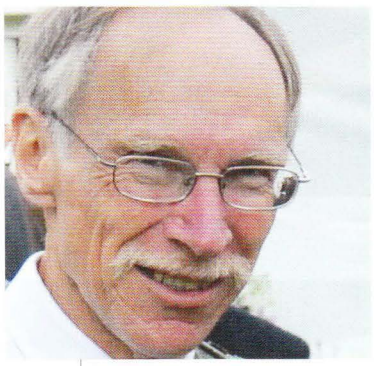
TALKING TIMBER

HOW NOT TO BE TWISTED

Twist is the most significant kind of distortion during kiln-drying of sawn timber, writes ***Mark Jarvis***



Twist can be a cause of rejection during grading, when the moisture content is 20% or less. Problems can also feed back up the supply chain when timber twists after sale, due to further drying when improperly stored on the construction site or in service in a centrally heated building. A recent PhD project at Glasgow University and trials at Edinburgh Napier University sought ways to minimise twist.

One way is to segregate kiln-dried timber that will twist if dried further after sale. Thus, it is common for sawmills to apply twist limits that are more severe than the standard requires. Roughly, a 1% decrease in moisture content leads to a 5% increase in twist. Correct stacking and storage is, of course, still vitally important.

Twist can be prevented to some extent by appropriate restraint in the kiln, but there is room to optimise the way in which restraint is applied and to share good practice. Smaller pack sizes might improve restraint after kilning and help to reduce twist after sale.

It would be better if timber with a propensity to twist could be identified earlier, ideally in the forest. The problem is that the earlier the assessment, the less reliable the prediction. One reason is that wood right at the pith normally twists the most, but is hidden from view in logs or standing trees. So, spiral grain leads to twist, but the grain angle immediately under the bark is not what matters.

There is some correlation between logs or trees with low stiffness and the extent of twist in the central battens when dried, so that successful acoustic selection for stiffness might be expected to lead, as a bonus, to some reduction in the incidence of twist. There may also be scope for new research on the prediction of severe twist at the log stage by using CT-scanning to measure grain angle close to the pith where twisted battens would be sawn from. Modelling of twist would help to identify twist-prone logs or to evaluate cutting patterns that would reduce twist.

CT-scanning and acoustic testing for stiffness could also be used to predict twist in green graded sawn timber. Testing stiffness would give better twist prediction in battens than in logs, because the central battens that will twist most are less stiff than the rest. Sawn timber could be graded green, dried, assessed again for distortion and sold as dry-graded timber: rejection at the green stage would avoid kilning of battens that would be rejected when dry.

The twist problem will not go away, but it can be minimised.

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Read the complete version at http://blogs.napier.ac.uk/cwst/how-not-to-be-twisted/

NOTE FROM JOHN PARK

Here is wood science in action at the basic material level and with profitability, or rather avoiding loss of profitability, at the heart of the research. With one natural propensity of wood being movement, most impractical when manifest as excessive twist, minimising that propensity, both during production and subsequently for whatever reason, can only be good news.

Whilst it might be possible to abdicate any responsibility for post-production deterioration of sawn timber by invoking that clause common to all grading rules – this from the Canadian NLGA grading rules: "The grade of lumber, as determined by the grader, applies to the size, form, condition or degree of seasoning at time of original grading" – the appliance of science to ensuring that wood "behaves itself" can only be to the benefit, in more ways than one, of solid wood in the longer term. ■

Below: A system to restrain timbers during drying in the experimental kiln at NRS