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AS 3700 Appendix AA – Masonry Subject to Earthquake

Electronic Blueprint and ENVIROSPEC provide building specifications, details and training on safe and sustainable buildings to architects, engineers and builders. Questions have arisen concerning the interpretation of AS 3700 Appendix AA for masonry subject to earthquake loading.

Table AA2 provides reference to appropriate details for various masonry options. See below for an example, the use of 140 mm loadbearing hollow masonry with wide-spaced reinforcement.

TABLE AA2
DETAILING OF MASONRY FOR EARTHQUAKE LOADS—
BUILDINGS UP TO 15 m HIGH

Application	Minimum thickness of masonry (see Note 2)	Is masonry to be designed as part of the seismic force resisting system? (see Note 6)	Acceptable details— Figure AA1 (see Note 5)	Ductility and structural performance factors (see Note 7)
Loadbearing wide-spaced reinforced masonry (see Note 4)	140 mm	Yes	Top: T4 Sides: S1, S2, S3, S4 Bottom: B3	Ductility (μ) 1.5 Structural performance factor (S_p) 0.77

Under such conditions, the masonry must be reinforced, but it is impractical to reinforce 140 mm hollow masonry both horizontally and vertically. This means that, in practice, it can only be reinforced vertically. Care must be taken to ensure that the concrete grout is particularly fluid, ensuring that it completely surrounds the reinforcing bars.

AS 3700 Clause 8.3.6 requires that the reinforcement, of wide-spaced reinforced walls, be designed to Clause 8.4 to 8.7. These are the main design clauses, dealing with compression, bending, shear and tension. Depending on the magnitude of the loads, reinforcement might be N16 or N20 vertical bars, at centres in the range or 800 mm to 2,000 mm. Such walls with vertical main bars, do not incorporate any horizontal reinforcement. The strength design process is the same as published in the Concrete Masonry Association of Australia, Design and Construction Manual, MA55;

- Compression – Design as unreinforced masonry, with the capacity discounted by 15% to account for combined loads.
- Bending – Design as “mixed construction” i.e. wide spaced reinforced elements supporting unreinforced masonry between, but allowing to compression flange up to four times the wall thickness.
- Shear – Design on the basis that there is no horizontal reinforcement, using Clauses 8.6.2 or 8.6.3 as appropriate. Consider whether the wall is fixed to the floor by starter bars.



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