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A LOOK AT YELLOW-POPLAR FOR STUDS.(U)
1977   H HALLOCK, E H BULGRIN

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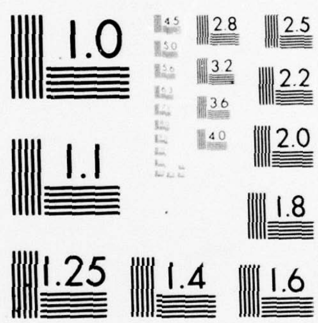

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

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FOREST PRODUCTS LABORATORY[1]

FOREST SERVICE

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(12)

(6) A LOOK AT YELLOW-POPLAR FOR STUDS

By

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Forest Products Technologists

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Abstract

A sawing system that reduces warp may be the key to utilize yellow-poplar for studs.

Introduction

Yellow-poplar has been reported to have a substantial surplus of growth over drain throughout its natural range and especially in the Tennessee Valley area. The customary use of the lower grades (2A and B) as core stock for plywood has suffered in recent years with the wide acceptance of particleboard as a core material. Some lumber of these grades is used as interior parts in the furniture industry but the supply of yellow-poplar greatly exceeds the demand and the market is thus depressed. Its relatively low specific gravity (0.42) makes it undesirable as a railroad tie species.

1/Maintained at Madison, Wis., in cooperation with the University of Wisconsin.

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Yellow-poplar has been suggested as a construction dimension species. Its growth habits tend to produce reasonably straight logs with moderate taper. Branches tend to prune at an early age, thus resulting in generally small tight knots in sawn lumber. It has good nailing properties and resists splitting well. In hardness it falls between woods such as white fir on one hand and the southern pines and Douglas-fir on the other.

Koch[2/] of West Virginia attempted to make studs from yellow-poplar but the studs crooked excessively. Final yields of studs that met warp limits were 34 percent at 19 percent MC (moisture content) and 40 percent at 12 percent MC.

An Idea

Hallock and Bulgrin reasoned that the problem of crook might be substantially reduced by an extension of part of the EGAR[3/] philosophy. Specifically, the idea was to live saw the log into flitches, dry the lumber in flitch form, and then rip the flitches into 2- x 4-, 2- x 3-, and 2- x 2-inch studs.

Procedure

Ten small trees were selected at the Kaskaskia Experimental Forest at Carbondale, Ill., and cut into logs 8 feet in length. All usable stem was included to a 5-inch top. No trees exceeded 14 inches DBH and some were as small as 8 inches DBH. One tree contained some heart rot. The final log mix was:

Diameter (in.)	Number	Scribner Scale (fbm)
5	3	15
6	11	55
7	11	110
8	6	60
9	8	160
10	9	270
11	5	150
12	1	40
Total	54	860

2/ Koch, C. B., Rousis, W. T. Yield of Yellow-Poplar Structural Dimension from Low-grade Saw Logs. Forest Prod. J. 27(4):44-48, 1977.

3/ The EGAR (Edge Glue and Rip) procedure is described in "Yield and Strength of Softwood Dimension Lumber Produced by EGAR System," by K. C. Compton, H. Hallock, C. Gerhards, and R. Jokerst, USDA Forest Serv. Res. Pap. FPL 293, 1977. Forest Prod. Lab., Madison, Wis.

The logs were trucked to the Laboratory and live sawn into flitches 1-3/4 inches thick. These were dried by Schedule T-10-D3, and equalized for 48 hours at 15 percent MC.

The flitches were then ripped into nominal 2 x 4's, 2 x 3's, and 2 x 2's, with actual widths of 3-5/8, 2-5/8, and 1-5/8 inches. Preference was given to 2 x 4's but the total flitch was utilized as nearly as possible by combining widths. The lumber was then planed to standard structural dimension sizes.

The final procedure was measurement of the crook, bow, and twist with the Laboratory's warp-measuring gage.

Results

Yield in lumber was

Item	Piece length 8 ft	7 ft	6 ft	Scale
2 x 2	82	14	9	269.3
2 x 3	71	7	8	332.5
2 x 4	164	12	2	938.7
				1540.5 board feet

Compared to the total log scale of 860 shown before, a net overrun of 79.12 percent was indicated. The total cubic scale of the logs (Smalian Formula) was 185.7 cubic feet. Thus, a lumber recovery factor of 8.296 was obtained.

Results of the warp measurements are shown in figures 1-3. In total, 99.12 percent of the lumber met warp limitations of stud grade. All lumber was within the bow and twist limitation of the grade.

In regard to crook, only one 2 x 4 (0.6 pct) exceeded the stud grade limit (1/4 in.) and it had only 9/32-inch crook. Two 2 x 3's exceeded the 1/4-inch limit but no 2 x 2's.

Comparison of the warp in the yellow-poplar with lodgepole pine, which is the lowest in warp of three common stud species previously studied at the Laboratory,[4/] indicates the following:

4/ Hallock, H. Sawing to Reduce Warp of Lodgepole Pine Studs. USDA Forest Serv. Res. Pap. FPL 102, 1969. Forest Prod. Lab., Madison, Wis.

	Average		
	Crook	Bow (in 1/32 in.)	Twist
Yellow-poplar			
All studs	1.90	4.29	2.23
Lodgepole pine			
Butt studs	4.5	7.2	4.3
Upper studs	2.5	3.6	5.9

Thus, in regard to freedom from warp, yellow-poplar manufactured by this process looks very good.

Based on these favorable results, a full-scale study will be conducted to compare conventionally produced studs, studs by this new method dried by both regular and high-temperature schedules, and standard 4/4 lumber from small, low-grade yellow-poplar logs.

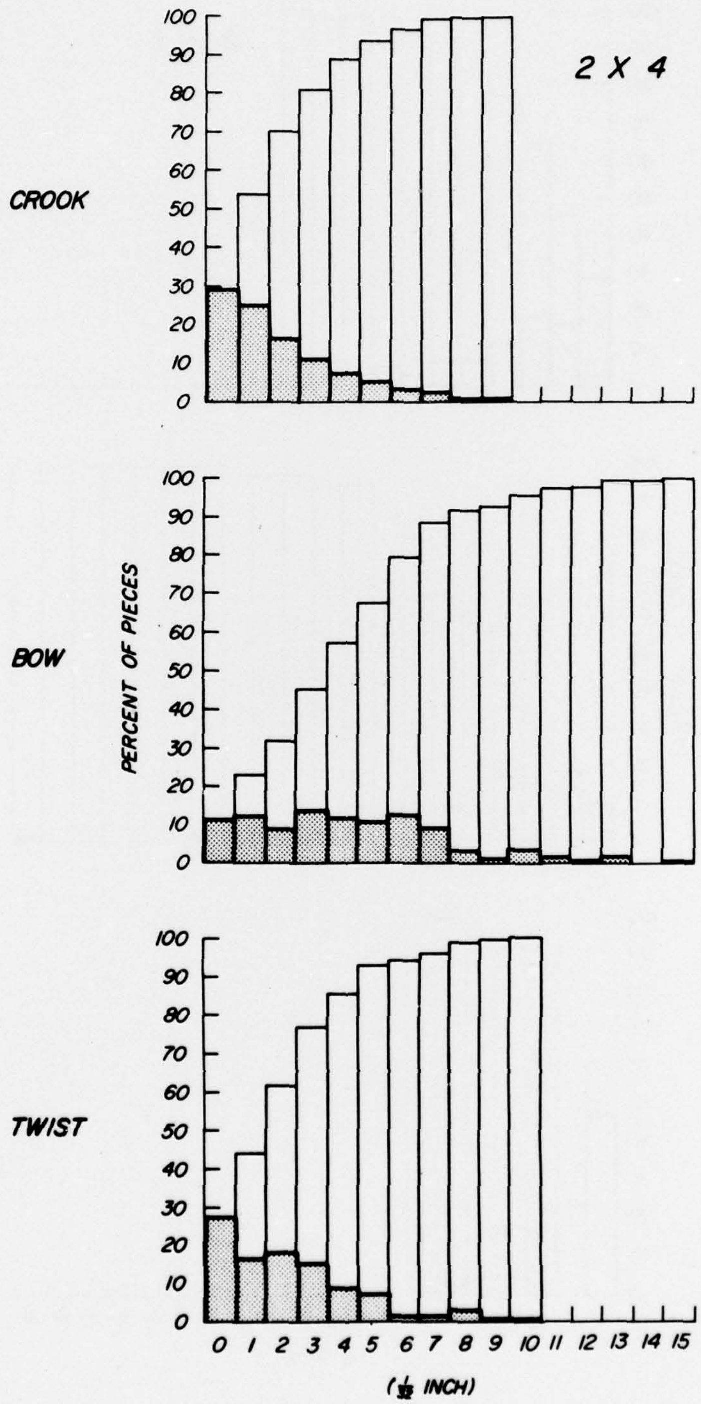

Figure 1.--Percentages of yellow-poplar 2 x 4's that exhibited various amounts of warp are shaded. Total values are cumulative to the right.

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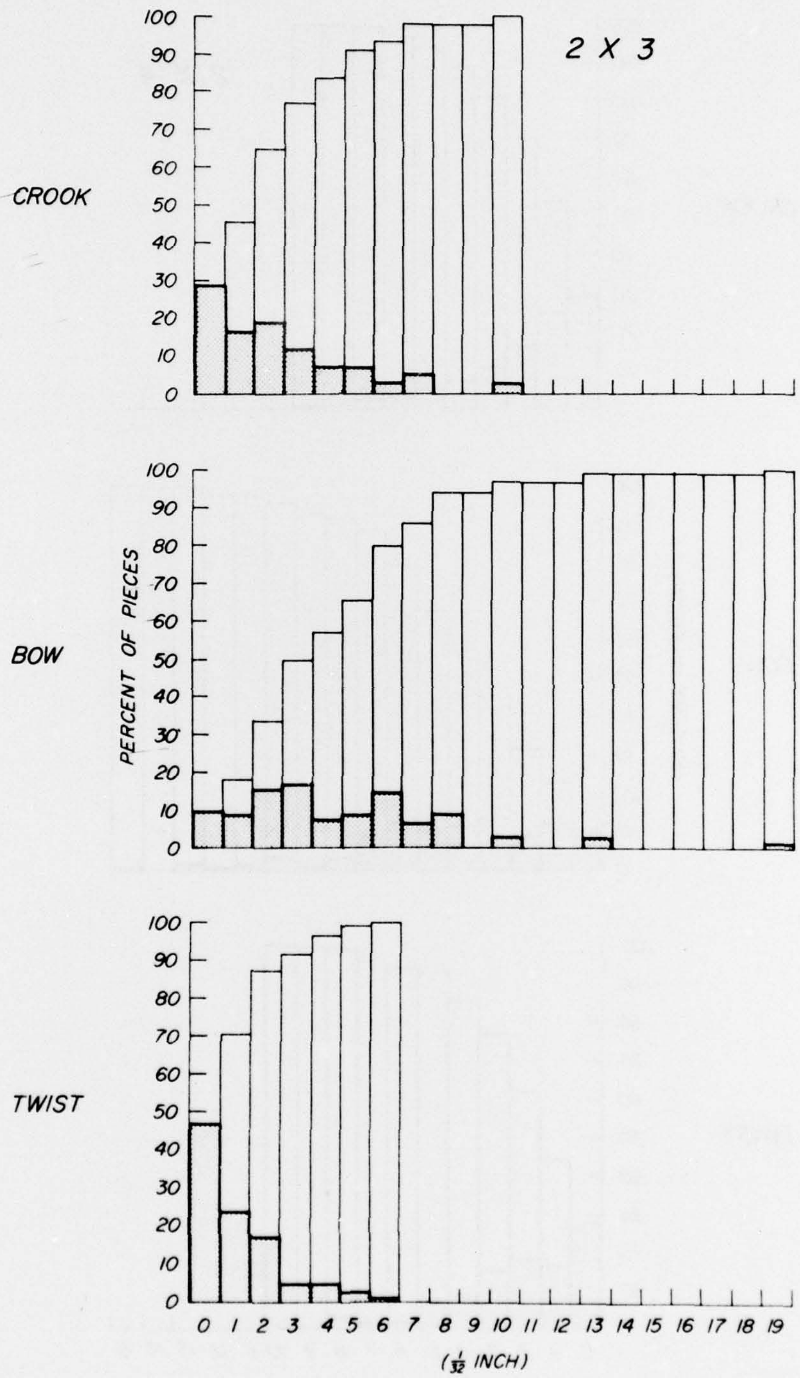

Figure 2.--Percentages of yellow-poplar 2 x 3's that showed various amounts of warp are shaded. Total values are cumulative to the right.

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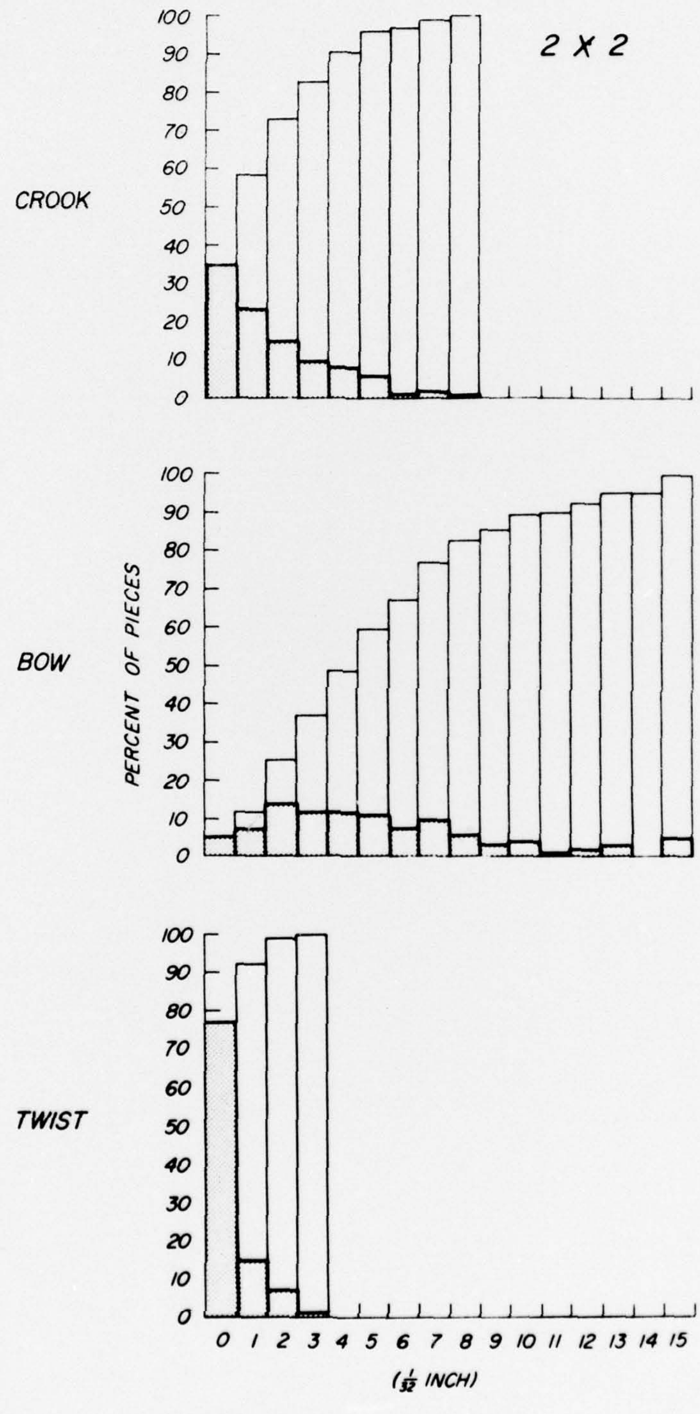

Figure 3.--Percentages of yellow-poplar 2 x 2's that showed various amounts of warp are shaded. Total values are cumulative to the right.

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