CHEMICAL TREATMENT AND
SEASONING OF THICK
BEECH STOCK

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CHEMICAL TREATMENT AND SEASONING OF THICK BEECH STOCK

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Because thick beech stock generally splits and checks badly during air seasoning, beech is often difficult to market or to utilize in the manufacture of wood products. For example, the wood bowls used as containers for some brands of shaving soap are turned mostly from birch. Beech makes an attractive bowl, and probably would be used more commonly for this product were it not for the great amount of checking and splitting in air seasoning. Reducing the seasoning defects would make the use of thick beech stock practical for this and many other purposes. Tests made at a turning mill in Maine show that it is possible to season beech shaving-bowl stock with no greater checking and splitting than in birch.

The seasoning process tested involved treatment with buffered sodium chloride, a proprietary chemical. 3 The chemical consists principally of common salt, plus a small amount of corrosion-inhibiting chemicals. The tests were made at the plant of the Brewer Manufacturing Company, Old Town, Me. Other organizations taking part in the experiment were the Bay Chemical Company, Inc., New Orleans, La.; the University of Maine, Orono; the Northeastern Forest Experiment Station, Philadelphia; and the Forest Products Laboratory, Madison, Wis. 4

The material used in the experiment was 1,600 green beech bars about 2-1/8 inches thick, 3 to 4-5/8 inches wide, and 4 to 5-1/2 feet long. These were divided into four comparable groups. Each group was given a different treatment and was made into a separate pile for air seasoning. Three of the groups were treated with the chemical, and the fourth was untreated, to serve as a control.

1 Original report dated April 1948.
2 Maintained at Madison, Wis., in cooperation with the University of Wisconsin.
3 Produced by the Bay Chemical Company, Inc. The reporting of the results obtained does not constitute an endorsement of this product.
4 Acknowledgment is also made to Ray Collett and Don Haskell of the Brewer Manufacturing Company and Prof. F. K. Beyer of the University of Maine, who assisted in the study.

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Three different ways of applying the chemical were tried: Dry spreading, spraying, and dipping. For the dry spreading (fig. 1) the green beech bars, after a light sprinkling with water, were solid piled, each layer covered with the chemical. The pile was covered with canvas and was allowed to stand for 6 days. About 150 pounds of the chemical were used per thousand board feet. This application was heavier than generally used, and a lighter application probably would have been sufficient. For the dipping and spraying a saturated aqueous solution of the chemical was thickened with cornstarch. The dipped bars (fig. 2) were piled for air seasoning immediately after dipping. The bars that were sprayed were first piled for seasoning, then the solution was applied by inserting a spray nozzle between the courses of the pile (fig. 3). The amount of chemical applied by dipping and spraying was somewhat less than 75 pounds per thousand feet, because the mixture of chemical and starch was not sufficiently viscous to adhere well to the surfaces of the bars.

The air-seasoning piles were well made, with good foundations, adequate ground clearance, and protective roofs. The piles were about 6 feet wide, 7 feet high, and 5 feet long, and were made without slope or pitch. The piles faced north, with the ends of the bars flush with this face of the pile. There were three vertical tiers of nominal 1-inch stickers, one flush with the north ends, one near the center, another at the south ends. The south ends of many bars projected because of the variable lengths (figs. 4 and 5).

The air seasoning was started in late June and early July and was continued for about 82 days. At the end of this period the average moisture content of the stock was approximately 20 percent. At this time the piles were taken down and the surface and end checks and splits present in each bar were measured and recorded in terms of total inches of length. Surface checks occurring in the middle 2-foot portion or in the end 1-foot portions of the bars were tallied separately. Splits were defined as those surface checks that extended to the end of the bar and joined with end checks. The north and south ends of the bars were tallied separately for defects. The effectiveness of a chemical treatment in reducing checking and splitting was evaluated by comparing the total amounts present in the stock of the different groups.

All three groups of beech bars treated with the chemical had fewer seasoning defects than the untreated bars (table 1). The results obtained by dry spreading were markedly the best. The values for end checks are less important than those in the other categories because practically all end checks would be removed in the normal trimming operation, in which about 1-1/2 inches are cut from the end.

After air seasoning the stock was kiln dried to a moisture content of 5 percent, in 18 days. An initial kiln condition of 170° F. and 34 percent relative humidity was used, with a final condition of 180° F. and a low relative humidity.

The last phase of the experiment was a factory test to determine the number of perfect shaving-soap bowls that could be obtained from the 4-5/8-inch bars in each group. The yield from regular birch bars, air seasoned at about the same time, and kiln dried in the same charge as the beech, was also studied. Assuming that the yield of perfect bowls is affected inversely as the number of bowls rejected because of seasoning defects, the data in table 2 show that treatment of the beech bars with the chemical -- by spraying, dipping, or dry spreading -- accomplishes a final yield of shaving bowls reasonably comparable to that of birch. There were no significant differences between the yields from the regular birch bars and the beech bars treated by dry spreading of the chemical.

The results of the experiment demonstrated that the usual amount of checking and splitting in 2-inch beech during air seasoning can be considerably reduced. The
reduction in seasoning defects was accomplished by applying a chemical to the green stock. With this chemical treatment the defects that developed in 2-inch beech during air seasoning were comparable to those developed in birch. The more successful air seasoning of beech permits its use in products where it was formerly barred because of seasoning defects. The commercial use of this chemical will depend on the perfection of the technique of the process and on the economical aspects.
Table 1.--Defects in 2-inch beech bars after air seasoning, according to treatment

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Total length of surface checks:</th>
<th>Total length:</th>
<th>Total length:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inches</td>
<td>Inches</td>
<td>Inches</td>
</tr>
<tr>
<td>Untreated</td>
<td>1,501</td>
<td>2,442</td>
<td>2,440</td>
</tr>
<tr>
<td>Chemically treated by:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spraying</td>
<td>563</td>
<td>1,314</td>
<td>1,906</td>
</tr>
<tr>
<td>Dipping</td>
<td>243</td>
<td>811</td>
<td>1,307</td>
</tr>
<tr>
<td>Dry spreading</td>
<td>137</td>
<td>280</td>
<td>419</td>
</tr>
<tr>
<td>Basis: 1,600 bars.</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Table 2.--Shaving-soap bows rejected for air-seasoning defects

<table>
<thead>
<tr>
<th>Material</th>
<th>Bowls rejected</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number per M linear feet</td>
</tr>
<tr>
<td>Birch</td>
<td></td>
</tr>
<tr>
<td>Regular stock</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Beech</td>
<td></td>
</tr>
<tr>
<td>Chemically treated by:</td>
<td></td>
</tr>
<tr>
<td>Dry spreading</td>
<td>62</td>
</tr>
<tr>
<td>Dipping</td>
<td>84</td>
</tr>
<tr>
<td>Spraying</td>
<td>99</td>
</tr>
<tr>
<td>Untreated</td>
<td>152</td>
</tr>
<tr>
<td>Basis:</td>
<td></td>
</tr>
</tbody>
</table>

Based on factory tests.
Figure 1.--Applying the chemical by dry spreading. Building a solid pile with alternate layers of bars and chemical.

Figure 2.--Applying the chemical by dipping in a saturated solution of the chemical thickened with starch.
Figure 3.--Applying the chemical by spraying.

Figure 4.--North end of the air-seasoning piles.
Figure 5.--The uneven south end of the piles. Projecting ends invite checking and splitting.

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