

Aurecon New Zealand Limited
 Level 1, 102 Customhouse Quay
 Wellington 6011
 PO Box 1591
 Wellington 6140
 New Zealand

T +64 4 472 9589
F +64 4 472 9922
E wellington@aurecongroup.com
W aurecongroup.com

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Canterbury Earthquakes Royal Commission
 PO Box 14053
 Christchurch Airport
 Christchurch 8544

Email: canterbury@royalcommission.govt.nz

Dear Sir

Submission to the Royal Commission Inquiry into the Christchurch Earthquake

We write in regard to the SESOC Practice Note entitled “Design of conventional structural systems following the Canterbury Earthquakes”. Aurecon has done an initial review and our preliminary comments are as follows. The comments are not exhaustive but convey the thrust of our thoughts. Aurecon is supportive of this initiative of the paper and its general aims. However there are elements of which we are not so comfortable, and are covered in the following text.

1 Background

This recently released practice note raises many issues that are worthy of debate, and further review.

While it is a SESOC practice note, it appears to have been endorsed by NZ Society for Earthquake Engineering, the NZ Geotechnical Society and peer reviewed internationally. Notwithstanding this level of review there are a number of issues that require wider debate and/or justification before it should be considered a workable document.

In the past NZSEE study groups prepared a series of papers on the design of reinforced concrete and structural steel structures which largely became embodied in the next revision of the relevant NZ Standard. We would expect that a similar process should be adopted for this document.

2 Distribution

Considering the content of this practice note and allowing that it is appropriate, it would seem that its application to new designs should not rely on engineers being members of SESOC or of IPENZ. The recommendations and guidelines require elevating to a higher status document so that all structural engineers are cognisant of its contents. For this reason the profession needs to be sure that the content is robust.

3 Errata and Comments

We highlight examples of each of the three levels of recommendation that we believe require correction or explanation. This level of error tends to indicate that the document has not had a thorough working or review to a sufficient level.

“Code Requirements: These are references to sections of the Standards, to either emphasise or clarify the meaning of a particular clause.”

“Minimum bar spacings are 400mm in toppings for precast floor systems, 200 mm for infill slabs between precast units.”

Clearly these are intended to be maximum spacings as discussed on the preceding page. Errors of this nature can only question the extent of independent review of the content.

“SESOC Requirement: These are imposed additions to the Code (Standards) requirements that should be considered mandatory to achieve the level of performance that the NZBC requires.”

“Absolute minimum topping thickness of 75mm. Wire meshes (hard drawn or ductile) are NOT to be used in floor diaphragms.”

It may be that this can be justified. But we not aware of the evidence that establishes that ductile mesh has or will perform badly. Indeed the DBH has only just issued guidance requiring the use of ductile mesh.

There needs to be a greater explanation or reference to other documents for provisions like this to be accepted.

“Recommendation: These are recommendations by SESOC for design or detailing improvements that will provide significant improvement in performance for little extra cost.”

“Conventional concrete moment resisting frames should be limited to be nominally ductile ($\mu=1.25$) actions, but detailed for resilience (refer below).”

From the preceding discussion it seems that in part this recommendation is based on the observation that many Christchurch concrete MRF structures are not economic to repair.

While the implementation of this recommendation could be expected to reduce damage to structures of this type, it is hard to believe that this would be for little extra cost.

This is a prime example of an issue that needs to be discussed with society at large, At present the objectives of the Building Code with respect to the consequences of seismic disturbance are based on the preservation of life. Given the consequences of the Christchurch earthquakes it may well be that society at large will be prepared to pay the costs associated with a greater focus on the preservation of property.

4 Summary

Considering the above, Aurecon is of the opinion that the SESOC practice note needs to be withdrawn as it stands. It should be reissued as a draft for comment by members of SESOC, NZSEE, Standards NZ and the NZ Geotechnical Society. When these organisations have reached a consensus and appropriately engaged with the leaders of industry and society it will be appropriate to reissue it. The aims and intentions of the document are worthy, however the report appears to be premature and lacking of detailed and critical industry review.

On behalf of Aurecon New Zealand Ltd.

A handwritten signature in black ink, appearing to read "John Finnegan".

John Finnegan
BE, ME, CPEng, MIPENZ, Int PE, MIStructE
Technical Director

DDI Phone: 04 439 0203

Email: john.finnegan@aurecongroup.com