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WESTERN HEMLOCK LUMBER RECOVERY AT A WESTERN WASHINGTON SAWMILL

by

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During April 1956, a study[1] was made at a western Washington sawmill to determine lumber grades that may be expected from old-growth western hemlock timber. Lumber cut at this mill is not seasoned and most of it is sold surfaced-green. It is the practice at this plant to use the band headrig for producing side-cut lumber and to send the large cants--the full length of the logs--to the sash gang to be cut into 2-inch material. Thus, production in the 2-inch dimensional grades is heavy.

Two hundred and nine logs (table 1) were scaled, graded and followed through the mill, and each piece of lumber was graded and tallied by individual logs. Two-thirds of these logs came from the Olympic Peninsula and the balance from the west slope of the Cascade Range. Logs varied from 16 to 40 feet in length, with the majority in the 32- to 40-foot class.

Test Procedure

Approximately every fourth log coming into the mill was designated as a test log. These logs were numbered consecutively and scaled and graded by a representative of the Grays Harbor Log Scaling and Grading Bureau according to their official rules of February 1954.

1/ Cooperative project of West Coast Lumber Inspection Bureau, Grays Harbor Log Scaling and Grading Bureau, Bureau of Land Management, Bureau of Indian Affairs, and the U. S. Forest Service.

Table 1.--Distribution of western hemlock test logs by commercial log grade and diameter class

Log diameter	Log grades				
	Peeler	No. 1	No. 2	No. 3	All grades
9	--	--	--	2	2
10	--	--	--	4	4
11	--	--	--	4	4
12	--	--	--	7	7
13	--	--	--	10	10
14	--	--	9	3	12
15	--	--	8	4	12
16	--	--	13	3	16
17	--	--	14	3	17
18	--	--	16	5	21
19	--	--	7	4	11
20	--	--	15	6	21
21	--	--	8	2	10
22	--	--	13	--	13
23	--	--	10	--	10
24	1	1	8	--	10
25	--	--	3	1	4
26	1	1	2	1	5
27	--	2	1	--	3
28	1	1	--	1	3
29	1	1	1	1	4
30	3	--	1	--	4
31	--	--	1	--	1
32	1	--	--	--	1
35	--	1	--	--	1
36	--	--	1	--	1
37	--	--	1	--	1
39	1	--	--	--	1
Total	9	7	132	61	209

Since this mill was equipped with a sash gang, resaw, and other machinery that caused lumber from one log to become mixed with other lumber, it was necessary to mark lumber from test logs carefully. Five colors of paint were used. All lumber from the first log was marked red; that from each of the four succeeding logs with separate colors. By the time the color series had been completed, the lumber from the first log had cleared the mill. Men were stationed at the headrig, sash gang, and resaw to be sure that all lumber from the test logs was properly marked.

A representative of West Coast Lumber Inspection Bureau grade-marked on the green chain every board from test logs. Then two men tallied each piece of lumber, using a separate sheet for each log. Lumber was graded according to Standard Grading and Dressing Rules No. 15, Effective March 15, 1956.

Lumber Grade Recovery

Lumber grade recoveries obtained in log grades 2 and 3 are shown in tables 2 and 3 and in figures 1 and 2. Data in these tables and graphs have been rounded to smooth inconsistencies in diameter groups and to strengthen the data where there was insufficient sampling. Recovery data for the 9 Peelers and 7 No. 1 logs in the study are shown in the summary (table 4). Since there were insufficient logs in these two grades, the lumber-recovery data should not be considered as representative.

Log rules used by log scaling and grading bureaus in the Douglas-fir subregion are based on the end product the logs will produce. No. 2 hemlock logs must be capable of producing not less than 65 percent of the net scaled content in Construction or Better lumber. No. 3 logs must be capable of producing not less than 33-1/3 percent of net scaled content in Standard or Better lumber.

Since the log rules are based on prescribed grade recovery of the net log scale, the lumber-recovery data shown in tables 2 and 3 and figures 1 and 2 have been computed on the same basis. In this study the No. 3 Sawmill logs met the minimum requirement for the No. 2 Sawmill grade. Apparently it is difficult to judge the grades of lumber that will be produced from knotty logs.

Ordinarily sawmills on the west side of the Cascades cut a minimum amount of boards. This practice was followed at this mill. Table 5 shows the percentage of the common grades of lumber that was cut into boards during this study.

All lumber data presented in this report are based on volumes and grades obtained on the green chain. Some change in both volume and grade would have been expected if the lumber had been dried and surfaced.

Table 2.--Lumber-grade recoveries in percent of net log scale, No. 2 western hemlock logs

Diameter class in inches	Lumber grade										No. of logs
	B	C	D	Select Merch.	Select Struc.	Construction	Standard	Utility	Economy	Total	
14	8.5	0.0	0.0	2.2	51.7	57.8	16.5	4.4	16.3	157.4	9
15	8.3	2.3	0.0	1.9	46.4	55.5	16.0	8.0	14.8	153.2	8
16	8.1	4.4	0.0	1.7	41.5	53.3	15.5	11.3	13.4	149.2	13
17	7.9	6.3	0.2	1.4	36.8	51.3	15.0	14.5	12.1	145.5	14
18	7.7	8.1	0.3	1.2	32.4	49.5	14.6	17.4	10.8	142.0	16
19	7.5	9.8	0.4	1.0	28.4	47.7	14.2	20.2	9.6	138.8	7
20	7.4	11.3	0.4	0.9	24.7	46.1	13.8	22.7	8.5	135.8	15
21	7.2	12.7	0.5	0.8	21.2	44.7	13.5	25.0	7.5	133.1	8
22	7.1	14.0	0.6	0.5	18.2	43.4	13.1	27.1	6.7	130.7	13
23	7.0	15.1	0.6	0.5	15.4	42.2	12.9	28.9	5.9	128.5	10
24	6.9	16.1	0.7	0.3	13.0	41.2	12.6	30.6	5.2	126.6	8
25	6.8	17.0	0.7	0.3	10.8	40.4	12.3	32.0	4.6	124.9	3
26	6.7	17.8	0.7	0.2	9.1	39.5	12.2	33.1	4.2	123.5	2
27	6.6	18.4	0.8	0.1	7.6	38.9	12.0	34.2	3.7	122.3	1
28	6.6	18.8	0.8	0.1	6.5	38.3	12.0	34.9	3.4	121.4	0
29	6.5	19.2	0.9	0.0	5.6	38.0	11.9	35.5	3.1	120.7	1
30	6.5	19.4	0.8	0.0	5.2	37.8	11.8	35.9	2.9	120.3	1
31	6.5	19.5	0.8	0.0	5.0	37.7	11.7	36.1	2.9	120.2	1
32	6.5	19.5	0.8	0.0	5.0	37.7	11.7	36.1	2.9	120.2	0
33	6.5	19.5	0.8	0.0	5.0	37.7	11.7	36.1	2.9	120.2	0
34	6.5	19.5	0.8	0.0	5.0	37.7	11.7	36.1	2.9	120.2	0
35	6.5	19.5	0.8	0.0	5.0	37.7	11.7	36.1	2.9	120.2	0
36	6.5	19.5	0.8	0.0	5.0	37.7	11.7	36.1	2.9	120.2	1
37	6.5	19.5	0.8	0.0	5.0	37.7	11.7	36.1	2.9	120.2	1

Table 3.--Lumber-grade recoveries in percent of net log scale, No. 3 western hemlock logs

Diameter class in inches	Lumber grade										No. of logs
	B	C	D	Select Merch.	Select Struc.	Construction	Standard	Utility	Economy	Total	
9	0.0	4.6	0.5	2.2	31.7	74.8	10.4	5.4	1.2	130.8	2
10	0.0	4.8	0.4	2.1	30.1	70.9	12.6	10.1	2.1	133.1	4
11	0.2	4.8	0.4	1.8	28.7	67.3	14.6	14.5	3.1	135.4	4
12	0.6	4.5	0.4	1.7	27.4	63.9	16.4	18.6	4.0	137.5	7
13	1.0	4.3	0.3	1.6	26.1	60.7	18.2	22.4	4.8	139.4	10
14	1.3	4.2	0.2	1.5	25.0	57.8	19.7	25.9	5.6	141.2	3
15	1.6	4.0	0.2	1.4	24.0	55.1	21.2	29.1	6.2	142.8	4
16	1.9	3.8	0.2	1.2	23.1	52.8	22.4	32.0	6.8	144.2	3
17	2.2	3.6	0.2	1.1	22.3	50.6	23.6	34.5	7.4	145.5	3
18	2.4	3.5	0.2	1.0	21.5	48.8	24.6	36.8	7.9	146.7	5
19	2.6	3.4	0.1	1.0	20.9	47.1	25.5	38.8	8.3	147.7	4
20	2.8	3.3	0.1	0.9	20.3	45.8	26.2	40.5	8.6	148.5	6
21	2.9	3.2	0.1	0.9	19.9	44.7	26.8	41.8	8.9	149.2	2
22	3.0	3.1	0.1	0.9	19.5	43.8	27.3	42.9	9.1	149.7	0
23	3.1	3.1	0.1	0.8	19.3	43.2	27.6	43.6	9.3	150.1	0
24	3.1	3.1	0.1	0.8	19.2	42.8	27.8	44.0	9.4	150.3	0
25	3.1	3.1	0.1	0.8	19.1	42.7	27.9	44.2	9.4	150.4	1
26	3.1	3.1	0.1	0.8	19.1	42.7	27.9	44.2	9.4	150.4	1
27	3.1	3.1	0.1	0.8	19.1	42.7	27.9	44.2	9.4	150.4	0
28	3.1	3.1	0.1	0.8	19.1	42.7	27.9	44.2	9.4	150.4	1
29	3.1	3.1	0.1	0.8	19.1	42.7	27.9	44.2	9.4	150.4	0
30	3.1	3.1	0.1	0.8	19.1	42.7	27.9	44.2	9.4	150.4	1

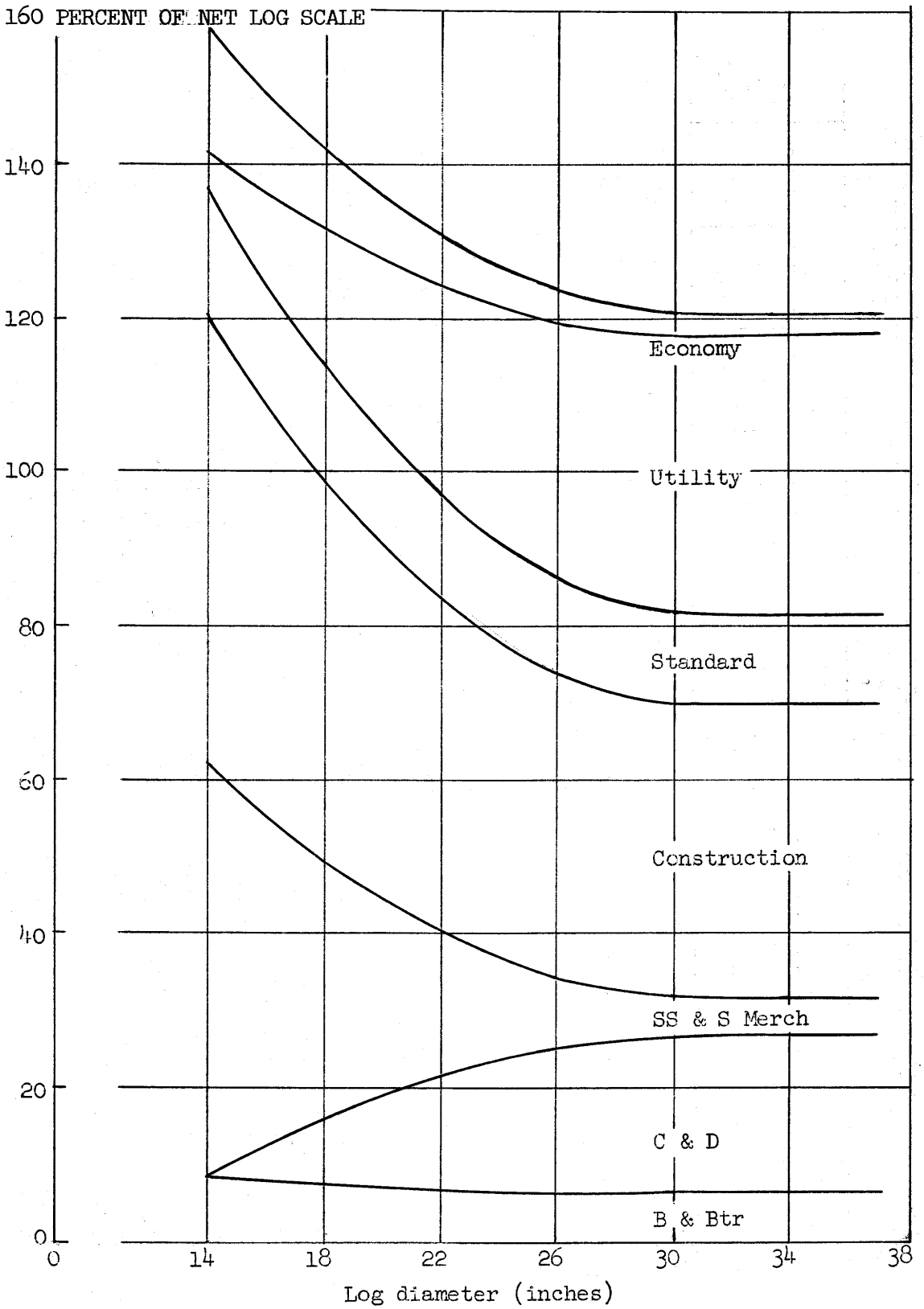

Figure No. 1.--Cumulative grade recoveries in percent of net log scale, No. 2 western hemlock logs

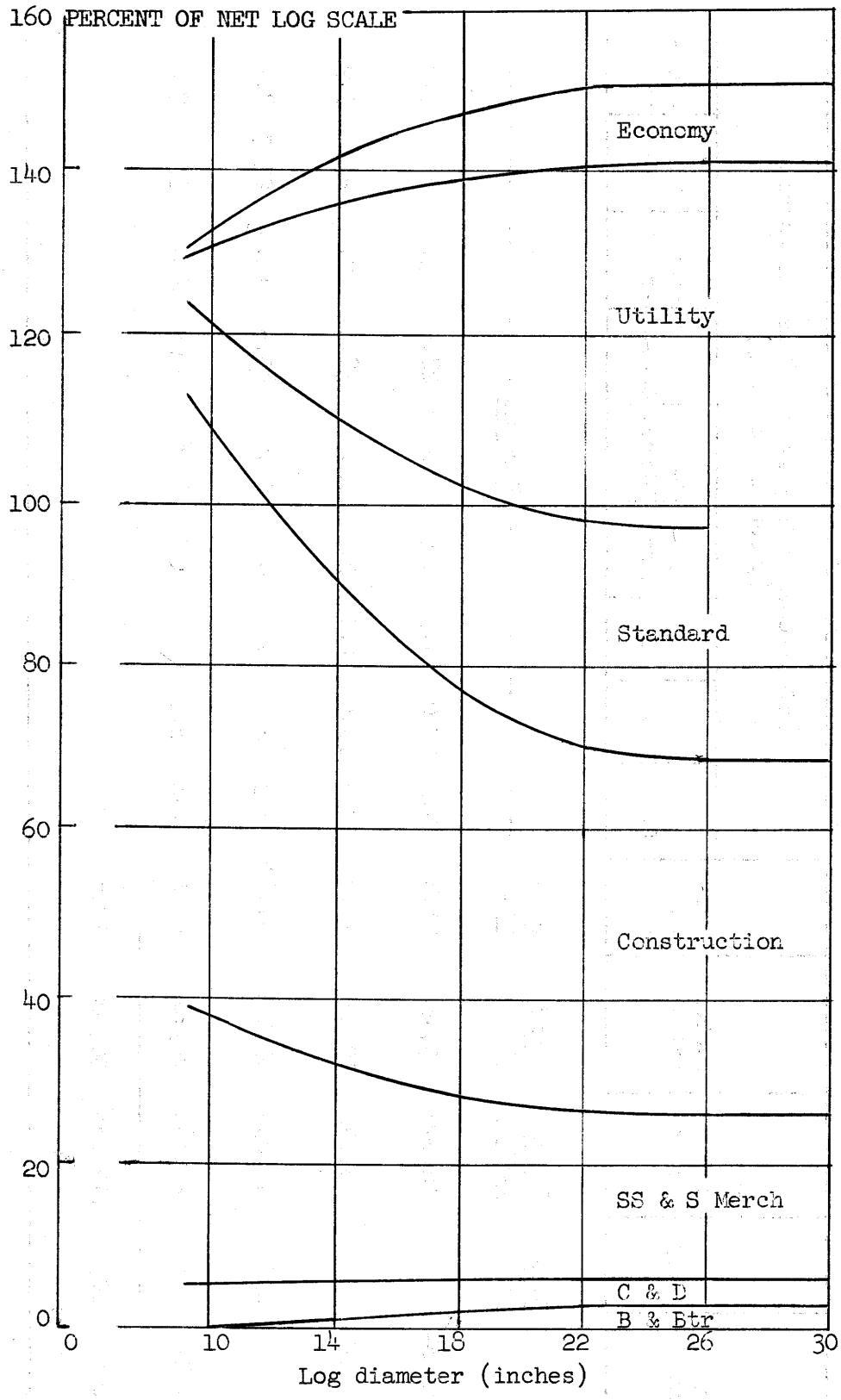

Figure No. 2.--Cumulative grade recoveries in percent of net log scale, No. 3 western hemlock logs

Table 4.--Summary of volume and lumber-grade recovery for all test logs

Log grade	Logs	Net log volume	Lumber tally	Over-run	Grade recovery in percent of net log scale (green chain tally)								
					B and Btr.	C	D	Sel. Merch.	Sel. Struc.	Const.	Stand-ard	Util-ity	Econ-omy
	Num-ber	Board-feet	Board-feet	Per-cent	Percent								
Peeler 1/	9	12,040	13,460	11.8	14.1	29.0	0.9	0.5	6.0	28.5	3.8	21.1	7.9
No. 1 1/	7	8,090	10,293	27.2	7.8	16.5	1.5	0.3	12.3	38.8	18.0	26.1	5.9
No. 2	132	76,854	103,471	34.6	7.3	12.0	0.4	0.8	23.2	45.5	13.6	23.7	8.1
No. 3	61	20,182	29,282	45.1	2.1	3.7	0.2	1.1	22.6	51.4	23.1	33.7	7.2
Total	209	117,166	156,506	33.6									

1/ Insufficient logs available for adequate sample

Table 5.--Board volume in percent of common lumber

Log grade	Lumber grade			
	Construction	Standard	Utility	Economy
	Percent			
No. 2 Sawmill	4.5	3.0	2.1	3.4
No. 3 Sawmill	4.2	5.4	7.9	2.7

Overrun

Overrun averaged 35 percent for the No. 2 logs and 45 percent for the No. 3 logs. Overrun by diameters can be read directly from the top curve in figures 1 and 2. Often the Economy grade of lumber is not included in figuring overrun. If this appears to be desirable, overrun for Utility and Better lumber can be obtained from the next to the top curve of the same two figures. Overrun was high on No. 3 logs. This is due partly to more taper in the top rough logs and the practice of making rough-cut deductions on these logs. Deduction for cull amounted to 10 percent in the No. 2 logs and 20 percent in the No. 3 logs.