



By Tim Rossiter, state manager, NSW and WA

Internal supports

Architecture is not a stagnant affair – as soon as we’ve had a season of Boomerangs, along comes Bell-cast roofs, followed by Fan-ends, and on it goes! We are now experiencing an era of shallow, flat roofs with parapets, a consequence of placing large buildings on tiny blocks. This creates a challenge for trusses, which are often far too slender for the distances they’re expected to span.

A flat truss with an average span-to-depth ratio of 10 is great for stiffness and structural performance. A ratio between 12-14 is tolerable and achievable with larger cambers and bigger chords. Once it gets to about 15 and beyond, multiple plies and other inefficiencies increase dramatically.

Enter the internal load-bearing wall. Breaking up the span reduces the span-depth ratio, and allows for a much more efficient shallow truss design. But there are important pre-conditions to satisfy.

Internal supports have three simple criteria:

1. Be able to carry the imposed load – check supporting studs, lintels and foundations for their adequacy, not forgetting tie-downs for uplift.
2. Be of the same height – trusses rely on level walls. Uneven heights (even very slightly uneven) changes the load distribution and may result in over-stressing the truss and support.
3. Be installed on site exactly where shown in the plan.

Internally supported trusses need two things:

1. Be designed with an internal support.
2. Be installed in the right place, and the right way around and in contact with all supports.

Installers should take note of “Support Here” stickers (see at right), or some such markings on the truss, to make sure that the truss is located in the right position, and in the correct orientation, with a support wall directly underneath that panel point.

There is a little bit of tolerance – a good rule of thumb is that the centre of the panel point on the bottom chord should be offset no more than 100mm from the centre of the internal support.

So what’s wrong with missing a support; if it’s too low down, or in the wrong orientation, or offset by more than that?

1. Web strength – without going too deep into engineering jargon, the forces within the webs of a truss are either pulling (in tension) or pushing (in compression), and their magnitudes are calculated according to where supports are assumed to be situated. Any missing or misplaced supports jeopardise all that, along with the timbers which have been carefully sized.
2. Chord strength – placing an unintended support mid-panel on a chord will probably bend the truss over the support and add extra stresses to the bottom chord, and deflection to the truss.
3. Nailplate strength – if the predicted member forces are all altered, the Gang-Nail plates connecting them together will no longer be accurately sized.
4. Straightness – if the supports are not level with each other, the truss will no longer be evenly supported and that affects the strength of the truss. If the truss were orientated the wrong way around, the cambers will be wrong and, together with the bottom chord bending over the internal support, will probably result in an uneven ceiling.



ABOVE: “Support Here” stickers

IN SUMMARY, HERE ARE MY RECOMMENDATIONS:

- Internal support stickers or markers should always be attached to trusses and noted in truss layouts to guide installers.
- Installers should always take note of truss layouts and labels on trusses to install trusses round the right way.
- If trusses are found to have been installed incorrectly either relocate them in the right position or contact the truss manufacturer immediately for rectification. (No, moving the stickers does NOT work!)
- Alternatively, consider detailing two half trusses in lieu of an internally supported truss. It may cost slightly more initially, but it avoids some of the problems described above.

As for “old-timers” out there shaking their heads (as I do) – yes, it’s still happening some 50 years after trusses first started appearing in the marketplace. **T**

Internal support markers should always be attached to trusses.