



Beam and truss uplifts



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Roof failures in high winds are unfortunately too common in timber-framed buildings, but get the connections right, and the roof should stay put.

MANY ARTICLES IN BUILD and elsewhere have focused on precautions necessary to avoid roof failures in high winds. These have ranged from retrofitting fixings to durability of screw fixings.

NZS 3604 sets the standard

The bible for New Zealand timber-framed buildings, NZS 3604:2011, includes solutions and joint details to cover most situations, from roof to foundations. These are in Table 2.2, together with the capacities required for alternative fixings.

NZS 3604:2011 introduced provisions for engineered wood products (clause 2.3.9) and for proprietary trussed roofs (clause 10.2.2).

Reactions over 16 kN outside NZS 3604

Clause 2.3.9.6 requires that proprietary beams have an uplift not greater than 16 kN, and clause 10.2.2 excludes girder trusses with an uplift greater than 16 kN.

This means any element that has a reaction – up or down – greater than 16 kN is outside the scope of NZS 3604:2011.

The 16 kN limit is there to avoid overloading the supporting framing. Traditional framing connections that form most of the details in NZS 3604:2011 have limited capacity. Concentrating large uplift loads from girder trusses or proprietary beams is a departure from the traditional distributed loads concept that NZS 3604:2011 is based on.

So what should a designer or BCA consent checker do when faced with this situation?

Specific design if over 16 kN

It is usually possible to specifically design suitable connections and tie-downs using the methods of New Zealand Building Code clause B1/VM1. The uplift and downward reactions greater than 16 kN can then be

accommodated within the remainder of the timber framing.

Designers will need a structural engineer to check out the complete load path from the beam or truss right down to the foundations. They will have to provide appropriate details to show compliance with Building Code clause B1 *Structure*.

Look at all the load path

If the truss designer identifies a girder truss reaction greater than 16 kN and provides a proprietary top plate connection detail, the remainder of the load path still needs to be covered off. Presumably, this will be done by someone else. Whoever does it must make a call on the appropriate load sharing by wall linings and so on for the project.

BCAs checking consent documentation will need to ensure that both the PSI and certificate of work cover off all these details. ◀