WEIGHT LOSS OF STORED JACK PINE PULPWOOD

O. F. Hall and T. D. Rudolph

During the past ten years weight has come to be used increasingly as the basis for buying pulpwood, replacing the older standard method of the scaled cord. Weight is used extensively in the southern states. It is used at the present time by two Minnesota companies in the purchase of aspen and jack pine pulpwood. Where pulping processes demand green wood, weighing offers advantages by speeding the measuring process, eliminating the need for personal judgments of closeness of stacking, and providing an incentive for delivering wood as soon as possible after cutting.

Although the pulpwood seller may suffer some loss of income if he delays delivery too long and so allows the wood to lose some of its natural moisture, some delays are unavoidable and others may be desirable for efficient logging. Therefore pulpwood sellers have needed more information about how rapidly the weight loss takes place and how great are the values involved.

During the past year and a half, a study has been conducted on the rate of weight loss in piled jack pine pulpwood during different seasons of the year. From July 28, 1955, to July 27, 1956, pulpwood sticks were cut at two-month intervals from a 45-year old stand of jack pine on the Cloquet Experimental Forest in northeastern Minnesota. At each cutting five sticks were placed in a pile and covered with other sticks as shown on the right in Figure 1. These sticks represented the drying condition "inside the pile." At the same time five other sticks were placed in a single rank on two stringers, as shown in the figure on the left, to represent sticks on the top and at the ends of the pile.

All sticks were weighed at two-month intervals from the time they were cut until November 23, 1956. The weighing was done initially on a suspended Fairbanks-Horse double beam scale and later on the platform scale shown in Figure 1.

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2/ Associate Professor and Research Assistant, respectively, University of Minnesota School of Forestry.

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In the analysis of the data the weight of each five-stick sample at each weighing date was calculated as a percentage of the weight when cut. The trends of weight loss for wood cut on three of the seven cutting dates are shown in Figure 2. The trend lines in the graph clearly show, as would be expected, that weight is lost much more rapidly in summer than in winter, in fact more than twice as fast, as shown by the figures in Table 1. Statistical analysis showed the differences in the seasonal rates to be highly significant (1% level of probability). It must be remembered that the loss from an entire pile of wood, with some sticks exposed and others inside, would have been intermediate between the two trend lines given for any one cutting date.

The seasonal difference in rate of drying is much greater for exposed wood, since the exposed wood actually gained weight very slightly in the winter. Presumably the exposed wood lost some moisture, as did the inside sticks, but the loss was more than counterbalanced by the accumulation of ice and snow which could not be removed. In handling the sticks no effort was made to treat them differently than in ordinary logging—all ice and snow easily brushed off was removed, but no extraordinary effort made to remove it.

Table 1. Average Monthly Weight Losses of Freshly Cut Wood

<table>
<thead>
<tr>
<th>Inside Wood</th>
<th>Exposed Wood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter Loss</td>
<td>Summer Loss</td>
</tr>
<tr>
<td>1.41%</td>
<td>3.27%</td>
</tr>
</tbody>
</table>

The differences in the weight losses for the two drying conditions proved to be significant by statistical test. Stick diameter did not seem to be related to rate of moisture loss, but during the summer there was a tendency for sticks with a higher initial moisture content to lose weight more rapidly, as might be expected.

The limited significance of this study must be emphasized. Without further research the results can be applied to only jack pine. Furthermore, because of differences in weather conditions from year to year and differences in drying conditions from place to place in the woods, considerable variation from the rates found here might be shown by further testing.

In conclusion, it can be seen that there is a definite monetary loss in delaying sale of cut pulpwood by weight, and that the loss is considerably greater in the summer than in the winter.

2/ These values were calculated from a price of $3.70 per thousand pounds and a cord weighing 4600 pounds.

4/ The exposed wood gained weight slightly in the winter just after being cut.