

U. S. FOREST SERVICE  
RESEARCH PAPER  
FPL 59  
MAY 1966

U. S. DEPARTMENT OF AGRICULTURE-FOREST SERVICE - FOREST PRODUCTS LABORATORY - MADISON WIS.

**VENEER YIELDS  
FROM LAKE STATES  
QUAKING ASPEN**



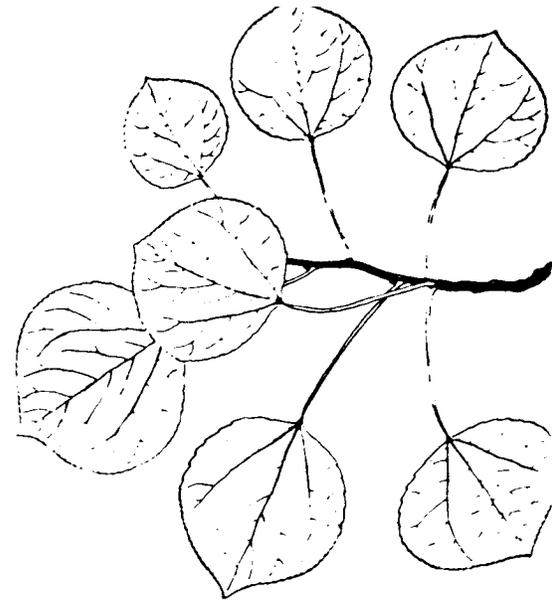
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## ABSTRACT

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This study provides the yield in square feet (3/8-inch basis) of veneer suitable for a C-D grade, five-ply sheathing product from quaking aspen logs from an area of the Lake States. Average yields by diameter, per bolt, per cord, and per 1,000-board-foot Scribner Decimal C log scale are reported.

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## veneer YIELDS FROM LAKE STATES QUAKING ASPEN

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### INTRODUCTION

Quaking aspen (*Populus tremuloides*, Michx.) is a rapid-growing, short-lived tree. It is particularly known by its aggressiveness in invading forest sites that have been cut and burned. This is evidenced by the fact that, at present, the aspen-birch type occupies approximately one-third of the commercial forest land of the Lake States.

Despite a wide variety of uses for aspen, a surplus of this species remains. The volume of

growth and desirable cut far exceed the volume actually cut. It is apparent that present uses of aspen must be expanded, or new uses found to take full advantage of the potential of this species. One new use for aspen that may merit evaluation is for sheathing plywood.

This study,<sup>2</sup> designed to provide information on the yield of veneer suitable for a C-D grade five-ply sheathing product from aspen logs, will be of value in such an evaluation.

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

<sup>2</sup>In cooperation with the Winton Company, Minneapolis, Minn.

## MATERIAL and METHODS

One thousand and sixty-seven aspen logs (approximately 60 cords) from northeastern Minnesota were selected for study. Of these, 790 were designated for peeling on an 8-foot lathe and 277 for peeling on a 4-foot lathe. An effort was made to sample the full range of quality of peelable<sup>3</sup> logs in each diameter class. However, this sample was not designed to represent the distribution of diameter or quality in the existing stands. Table 1 lists the size of the sample logs and the number cut on each lathe.

Sample logs were cut to 104 inches in length. The diameter, together with a color-coded mark to indicate the lathe designated to peel them, was painted on the end of each bolt. Logs were then transported to the veneer mill for peeling.

At the veneer mill each log was assigned a log number for identification. Logs processed on the

8-foot lathe were peeled into 1/10-inch-thick (0.108) veneer to a 6-1/2-inch core. The core was shunted to the 4-foot lathe for further peeling. All veneer peeled was clipped for grade; the minimum width was 4 inches. All pieces produced were marked with the parent log number.

Eight-foot cores and the logs designated for the 4-foot lathe were bucked into 4-foot bolts. Each bolt was marked with the parent log number.

Bolts processed on the 4-foot lathe were peeled into 1/10-inch veneer to a 3-3/4-inch core. Again, all veneer produced was clipped for grade, and each piece was marked with the parent log number.

After clipping, the veneer was dried, graded,<sup>4</sup> and sorted for layup. Each piece was then measured and tallied by log number, grade, actual width, and length.

Table 1.--Size and number of sample logs

Diameter <u>In.</u>	Logs cut on--		Total logs
	8-foot lathe	4-foot lathe	
8	186	138	324
9	195	79	274
10	171	46	217
11	97	8	105
12	78	5	83
13	35	1	36
14	19	---	19
15	4	---	4
16	<u>5</u>	<u>---</u>	<u>5</u>
	790	277	1,067

## RESULTS

### Core Size

Of the 790 logs designated for peeling on the 8-foot lathe, 712 (or 90 percent) were peeled to a 6-1/2 inch core. Fourteen (or 2 percent) were peeled to a core less than 6-1/2 inches, and 64 (or 8 percent) were peeled to a core more than 6-1/2 inches. Core size ranged from 6-1/4 inches to 11 inches. Excessively oversized cores resulted from chuck spin-out or other difficulties in holding the bolt in the 8-foot lathe and maintaining a smooth peel.

### Veneer Yield

In industry for comparative purposes, veneer yields are commonly expressed in terms of "square feet on a 3/8-inch basis." In keeping with this practice the 1/10-inch veneer yields obtained from the study logs have been converted to a 3/8-inch basis.

<sup>3</sup>A peelable log is one that does not have either center decay or hole larger than 3 inches, or sweep in excess of 2 inches. Seams and large cankers (over 4 inches in diameter) must be confined to one face.

<sup>4</sup>U.S. Department of Commerce. Western Softwood Plywood, Commercial Standard CS-122-60, (1990).

The veneer produced from the logs designated for peeling on the 8-foot lathe fell into three categories: full 8-foot lengths of veneer, 4-foot fishtails, and 4-foot veneer from the cores. Tables 2 to 4 list the average veneer yields per bolt and per cord by bolt diameter for each of the three veneer categories. Theoretically, bolt diameter should have little or no influence on veneer yield from cores. Average yield per bolt of 4-foot veneer from the cores, as listed in table 4, appears to increase as bolt diameter

increases. The reason for this is not apparent from this study.

Table 5 lists the total of all categories of veneer produced from bolts peeled on the 8-foot lathe.

Table 6 lists the veneer yields obtained from the 277 logs peeled on the 4-foot lathe.

Since the purchase of aspen logs on a log scale basis may be considered, table 7, which lists the "Volume Recovery Factor" by log diameter for Scribner Decimal C log scale, is included.

Table 2.--Yield of 8-foot veneer per cord from 8-foot bolts

Bolt diameter	Number of 8-foot bolts	Veneer grade <sup>1</sup>		Total yield, all bolts <sup>1</sup>	Average yield per bolt <sup>1</sup>	Number of bolts per cord	Yield per cord <sup>1</sup>
		C	D				
<u>In.</u>							
8	186	375	368	743	4.0	26	104
9	195	882	990	1,872	9.6	20	192
10	171	1,335	1,618	2,953	17.3	17	294
11	97	1,247	1,655	2,902	29.9	14	419
12	78	1,610	2,166	3,776	48.4	11	532
13	35	1,205	1,185	2,390	68.3	10	683
14	19	817	684	1,501	79.0	9	711
15	4	136	165	301	75.2	8	602
16	5	176	172	348	69.6	7	487

<sup>1</sup>Amounts in square feet on a 3/8-inch basis.

## DISCUSSION

In the production of 4- by 8-foot plywood panels, veneer in both 4-foot and 8-foot lengths is required. However, the 8-foot requirements exceed the 4-foot requirements by varying amounts depending upon the number of plies making up the panel. For three-ply panels, 67 percent of the veneer must be 8 feet long; for five-ply panels, 60 percent must be 8 feet long; and for seven-ply, 57 percent must be

8 feet long. Because of this, the ratio of 8-foot-long veneer to total veneer yield per bolt by bolt-diameter is an important consideration.

For example, table 8 shows that, for bolts 8 inches in diameter, only 16 percent of the total yield is 8-foot-long veneer. From this it is evident that the required yield of 57 to 67 percent of 8-foot-long veneer cannot be obtained from a supply of logs that is predominately 8 inches in diameter if the limit of peel is to a 6-1/2-inch core. In fact, the required yield of 8-foot-long veneer cannot be obtained until bolts 12 inches and up in diameter are peeled.

Table 3.--Yield of 4-foot fishtails per cord from 8-foot bolts

Bolt diameter	Number of 8-foot bolts	Veneer grade <sup>1</sup>		Total yield, all bolts <sup>1</sup>	Average yield per bolt <sup>1</sup>	Number of bolts per cord	Yield per cord <sup>1</sup>
		C	D				
<u>In.</u>							
8	186	461	182	643	3.46	26	90
9	195	636	264	900	4.61	20	92
10	171	684	272	956	5.59	17	95
11	97	400	230	630	6.49	14	91
12	78	388	168	556	7.12	11	78
13	35	228	74	302	8.61	10	86
14	19	120	43	163	8.59	9	77
15	4	31	11	42	10.5	8	84
16	5	103	32	135	27.0	7	189

<sup>1</sup>Amounts in square feet on a 3/8-inch basis.

Table 4.--Yield of 4-foot veneer per cord from 8-foot cores

Bolt diameter	Number of 8-foot bolts	Veneer grade <sup>1</sup>		Total yield, all bolts <sup>1</sup>	Average yield per bolt <sup>1</sup>	Number of bolts per cord	Yield per cord <sup>1</sup>
		C	D				
<u>In.</u>							
8	186	2,001	1,269	3,270	17.6	26	458
9	195	2,283	1,259	3,542	18.2	20	364
10	171	2,048	1,162	3,210	18.8	17	320
11	97	1,199	709	1,908	19.7	14	276
12	78	1,034	565	1,599	20.5	11	226
13	35	474	190	664	19.0	10	190
14	19	233	160	393	20.7	9	186
15	4	49	40	89	22.2	8	178
16	5	62	49	111	22.2	7	155

<sup>1</sup>Amounts in square feet on a 3/8-inch basis.

Table 5.--Total yield of 8-foot veneer, 4-foot fishtails, and 4-foot veneer per cord from 8-foot bolts and cores

Bolt diameter	Number of 8-foot bolts	Veneer grade <sup>1</sup>		Total yield, all bolts <sup>1</sup>	Average yield per bolt <sup>1</sup>	Number of bolts per cord	Yield per cord <sup>1</sup>
		C	D				
<u>In.</u>							
8	186	2,837	1,819	4,656	25.0	26	650.0
9	195	3,801	2,513	6,314	32.4	20	648.0
10	171	4,067	3,052	7,119	41.6	17	707.2
11	97	2,846	2,594	5,440	56.1	14	785.4
12	78	3,032	2,899	5,931	76.0	11	836.0
13	35	1,907	1,449	3,356	95.9	10	959.0
14	19	1,170	887	2,057	108.3	9	974.7
15	4	216	216	432	108.0	8	864.0
16	5	341	253	594	118.8	7	831.6

<sup>1</sup>Amounts in square feet on a 3/8-inch basis.

Table 6.--Yield of 4-foot veneer per cord from 4-foot bolts

Bolt diameter	Number of 4-foot bolts	Veneer grade <sup>1</sup>		Total yield, all bolts <sup>1</sup>	Average yield per 4-foot bolt <sup>1</sup>	Number of 4-foot bolts per 8-foot cord	Yield per 8-foot cord <sup>1</sup>
		C	D				
<u>In.</u>							
8	266	2,097	1,656	3,753	14.1	52	733.2
9	148	1,374	1,455	2,829	19.1	40	764.0
10	88	984	1,167	2,151	24.4	34	829.6
11	16	258	241	499	31.2	28	873.6
12	8	138	175	314	39.2	22	862.4
13	1	17	42	59	59.0	20	1,180.0

<sup>1</sup>Amounts in square feet on a 3/8-inch basis.

Table 7.--Total veneer yields per 1,000 board feet  
Scribner Decimal C log scale

Bolt diameter	Scribner Decimal C log scale	Bolts per 1,000 board feet	3/8-inch yield per 1,000 board feet	Volume recovery factor
<u>In.</u>	<u>Bd. ft.</u>		<u>Sq. ft.</u>	
8	1	100.0	2,500	2.5
9	2	50.0	1,620	1.6
10	3	33.3	1,385	1.4
11	3	33.3	1,868	1.9
12	4	25.0	1,900	1.9
13	5	20.0	1,918	1.9
14	6	16.7	1,809	1.8
15	7	14.3	1,544	1.5
16	8	12.5	1,485	1.5

Table 8.--Ratio of 8-foot veneer to total veneer yield

Bolt diameter	8-foot veneer <sup>1</sup>	Total veneer <sup>1</sup>	$\frac{8\text{-foot veneer}}{\text{total}}$
<u>In.</u>			<u>Pct.</u>
8	4.0	25.0	16.0
9	9.6	32.4	29.6
10	17.3	41.6	41.6
11	29.9	56.1	53.2
12	48.4	76.0	63.6
13	68.3	95.9	71.2
14	79.0	108.3	72.9
15	75.2	108.0	69.6
16	69.6	118.8	58.6

<sup>1</sup>Amounts in square feet on a 3/8-inch basis.



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