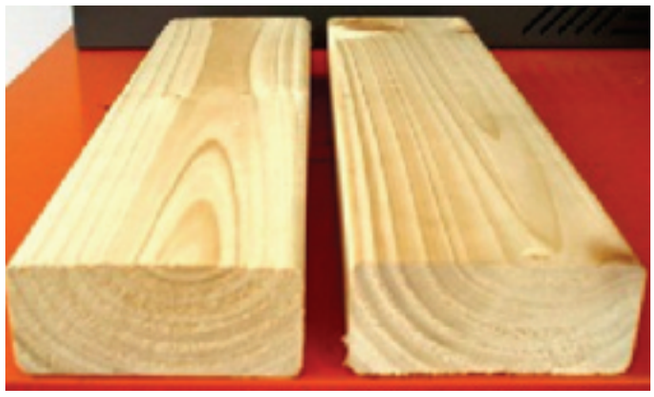
Modelling Sitka spruce properties

bre

Linking batten performance to silvicultural models

Sponsor: Forestry Commission



Battens containing compression wood

Project Aims:
The objective of the project is to develop combined batten performance and silvicultural models, and to apply and validate recent research findings by both organisations in particular from the EU compression wood project and DTi PII project on timber scanning.

Project Objectives:

- Correlate batten performance with log, tree and stand parameters using the unique Compression Wood project database from 4 Sitka spruce stands
- Link batten performance to the Timber Quality Model being developed at Forest Research that predicts wood density, knot distribution and grain angle within trees.
- Investigate models to predict distortion, mechanical properties and density.
- Validate observations on sawmill sorting techniques and potential scanning technologies.
- Investigate different silvicultural scenarios and their impact on batten performance.
- Pull together existing knowledge and information in BRE and Forest Research regarding factors influencing the performance of sawn timber from Sitka spruce, in the form of a review report.

Background:
BRE and Forest Research share a common knowledge base for Sitka spruce that has the potential to be applied to both silviculture and industrial sorting. Recent project work at BRE has built on data gathered during the EU compression wood project. The main bulk of the practical work has comprised the testing and assessment of 500 Sitka spruce battens obtained from four forest stands. In collaboration with Forest Research, ninety logs were characterised with variables such as top and bottom diameter, whorl spacing and under-bark slope of grain being recorded. The logs were scanned by a 3D laser scanner prior to being converted. Log shape variables such as sweep, ovality and taper were obtained from the scanner data. Pith eccentricity and ovality was manually measured from log disc images produced by FR. The battens were machine stress graded and then conditioned to in-service levels of moisture content. Measurements were taken of distortion, knot size and position, knot area ratio, compression wood content, rate of growth, density, position relative to pith and slope of grain. Other work involved testing of small clear samples spruce, together precise measurement of radial, tangential, and longitudinal shrinkage during drying. A database of around 100 machine grader rejects was also compiled, with the battens being re-graded to obtain detailed machine stiffness values.

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