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A SIMPLE MATTER OF ADDITION

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One of the most "interesting" phone calls a truss fabricator can experience is when a builder rings to say the trusses have failed!

Usually by "failed" the builder means they have deflected too far - often so much that they are now touching the top of internal frames.

Unfortunately the ceiling installers usually discover this and the problem is very urgent.

There are a couple of choices open to the fabricator:

- he may politely query the builder as to extent, the response to which may or may not be as polite,
- he may choose to go on site himself and check,
- he may ring his nailplate supplier and get them to go on site to check.

The actual inspection of the trusses can be handled a number of ways:

- they can be checked by eye,
- they can be checked by measuring their clearance from the internal frames,
- they can be compared to the adjacent truss(es),
- they can be measured for straightness and levelness along their length.

The only true measurement from the options above is to check the straightness and levelness along the bottom chord using a string line, a dumpy level or a laser level.

It is not always a good idea to take levels from the underside of ceilings because the lining may not be fixed hard to the underside of the truss(es).

The other measurement options are all subjective because they assume the element the truss is compared to is level.

So the trusses have been checked and are found to be sagging - solution, contact a truss engineer and get some rectification details.

The other result, and by far the most common one is that the trusses are in fact level or even still cambered up to some degree - solution, contact a truss engineer and get some rectification details.

Hang on! I hear you cry. If the trusses are level, then why are the trusses touching the wall? Can it be avoided in future? You may well ask.

It is really a matter of simple addition. The "acceptable" tolerances for construction vary greatly from person to person but some dips and rises are acceptable in all areas of construction.

- A slab can easily be out of level by 15mm (I've seen some cases where it's out by over 30mm!!) Slabs also move with change in soil moisture content which can either cause apparent heaving or sagging of slabs.
- A few millimetres difference in overall wall height between the internal and external lower storey frames isn't a problem.
- Lintels can sag up to 6mm without anyone making any fuss.
- Floor joists can vary in depth by a couple of millimetres.
- Top plates can deflect a millimetre or two or even crush a bit under load.
- Trusses themselves can even sag a couple of millimetres.

None of these statements is excessive, and when taken individually most people would agree with them.

The problem is when they are all present in the same building and all add up! In that case, there can easily be a difference between the top of the top plate on an external frame and a point in the centre of a building of anything up to 30mm.

So the solution is simple - tighten the restrictions to a zero tolerance??!! Of course not. Rather, build a bit smarter allowing more tolerance between zones.

For example, instead of a difference in frame height of 20mm between internal and external frames under trusses, make it 50mm or even more.

You could apply stricter tolerances if you like, but don't forget, that will normally incur a cost increase.

There are sub-floor and foundation systems apart from slab on ground that you might investigate.

For example, a system developed by the Timber Development Association in New South Wales uses "screw-in" piles with a bearer and joist system on top.

This is innovative in that the grid system is quite wide, up to 3.6 metres, and the brick veneer is actually suspended from a steel lintel attached to the piles.

This is an ideal system for medium to highly reactive soils and sloping ground.

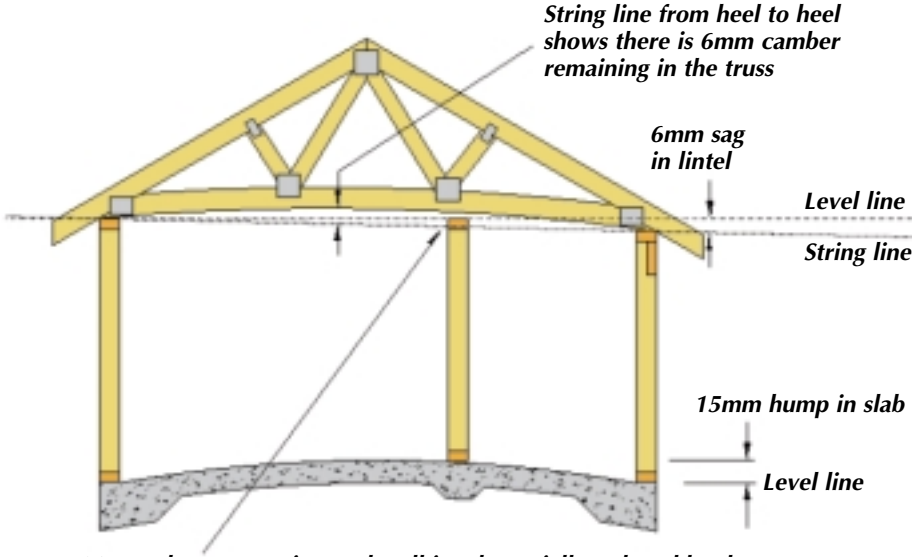
The other big benefit is the piles and joists can be leveled to a couple of millimetres tolerance!

You can also investigate the cost effectiveness of more dimensionally stable floor joists or systems like Posi-Strut floor trusses, or plywood I-beams.

The two main points to remember are:

1. Measure any deflections in the trusses correctly, not comparatively

2. A lot of small "acceptable" deflections can easily add up to an unacceptable finish.



20mm clearance to internal wall is substantially reduced by the 15mm hump in slab and 6mm sag in supporting lintel resulting in the builder thinking trusses have sagged. However it can be shown by a string line stretched between the truss heels that this is not the case.