HEATTREAT

Heat treatment of fast-grown softwood

PROJECT TEAM
Prof. Colin Birkinshaw, University of Limerick*
Daragh Thornton, University of Limerick
Seamus Dolan, University of Limerick
Seamus Heaney, Coillte

** Address correspondence to:*
colin.birkinshaw@ul.ie

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OBJECTIVES
A previous report described the application of heat treatment to Sitka spruce and lodgepole pine and identified the advantages of improved moisture stability and fungal resistance, but a drawback of the heat treatment is increased brittleness of the timber. Cladding was identified as a potential application for heat treated timber but the question of fixing and resistance to nailing had to be addressed. Timber must be capable of withstanding power nailing under normal site conditions, without undue splitting or fracture. In the longer term it must not show any significant surface deterioration or mechanical failure when exposed to outdoor weathering. Consequent on these considerations a project to investigate the nailing and cladding performance of Irish heat treated Sitka spruce was established with the objective of comparing heat treated materials with untreated controls.

PROGRESS
Timber from two sources was used. The larger amount was material remaining from a large scale heat treatment trial carried out by the Wicklow Rural Partnership and consisted of Sitka spruce grown within that county. This timber was available as sawn boards with cross-section 150 x 20 mm. Machining to tongue and groove and to shiplap profiles was carried out at the Coillte Dundrum sawmills. Smaller amounts of timber remaining from the original University of Limerick heat treatment trials, and treated in the Netherlands using the Plato and Lignius processes, were also included. Power nailing was used and following insertion of each nail visual assessment of the quality of the fixing was carried out and judged as pass or fail on the basis of the quality of fixation and absence of splitting. Untreated controls were also nailed, along with the widely used western red cedar. Figures 1 and 2 show a typical panel and an edge nailing situation. Prepared panels are now undergoing

Figure 1: Nailed test panel prior to outdoor exposure.

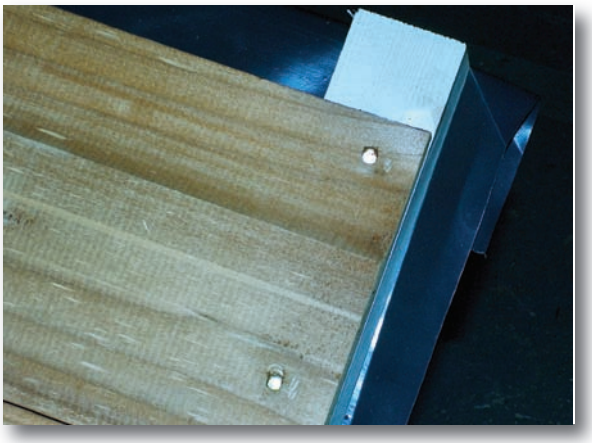

Figure 2: Extreme edge nailing presents the most severe fixing condition.

exposure trials at the Coillte mill in Dundrum. A small number of additional panels have also been included in an extended series of tests at the Building Research Establishment in the UK and Figure 3 illustrates these.

The results have shown that the heat treatment process does not increase the tendency of softwoods towards splitting when subject to nail fixing in cladding situations. Sitka spruce controls are somewhat more prone to splitting than western red cedar, an observation that is consistent with the grain structures present. With the softwoods examined the nailing outcome is substantially determined by the quality of the timber, and the care of the operative, rather than by the treatment received. Of the different profiles investigated it was clear that heat treated shiplap was the most prone to splitting and again this is consistent with the nature of the profile and the nailing stresses induced. As would be expected, heat treated rough sawn timbers nail well.

Three heat treatment processes were included in this work, although only small amounts of material were available from the Lignius and Plato processes. These latter processes are more severe in respect of total thermal exposure and this was reflected in a greater tendency towards splitting compared with Thermowood materials. However, it was still comparable with the controls.

Exposure trials are ongoing, but some bleaching out of the dark colouration resulting from heat treatment is apparent, as is some staining from plated nails. Stainless steel nails show no staining.

Figure 3: Panels undergoing exposure trials at the Building Research Establishment.