

LETTER TO THE EDITOR

With reference to the paper

**"The 1989 Newcastle, Australia, Earthquake:
The Facts and the Misconceptions"**

Rynn, Brennan, Hughes, Pedersen and Stuart

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The authors are to be commended for compiling a very comprehensive multidisciplinary summary of the Newcastle earthquake. This paper is an excellent compendium of information on that event, and contains fresh interpretive comment from the authors, all of whom have been closely involved in work in Newcastle following the earthquake.

There are however a number of areas within this paper that contain statements and inferences with regard to previously published work on the Newcastle earthquake which are both incorrect and inappropriate, and which warrant clarification.

Analysis of the effects of both the earthquake and the events that followed generated three particular areas of what could best be described as "technical controversy"; these are as follows:

- (i) The influence of near-surface sediments and the underlying geology on the transmission and magnitude of the seismic forces.
- (ii) The immediate and long-term effects of the earthquake on the ground surface in and around Newcastle.
- (iii) The effect of the shrink-swell behaviour of reactive clay soils on buildings that had already been the subject of earthquake repairs.

These and associated issues have been debated at considerable length by geotechnical and structural engineers alike, and the discussion is furthered in this paper, generally under the heading of "Misconceptions". The use of this word is somewhat unfortunate, as it implies that the authors' views are correct and opinions to the contrary by others are not.

Comments in the paper that give rise to the greatest concern are in relation to a previous publication⁽¹⁾ which backgrounded the problems typically encountered with reactive clay foundations beneath residential buildings. Messrs Rynn, Brennan et al express the view (p.132) that the research associated with that document did not use all the available data. In the context of technical writing, such a comment represents a serious criticism, which in this case is both inappropriate and unjustified.

It is apparent that in making such a comment, the original authors have failed to appreciate the distinction between making a different technical interpretation from relevant information, and not using the available data.

There is no doubt that there is a considerable divergence of opinion within the engineering and scientific fraternities on the issue of reactive clays interacting with earthquake damage and repairs, as acknowledged by the authors in p.133 of their original paper: *".....it is considered that no unequivocal answer is yet available.....noting that the debate is still very open and further research and discussion are in progress"*.

Other points from the original paper that warrant further comment are as follows:

- With regard to the question of changes to the ground surfaces around the Newcastle CBD immediately following the earthquake, the post-earthquake survey referred to by the authors was taken across areas of active mine subsidence with no dependable or unaffected datum, and had not been surveyed for some time prior to the earthquake. The results of the survey therefore could not be taken as a definite indication of earthquake-induced movements, a point acknowledged by the author of the survey report in a personal communication.
- The graph of claims experience from one insurance company for the period December 1989 to June 1991⁽²⁾ was included simply to illustrate the problems faced by the insurance industry in resolving claims; no attempt at correlation with shrink/swell clay conditions was made or intended, contrary to the assertions of the authors.

Further contributions from the authors on the continuing findings from research in regard to the Newcastle earthquake will be awaited with keen interest, provided appropriate and correct acknowledgement is given to other researchers and contributors in the field, irrespective of any differences in technical opinion.

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References

1. Brunson, D.R., Forbes, J.G. and Douglas, D.J., "Factors Influencing the Structural Behaviour of Residential Buildings in Newcastle Following the December 1989 Earthquake", Report to the Insurance Council of Australia, Sydney, by Irwin Johnston and Partners and D.J. Douglas and Partners, July 1991.
2. Brunson, D.R., "The Aftermath of the Newcastle Earthquake", Proceedings of the Pacific Conference on Earthquake Engineering, NZNSEE, Vol. 3, pp 285-296, November 1991.