

IMPACT OF LENGTH AND DIAMETER VARIATIONS IN BEECH (*Fagus sylvatica* L.) SAWLOGS ON THE YIELD AND WASTE

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ABSTRACT

*This study evaluates the yield and waste distribution in beech (*Fagus sylvatica* L.) sawlogs, focusing on the influence of log length and diameter. Two log lengths, 4.0 m and 5.0 m, were analysed across various diameter classes. The research examines the relationship between log geometry and the quantitative utilisation of raw materials, emphasising the impact on sawn timber yield, coarse waste, fine waste, and shrinking allowance.*

Experimental sawings were conducted on a vertical bandsaw in a saw mill optimised for moderate-capacity production. Statistical analysis of the data reveals significant differences in yield efficiency between the two log lengths. Logs with shorter lengths (4.0 m) demonstrated lower quantitative yield compared to longer logs (5.0 m) due to reduced taper effects and enhanced sawmill processing efficiency. Similarly, larger diameters were correlated with increased sawn timber yield, whereas smaller diameters resulted in higher proportions of waste. The waste distribution analysis highlighted that coarse waste formed the largest component, followed by fine waste, both influenced by log dimensions and quality. Precision in sawmill operations was demonstrated by the diminishing allowance, which provided a small but constant proportion to all logs. The findings underscore the importance of optimising log selection and processing parameters to maximise resource efficiency and minimise waste.

This study provides insights into sustainable practices in beech sawlog processing, supporting the development of optimised sawing techniques for improved material utilisation. The results contribute to a better understanding of how log characteristics impact industrial processing outcomes, informing decision-making for sawmill operations and forest management strategies.

Keywords: beech, coarse waste, fine waste, quantitative yield, sawlogs, shrinking allowance