GANG-NAIL GUIDELINES No.151

ANOTHER MITEK ADVANTAGE

KEY TO WALL FRAME CONNECTIONS

In June 2008, strong winds struck the Roleystone and Shearwater areas in Western Australia, causing substantial damage to many homes.

In a report commissioned by the WA Government, TimberED Services found far less damage should have been caused as the wind speeds did not actually exceed the N2/N3 classifications appropriate to the area.

This finding was more an indictment on poor design and construction practices than a criticism of AS1684, as many failures were attributed to a lack of compliance with this standard.

Of the five major deficiencies summarised in the report, four related to connections, connections, connections and connections.

They were connections in the roof structure, between roof and wall, and within the wall.

In general terms, in the process of framing a house, the carpenter is normally well aware provision needs to be made to support vertical down loads.

However, the TimberEd Services report stated, "… carpenters can appreciate the load path when the roof is loaded with gravity loads, but do not provide tie down through the same load path for uplift loads."

If visualising uplift forces is difficult, think of it this way: Imagine turning the whole house upside down and hanging it off the foundations (now above it) - which connections would let go?

Unfortunately, I regularly find during site inspections a lack of adequate fixing in wall frames, particularly internal load-bearing wall frames.

The most common culprits are top plate connections to lintels, critical studs and jamb studs.

Predictably, corresponding connections at bottom plates are often overlooked as well.

Where there is significant uplift, and the roof structure is heavily anchored to the top plate, a similarly strong

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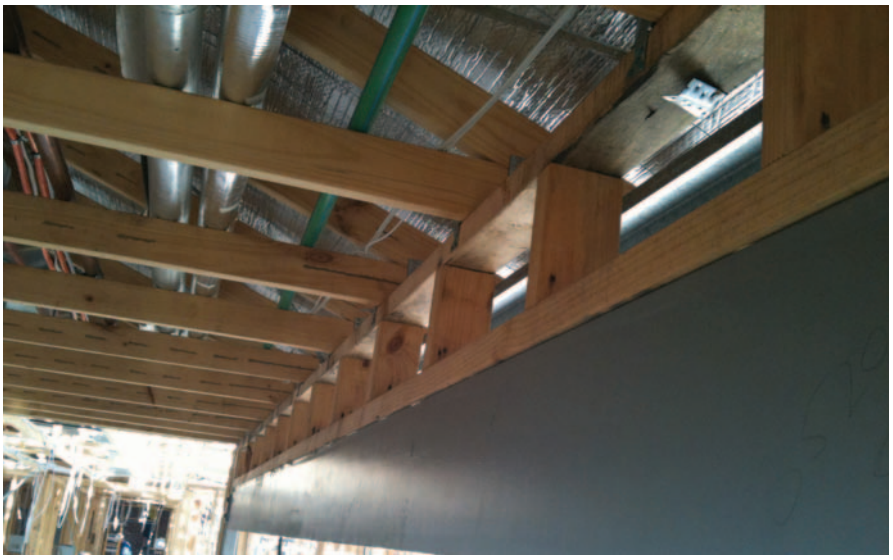
connection is also required to attach the top plate to the stud, the stud to the bottom plate and the bottom plate to the foundation.

One of the main benefits of prefabricated roof trusses is that the forces at the supports of every truss are calculated at the time of design so that accurate connections are detailed at every point without requiring guesswork.

However the construction of wall framing to support the trusses is manually designed using AS1684.

Top plate not tied to stud.



Top plate not tied to steel beam.

Where this is done at the frame and truss plant, the detailer takes responsibility for that determination and must nominate the correct straps and details for the prefabricated frames.

Where wall framing is cut and assembled on site, the builder must make the same design determination in accordance with AS1684.

Severe wind events are fortunately a rare occurrence, but a house needs to survive for its entire working life.

The "big wind" that happens every few years is not the one to visualise.

Rather, it's the "huge storm" that happens on average once a generation that our houses are expected to withstand and remain solidly tied together - and to the ground!

Each and every tie-down, every link in this vital chain, from roof cladding to ground, must be correctly designed and installed.

Although the test may not come for many years, the structure must be able to withstand it if and when it does. TTN