FTMA TECH TALK

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# BOTTOM PLATE REQUIREMENTS FOR DOUBLE-SIDED PLYWOOD WALL BRACING UNITS

Consulting engineers commonly specify double-sided plywood bracing units when there is insufficient width for single-sided bracing, a situation frequently encountered in modern buildings with large openings.

AS1684-2:2021, clause 8.3.6.5, clearly states that where plywood units from Table 8.18 (g), (h) and (i) are fixed to both sides of a wall, the bracing capacity is double that of a single sided unit; the depth of the bottom plate shall be a minimum of 45mm and, the tie-down of the bracing wall shall be double that of a single sided unit or in accordance with clause 8.3.6.10 for the increased capacity.

When it comes to detailing of wall frames, one commonly overlooked aspect is the 45mm depth bottom plate. Recently, timber design engineers have received several inquiries regarding suitable solutions for double-sided plywood bracing units when using a 35mm bottom plate wall frame.

Traced back to October 2009, a testing program was conducted by EWPAA to evaluate whether the 8.7kN/m single-sided ply bracing unit, when used as a double-sided 17.4 kN/m unit (i.e., sheathed on both sides), required special consideration to be applied to the design of the top and bottom plates. However, testing was only conducted using 90x45 and 70x45 MGP10 (JD5) material. No test data is currently available for 90x35 or 70x35 wall framing with double-sided plywood bracing.

Let's start by taking a deeper dive into how the bottom plate of a braced wall functions.

Typically, a braced wall acts as a cantilevered structure, anchored by rods or bolts at each end and at 1200mm centres intermediately along its length. It is designed to resist two load components when subjected to lateral forces:

- Pure shear load:
  This component generates a horizontal reaction that is transferred through the bottom plate to the bolt or rod anchorage, resulting in a shear force along the length of the bottom plate.

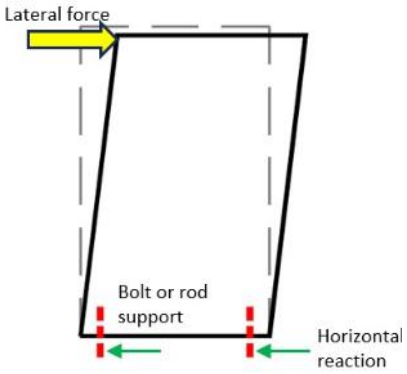


**Figure 1 - Pure shear load component**

- Overturning forces:
  The overturning component generates the vertical reactions, which is in different directions at each end, causing bending in the bottom plate.

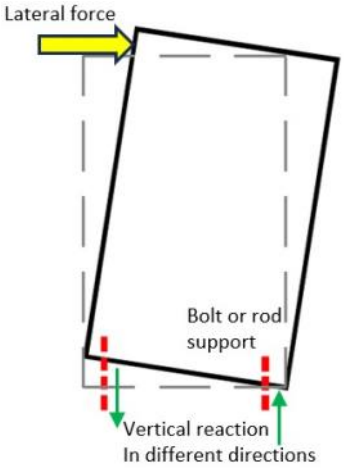


**Figure 2 – Overturning component**

## An engineered approach for rectification:

As mentioned above, the bottom plate is a key component in the performance of the bracing. Therefore, using a 35mm bottom plate instead of a 45mm in double-sided plywood wall bracing may compromise its lateral stability.
Ideally, if there is sufficient wall length, converting it to single-sided plywood could avoid the need for the rectification. Otherwise, rectification will be required.

A rectification detail has shown in Figure 3. The use of separate blockings and screw lamination aids in shear transfer and strengthens the bottom edges of the blocked plywood bracing. The intention of the steel brackets is to ensure continuity between the separate blockings.

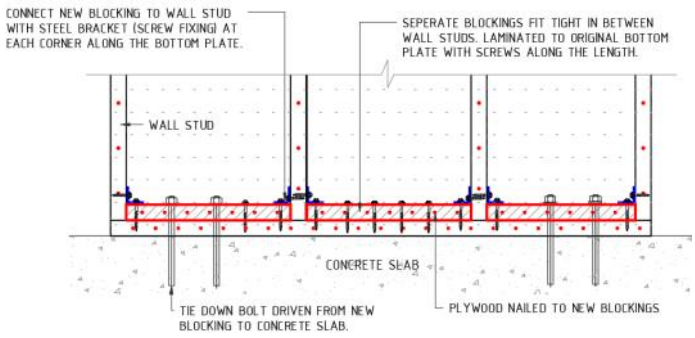


**Figure 3 – Bottom plate strengthening**

For further consideration, adding steel brackets to the other internal corners of the braced wall as Figure 4 can enhance the performance of the wall frames in resisting in-plane forces.

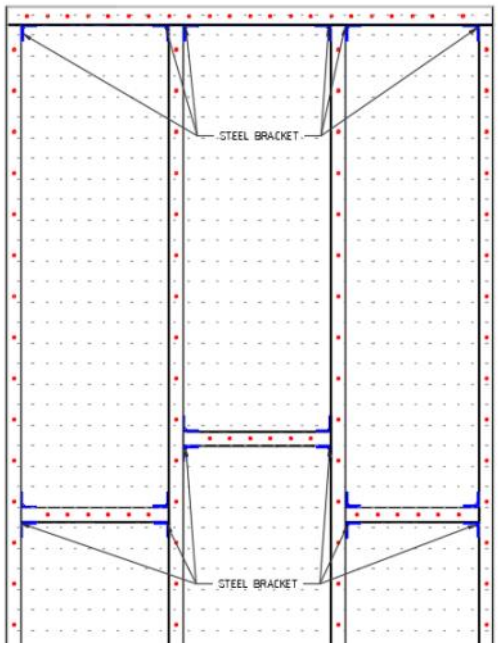


**Figure 4 – Inner corner brackets apply**

### Compliance

Be sure to consult the structural engineer or timber design engineer to assess each situation on a case-by-case basis and any rectifications in this situation must be approved by the design engineers to ensure compliance.

In summary, when detailing wall frames, it is crucial to account for 45mm bottom plate as required by AS1684 for double-sided plywood wall bracing units, and adding this requirement to your checklist will enhance detailing accuracy and help prevent future issues especially if your design/detailing software package does not account for this automatically.

This FTMA Tech Talk was written by Cici Cai, Structural Engineer of FTMA Principal Partner, Pryda.

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