



IS YOUR BUILDING STABLE?

As we move towards Christmas holidays our minds turn to the great Australian tradition - having a BBQ and entertaining family and friends in outdoor Alfresco areas.

House designs are often built around these entertainment hubs as we seek to connect our indoor lives with the great Australian outdoors.

While these areas are almost an essential element of house designs they can also create headaches for building designers.

The 'open plan' focus in modern house design often comes at the cost of building stability – as these areas are often featured by large sliding or bi-fold doors which remove the key component of building stability – Bracing Walls.

The stability and design of most residential houses is governed by Section 8 of AS1684.2

The typical method is to calculate a Total Racking Force on the building.

This is determined by the area of Elevation that the house projects to the wind. This area is multiplied by Wind Pressure values set out in Tables in AS1684 to determine the total bracing force the building must resist.

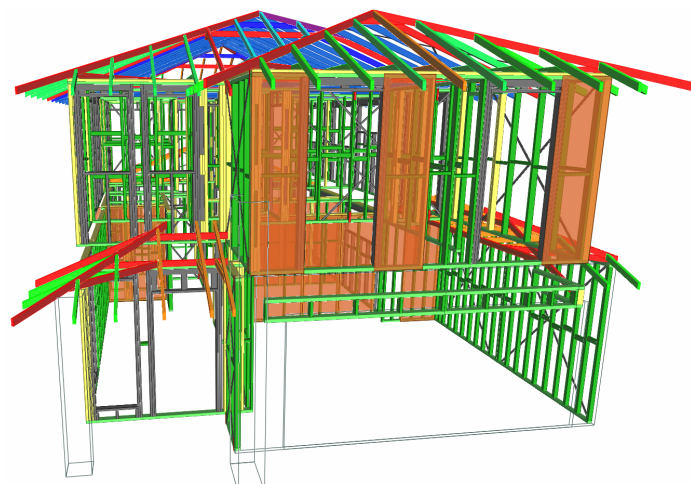
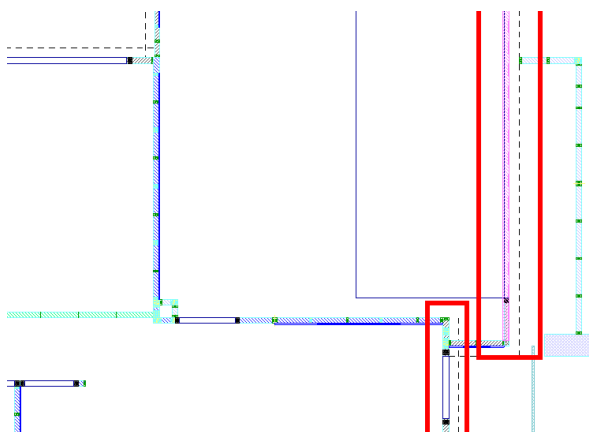
Once this is completed it then falls upon the designer to interpret the remaining clauses and sub-clauses to enable a bracing plan to be developed.

This is where it gets interesting!

Section 8.3.6.6 of the standard talks fairly loosely about bracing being “evenly distributed” in both directions and that bracing should initially be placed in “external corners”. However with the desire for open plan living and smaller land allotments this can often lead to large sections of external walls without a suitable width of wall to brace.

Bracing units in AS1684 suffer capacity reductions below 900mm wide and are typically limited to 600mm. However sometimes even these reduced widths are just not available.

A typical example of this sort of issue is highlighted on the lower level of the building shown below - where the front entry to the house has a garage opening which returns to the entry door and a highlight window.



There is simply no space to install a suitable timber bracing unit!

These types of issues can often be missed by detailers and building designers as they are focused on achieving the "Overall" bracing value for the building. However for a building to be stable they must have the bracing distributed in a way which stabilises each section of the building.

So what do we do with these areas?

The AS1684 gives some indication, however there are no prescriptive measures outlined in AS1684 to address these areas.

Section 8.3.6.7 of AS1684 states the following:

"Where bracing cannot be placed in external walls because of openings or similar situations, a structural diaphragm ceiling may be used to transfer racking forces to bracing walls that can support the loads. Alternatively, wall frames may be designed for portal action."

On single storey houses ceiling diaphragms can often be a practical solution – this usually requires running strap or speed brace in a diagonal fashion at the ceiling level and fixing them back to a valid braced wall.

On double storey however the loads often surpass the capacity of the bracing and the transfer of loads becomes a lot larger which may necessitate reinforcing wall junctions.

In some cases these solutions can be impractical and a steel portal frame may need to be introduced to stabilise the building.

Summary:

Be mindful that building designs are progressively becoming more challenging to brace effectively.

Keep a vigilant eye on sections of the building which have limited wall widths available for bracing, especially in external walls. It is always best to address these issues at quote stage with the builder – as often the fabricator ends up owning any omissions or oversights once wall frames arrive on site!

If in doubt talk to an Engineer to get advice.



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