

STOP YOUR GIRDERS DOING “THE TWIST”

By far the most common requirements for site inspections by our engineers are bumps and dips in ceiling lines. The most frustrating thing is that in a large number of cases, the causes of these irregularities could have been fixed more easily before the ceiling was installed or even avoided altogether!

One of the causes of ceiling issues that is easily avoidable is twisted girder bottom chords. This results in the carried truss being lower than the girder truss. This could mean the girder truss deflects excessively, and in some cases the girder bracket protrudes into the ceiling plane making it impossible to install the ceiling material.

Any slender member placed on its edge under bending load will want to twist. If it is not allowed to twist it will carry a higher load before deflecting. Girder truss bottom chords perform the same way.

There are a number of ways that this can be prevented. Girder brackets are commonly used to connect carried trusses to girder trusses and these brackets are nailed or bolted to the face of the girder truss. Most brackets have some sort of anti-rotation measures built into them. The following are the most common measures.

Firstly, the anti-rotation flange with two bolt holes to the carried truss. This is used on higher capacity brackets, including those for connecting one girder truss to another.

This is also the concept behind “screw-on” brackets with multiple screws to the carried trusses. There have been times when it has been found on site that the bolts to the carried truss have been installed after the rotation has occurred and there is an assurance from the installer that “it was straight when we bolted it”.

Look at the diagram below and see how the second bolt has to “move through the timber” for this to occur - it is simply not possible for this rotation to occur when both bolts are present from the beginning.

by **TIM ROSSITER**

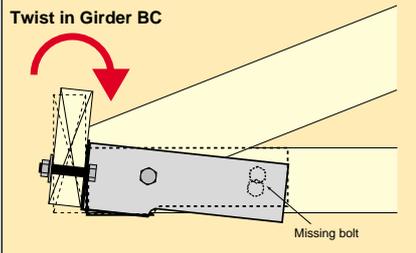
Chief Engineer, MiTek Australia Limited



An exaggerated example of a twisted bottom chord due to incorrect bolting of the supported truss..

Note the following:

- The carried truss is below the level of the girder truss
- The bracket is protruding into the ceiling lining.
- The gap that has been allowed to form between the carried truss and the face of the girder is caused by a loose bracket.



Secondly, the use of a nailing “tab” which is to be fixed to the underside of the girder truss. This acts to stop the underside of the girder truss bottom chord from pulling away from the carried truss. With this system it is vital that the nails be driven into the bottom chords of **both the girder and the carried truss.** **An example of the twist in a bottom chord where the anti-rotation tab was not nailed off.**

There are some brackets, such as Joist Hangers, that require anti-twist measures that allow the bracket to achieve the full load capacity specified in the manufacturer’s literature.

Anti Rotation measures for Joist Hangers

It is important that these anti-twist measures be carried out **when the bracket is first installed.** It has been found

on site that trusses fitted to girder trusses have twisted the bottom chord of the girder simply under their own weight - before the roofing was even on site.

The manufacturers of the brackets require their details to be followed or the implied guarantee on the brackets’ performance becomes void.

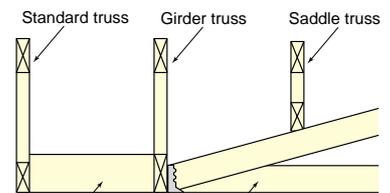
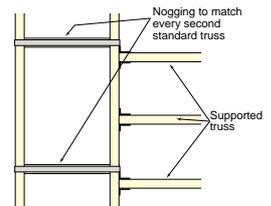
Similarly, a twisted girder bottom chord is not the truss supplier’s problem and performance of girder trusses under those conditions will not be guaranteed. It is the responsibility of the truss installer to correctly fit the girder brackets and any rectification resulting from doing it incorrectly should also be their responsibility.

This is one site issue that can be well and truly avoided simply by following the correct procedures.

It is one that, particularly if found after the ceiling is installed, is difficult to rectify as the twist will “set” into the girder truss’ bottom chord when left for a long period.

What’s the old saying? -

“A pinch of prevention is worth a pound of cure”.



Nogging same depth as girder truss bottom chord

