

Investigation of Sawmill Management and Technology on Yield Optimisation at Selected Sawmills in Moratuwa

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Abstract

Sawmilling is a primary industry which provides raw materials to other industries such as construction, joinery, furniture and others. The raw material used in sawmills consists of logs which come from different forests. Logs are classified by diameter, length and quality. Depending on the consumer demand for the products and the nature of the production process, each sawmill has to determine the quantity of different type of logs required to satisfy the consumer demand. Optimization models are referred as a main branch in Operations Research used to support decisions in the forestry industry. The yield optimisation system can significantly improve timber value recovery in sawmills. A hybrid volume value optimized solution will allow maximum utilisation of each log while achieving the highest possible value recovery from logs. The key objective of this study is to construct a yield optimization model suggesting best cutting pattern for the logs taking its dimensions into consideration.

A sample of twenty one sawmills were selected out of 206 registered private sawmills in Moratuwa based on the sampling percentages determined from an initial survey. The selected sawmills represent all types of sawmills available in Sri Lanka namely frame saw, circular saw and band saw mills. Length, mid diameter, diameter at top, diameter at the bottom, taper and eccentricity of two hundred and ten (210) logs were measured and recorded.

A yield optimization model was developed using the data obtained during this study. The developed model which can be categorised as a non linear integer programming model is capable of generating optimum cutting patterns in order to minimise the wastage. There are two assumptions considered such as the usable area of the log is half cone shaped and there are no internal defects of the usable area in the log in order to reduce the complexity of the problem.

In the subsequent stage the model will be solved using a suitable algorithm with the help of optimisation computer software.

Keywords: Sawmill, Yield optimisation