

# Minnesota Forestry Research Notes

No. 230

October 15, 1971

THE SIZE AND QUALITY OF WOODSRUN ASPEN BOLTWOOD IN NORTHERN MINNESOTA<sup>1/</sup>

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When considering aspen boltwood as a raw material for lumber or veneer production the question of the size and quality of woodsrunk material is very important.

In order to determine the nature of the aspen currently being purchased, 3,245 aspen bolts at five different storage yards in northern Minnesota were measured for size and quality characteristics. All bolts included in the sample had been purchased on a woodsrunk basis and were approximately 100 inches in length. Tree length logs were not sampled because of difficulties in decay evaluation and in measurement of piled logs. It is believed that the data from measurement of bolt-length material provides a good estimate of the size and quality of bolts which would be obtained if tree-length logs are purchased.

The sample consisted of those bolts located at the ends of each pile in the storage yards. When accessible, the top three rows of bolts were also inspected. Sampling in this manner insured that the bolts measured were from a variety of truck and carloads. Only those bolts with a small end diameter inside the bark (d.i.b.) of 4 inches and larger were included in the sample.

The large and small end diameters of each bolt were measured to the nearest inch, the diameter of any decayed area and the presence of shake were recorded, and the amount of sweep was determined. Sweep was considered excessive if more than 1/4 of the diameter of the log would be lost in sawing a straight line parallel to the surface.

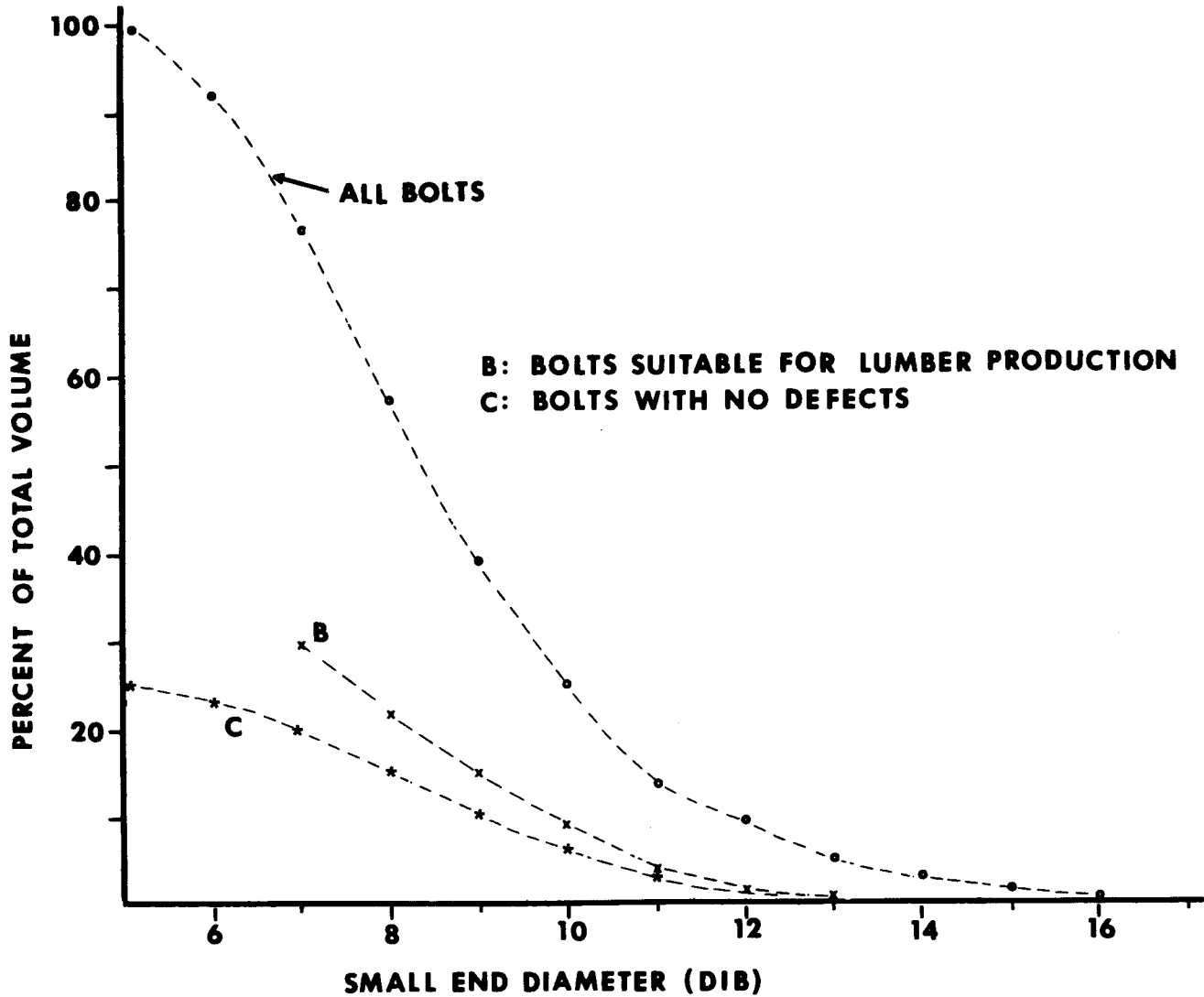
Data were analyzed for each of the five storage yards (see Tables 1-3). No significant difference was found between average bolt diameters, although differences in the amount of shake and sweep were found between some locations.

Figure 1 shows the cumulative volume distribution for bolts in various quality classifications; some criteria defining saw and veneer bolts were established to allow an indication of the relative volume of each that might be expected. For example, assuming that bolts with a small end d.i.b. of 7 inches or larger, without excessive sweep or shake, and with 2 inches decay or less are suitable for lumber production,

<sup>1/</sup>The term woodsrunk as used in this paper is used to describe all material with a small end diameter larger than 4 inches, removed for mill shipment in logging an area.

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then 21.7% of the total number of bolts and 29.1% of the total volume fell into this category. Material assumed to be of veneer quality, that is those bolts with a small end d.i.b. of 8 inches and larger with less than 3 inches of decay and without sweep, made up 20.8% of the total number of bolts and 34.8% of the total bolt volume.



**FIGURE 1**  
**PERCENT OF VOLUME EQUAL TO OR**  
**GREATER THAN DIAMETER**

Table 1

Aspen Bolt Frequency Distribution

Bolt Diameter in Inches	4&5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	Total		
Small End Diameter																					
Number of Bolts	807	671	642	487	297	185	75	37	24	9	7	2	2							3,245	
Large End Diameter																					
Number of Bolts	335	546	647	582	431	299	140	118	68	37	17	10	3	5	2	2	1	2		3,245	
Percent of Wood Volume <sup>1/</sup>																					
--Percent Volume in Each Small End Dia. Class	8.9	14.6	18.9	18.5	14.1	11.2	5.4	3.1	2.4	1.2	1.0	.3	.3							99.9	
--Cumulative Percent Volume	8.9	23.5	42.4	60.9	75.0	86.2	91.6	94.7	97.1	98.3	99.3	99.6	99.9								

Table 2

Occurrence of Decay by Bolt Diameter

Small End Diameter	Number of Bolts with Decay in Each Diameter Class																		Total	
	4&5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		
Diameter of Decayed Area in Inches <sup>2/</sup>																				
1	11	13	8	5	4		1													42
2	30	34	23	14	11	4	1													117
3	31	37	31	25	16	7	2	1												150
4	20	22	22	27	19	10	2	1	2											125
5	17	19	18	23	21	12	3	2	1											116
6		17	5	13	8	7	5	2												57
7			9	4	3	4	3	1	1											25
8				6	1	4	3		1		1									16
9				1	5	3		2	1											12
10						7	2	3	1	1										14
11							1		1	2	1									5
12								2												2
13									2											2
14										1										1
15											1									1
16												1								1
Total Number of Bolts with Decay	109	142	116	118	88	58	23	14	10	4	3	1								686
Percent of Bolts with Decay	13.5	21.1	18.1	24.2	29.6	31.4	30.7	37.8	41.7	44.4	42.9	50.0								3/

<sup>1/</sup>The percent is based on the volume of a cylinder with a diameter equal to the average diameter of both ends of the bolt.

<sup>2/</sup>The size of the decayed area is expressed as the average diameter of the area actually exhibiting decay. In most cases, decay was noted to occur in the centers of the bolts.

<sup>3/</sup>21.1% (686/3,245) of the total number of bolts contained decay.

Table 3

Summary of Shake and Sweep

Small End Log Diameter	Logs with Shake		Logs with Sweep				Total No. of Logs
	No.	Percent	Some		Excessive		
	No.	Percent	No.	Percent	No.	Percent	
4-5	215	26.6	120	14.9	379	47.0	807
6	274	40.8	153	22.8	183	27.3	671
7	260	40.5	147	23.0	137	21.3	642
8	209	42.9	96	19.7	54	11.1	487
9	148	49.8	55	18.5	25	8.4	297
10	89	48.1	23	12.4	8	4.3	185
11	45	60.0	7	9.3	3	4.0	75
12	21	56.8	3	8.1	3	8.1	37
13	16	66.7	1	4.2	3	12.5	24
14	5						9
15	5						7
16	2						2
17	2						2
<b>Total</b>	<b>1,291</b>	<b>39.8</b>	<b>605</b>	<b>18.6</b>	<b>795</b>	<b>24.5</b>	<b>3,245</b>

Table 4

Cross Tabulation of Shake, Sweep, and Decay

	Amount of Sweep					
	None		Some		Excessive	
	% of Bolts	% Volume	% of Bolts	% Volume	% of Bolts	% Volume
Some Shake and Some Decay	6.3	9.3	1.5	1.5	1.4	1.5
No Shake but Some Decay	6.8	8.0	2.5	2.6	2.5	1.8
Some Shake but No Decay	19.0	22.9	5.4	5.1	6.1	4.6
No Shake and No Decay	24.8	25.6	9.2	8.2	14.5	8.8