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VENEER YIELD BY LOG GRADE AND SIZE FROM
BLACK HILLS PONDEROSA PINE

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ABSTRACT

Veneer grade recovery by log diameter class and log grade for ponderosa pine is presented from 236 Black Hills ponderosa pine logs. Log diameters ranged from 7 to 18 inches. Average veneer recovery was 3 percent in grades A and B, 44 percent in grade C, and 53 percent in grade D.

Keywords: Veneer logs, ponderosa pine.

INTRODUCTION

To help determine potential veneer yields from South Dakota Black Hills ponderosa pine (*Pinus ponderosa* Laws.), a recovery study was conducted jointly by the marketing research project of the Rocky Mountain Forest and Range Experiment Station and the timber quality research project of the Pacific Northwest Forest and Range Experiment Station. This study contributed to an analysis by the Rocky Mountain Station of the feasibility of producing plywood from ponderosa pine in the Black Hills. It also has provided information that is useful in relating veneer recovery to ponderosa pine log grades and sizes.

This report summarizes the veneer grade yield information from the study according to ponderosa pine log grade^{1/} and log diameter. The procedures and other results of the study related to plywood production are described in considerably more detail in a research paper by the Rocky Mountain Station.^{2/}

The veneer yield data from the study are based on 144 trees selected from eight areas considered representative of the commercial timber available in the Black Hills. The sample trees were bucked into 236 logs and trucked to the Montezuma Plywood plant at Dolores, Colorado, for peeling under this plant's normal commercial production conditions. The distribution of log lengths by the improved ponderosa pine log grades is shown in table 1.

Table 1.--*Distribution of study logs by length*

Log grade	Log length in feet					Percent
	8	17	26	34	Total	
	----- <i>Number of logs</i> -----					
1	--	--	--	3	3	1.3
2	--	3	9	21	33	14.0
3	--	9	21	21	51	21.6
4	--	--	1	--	1	.4
5	9	43	64	32	148	62.7
Total	9	55	95	77	236	100.0

^{1/} The log grades referred to in this report are from Edward M. Gaines, "Improved system for grading ponderosa pine and sugar pine saw logs in trees," USDA Forest Serv. Pac. Southwest Forest & Range Exp. Sta. Tech. Pap. 75, 21 p., 1962.

^{2/} Vern P. Yerkes and Richard O. Woodfin, Jr. Veneer recovery from selected sample of Black Hills ponderosa pine. Rocky Mt. Forest & Range Exp. Sta. USDA Forest Serv. Res. Pap. 82, illus.

The logs were cut into 8-foot peeler blocks, debarked, steamed, and peeled into one-tenth-inch veneer. The dry, untrimmed veneer was graded under the supervision of the American Plywood Association. All veneer was sorted and tallied on a rough, dry untrimmed basis into seven grades--A, A patch (Ap), B, B patch (Bp), C, D, and E. The A, B, C, and D grades are as described in the Plywood Product Standard Handbook.^{3/} Ap veneer is A grade that permits up to 14 patchable defects in a 4- by 8-foot sheet. Bp veneer is B grade that permits up to 20 patchable defects in a 4- by 8-foot sheet. E veneer is grade D with admissible rot.

VENEER RECOVERY

The veneer yield from the 236 study logs is summarized in figure 1 and tables 2 through 8. The sample included only one grade 4 log which

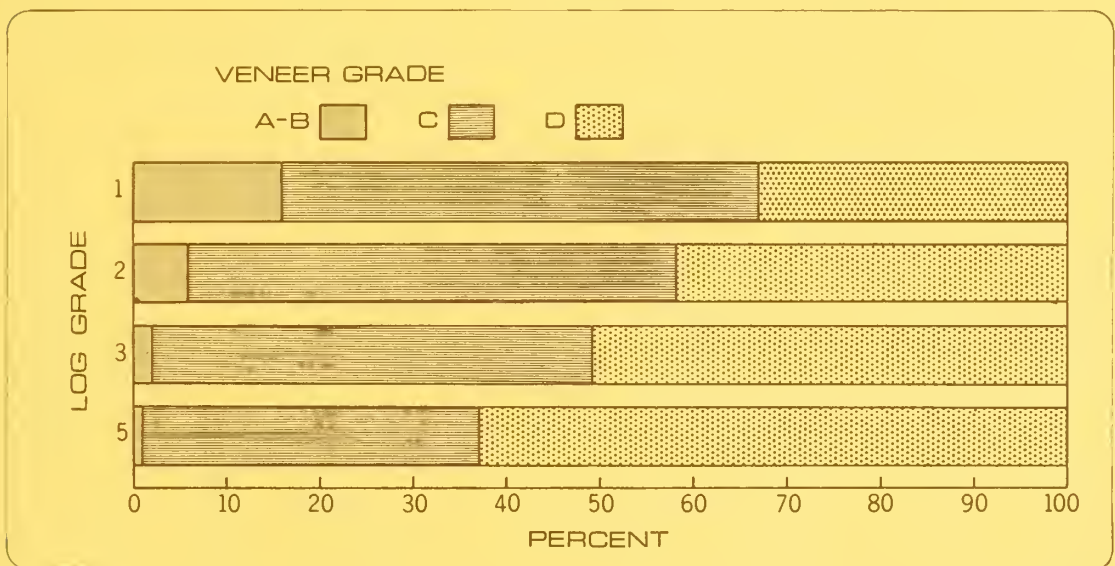


Figure 1.--Distribution of veneer grade recovery percentages by log grades. Only one grade 4 log was sampled, and it is not included.

^{3/} Reprinted from "U.S. Product Standard PS 1-66 for Softwood Plywood--Construction and Industrial." Prepared by American Plywood Association, Tacoma, Wash., 1970.

Table 2.--The distribution of log volume^{1/} and veneer recovery by log grade

Log grade	Number of logs	Gross scale	Net scale	Percent sound	Veneer volume, 3/8-inch basis	Recovery ratio ^{2/}
		---Board feet---			Square feet	
1	3	750	740	99	2,558'	3.46
2	33	7,090	6,790	96	22,024	3.24
3	51	7,830	7,490	96	23,321	3.11
4	1	130	130	100	362	2.78
5	148	11,840	11,480	97	32,312	2.81
Total	236	27,640	26,630	96	80,577	3.03

^{1/} Log volume was measured by Scribner Decimal C log rule, U.S. Forest Service scaling handbook rules, 20-foot maximum scaling length.

^{2/} Based on rough, dry untrimmed veneer volume expressed as a ratio of net log scale.

Table 3.--Log grade 1—dry untrimmed veneer grade recovery percentages by diameter

Diameter (inches)	Number of logs	Veneer volume, 3/8-inch basis	Veneer grade							Total
			A	Ap	B	Bp	C	D	E	
		<i>Square feet</i>	<i>-----Percent-----</i>							
12	1	660	--	--	7.1	4.4	56.1	16.3	16.1	100.0
13	--	--	--	--	--	--	--	--	--	--
14	2	1,898	1.5	--	9.5	6.5	49.7	23.6	9.2	100.0
Total	3	2,558	1.1	--	8.9	6.0	51.3	21.8	10.9	100.0

Table 4.--Log grade 2—dry untrimmed veneer grade recovery percentages by diameter

Diameter (inches)	Number of logs	Veneer volume, 3/8-inch basis	Veneer grade							Total
			A	Ap	B	Bp	C	D	E	
		<i>Square feet</i>	<i>-----Percent-----</i>							
7	1	172	--	--	--	--	52.9	47.1	--	100.0
8	2	137	--	--	--	--	67.2	32.8	--	100.0
9	2	645	--	--	--	--	18.9	81.1	--	100.0
10	6	1,739	0.6	0.6	2.2	2.8	61.0	25.1	7.7	100.0
11	3	1,536	--	--	3.5	2.5	38.1	40.1	15.8	100.0
12	--	--	--	--	--	--	--	--	--	--
13	5	3,877	--	--	3.7	5.0	51.3	33.0	7.0	100.0
14	6	5,315	1.7	--	4.4	2.9	53.5	31.1	6.4	100.0
15	4	3,821	--	--	1.8	2.1	50.5	39.3	6.3	100.0
16	3	3,268	--	--	.4	5.4	57.2	33.8	3.2	100.0
17	1	1,514	--	--	.6	0.7	62.5	27.2	9.0	100.0
Total	33	22,024	0.4	(<u>1/</u>)	2.5	3.2	52.3	34.9	6.7	100.0

1/ Value less than 0.05 percent.

Table 5.--Log grade 3—dry untrimmed veneer grade recovery percentages by diameter

Diameter (inches)	Number of logs	Veneer volume, 3/8-inch basis	Veneer grade							Total
			A	Ap	B	Bp	C	D	E	
		<i>Square feet</i>	<i>-----Percent-----</i>							
7	2	155	--	--	--	3.2	25.8	71.0	--	100.0
8	8	778	--	--	--	1.3	69.2	21.5	8.0	100.0
9	5	949	--	--	2.0	1.1	68.5	26.1	2.3	100.0
10	3	796	--	--	.6	--	75.9	13.8	9.7	100.0
11	7	2,793	--	--	1.7	5.5	52.0	34.7	6.1	100.0
12	10	5,357	--	0.5	.2	2.0	50.3	43.8	3.2	100.0
13	9	6,462	--	--	--	.6	46.4	47.8	5.2	100.0
14	3	1,536	--	--	.3	--	26.6	73.1	--	100.0
15	2	1,786	--	--	--	--	38.2	61.2	.6	100.0
16	--	--	--	--	--	--	--	--	--	--
17	1	1,305	--	--	--	--	10.3	89.5	.2	100.0
18	1	1,404	--	--	.6	1.0	56.1	42.3	--	100.0
Total	51	23,321	--	.1	.4	1.4	47.1	47.3	3.7	100.0

Table 6.--Log grade 5—dry untrimmed veneer grade recovery percentages by diameter

Diameter (inches)	Number of logs	Veneer volume, 3/8-inch basis	Veneer grade							Total
			A	Ap	B	Bp	C	D	E	
		<i>Square feet</i>	----- <i>Percent</i> -----							
7	32	2,704	--	--	--	--	43.9	55.2	0.9	100.0
8	50	6,850	--	--	--	0.1	30.1	68.9	.9	100.0
9	26	5,725	--	--	0.3	.4	34.1	64.9	.3	100.0
10	13	3,854	--	--	--	.3	41.7	55.3	2.7	100.0
11	9	2,644	--	--	--	--	46.1	53.9	--	100.0
12	5	2,287	--	--	--	1.7	37.6	57.2	3.5	100.0
13	6	2,493	--	--	.1	--	23.1	76.8	--	100.0
14	5	3,706	--	--	--	.3	40.4	58.2	1.1	100.0
15	2	2,049	--	--	.2	3.0	35.0	61.6	.2	100.0
Total	148	32,312	--	--	.1	.5	36.1	62.3	1.0	100.0

Table 7.--All log grades combined—dry untrimmed veneer grade recovery percentages by diameter

Diameter (inches)	Number of logs	Veneer volume, 3/8-inch basis	Veneer grade							Total
			A	Ap	B	Bp	C	D	E	
		<i>Square feet</i>	----- <i>Percent</i> -----							
7	35	3,031	--	--	--	0.2	43.5	55.5	0.8	100.0
8	60	7,765	--	--	--	.2	34.7	63.5	1.6	100.0
9	33	7,319	--	--	0.5	.5	37.2	61.2	.6	100.0
10	23	6,751	0.1	0.1	.6	.9	51.5	42.1	4.7	100.0
11	19	6,973	--	--	1.4	2.8	46.7	43.2	5.9	100.0
12	16	8,304	--	.3	.7	2.1	47.2	45.4	4.3	100.0
13	20	12,832	--	--	1.1	1.8	43.4	48.9	4.8	100.0
14	16	12,455	.9	--	3.4	2.3	45.7	43.3	4.4	100.0
15	8	7,656	--	--	.9	1.9	43.5	50.4	3.3	100.0
16	3	3,268	--	--	.4	5.4	57.2	33.8	3.2	100.0
17	2	2,819	--	--	.3	.4	38.3	56.1	4.9	100.0
18	1	1,404	--	--	.6	1.0	56.1	42.3	--	100.0
Total	236	80,577	0.2	(1/)	1.1	1.7	44.3	49.1	3.6	100.0

^{1/} Less than 0.05 percent.

Table 8.--Percentage of dry untrimmed veneer recovered by width and length of veneer sheets^{1/} for each log grade

Log grade	Veneer volume, 3/8-inch basis	8-foot length			4-foot length
		Full width	Half width	Random width	Random width
	<i>Square feet</i>	----- <i>Percent</i> -----			
1	2,558	61.8	8.0	23.1	7.1
2	22,024	58.5	6.4	27.4	7.7
3	23,321	52.8	7.0	31.5	8.7
4	362	52.8	5.2	29.8	12.2
5	32,312	47.6	7.0	33.7	11.7
Total	80,577	52.5	6.9	31.0	9.6

^{1/} Average sizes of the dry untrimmed veneer were 101 inches for 8-foot lengths, 51 inches for 4-foot lengths, 51 inches for full-width sheets, and 25 inches for half-width sheets.

yielded 362 square feet of veneer on a 3/8-inch basis. Fifty-seven percent of this volume was grade C veneer and 43 percent, grade D. The specification for a grade 4 log describes a log with numerous small knots that is expected to yield a large portion of high grade common lumber. This log is not usually found in Black Hills ponderosa pine.

The yield of C and better grades of veneer decreased progressively from 67 percent for log grade 1 to 37 percent for log grade 5 as shown in figure 1. Conversely, there was about 10-percent increase in the amount of D veneer for each log grade, starting with 33 percent for log grade 1.

The average veneer grade yield for all log grades was about 3 percent B, 44 percent C, and 53 percent grade D (table 7). About 50 percent of both grades C and D veneer volumes were produced as full sheets of veneer (nominal 4 by 8 feet). About 40 percent of the volume was random width strips and the rest was half sheets. Since grades C and D veneer account for about 97 percent of the total veneer volume produced in this sample, it is expected that a sheathing type C-D plywood panel could be produced from Black Hills pine.

The suitability for plywood production of the veneer grade and size distribution recovered in this sample is discussed in the Rocky Mountain Forest and Range Experiment Station paper by Yerkes and Woodfin (see footnote 2).

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