

INFLUENCE OF LUMBER VOLUME MAXIMIZATION ON VALUE
IN SAWING HARDWOOD SAWLOGS

Philip H. Steele, Associate professor
Francis G. Wagner, Associate professor
Lalit Kumar, Research Assistant
Mississippi Forest Products Laboratory, Mississippi State, MS, USA

and

Philip A. Araman, Project Leader
Southeastern Forest Experiment Station, Blacksburg, VA, USA

Research based on applying volume-maximizing sawing solutions to idealized hardwood log forms has shown that average lumber yield can be increased by 6.3 percent. It is possible, however, that a lumber volume-maximizing solution may result in a decrease in lumber grade and a net reduction in total value of sawn lumber. The objective of this study was to determine the existence, and potential significance, of the conflict between lumber volume and lumber grade maximization.

Twenty-four 12-foot long red oak sawlogs of 16-inch diameter were selected. Logs were sawn into cross sections of 1/4 inch thickness. The cross sectional periphery and outline of included defects were digitized and were assembled into digital log descriptions. The digital logs were sawn by a computer simulated live sawing method at 24 angular rotations around the log periphery. Values of lumber sawn at each rotation were compared and the highest determined. At this position of highest value, further live sawing solutions were performed by incrementing the initial opening face position toward log center. The initial opening face was incremented toward log center a distance of one inch in 1/4 inch increments to give 5 solutions per log. The purpose of this incremental movement of sawing pattern toward log center was to determine the position of maximum volume yield.

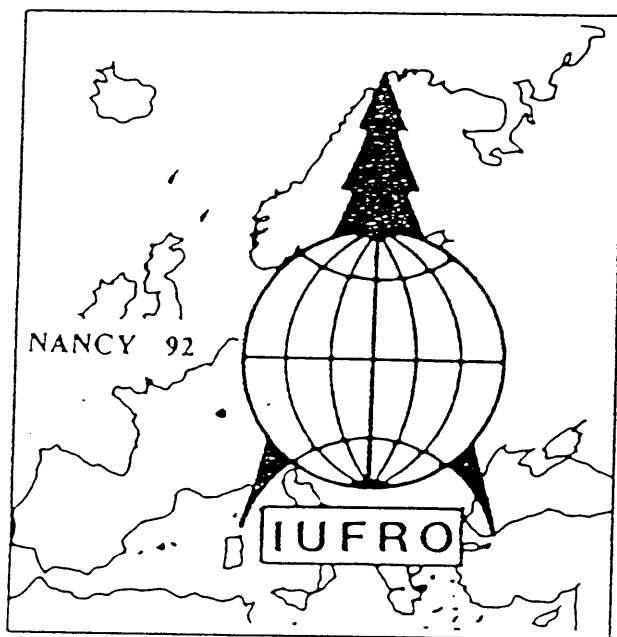
The maximum value-yielding position had a significantly higher value (5.8 percent) than the maximum volume-yielding position. This result substantiates the potential conflict between volume and value maximization. The minimum value-yielding position had significantly lower value than both the maximum value-yielding position (13.4 percent less) and maximum volume-yielding position (7.2 percent less).

The maximum value-yielding position was significantly (0.320 inch) closer to log center than position of maximum volume yield. However, the distance from log center of maximum value solution did not differ significantly from that of the minimum value solution.

These results indicate that the conflict between grade and volume maximization is a real one that is apparently insoluble by a geometric solution. Actual log scanning to identify internal log defects will be required for computer maximization of value yields. Further research is underway to determine if these findings also apply to the more widely-used grade sawing method.

NANCY, FRANCE

August / Août 23-28, 1992



BETTER WOOD PRODUCTS THROUGH SCIENCE
LE PROGRÈS SCIENTIFIQUE AU SERVICE DU BOIS
BESSERE HOLZ PRODUKTE DURCH FORSCHUNG
MEJORAR LOS PRODUCTOS DE MADERA MEDIANTE LA CIENCIA

VOLUME 2

Edited by / Editeur:

ASSOCIATION POUR LA RECHERCHE SUR LE BOIS EN LORRAINE
ÉCOLE NATIONALE DU GÉNIE RURAL, DES EAUX ET DES FORÊTS

14, rue Girardet

F-54042 NANCY CEDEX

TÉLÉPHONE : (33) 83.39.68.20 - TÉLÉFAX (FAX) : (33) 83.30.22.54.