

# Spacing and Timber Performance in Sitka Spruce

by

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Control of tree spacing is one of the main methods by which a silviculturist can influence timber quality within forest stands. Spacing influences a number of characteristics including: knot size, the size of the juvenile wood zone and stem straightness. In widely spaced stands, large branches tend to remain alive far down the tree and tree taper also tends to be increased. A number of studies have investigated the effect of spacing on stiffness (modulus of elasticity - MOE) and strength (modulus of rupture - MOR) of timber. In most cases, a general trend of a reduction in MOE and MOR with increasing initial spacing has been observed.

The effect of spacing on the mechanical properties of Sitka spruce grown in the UK has been studied by Brazier and Mobbs. They sampled trees from spacing and thinning trials established in 1935 at Clocaenog, North Wales and Brechfa, South Wales. The authors found that the mean minimum reaction force for timber decreased with increasing initial spacing. Based on this result, Brazier and Mobbs recommended that the maximum initial planting spacing for UK-grown Sitka spruce should be 2 m by 2 m (2500 trees/ha) if commercially acceptable yields of timber achieving the SC3 grade (broadly equivalent to C16 in the CEN standards) are to be obtained. This study has had a considerable influence on UK forestry practices, however, there are a number of issues with the experimental design.

In order to better understand the effect of spacing on the physical and mechanical properties of wood, a study is being undertaken in a 57-year-old replicated spacing trial located at Baronscourt Estate in Northern Ireland. A total of 75 trees were sampled at five different spacings (1.8 m x 1.8 m up to 5.8 m x 5.8 m). Detailed measurements of crown structure and stem profile were made on a sub-sample of these trees, and all trees were processed into structural battens. All battens were x-ray graded to C16 and a sub-sample are currently being tested to determine MOE and MOR. Preliminary results from the study will be presented. These indicate that there are considerable differences in the morphological characteristics of the trees and mechanical properties of the timber.