

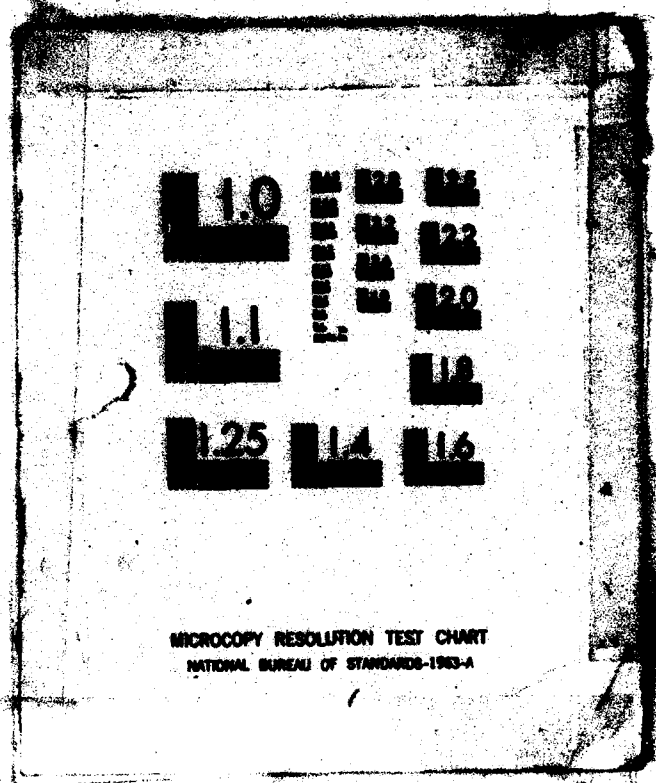
DA 124 934 MOISTURE CONTENT OF WOOD IN USE REVISION(U) FOREST
PRODUCTS LAB MADISON WI 1973 FSRN-FPL-0226

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U.S. DEPARTMENT OF AGRICULTURE - FOREST SERVICE
FOREST PRODUCTS LABORATORY - MADISON, WIS.

U.S.D.A. FOREST SERVICE
RESEARCH NOTE
FPL-0236
1973

MOISTURE CONTENT OF WOOD IN USE¹

Forest Products Laboratory,² Forest Service
U.S. Department of Agriculture

DTIC
EXCERPT
FEB 25 1980

Summary

→ The moisture content of wood will change with changes in the conditions under which it is used. To give best service, the wood should be installed at a moisture content close to the midpoint between the high and low values it will usually attain in use. This report presents recommendations that will enable the user to select the preferable moisture content for wood used under various conditions. ←

Introduction

Wood products shrink as they dry and swell as they absorb moisture, either liquid or vapor, from the atmosphere. Unless these changes in dimension are kept to a minimum, they may result in unsatisfactory service of wood products and structures.

Fortunately, most of the difficulties caused by moisture can be practically eliminated by drying the wood—to the moisture content best suited for the intended use—before the wood is put into service. The optimum moisture content will be midway between the extreme values that the wood is likely to reach.

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If the wood is too wet when it is put into place, it will eventually dry to a moisture content approximating that of the conditions under which it is used. This drying in place will be accompanied by shrinkage.

In a house, this shrinkage may cause loosening of fastenings and settling of the building with resulting plaster cracks, drywall nail popping, and unsightly openings around trim and moldings. Excessive shrinking of studs, sheathing, and siding decreases the weathertightness of walls, loosens fastenings, and may reduce the mechanical stiffness of walls.

If wood is dried too far below the average moisture content it will reach in use, swelling may cause drawers, windows, and doors to stick.

¹Revision of Forest Products Laboratory report 1655, of the same title, originally written in 1947 by E. C. Peck.

²Maintained at Madison, Wis., in cooperation with the University of Wisconsin

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Shrinkage and swelling... ..
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This report summarizes information and recommendations that will help the wood user select the correct moisture content.

Green Lumber and Timber

Green lumber, dimension, and timber are best used under conditions where the wood is maintained at the moisture content or where shrinkage and defects caused by drying in place have been considered in the design of the structure.

It may be feasible, for example, to use green timber for piling that is submerged in water or for large members of wood boats.

Large timbers that would require an exceedingly long and mild seasoning period to dry without serious seasoning defects are generally used green and allowed to season in place. Such timbers are used in construction of bridges, trestles, and mill buildings where shrinkage, splits, checks, and other drying defects have been considered in the design of the structure. Also, at present, many large timbers are fabricated from several laminations of dried 1-inch or 2-inch lumber banded together. The dried laminations permit the producer to control final moisture content quite accurately, and this minimizes many of the moisture content problems associated with the use of green timbers.

The greatest difficulty connected with the use of green, untreated lumber and timber is decay, particularly at joints and contact points.

Air-Dried Lumber and Dimension

In most parts of the country, the minimum moisture content that can be generally obtained in air drying is about 12 to 15 percent. Most air-dried material is usually closer to 20 percent moisture content when used.

Air-dried lumber is suitable for items that are not ordinarily subjected to the artificial heat and dehumidification of buildings or where appreciable shrinkage can be tolerated. All types of out-buildings, such as sheds and barns, can usually be safely constructed of air-dried lumber. Air-dried lumber is also satisfactory for products used outdoors, such as boxes and crates, parts of agricultural implements, and truck and trailer bodies.

Kiln-Dried Lumber and Dimension

Kiln-dried lumber or air-dried lumber that has received additional drying in a heated room is recommended for all uses that require a moisture content below about 12 percent. In most parts of the United States this will include practically all interior woodwork, such as flooring, trim, furniture, stairway stock, panels, and cabinet work that is used inside heated buildings.

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Table 1.—Recommended moisture content values for various wood items at time of installation

Use of wood	Moisture content for—					
	Wet areas of United States ¹		Dry southeastern area ¹		Damp, warm coastal areas ¹	
	Average ²	Individual pieces	Average ²	Individual pieces	Average ²	Individual pieces
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Interior:						
Woodwork, flooring						
Furniture, wood trim	8	6-10	6	4-9	11	8-13
Laminated timbers						
Exterior:						
Siding, wood trim						
Framing, sheathing	12	9-14	9	7-12	12	9-14
Laminated timbers						

¹For limiting range, see figure 3.

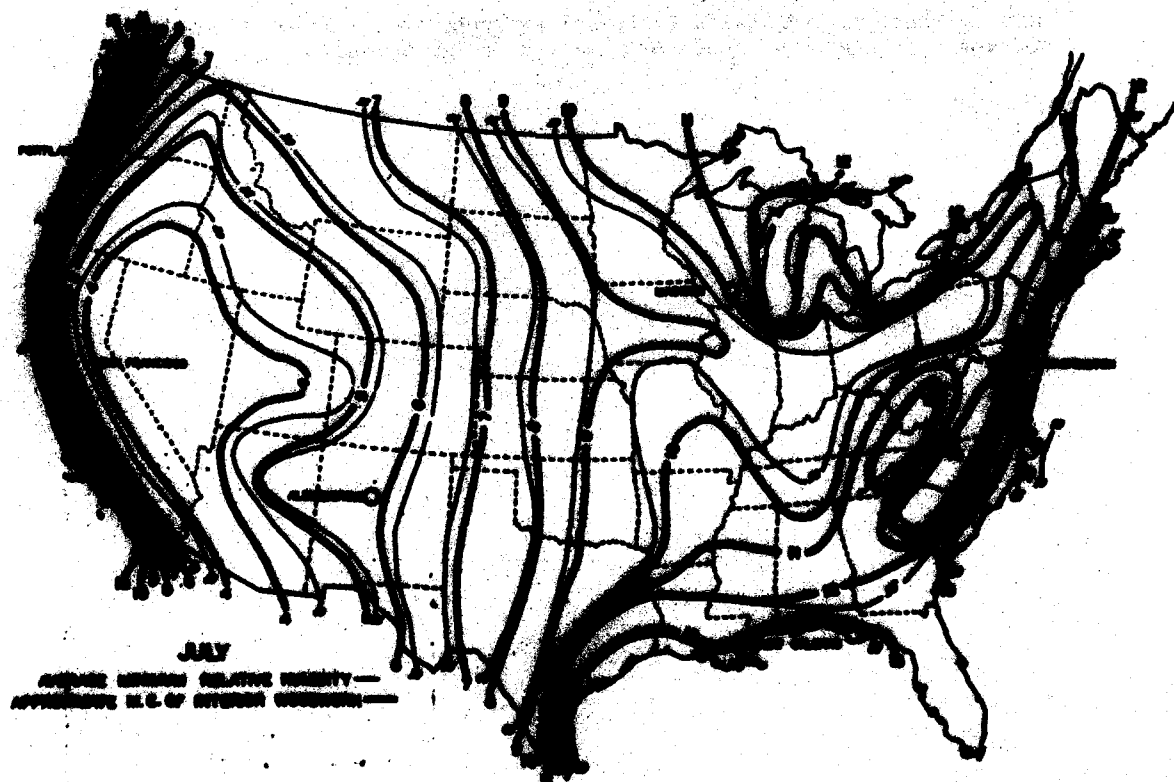
²To obtain a realistic average, test at least 10 pct. of each item. If the amount of a given item is small, several tests should be made. For example, in an ordinary dwelling having about 60 floor joists, at least 10 tests should be made on joists selected at random.



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JANUARY
 AVERAGE TEMPERATURE ---
 APPROXIMATE U.C. OF INTERIOR WOODWORK ---

Figure 1.--Relation of moisture content of interior woodwork to outdoor temperature of various areas of the United States in January. M 16876F



JULY
 AVERAGE MONTHLY RELATIVE HUMIDITY ---
 APPROXIMATE U.C. OF INTERIOR WOODWORK ---

Figure 2.--Relation of moisture content of interior woodwork to outdoor relative humidity of various areas of the United States in July. M 16877F

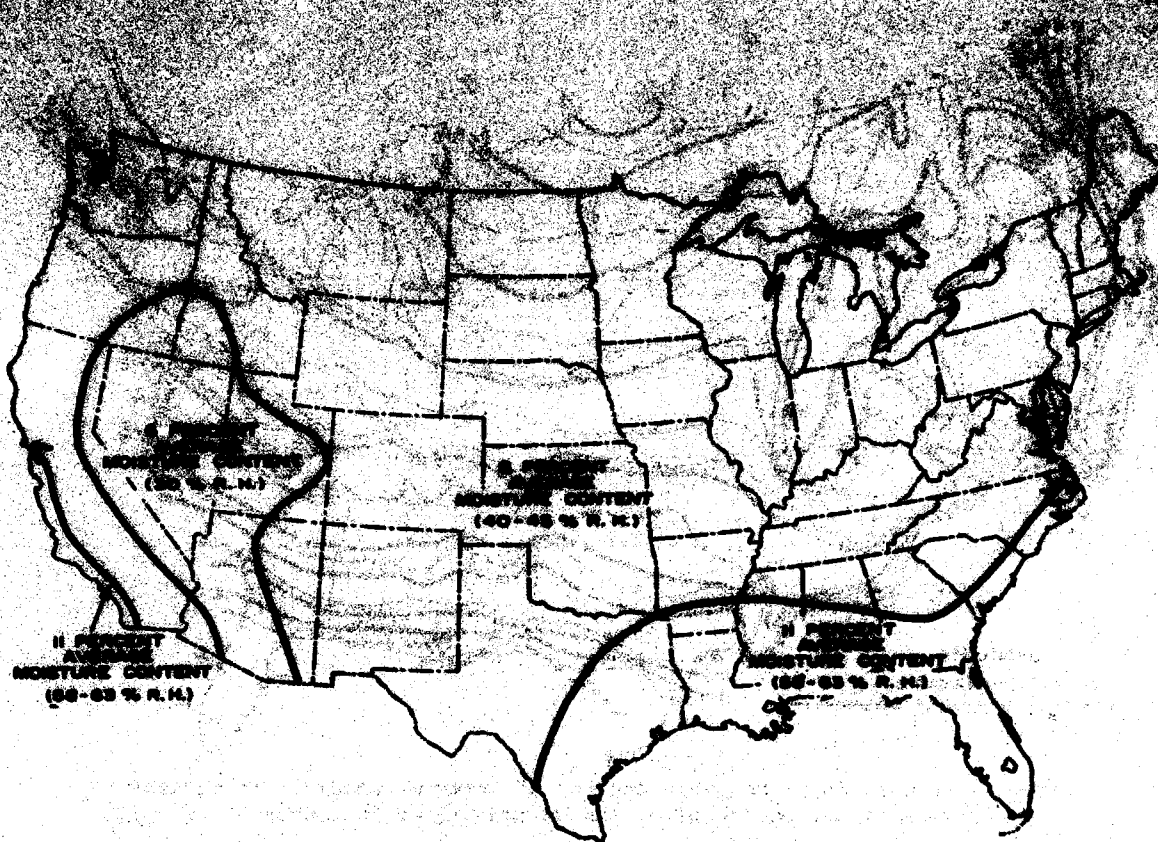


Figure 3.--Recommended moisture content averages for interior-finishing woodwork for use in various parts of the United States.

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