GN GUIDELINES No.173

ANOTHER MITEK ADVANTAGE – NOVEMBER 2011

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# DON'T MULTI-PLY YOUR PROBLEMS

It disturbs me deeply when I see any of the following on site: a big empty ducted air-conditioning carton, an obvious wave in the roof plane, roof material that doesn't match the design details or a "spare" truss leaning against the garage beside the completed house!

If you find a truss left over, that is not a bonus - it's much more likely to indicate a problem.

Go back and check for the reason very thoroughly. A fabricator does not waste his resources by supplying an extra truss "just in case".

In the design of multi-ply trusses, it is always assumed that the load is equally shared by all layers.

Cambers are calculated and set based on all plies working together in unison.

As such, something must be set in place before the time of loading to ensure the effective sharing of loads.

A multi-ply truss is made that way for a reason.

It is usually a girder truss with some connections to trusses that are being carried.

In most instances, the connections to the bottom chord are achieved with brackets that have longer fasteners specified and supplied, be they bolts or screws.

Bolted connections are visibly apparent – the bolts poke out of both sides, making it very easy to check its length.

However screws require much more diligence by the installer and inspector to make sure that longer screws have, in fact, been used since it is almost impossible to see them in between tightly clamped trusses.

Some suppliers distinguish screw lengths by the colour of their screw heads – does yours?

Other brackets can be fixed to only one ply, e.g. nailed joist hangers & press-on brackets with connector teeth.

This makes it all the more important to be sure you have the supplier's specific details on how the plies must be joined together.

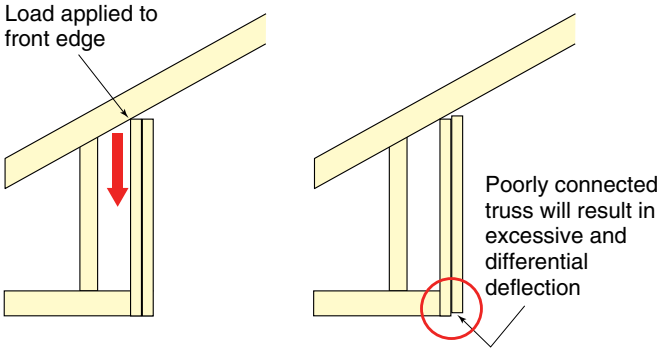


**Fig 1. Bending Ply Seperation**

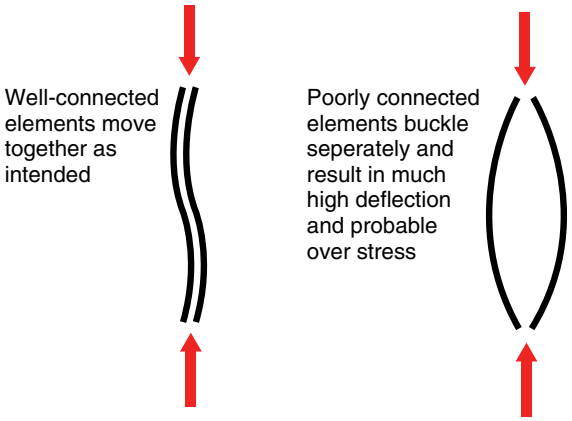


**Fig 2. Compression Ply Seperation**

Two problems can arise if the plies are *not* adequately connected:

**Vertical separation in bending:** In this situation, the "loaded" ply moves down and doesn't pull its partner(s) with it.

This is particularly an issue with trusses using nailed or pressed on brackets and with truncated girders where the jack trusses bear only on the front edge of one ply (See Fig 1).

**Horizontal separation in buckling:** Webs in high compression, especially when internal support points are present, are a prime candidate for this problem.

The combined widths of timber fixed together resists buckling better than individual widths but if the plies are permitted to separate, then each ply has to work on its own and will not be as rigid (See Fig 2).

Web fixing is a part of joining multi-ply trusses that must not be omitted.

Three ply trusses are occasionally required when very heavy loads are present.

The fixing details are naturally more onerous than for two ply trusses and involve either nailing from both sides or by repeatedly nailing one ply on at a time. In addition, bolted connections must also be fitted at panel points.

The best way to be confident of fixing in the correct manner is to "read the instructions".

It may not be very masculine, but it will protect you from blame. If the installer does not follow instructions, he risks being found liable in the event of an incident.

If the instructions are missing or misplaced – always ask, do not assume.

Trusses are precisely designed by computer programs aimed at utilising the timber and nailplate components as efficiently as possible.

It makes necessary assumptions regarding installation.

Multi-ply trusses are a very important case in point – if it's designed as a multi-ply, then it must be connected to act like a multi-ply. TTN