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Short wall bracing solutions

ARE THERE ENOUGH WALLS FOR BRACING?

That is the question every architect should consider before releasing their drawings for tender, especially if the building is a timber framed structure to be braced in accordance with the Australian Standard 1684 - Residential Timber Framed Construction (AS1684).

The trend towards ever-more and ever-larger wall openings is causing a dramatic decline in the amount of uninterrupted wall lengths suitable for bracing to provide wind racking resistance. As a result there are fewer nominal wall bracing panels being installed in today's structures, and more importance is being placed on short wall braces – but they have their limitations.

WHAT IS A SUITABLE SIZED LENGTH OF WALL?

AS1684 requires sheet bracing to be a minimum of 900 mm wide in order to achieve its nominated rating, whereas diagonally tensioned metal straps and angles require a minimum of 1,800 mm.

Shorter bracing lengths under 900 mm are achievable, but a wary eye must be cast on a reduction in capacity and a corresponding increase in tie-down requirements to counteract an increase in uplift at each end of the panel.

The responsibility of devising a wall bracing delegated solution is often relegated to the wall frame detailer in the majority of Australian states. Queensland architects are the exception, and are required to include a bracing solution in their drawings before releasing them for building approval and quoting.

Unfortunately, for most wall frame detailers, the thought of designing wall bracing is often lost in translation by many architects. Consequently, the possibility of

WALL BRACE DESCRIPTION	BRACING LENGTH (MM)	BRACING CAPACITY (KN)
3.4 kN/m EWPAAs Plywood (x 0.2 reduction factor)	330 mm	0.22 kN
6 kN/m EWPAAs Plywood (x 0.2 reduction factor)	330 mm	0.40 kN
3.4 kN/m Hardboard with M10 coach screw in each corner (AS 1684: Table 8.18 (n) – Type D)	460 mm	1.56 kN
6 kN/m Hardboard with M12 rods at each end (AS 1684: Table 8.18 (n) – Type E)	460 mm	2.76 kN
6.4 kN/m Plywood with M12 rods at each end (AS 1684: Table 8.18 (h) – Method A)	600 mm	3.84 kN
Multiple layered diagonal structural bracing strap (AS 1684: Table 8.18 (f))	600 mm	2.20 kN

Table 1.

being unable to brace a building in a conventional way according to AS 1684 is very real. They may then be forced to seek proprietary systems (such as portal frames and cantilevered steel columns) where anchors and hold downs are critical.

Before resorting to these systems, Table 1 below is a compilation of standard bracing solutions from AS1684 and the Engineered Wood Products Association of Australasia (EWPAAs) for walls under 650 mm. Although they are common, the oriented strand board (OSB) solutions have been omitted from this table because of their proprietary nature. **T**

EWPAAs REDUCTION FACTORS FOR PLYWOOD SHEATHED WALLS (3 kN/M - 6 kN/M)	
Width (mm)	Reduction factor (kN/m)
900	1.0
600	0.5
450	0.25
330	0.2

Table 2.

TABLE NOTES:

- The capacities in Table 1 are based on 2.7 m high walls and joint group JD4 material. A 15 per cent reduction applies for joint group JD5.
- Plywood reduction factors in Table 2 come from the EWPAAs Structural Plywood Wall Bracing Manual.

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