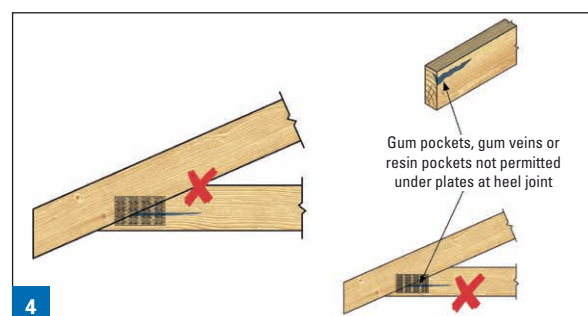
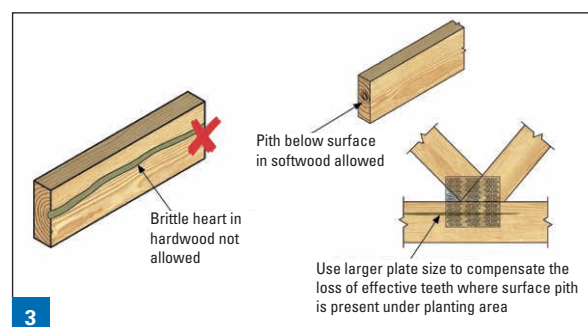
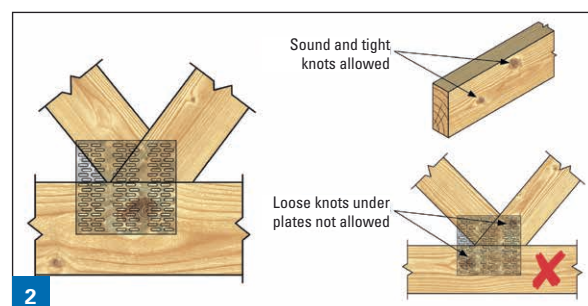
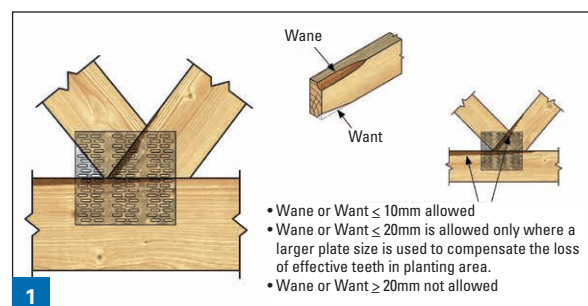




By Stuart Branch – State Engineer NSW

Sawn timber characteristics and roof truss construction



Not that long ago I was asked to prepare a remediation/rectification detail for the broken bottom chord segment shown in the photo (above right).

My first line of thought was “surely this piece of timber isn’t of structural grade considering the extent of the knot present.” Consulting with the truss plant manager it was confirmed it was of structural grade and had been graded MGP10 by the timber supplier.” The next question I asked the plant manager – should it have been used for truss construction? – was met with a resounding “no.”

Building on these questions which had arisen by staring at the unsightly photo, I thought it would be a good opportunity to identify some of the inherent physical characteristics which exist in sawn timber which must be managed in order to achieve strong truss joints.

Sawn timber characteristics affecting joint strength:

1. Wane: wane is a lack of wood at the corner of a board. It is usually created by the sawmiller cutting timber sections too close to the outside surface of the log. Wane is a problem when its extent reduces the number of effective gang-nail teeth penetrating into the timber at a joint location.

2. Knots: knots are the leftover remnants from where a branch

of a tree once existed. The shape of the knot on the surface of the timber is dependent upon the direction of the saw cut with respect to the axis of the branch.

All types of knots will cause some reduction in the strength and stiffness in the timber section because:

- The fibres in the area of the knot are distorted, resulting in perpendicular to grain stresses.
- There is a loss of load-carrying cross section.
- Splitting often occurs around knots when the wood dries.

3. Pith: the pith is the small soft core of material at the centre of a tree which is formed in a tree’s first year. Wood accumulates outwards around the pith as the tree grows. The pith material along with the adjacent five rings has lower strength and density when compared with timber further away from the centre. When the pith coincides with the surface of the timber and the joint plating region, it reduces the number of effective gang-nail teeth penetrating into good quality wood and reduces the strength of the joint.

4. Gum veins: gum veins are cracks in the timber which contain gum. The structural strength of the timber is affected when gum deposits are loose and there are no timber fibres within the cracks. Gum veins should not be placed in heel joint regions due to the increased perpendicular to grain tension forces created by bending.

Sawn timber, if managed properly, is a strong, lightweight, cost-effective building material which is purpose-built for building timber structures. It is recommended that all timber quality control concerns be directed back to the timber supplier for further assessment. **T**

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