform. We also work collaboratively with other disciplines in associated areas such as Geotechnical and Fire Engineering. SESOC employs a part time Executive Officer and we work closely with Engineering New Zealand who manage many of our operational needs. SESOC otherwise runs on the good will and volunteer efforts of our Management Committee and Membership.

SESOC has close links with overseas Structural Engineering Professional bodies such as IStructE (UK), SEAOC (California) and Engineers Australia.

SESOC's objectives are:

- To promote the science, art and practice of structural engineering;
- To ensure the advancement and dissemination of knowledge relating to structural engineering; and
- To provide a forum for structural engineering practitioners to communicate amongst themselves and to the public at large

This submission has been prepared by members of the SESOC Management Committee. It is intended to reflect the views of the wider membership of SESOC and member feedback has been sought in relation to our views. SESOC has also encouraged our membership to engage with the framework, and make their own submissions during this consultation period. Our message to our membership reaches over 2700 structural engineers, and we have had good feedback that it not only brought the framework and consultation to their attention, but also fostered discussion in the design offices, and captured some engineers' attention and got them thinking about upskilling in this area.

ENGINEERING NEW ZEALAND TECHNICAL GROUP

SESOC Submission

As a group of professional structural engineers, SESOC are in full support of MBIE's work on the Building for Climate Change programme, and strongly endorse the commitment to meet Carbon Zero targets by 2050.

With the biggest contributor to the Embodied Carbon figure for a building being structural materials, we, as an industry, will have no place to hide and need to quickly come to terms with what this will mean for our work and our clients.

SESOC has put to our membership that the action being taken by MBIE and the Government should be considered an invitation for us as an industry to step forward and play a leading role in the conversation and action around how we help New Zealand reach its Net-Zero 2050 goal. By setting whole-of-life embodied carbon reporting and reduction as a Building Consent requirement it is going to become an integral part of the brief for any project, alongside our familiar SLS & ULS structural performance criteria and the time + cost constraints of the client. SESOC are supportive of this, and are keen to play our part in helping the industry in the upskilling and actioning of this plan.

Importance of Building/Infrastructure Quality and Holistic view of Sustainability

Whilst we are in support of the three overarching objectives on which the framework is based, elements within the objectives and the way in which they are implemented will have a significant impact on the success of the framework. SESOC are concerned that the framework may not promote good quality design and construction. We believe that a focus on design and construction quality (including design life well beyond minimum Building Act expectations) is crucial to ensure that a holistic view of sustainability is maintained. Consideration of resilient, robust and durable buildings and infrastructure assets are very important in this context.

Considering the definitions provided, and reflecting on the implications from a structural design perspective, there is concern that the promotion of 'lean design' could result in deficient structural design or design that meets only the minimum requirements of the Building Act. The framework should promote good design (from a holistic sense), good quality urban planning, buildings and infrastructure, good quality buildings that are great to work, live and play in, ones that are durable, robust and resilient. SESOC and the structural industry are actively working to ensure more robust and resilient seismic design practice, including coherent considered and simple load paths, good quality structural design, construction quality and constructible designs to stand the test of time and achieve more than minimum (or worse) Building Act imperatives. This includes ongoing initiatives such as the Low Damage Seismic Design project as part of MBIE's Tu Kahika, Building Resilience programme. It would be useful if the Building for Climate Change framework was able to reference such initiatives.

The objective of reducing emissions through the reduction in materials (with reference to materials specified in the structural design), could potentially be contradictory to the intended outcome when weighed against the objective of ensuring buildings are usable following earthquakes, and designing buildings that will see out (or exceed) their design life. The framework and objectives should consider holistic issues of long term sustainability and avoid unintended consequences, such as 'single use buildings' where the structure is extensively damaged following an earthquake such that it is irreparable.

Robust, Resilient and Durable Buildings/Infrastructure and Low Damage Seismic Design

Following the extensive demolition of buildings in Christchurch, there is a move to encourage and educate engineers and clients on the principles of low-damage seismic design. Moving beyond the minimum requirements of the Building Act could be seen as the opposite of "lean design", however research has shown that more seismically resilient structures are more sustainable over the life of the building. Research currently being carried out at the University of Auckland, "Building the Carbon Case for Resilient Design" project will provide valuable insight into the carbon cost of designing seismically resilient buildings by comparing the life cycle environmental impacts of baseline buildings (designed to current standards), and "above code" buildings (designed for a higher seismic performance) will be evaluated taking into account

seismic risk using a fragility based approach. This will provide a clear comparison of the impacts of designing lean buildings (where there may be significant environmental impacts follow large seismic events) and resilient buildings (where the higher up front carbon costs may be offset by limited damage follow large seismic events).

SESOC supports the promotion of efficient design outcomes (in a materials usage sense) – but not at the expense of quality, durability, robustness and resilience.

Existing Buildings, Adaptive Re-Use and Seismic Strengthening

It is clear from the consultation document that the framework will initially focus on new building construction and we support that approach as a first step. However, the ongoing use of existing buildings, the maintenance and upgrade of such buildings (and infrastructure); building/infrastructure adaptive re-use, redevelopment and seismic strengthening all play a very important role in ensuring the sustainable use of existing built infrastructure and assets. This is particularly relevant to heritage buildings.

SESOC would be interested to understand how the sustainable benefits of existing building maintenance, strengthening and upgrade are being recognised as part of the framework. Likewise, for development projects that include a demolition component, clear guidance on system boundaries and whole-of-life measurements (including the role that design life has to play in that) will be important.

Framework Methodology

Considerable detail will need to be provided as part of future stages of this framework and proposed implementation and clear methodology and guidelines will be important. In developing such detail MBIE will need to consider how best to reflect some of the following considerations;

- How to recognise and reward good quality design and construction (beyond Building Act minimums)
- How to recognise and reward more resilient, robust, durable buildings that having longer design life
- How to account for different building types and functions
- How to recognise regional and local variances (e.g. higher loading conditions in parts of New Zealand; wind, earthquake, snow and different durability exposure classifications) and the impact of site selection
- Clear system boundaries, including clarity on what needs to be included and over what system timeframe
- Clear metrics on embodied carbon content of materials – including the impact of imported materials (or transport more generally)

Conclusion

SESOC endorse and support the purpose of the consultation document, and in principal agree with most of the proposals. We are pleased to provide this submission to MBIE and would be happy to provide further information if required. We are also keen to provide input into ongoing phases of the frameworks development and to work with MBIE in its implementation. SESOC would like to be involved in helping MBIE shape the detail of the proposals and believe we have an important role to play in supporting the structural engineering professions implementation of this framework.

In the meantime please feel free to contact the following people in relation to this submission:

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