AS 1170.4 Supplement 1—1993

Minimum design loads on structures

Part 4: Earthquake loads—Commentary

(Supplement to AS 1170.4—1993)

This Australian Standard was prepared by Committee BD/6, Loading on Structures. It was approved on behalf of the Council of Standards Australia on 21 May 1993 and published on 16 August 1993.

The following interests are represented on Committee BD/6:

Association of Consulting Engineers, Australia
Association of Consulting Structural Engineers, N.S.W.
AUBRCC
Australian Clay Brick Association
Australian Construction Services—Department of Administrative Services
Australian Federation of Construction Contractors
Australian Institute of Steel Construction
AUSTROADS
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CSIRO, Division of Building, Construction and Engineering
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Engineering and Water Supply Department, S.A.
James Cook University of North Queensland
Master Builders Construction and Housing Association, Australia
Monash University
Public Works Department, N.S.W.
University of Melbourne
University of Newcastle

Additional interests participating in preparation of this Standard:

Australian Geological Survey Organization
Cement and Concrete Association of Australia
Department of Housing and Construction, S.A.
Department of Mines and Energy, S.A.
Department of Resource Industries, Qld.
Institution of Engineers, Australia
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University of Adelaide
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Minimum design loads on structures (known as the SAA Loading Code)

Part 4: Earthquake loads—Commentary

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PREFACE

This Commentary was prepared by the Standards Australia Committee for Loading on Structures as a Supplement to AS 1170, SAA Loading Code, *Minimum design loads on structures*, Part 4: *Earthquake loads*.

The Supplement provides background material for and guidance to the requirements of the Standard.

The clause numbers of this Commentary are prefixed by the letter 'C' to distinguish them from references to the Standard clauses to which they directly relate. The Commentary clause numbers are not sequential because if no explanation of the Standard clause is necessary that clause number is not included.

Standards Australia and Standards New Zealand are moving towards harmonization of Standards in both countries and the harmonization of the building codes is taking place first. Further changes to the Standard are therefore expected but not before 1995.

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(Supplement to AS 1170.4)

SECTION C1 SCOPE AND GENERAL

C1.1 SCOPE The Standard considers loads on structures due to earthquake ground motion. The provisions are not intended to prevent damage due to surface rupture, landslip or liquefaction. Nor do they consider other secondary earthquake effects such as fire, loss of services, seiche or tsunami. They do not consider site-structure resonance, where the natural frequency of a site is the same as that of the structure. They do not consider pounding of adjacent structures moving out of phase in an earthquake. These aspects require consideration of issues other than 'loads' and therefore are inappropriate in a loading Standard.

Special structures require special consideration of their response characteristics and environment that is beyond the scope of these provisions. Special structures such as nuclear reactors and cyrogenic tanks, which may present a considerable hazard to the community in the event of their failure, are not covered by the Standard, nor are industrial facilities of high economic importance. In either event, such structures require consideration of strong earthquake motions of very low probability, regardless of location.

Structures with unusual structural characteristics, or of novel design or construction, are not excluded by the Standard. However, the Standard may be of little assistance in the design of such structures since a structural response factor (R_f) may not have been assigned.

Bridges are not covered by the Standard but could be included with some additional requirements.

Agricultural buildings may be excluded from earthquake consideration because of the exceptionally low risk to life involved.

Alterations to existing structures are covered by these provisions (see Section 8) but the assessment, strengthening and repairs to existing structures are not covered. However, guidance and some information are included in Appendix E.

C1.2 REFERENCED DOCUMENTS The Standards listed in the Clause are subject to revision from time to time and the current issue should always be used. The currency of any Standard may be checked with Standards Australia.

C1.3 DEFINITIONS The Clause gives the definition of some essential terms used in the Standard. The meanings of the terms will become clear with the reading of the appropriate clauses. A number of the terms defined are common to other Standards such as AS 1170.1, AS 3600, AS 3700 and AS 4100.

C1.6 EARTHQUAKE LOAD COMBINATIONS Earthquake loads are the horizontal and vertical ground displacements caused by an earthquake action. These displacements induce inertial forces in a structure, related to its mass and rigidity distribution, which in turn induce action effects, i.e. axial forces, shear forces and bending moments, in its structural members.

These earthquake loads are ultimate loads even when defined in terms of unfactored loads.