

Software Analyzes Feasibility of Saw Kerf Reduction for Hardwood Mills

By Philip H. Steele

Reductions in saw kerf on head rigs and resaws can dramatically increase lumber recovery in hardwood sawmills. Research has shown that lumber sawing variation reduction will increase lumber recovery above that obtained solely from kerf reduction.

Reductions in sawing machine kerf or variation always come at some cost in both capital and variable costs. Determining whether the financial benefits outweigh the costs can be a daunting task.

A free software package titled ECHO (Economic Choice for Hardwood Operations) is available that performs an investment feasibility analysis. Replacement of head rigs and resaws with reduced kerfs and-or sawing variation can be determined by this software.

Circular head rigs can consume 0.131-inch more wood fiber in saw kerf and

sawing variation than band head rigs. This increased loss of wood fiber by circular head rigs translates into a 10%-12% loss in lumber yield for the volume of lumber sawn on the head rig. This magnitude of lost yield indicates that sawmills with circular saws should at least consider the potential benefits of installing a band head rig.

Circular head rigs reduce overhead costs for hardwood sawmills while band head rigs require more capital for installation and saw tiling. Circular head rigs with inserted teeth can be maintained by the sawyer or other personnel with a few minutes of daily maintenance; insertion of teeth and sharpening can be performed while the circular saw remains on the arbor. Maintaining band saw blades requires that the blade be removed from the machine for filing. In addition, a full-time filer and capital investment in a fil-

ing room and specialized filing equipment are usually necessary. Most sawmills with a circular head rig will require installation of a saw pit, which is also an expensive undertaking.

Some hardwood sawmills will benefit financially from their continued use of a circular head rig while others will benefit from switching to a band head rig. Mills that saw a high percentage of cants or ties may lose only a small amount of yield from a circular saw compared to a thinner-kerf band saw. Some sawmills may produce too small a lumber volume to support the increased per-unit costs required for a band head rig.

Modern resaws are able to saw with substantially thinner kerfs and lower sawing variation than those available in the past. However, a significant capital outlay for this new technology and increased maintenance costs need to be

considered to justify the substantial investment that may be required.

The ECHO software was developed by the Mississippi State University Department of Forest Products. It is designed to determine the economic feasibility of purchase and installation of head rigs and resaws with thinner kerfs and-or reduced sawing variation. The software provides the three measures of investment feasibility that are most frequently used to determine investment feasibility: payback period, internal rate of return, and present net value.

ECHO was developed to be run on IBM compatible personal computers. It will run in the Microsoft Windows environment 95/98/2000/NT/XP. A monochrome, color or VGA adapter is required. A 3.5-inch floppy or CD drive and hard-disk drive are also required. ECHO is a Microsoft Visual Basic application that requires no additional software to execute.

Although a complete financial analysis is a detailed task that requires a professional investment analyst, the ECHO software develops such an analysis based on data that every sawmill manager will

know. The program simplifies data entry by prompting the user for each needed data item.

Data required are:

- kerfs of machines on which kerf or sawing variation reduction will be made
- average log diameter and length processed
- rough green target size for all thicknesses sawn at sawing machines of interest
- volume of production (percent) for each lumber thickness produced by sawing machine
- proportion of log volume that will not be affected by the changes at the sawing machines of interest
- annual lumber production
- annual total revenue from production

If capital costs for the change are incurred, the software prompts for the required data, including initial sawing machine and saw blade cost, machine installation cost, saw brake, debarker, filing room and other miscellaneous capital costs. The program also asks for information for variable costs. Financial informa-

tion required includes each sawmill's tax rate, alternative investment rate, and property tax, insurance and depreciation rates.

While considerable information is requested by ECHO, it is all data that a sawmill owner or manager should know or that is readily available. A 'tutorial' is supplied with ECHO that guides users through an example analysis to provide experience with software operational details.

ECHO was initially available three years ago and has been widely distributed to 123 companies nationwide. Examples of investment analyses that have been run with ECHO are replacement of a circular head rig with a band head rig and determination of the investment feasibility of purchasing an automated saw leveling system. 

(Editor's Note: Dr. Philip Steele is a professor in the Mississippi State University Department of Forest Products and Forest and Wildlife Research Center. For more information on ECHO or to obtain a copy of the software, contact Dr. Steele at psteale@cfr.msstate, or by phone at (662) 324-0822.)