

Revised  
March 1982



# FOREST PRODUCTS UTILIZATION

## TECHNICAL REPORT No. 6

### A CHECKLIST FOR DRYING SMALL AMOUNTS OF LUMBER

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For many small woodworking companies and hobbyists, questions frequently arise as to proper procedures in processing the wood from the log to the ready-to-use dry lumber. This report suggests a list of procedures developed from the experience of personnel from the U.S. Forest Products Laboratory and State and Private Forestry. If these procedures are followed, there will be little, if any, loss from drying degrade.

(1) All logs should be end-coated as soon as possible after felling to prevent end checking. Aluminum paint in a spar varnish base or asphalt roofing cement work well for several months. However, the sooner the log can be sawn, the better.

(2) If the logs will not be sawn immediately, damage from insects, stain, and decay may result, especially during warm weather. To minimize this problem, check with your state forestry officials for their recommendations on use of insecticides and fungicides or keep logs submerged or continuously sprinkled with water in lieu of insecticides and fungicides.

(3) Determine what lumber sizes you will need. As a general rule, the drying results will be best if the thickness is no greater than 2 inches. If you need thicker material for turnings, it is better to saw 1-inch-thick boards, dry them, and glue them back together into thicker pieces. Thicknesses less than 1 inch may lead to warping difficulty during drying. If you are going to use polyethylene glycol (PEG),\* frequently used for cross section disks or carving stock, use it right after sawing and omit steps 4 through 9.

(4) Find a sawmill that can do the work needed. Again, state forestry officials may be of help. The more accurate the sawn thickness, the less wood wasted and the more uniform the drying job. If the sawn lumber is quite variable in thickness, one or both faces of the thicker material may be jointed or planed to bring it down to size.

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\* PEG is a chemical used by hobbyists to stabilize wood so it won't swell or shrink.

(5) Decide where you want to put your lumber for air drying--not too exposed to strong wind, but not too sheltered either. Avoid areas where grass or weeds might block air flow in the lower layers. Use bricks or cement blocks to keep the lowest layer off the ground.

(6) Immediately after sawing, the lumber should be stacked in neat layers (with the thicker material on the bottom since it will be "done" last) with each layer consisting of only one thickness of lumber (Fig. 1). Spacers, called stickers, running perpendicular to the board lengths and spaced every 12 to 18 inches along the lumber, separate each layer of lumber. Make certain stickers support the board ends. (With 12-in. spacing, 8-ft boards would require nine stickers per layer. If the pile is 4 ft wide, the stickers would be 4 ft long.) The purpose of the stickers is to permit air to move through the lumber pile and to keep the lumber flat.

(7) At this point, it would be wise to check the ends of the thicker boards and make sure the end coatings are still intact; if not, use some more of the coating from step No. 1.

(8) Lay another course of stickers on the top layer and cover the pile with a sheet of plywood or old boards to protect the top layers from the sun and repeated wetting from rain. If you feel that warping might be a problem, you can place a lot of weights, rocks, etc., on top of the pile cover.

(9) In warm, not too humid weather, the 1-inch lumber will be fairly well air dried (15 to 20 pct moisture content) in 45 to 60 days (2-in. lumber, 60 to 90 days). In the winter lumber may require twice as long to dry. Not much drying will occur after about 60 days of good drying weather. BUT IT IS NOT READY FOR USE INDOORS. For these applications, further drying is necessary. (For constructing unheated garages, barns, or out buildings, air drying alone is adequate.)

(10a) If you can find a commercial kiln-drying operation, see if they can dry your lumber the rest of the way (6 to 8 pct moisture content for indoor use in most of the U.S.). Make sure you will get a stress-relief period; no stress relief causes saw pinching when dried boards are ripped, as well as other problems.

(10b) Although some people have dried lumber in their attic, this procedure is not recommended as a substitute for kiln drying. However, a solar kiln--a small, plastic-walled greenhouse with a fan to circulate air and a few holes in the wall to let out moisture--is a suitable substitute for commercial kiln drying. A month or longer during cold or cloudy weather in a solar kiln will finish drying most previously air-dried woods. If the wood is not sufficiently dried when used or is allowed to pick up moisture by poor storage (i.e., not low enough humidity), you may experience shrinking, warping, or checking in use. Try to keep the temperature in the solar dryer (on the average) about 15° F above the average outdoor temperature at the end of drying or during storage. You should be able to store lumber in the solar dryer indefinitely with this temperature difference. If you do your own drying, it is suggested that you measure the moisture content of wood so you can determine when the wood is dry enough to use. Several methods

are described in Reitz' "Storage of lumber." (See publication list at end of this report.) One approximate method is to saw a piece 1-1/2 to 2-feet long from several wider boards; the cut should be made at least 6 inches from any knot or other defect. From the freshly cut end of the board, cut off a section approximately 1 inch in length along the grain. Measure the width of this section (width of the board) to within 1/64 inch and then place it near a radiator, hot air register, or a stove for at least a day. If no checks appear on the ends and no measurable shrinkage in width occurs, the wood is uniformly dry to a moisture content of about 7 or 8 percent.

(11) If, at any time, difficulty is experienced, check with a knowledgeable person--perhaps your state forester's office can help--or your local library. You may also wish to write to the U.S. Forest Products Laboratory, P.O. Box 5130, Madison, Wis. 53705, for a needed report.

#### Some Useful Publications

##### A. Log Treatments

U.S. Department of Agriculture, Forest Service.

1977. List of manufacturers and dealers for log and lumber end coatings that reduce checking and splitting. Forest Products List 80-017.

##### B. Sawing

Malcolm, F. B.

1965. A simplified procedure for developing grade lumber from hardwood logs. USDA For. Serv. Res. Note FPL-098.

##### C. Polyethylene Glycol

Mitchell, H. L.

1972. How PEG helps the hobbyist who works with wood. USDA For. Serv., For. Prod. Lab (\$1.25, Supt. of Doc., U.S. Gov. Printing Office, Washington, D.C. 20402).

##### D. Drying and Storage

Bois, P. J.

1977. Constructing and operating a small solar-heated lumber dryer. For. Prod. Utiliz. Tech. Rep. No. 7, USDA For. Serv., State and Private Forestry, P.O. Box 5130, Madison, Wis. 53705.

Rasmussen, E. F.

1965. Seasoning small quantities of lumber. USDA For. Serv. Res. Note FPL-089.

Rietz, R. C.

1978. Storage of lumber. USDA Handbook No. 531 (\$2.25, Supt. of Doc., U.S. Gov. Printing Office, Washington, D.C. 20402), 63 p.

U.S. Department of Agriculture, Forest Service.

1980. List of lumber dry-kiln manufacturers in the U.S. Forest Products List 80-035.

U.S. Department of Agriculture, Forest Service.

1980. List of manufacturers and distributors of dehumidification lumber drying units available in North America. Forest Products List 80-034.

Wengert, E. M.

1971. Improvements in solar kiln design. USDA For. Serv. Res. Note FPL-0212.

Wengert, E. M.

1980. Solar heated lumber dryer for the small business. Bull. MT No. 20C Utilization and marketing, Virginia Cooperative Extension Service, VPI & S.U., Blacksburg, Va. 24061.



**Figure 1.-- This illustrates correct stacking. Note that the bottom layer is well above the ground, stickers are directly above one another, ends of the boards are in contact with a sticker, and a pile cover is in use and tied down.**

These technical reports are issued by State and Private Forestry. Suggestions for topics for this report can be forwarded to Forest Products Laboratory, P.O. Box 5130, Madison, WI 53705.