

**Client Report :**

Enhancing the quality and  
adding value to UK timber by  
improved conventional kiln  
drying

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## Executive Summary

This report provides a brief up-date on the project 'Enhancing the quality and adding value to UK timber by improved conventional kiln drying'. The project was funded by the Forestry Commission under contract number PPD 94, and was due to finish at the end of February 2004. Due to changes in the contract part way through the project, an extension was granted by the Forestry Commission, and the project is now due to finish at the end of September 2004. This report provides a short summary of the work completed to date.

This research programme complements work previously carried out under both Forestry Commission and European Commission funded projects and forms part of the extensive BRE and UK sawmilling industry research programme, targeted at optimising drying efficiency and the quality of kiln dried softwood timber.

The first programme of work within the project has been completed and consisted of:

- Seven experimental kiln trials and seven control kiln trials.

Using the results obtained from this first programme of trials, further trials will be undertaken to investigate how airflow, sticker dimension and top weight affect the drying schedule, plus timber quality after drying. These continuation trials will indicate how wood quality and moisture content uniformity is affected by increasing temperatures during the drying schedule, and how other drying parameters interact as drying time is reduced.

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## Introduction

The UK sawmilling industry has invested over £20 million in conventional drying technology over the last few years. Although significant improvements in drying efficiency have been achieved, further work is required to speed up the drying process and reduce the distortion that can occur during the drying process.

The objective of this project was to undertake a series of experimental drying trials to investigate how increases in drying temperature and changes to other drying parameters affect drying times and the distortional quality of UK spruce.

This project specifically targets the improvement and optimisation of conventional drying techniques by using current drying equipment. The drying equipment in use by the UK sawmillers at the moment has the capability of drying timber using higher temperatures which, in theory, should reduce drying times. It is essential to capitalise on the current potential of existing drying equipment and increase the volume and drying quality of the timber passing through the drying process. However, a number of industrial kilns are limited in the maximum temperatures they can use, due to the low thermal capacity of the insulation material used in construction.

## Description of the project and progress to date

The main objective of this project will be achieved by undertaking a series of accelerated drying trials in BRE's new experimental wood drying kiln. The trials will incorporate a number of different drying parameters to speed up the drying process, whilst attempting to retain or reduce distortion on dried material. Each experimental trial in the series will consist of a control and an experimental drying run.

The first trial in the work programme was planned as a baseline control trial. A single pack of 'green' spruce was cross-cut into two, to provide two almost identical packs. One pack was dried by one of the industrial partners and one was dried using the experimental kiln at BRE, utilising the same schedule as that of the industrial partner. The results from this trial were then compared to ensure similarity between the drying parameters. This trial was then used as the main control run throughout the remaining programme.

The next phase of the programme consists of six accelerated drying trials. Each of these trials would have a stepwise increase in maximum temperature in 5°C increments up to a maximum temperature of 87°C. The other drying parameters would be kept constant, whilst maintaining a similar schedule shape in accordance with the rise in dry temperature. The target moisture content for all trials has been set at 18%. The timber from each of the trials will be measured for distortion and uniformity of moisture content after drying. Each drying schedule would also be monitored by external electronic equipment, to verify the kiln control unit.

Depending on the results obtained from the first programme of trials, further trials would be undertaken to investigate how airflow, sticker dimension and top weight affect the drying schedule, plus timber quality after drying. These trials would indicate how wood quality and moisture content uniformity is affected by increasing temperatures during the drying schedule and how other drying parameters interact as drying time is reduced.

All the trials undertaken will concentrate on timber with a dimension of 50 mm x 100 mm, as past trials have indicated that this dimension seems to be the worst affected by distortion.

From the completed programme of experimental trials, three kiln schedules will be selected for verification by industry (two based on accelerated temperatures and one with other modifications (to be decided)). The sawmills where these trials take place will be selected on the basis of the insulation levels of their kilns.

A main report detailing all the experimental work and recommendations will be produced at the end of September 2004.

