

Assessing the Timber Quality of Standing Oak

A Study to Determine Whether any Easily
Measurable External Characteristics can
Indicate a Propensity to Shake

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Contents

- Effects and causes of shake
- Reliably identifying shake
- Measuring the severity of shake
- Research we're doing
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- Where we're heading

Identification - What Is Shake?

- Internal (longitudinal) splitting of the timber
- Usually detectable only when felled
- Occurs as 'star' shake (across growth rings), and 'ring' shake (between rings)

Star Shake



Ring Shake



What Are the Effects of Shake?

- Splits will manifest in felled timber, increasing as it dries or is sawn
- Cut products are weaker and more prone to warping
- Unsuitable for load-bearing and decorative uses
- Significant degrade in value

How Prevalent is the Defect?

- Study in 1994 indicated that about 21% of all UK oak is affected
- Annual national loss in harvesting revenues of between £3-8 million (1994)

What Causes Shake?

Traditionally associated with soil type:

- Higher incidence in sandy & sandy loam soils
- Lower incidence in clays & clay loams

Known that trees with a large difference in cell sizes produced during 'early' and then 'late' season growth are pre-disposed to shake.

Late flushing may also be an indication – known correlation between late flushing and large early growth cell size

'Ring-porous' - formation of early and late wood *may* be influenced by extremes of climate.

Long rotations, so difficult to study!

What Causes Shake?

Sweet Chestnut – very prone to ring shake

- More extensively studied than oak, particularly in mainland Europe
- Shake known to occur between areas of normal wood and 'strengthened' wood
- Regulating growth and avoiding stresses is recommended

Implications for Oak?

Identifying Shake – Caution!

- May easily be mistaken for drying-out cracks
- Note 'feathering' (may or may not be darkened) around actual shake

Star Shake



Drying-Out Cracks



Distinguishing Shake – Close Up

- Note shake and drying-out cracks present in same log



Severity of Shake – Examples

Severe Shake



Severity of Shake – Examples

Moderate Shake



Severity of Shake – Examples

Minor Shake



Severity of Shake – Examples

Negligible Shake (ring)



Other External Indicators of Shake

Look out for:

- Fluting
- Spiral Grain
- Bark Fissures



Other External Indicators of Shake

Caution – Bark Fissures



Quantification of Shake

- 0 - None *visible*
- 1 - Present but negligible: value unaffected
- 2 - Low proportion of visible cross-section affected
- 3 - Intermediate proportion of visible cross-section affected
- 4 - High proportion of visible cross-section affected

Can Acoustic Devices be Used to Reliably Test for the Presence of Shake?



Do Lean and Sinuous Growth Increase the Risk of Shake?

Leaning



Sinuuous (& Spiral) Growth



Economic Impact of Shake Defects - Products

Large diameter oak grown for:

Most valuable	Butt	£5.50 - £10.00 / hp. ft
	Bend	£6.00 / hp. ft
	Beam	£3.00 - £7.50 / hp. ft
	Fencing	£2.25 / hp. ft
	Firewood	£1.30 / hp. ft
	Least valuable	

Economic Impact of Shake Defects

Extent:

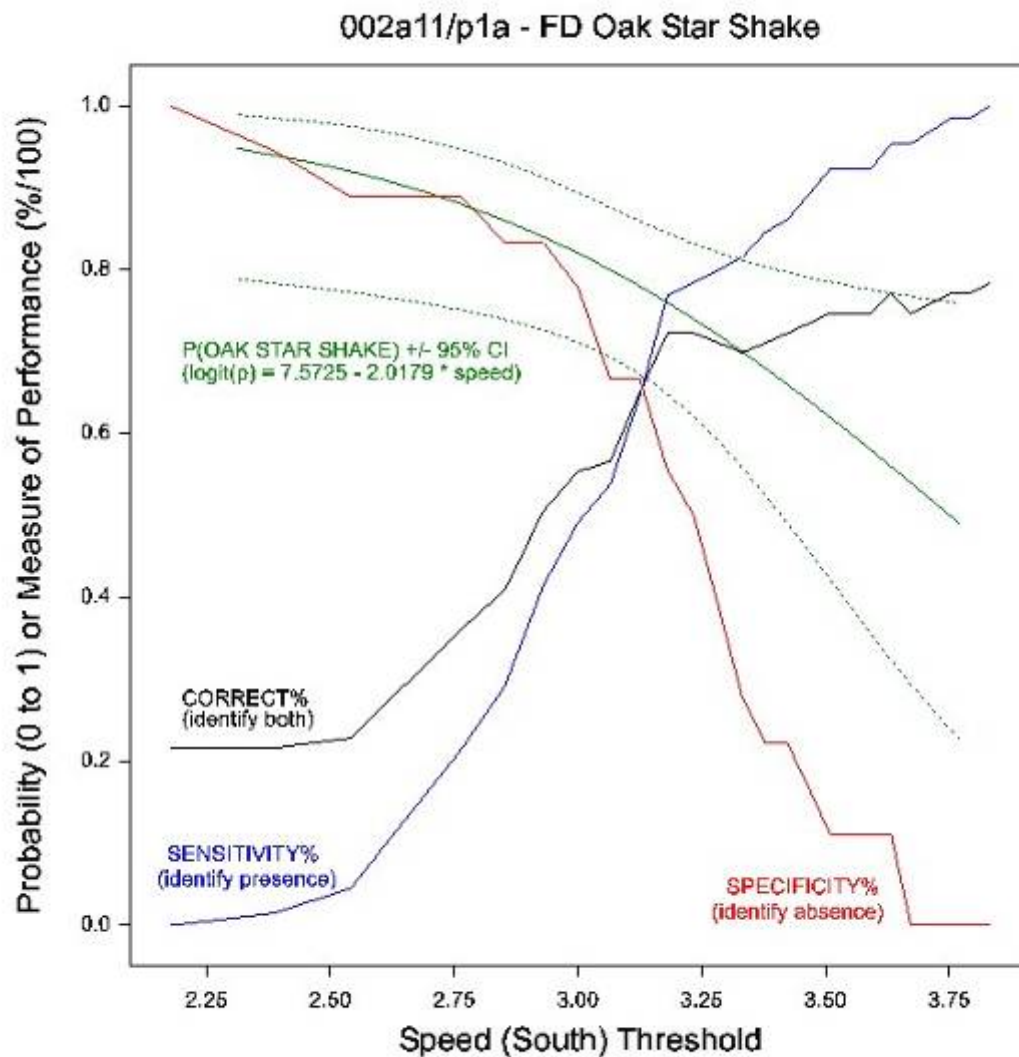
- 'Shake' site: 73% of trees affected
- 'Non-Shake' site: <1% affected

Severity:

- Minor shake: 12%
- Intermediate shake: 40%
- Major shake: 48%

Estimated Value of Parcel:

- Value if no shake were present: £24,250
- Value, accounting for defects: £19,050
- Estimated loss, due to shake: £5,200 (-21%)



Summary

- Shake is a major problem for British oak
- Shake can severely devalue logs
- At present not possible to predict trees containing shake
- We have tested the relationship between a number of standing tree measurements and the presence of shake
- Acoustic velocity on the south side of oak appears to be a reasonable indicator of shake
- Still to test other measures such as tree sinuosity and lean
- Now need to improve diagnostic methodology and test and validate on other sites