# RECOMMENDED PRACTICE FOR CONTROLLING SAP STAIN IN AIRCRAFT YELLOWPOPLAR LUMBER

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DIVISION OF FOREST PATHOLOGY
MADISON, WISCONSIN
IN COOPERATION WITH THE
FOREST PRODUCTS LABORATORY
FOREST SERVICE

# RECOMMENDED PRACTICE FOR CONTROLLING SAP STAIN IN AIRCRAFT YELLOWPOPLAR[1] LUMBER

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Sap stain or blue stain in yellowpoplar is caused by fungi that discolor the wood, but ordinarily do not weaken it. It is not decay nor a stage of decay. However, incipient decay sometimes occurs with heavy stain and this association has led to some confusion. If the lumberman furnishes stained material he endangers its acceptance and complicates the job of the inspector and manufacturer in producing safe aircraft. Both stain and decay infections can be controlled by methods that are cheap, and have stood the test of years of experience in the South. If the recommended practices are followed during the warmer parts of the year when stain is apt to occur, there should be less need for future questions as to the acceptance of stained material.

## Avoid infection in logs

Much of the stain in lumber actually starts in the logs before they reach the saw. It gets in most often through the ends, but also where the bark has been knocked off. To prevent log stain the following is advised:

(1) Get logs in from the woods promptly and saw them within a few days, if weather is warm.

(2) Where prompt sawing is not possible, logs can be protected for some weeks by treating the ends and barked places with one of the commercial stain-preventive chemicals.[3] These can be most easily applied with an ordinary garden sprayer (fig. 1, A), but can also be put on with a brush. For best results, they should go on within 24 hours after the logs are bucked. Tests have indicated that any of the following proprietary chemicals can be used:

| | | | | | | |
|---|---|---|---|---|---|---|
| Dowicide H[4] | – | 30 | pounds | per | 100 | gallons of water |
| Lignasan | – | 8 | " | " | " | " " " |
| Permatox 10S | – | 40 | " | " | " | " " " |

In places and seasons in which stain is especially hard to control, the amounts may be advantageously increased by as much as one-sixth to one-third.

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1/ The same practice would be satisfactory for sweetgum, and so far as known for other hardwoods.

2/ Division of Forest Pathology, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, in cooperation with the Forest Products Laboratory, maintained by the Forest Service, United States Department of Agriculture, at Madison, Wis., in cooperation with the University of Wisconsin.

3/ If it is desired to prevent end checking, a moisture-proof coating can be put on after the stain-preventive treatment. Information about such end coatings can be obtained from the Forest Products Laboratory, Madison, Wis.

4/ Not advised if pine is also to be treated. For treating softwoods, see Forest Products Laboratory Technical Note 225.

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The amount of chemical required to treat logs should cost only 5 or 6 cents a thousand feet log scale. The chemicals are distributed by the following companies:

Dowicide and Permatox 10S, by A. D. Chapman & Co., Chicago, Ill.
Lignasan, by E. I. du Pont de Nemours & Co., Wilmington, Del.

Prevent stain in lumber

(1) Get lumber into the kiln within 72 hours from the saw. Kiln temperatures kill most fungi, and no further spread of any fungus can take place if the wood stays below 20 percent moisture content.

(2) If the lumber is to be kiln-dried but only after some delay, dip it as it comes from the saw, or at least within 24 hours. The chemicals for dipping are the same as advised for logs but at different concentrations. For Dowicide H the strength should be 6 pounds per 100 gallons of water; for Permatox 10S, 10 pounds; and for Lignasan, 2 pounds, or only 1 pound if 16 to 20 pounds of borax also are added. These are the usual strengths, but here again yards that have had more stain than average may do better to use somewhat larger amounts. Powdered borax (preferably dissolved in warm water) can be used alone on poplar lumber. The recommended amount is 32 pounds per 100 gallons. Promptly dipped lumber can be bulk-piled with a fair degree of safety for 2 weeks or more while waiting for the kiln-drying.

(3) If the lumber is to be air-seasoned, dip it within 24 hours from the saw and open pile on narrow dry stickers with care to get air circulation under and through the pile. The lumber after dipping should be protected from heavy rains that would wash off the chemical, and the piles should be roofed. Dipping cannot be expected to offset careless handling. More detailed advice as to seasoning methods is given in Forest Products Laboratory Mimeograph R899-8.

(4) For any lumber for which neither prompt kiln-drying nor dipping is possible. the best possible air-seasoning practice should be followed. Some operators report that end racking ("finger racking") has enabled them to avoid stain in poplar without dipping. This method and other quick-drying procedures, as well as their limitations, are described in the above-mentioned mimeograph. With proper drying methods, most mills should find dipping unnecessary for winter-cut lumber.

(5) Wood that once has been dried must be kept dry. Anti-stain dipping is not equivalent to wood preservation, and either dipped or kiln-dried wood can stain if it becomes wet at some future time.

Dipping technique

At large mills the dipping vat is commonly built into the sorting table at some convenient point so that the grades of stock not to be dipped can be pulled off before they reach the vat (fig. 1, B). At small mills a vat for hand-dipping is generally built, which is simply a trough large enough for the items that are to be dipped. The lumber is carried to it by hand or on rolls (fig. 1, C). Both the mechanical and the hand-dipping vats can be made of wood. Both need a wide drain board from which the excess solution can run back into the vat; if boards are dropped in with a splash and taken out without letting them drain properly, the waste of chemical is considerable and the men who do the work get unnecessarily wet. A hook can be used for taking the boards out of the hand vat. A third type of vat, usable at small mills and in some ways better than the ordinary vat, is the gravity type shown in figure 1, D. In this, skids are so installed that the fresh boards put on them slide down into the vat and push out those already dipped. It has the one disadvantage that it is difficult to build it high enough to allow a wide drain board; a drain trough for salvaging excess solution may be practicable.

Detailed suggestions for constructing both mechanically- and hand-operated vats are given in Forest Products Laboratory Mimeograph R899-15. Suggestions can also be obtained from the companies that supply the chemicals.

The chemicals should be dissolved in a tank or barrel of known capacity before putting them into the vat. This is necessary to insure proper dipping concentrations. When the water is cold it may take some time and stirring to get it into solution. There should always be enough solution in the vat to make it easy to get boards clear down into it; this can be done by rolls or wheels in a mechanical vat (fig. 1, B). Before enough sawdust accumulates in the vat to hinder dipping, the vat should be cleaned out and the next start made with entirely new solution.

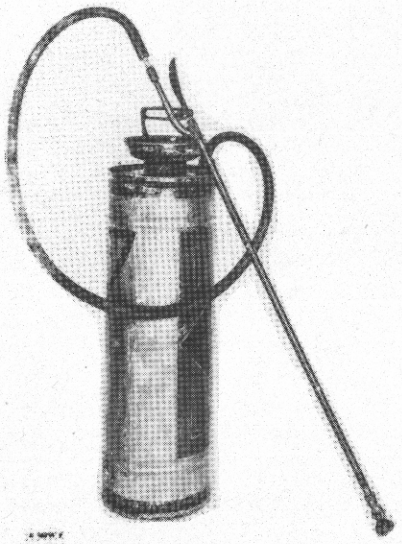
The dipping vat should be protected from rain; if a vat has a properly wide drain board a moderate rain will put enough water into it to seriously weaken the solution.

It is desirable to dip the stickers as well as the lumber, but they should be dried before they are used. This reduces the possibility of dote and sticker stain beneath the stickers.

Costs for chemicals are about 15 cents per thousand board feet of 4/4 lumber dipped, if there is no waste. To this must be added a labor charge at mills that do hand dipping; one man can ordinarily dip no more than 7 thousand board feet of inch lumber per day.

Precautions in use of stain-preventive chemicals

In the solid form or in high concentrations, such as for log sprays, all of the antistain chemicals, except borax, may cause burns if allowed to remain on the skin. Ordinary caution should prevent trouble; these chemicals have been in use in the South for a number of years with no known cases of injury except where carelessly handled. Men who spray logs should avoid breathing the spray. For the men who do the dipping, waterproof aprons and gloves or hand pads of oiled material (if rubber cannot be had) are helpful, and the use of heavy oil or grease on the skin is reported to have protective value. Washing with soap and water is the best method of removing any solution that has come in contact with the skin. The occasional man who is especially sensitive to the chemical that is being used should not attempt to do treating or to handle freshly dipped lumber. By the time the dipped lumber reaches the seasoning yard little trouble will be encountered.

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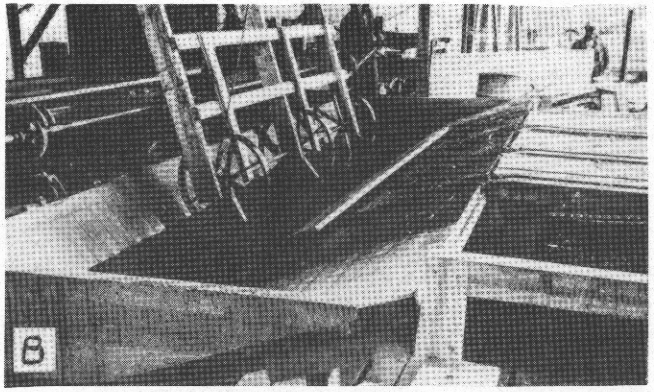




Figure 1.--A, An efficient, portable type of spray equipment for treating logs. B, A common type of mechanical dipping vat. C, A good hand dipping vat, equipped with splash board and drain apron. D, A gravity-fed dipping vat, requiring less contact of workmen with the treating solution. A disadvantage is that a drain apron cannot be attached without stopping movement of the boards.