GANG-NAIL GUIDELINES No.98

ANOTHER MITEK ADVANTAGE

THE WEAK LINK IN WALL BRACING

by TIM ROSSITER
Chief Engineer,
MiTek Australia Limited

Truss and wall frame plant operators are now well aware of the need for adequate wall bracing and understand how to obtain bracing and connection details from AS1684.2 - 1999 Residential Timber Framed Construction Part 8.

Despite the good efforts of wall frame manufacturers in designing and constructing panels, the assumption is that they will be fitted on site with the correct hold down connection; however, quite often the anchorage of the braced panels to the slab is not done effectively

This appears to be the weak link in the wall bracing chain. Consider the diagram in Figure 1 a brace unit being loaded.

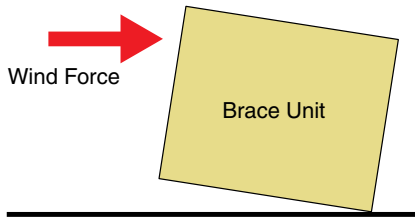
When a load is applied to the top of the wall bracing panel, the panel will either slide or rotate if not adequately fixed to the slab.

AS1684 specifies the adequate fixings: for brace units with 1.5kN/m capacity (or less), nominal fixing is enough (Clause 8.3.6.10) - in other words just nail it down.

But what to do for units with a higher capacity? Table 8.23 provides the numbers, for example - 2400mm high braced units with a 3kN/m capacity require a tie-down force at each end of a least 7.2kN.

For units of 6kN/m in a 2400mm high wall the requirement is 14kN.

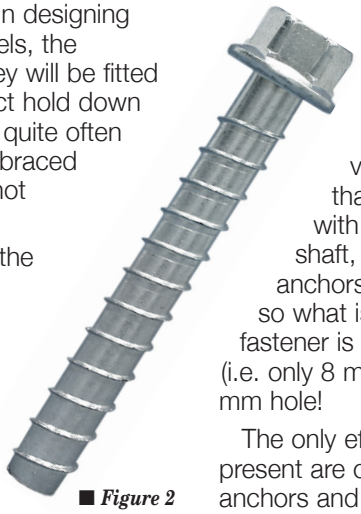
However there is a problem.



■ *Figure 1*

Despite common practice, an expanding anchor in a concrete slab placed 35 or 45 mm away from the edge of the slab will not come close to either of these values.

Unfortunately AS 1684 is not much help here as it can only refer to "Manufacturer's Specifications" for connections to concrete slabs, as there are so many different fastening systems available, all with different load capacities.



■ *Figure 2*

For the record, be very sure you are clear that an M10 bolt is one with a 10 mm diameter shaft, often expanding anchors are sold by hole size - so what is sold as a "10mm" fastener is actually an M8 bolt (i.e. only 8 mm in diameter) in a 10 mm hole!

The only effective options at the present are chemical bonded anchors and a relatively new item in the market place - the 'screw bolt' (Fig 2).

The screw bolt is a self tapping concrete screw that requires a hole to be drilled into the slab allowing the 'screw bolt' to be easily screwed in using a power drill.

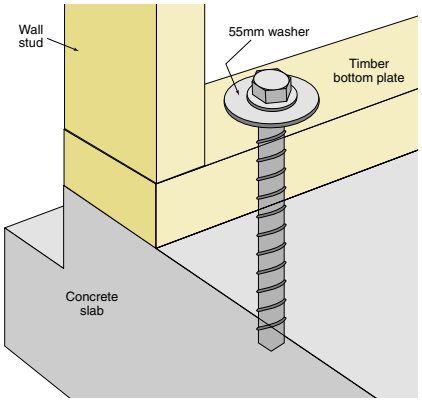
As they are a non expanding anchor they are ideal for structural applications even at minimum edge distances and under reduced spacing conditions.

They are also quick to install and will provide a strong mechanical interlock over the entire length of the anchor.

Another common problem with the fixing of braced panels to slabs is that large diameter and heavy gauge washers are required.

Washers supplied with common engine bolts or coach bolts are not adequate. AS1720 - Timber Engineering Code provides guidance on washer sizes to be used with timber connections.

Typically an M12 bolt requires a 55mm diameter by 3mm thick washer (Fig 3).



■ *Figure 3*

The screw bolt provides adequate capacity for braced panel/slab connection providing they are the correct size. They also provide a simple and economical alternative to chemical bonded anchors.

While logic states that in some cases the overburden of building above the brace unit will help to hold it down, the requirement remains in the code to cover all cases including the ones where the overburden is not sufficient.

So be sure that you do not go to all the effort of correctly calculating, specifying and installing the correct braces, only to be let down by the installers on site; make sure they know what is required.