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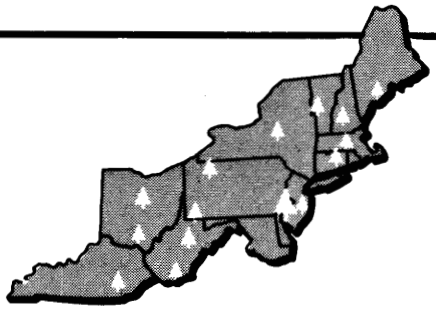

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YIELD TABLE FOR HARDWOOD BARK RESIDUE

Abstract. Bark residue weights are tabulated for eight species of hardwood sawlogs according to log volume by the Doyle, International ¼-inch, and Scribner decimal C log rules. Factors are provided for converting from weight in pounds to volume in cubic yards.

Hardwood sawmills that have debarkers generate large amounts of bark residue. The term "bark residue" as used here includes bark, dirt, and wood fiber removed from the log in the debarking process.

Bark residue from some mills ends up in the dump or incinerator; residue from other mills is processed into useful garden and farm products. No matter how the bark residue is used or disposed of, the sawmiller needs to know how much of it is produced.

This note was prepared to give a practical tool for estimating quantities of bark residue. The table shows the weight of bark residue that can be expected from eight species of hardwood sawlogs according to log size by any one of three log rules: Doyle, International ¼-inch, or Scribner decimal C. And conversion factors are offered for converting from weight of bark residue in pounds to volume in cubic yards.

Procedure

At four sawmills, two with rosserhead debarkers and two with floating cutterhead debarkers, 686 logs were numbered, scaled, and weighed before and after debarking (fig. 1). The weight difference was considered the weight of bark residue. Cubic-yard samples were collected by hand from the bark conveyor and weighed for determining conversion factors for volume. Smaller samples of bark residue were taken for laboratory analyses of moisture content.

Results

The average green weight of hardwood bark residue per 1,000 board feet from all study logs was:

Log rule	*Pounds*
Doyle	1,534
International ¼-inch	1,164
Scribner decimal C	1,255

This weight of residue represented an average of 11 percent of total log weight. The moisture content of bark residue (oven-dry basis) averaged 68 percent.

Since there were differences in bark residue weights due to species, the species are reported separately in the table. The three species that showed no differences—chestnut

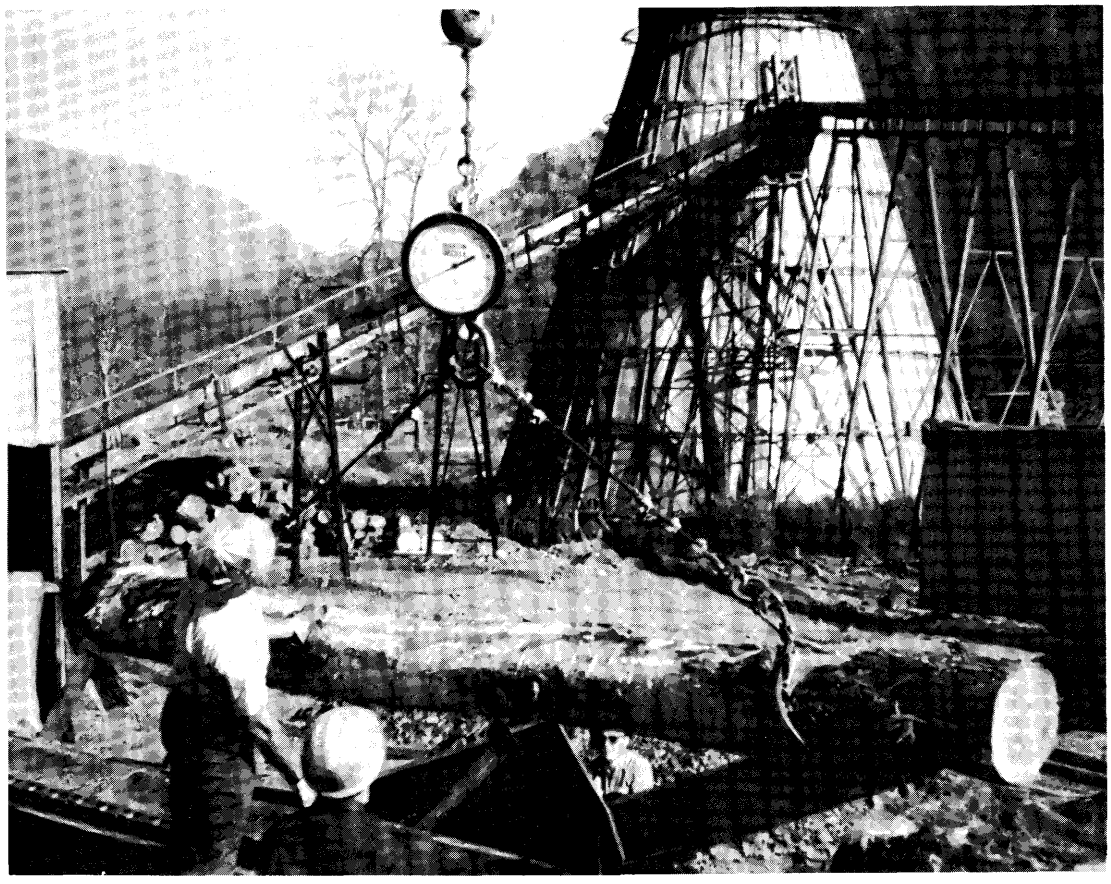

Figure 1.—Method of weighing sawlogs with truck-mounted crane and in-line scale.

oak, white oak, and hickory—are presented as a species group.

Differences also showed up between operators. One operator took more than twice as much bark residue off the same species of logs with the same machine as another operator did. However, it was not practical to classify operators; so the tabular data for each species or species group are shown as the average of the operators in the study. The data are also averaged for the two types of debarkers tested, because differences were not found due to debarker type.

A part of the weight of bark residue is moisture. The table values are green weights according to the average moisture content determined for each species and species group. The moisture contents were (oven-dry basis):

Species	*Percent*
Red oak (*Quercus* spp.)	63
Yellow-poplar (*Liriodendron tulipifera*)	96
Chestnut oak (*Quercus prinus*), white oak (*Quercus* spp.), and hickory (*Carya* spp.)	59
Maple (*Acer* spp.)	55
Beech (*Fagus grandifolia*)	68
Basswood (*Tilia americana*)	114
Average	68

Estimates of bark residue weight can be made from the table for any period of time. First an average log size for that period of time is calculated from log-tally sheets. Then the weight found opposite that average log volume in the table is multiplied by the number of logs debarked. The result is the total green weight of bark residue produced in that period of time.

If the sawmill operator wishes a volume estimate, he simply converts the green

Bark residue weights per log by log volume and species, in pounds[a]

Log volume (board feet)	Red oak	Chestnut oak, white oak and hickory	Maple	Beech	Yellow-poplar	Basswood
			DOYLE LOG RULE			
20	70	64	68	35	53	71
40	92	81	89	57	74	87
60	113	99	108	77	94	103
80	135	116	126	96	115	119
100	157	134	142	114	136	134
120	179	151	157	130	157	150
140	201	168	169	146	177	166
160	223	186	181	160	198	182
180	245	203	190	172	219	198
200	266	221	198	184	240	213
220	288	238	204	194	260	229
240	310	255	208	203	281	245
260	332	273	211	210	302	261
280	354	290	212	217	322	277
300	376	308	212	222	343	292
			INTERNATIONAL ¼-INCH RULE			
20	51	47	45	17	37	60
40	72	64	67	38	55	74
60	92	81	88	57	73	88
80	112	97	107	75	91	102
100	133	114	124	92	109	116
120	153	131	140	109	127	130
140	173	148	154	124	145	144
160	193	165	167	138	163	158
180	214	182	178	151	181	172
200	234	198	188	164	199	186
220	254	215	196	175	217	200
240	274	232	202	186	235	214
260	295	249	207	195	253	228
280	315	266	210	203	271	242
300	335	283	212	211	289	256
			SCRIBNER DECIMAL C RULE			
20	55	50	51	20	39	62
40	76	68	73	41	58	77
60	97	85	93	62	78	92
80	119	103	112	81	97	106
100	140	120	130	99	117	121
120	161	138	145	115	137	136
140	183	155	159	131	156	151
160	204	173	172	146	176	165
180	225	190	182	159	195	180
200	247	208	192	172	215	195
220	268	225	199	183	234	210
240	289	243	205	193	254	224
260	311	260	209	202	273	239
280	332	278	212	210	293	254
300	353	295	212	217	312	269

[a] Green weight at average moisture content for each species and species group. Values were computed using regression equations.

weight in pounds to volume in cubic yards by dividing by the following conversion factors (bulk density of hardwood bark residue, pounds, green, per cubic yard) :

Species	*Conversion factor*
Basswood	250
Hickory	287
Yellow-poplar	419
White oak	439
Chestnut oak	457
Red oak	509
Maple	625
Beech	717
Average	474

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This study was made with the cooperation of four sawmills in West Virginia: Pardee Curtin, Frazee Lumber Company, Mullenax Lumber Company, and Hinchcliff Products Company.

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