FTMA TECH Talk

pryda

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SAGGING TRUSSES - MYTHS UNCOVERED

A common site issue comes from the builder complaining that “trusses are sagging”. However, more often than not, the issues can be traced back to incorrect installation or uneven slabs.

Following are some of the common problems that occur on site:

1. Incorrect Measurement of Truss Deflection

Builders claim about ‘sagging trusses’ often result from incorrect measurement of the true deflection. Typically, truss deflection cannot be measured with a straight edge or level with much degree of accuracy as illustrated in Fig 1.

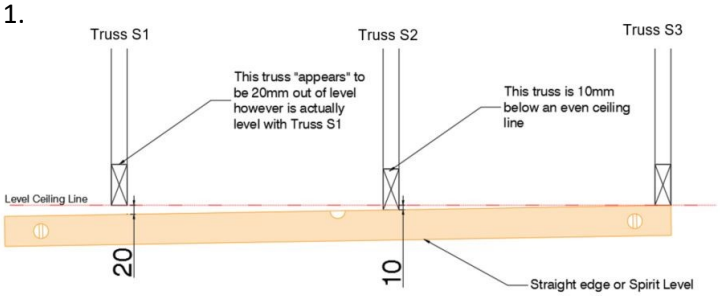

Fig. 1 - Inaccurate measurements with a straight edge or spirit level

Although S1 and S3 are at the SAME level when a straight edge is run over the three trusses, the S2 truss (which is down 10mm) causes the straight edge to project downwards and make it appear that is has deflected by 20mm!

Truss deflection can be measured as simply as a string line, however it is not as accurate or reliable as a laser level or an electronic water level. The level readings should be taken along the trusses span length, at each panel point location on the bottom chord (BC). This will give a true indication of how much the truss has actually deflected, as

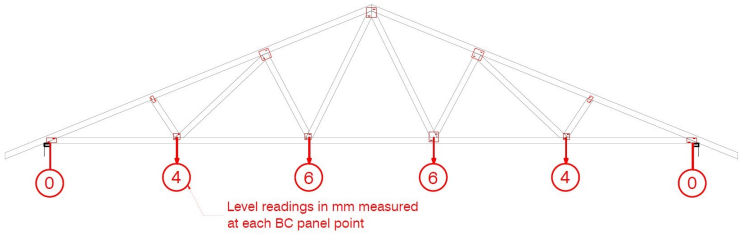

Fig. 2 - Truss measured at each BC panel point and readings recorded with a laser or electronic water level.

Level readings may also need to be adjusted to determine the ‘true’ truss deflection due to the fact that truss support heights may vary!

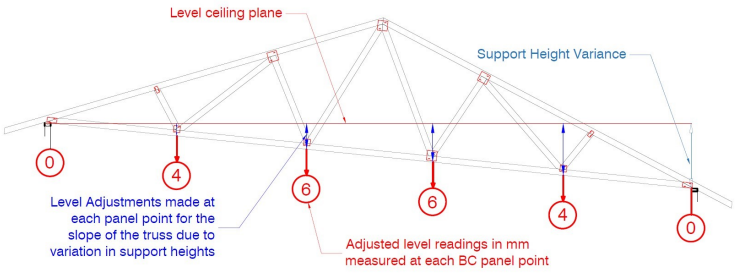

Fig. 3 - Level readings adjusted for uneven support heights

2. Uneven Support Heights

Wall heights supporting the trusses are a critical factor in determining level ceiling lines. These are often impacted directly by slab levels as an uneven slab will result in uneven wall heights.

Variations in wall support heights can cause issues with clearance over internal walls – making it appear that trusses have excessively deflected. One example of this is a situation when there is a sloping cornice lines from an external wall to a Truncated Girder (TG).

It may appear as though the TG has excessively deflected, however level readings can often show that the front and side support walls are at different heights. In this example, the side wall supporting the TG is 20mm lower than the front wall supporting the jacks.

This issue, highlighted in Fig 4 and Fig 5, can be circumvented by spot level checks prior to installing trusses.

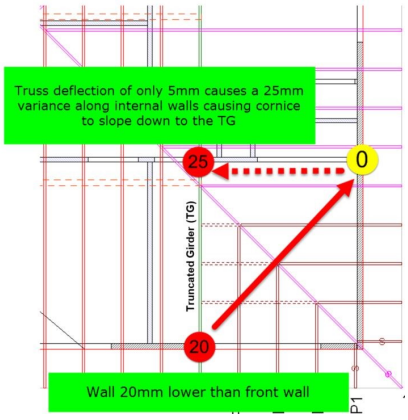

Fig. 4

Height variations of supporting walls

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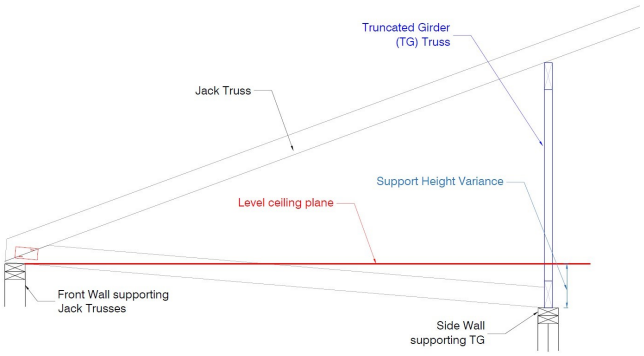
Fig. 5 - Uneven wall supports on jack to Girder connections as seen from a slide elevation



3. Incorrection Installation of Wall Brackets

Internal wall brackets are designed to support walls laterally while the slots allow the trusses to deflect as dead loads are added to the trusses. They do this by letting the trusses slide down through the slots. Refer Fig 6.

Fig. 6 - Nails should not be overdriven or fixed at the bottom slots

If nails are overdriven or fixed at the bottom of slots, the associated truss will not be able to deflect, while the trusses either side will. This can create an uneven ceiling line over the run of trusses. In addition, if the bracket is fixed mid-panel on a truss bottom chord, it can bow the bottom chord of the truss between the panel points.

Since the adjacent trusses are allowed to deform normally, the differential movement can cause cornice cracking. Refer Fig 7.

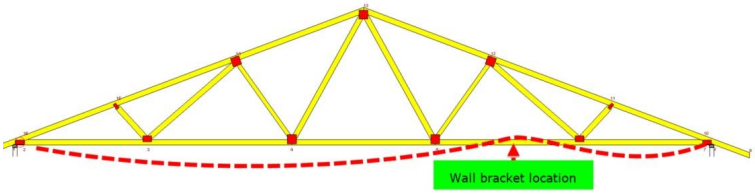


Fig. 7 - The deflected shape of truss can be altered by incorrect installation of wall bracket

In all cases it is advised to fix nails at the centre to top of slots and also not over-drive the nails.

In summary not everything always goes to plan onsite, but ensuring there is some attention to detail during construction and levelling checks during the installation phase can save some costly repair work and delay of trades as the project nears completion.

This edition of FTMA Tech Talk was written by Ian Hayward, NSW State Engineer of our Gold Sponsor, Pryda.

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