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SEASONING OF BEECH LUMBER AND DIMENSION STOCK

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Progress Report

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SEASONING OF BEECH LUMBER AND DIMENSION STOCK

(PROGRESS REPORT)

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Beech is a heavy, close textured, strong wood that has many general and special uses and as it does not impart taste or odor is suitable for food containers. Its principal uses necessitate breaking down the logs into lumber or dimension stock although a considerable number of ties are produced. The seasoning of beech lumber and dimension stock without degrade is somewhat difficult as it shrinks greatly, surface checks and end checks readily, and tends to warp more than most other Appalachian hardwoods. To reduce seasoning degrade in air seasoning or kiln drying of either lumber or dimension stock, certain handling practices must be employed, chief of which is the separation of beech from the other hardwoods for seasoning. Insofar as practicable all lumber produced should be quarter-sawed. Plain-sawed lumber in narrow widths will season with less surface checking than lumber 8 inches or more in width.

Air Seasoning

Lumber

If feasible beech lumber should be air seasoned in a shed; particularly so for dimension stock. Recommendations as to piling practice in the yard apply to the seasoning in sheds.

The general recommendations for the air seasoning of hardwoods apply to the air seasoning of beech with modifications in practices to control surface checking. The stock should always be under cover at the mill or in the yard where appreciable time between sawing and piling occurs. Exposure to direct sunlight for even short durations of time results in surface checking. Good air seasoning practices include (1) a well-drained site kept free of debris, weeds, and other vegetation; to control surface checking the yard probably should be located on lower ground not fully exposed to prevailing winds; and (2) firm and durable pile foundations sloping 1 inch to the foot of pile length

and high enough to allow the air that has circulated down through the lumber to readily escape.

Not only is it advisable to separate the beech from other species for air seasoning but proper piling will be facilitated and seasoning degrade reduced if the separation is also made with respect to thickness, grade, and length. When the lumber is separated as to length, piling so as to avoid overhanging ends as shown in plate 1, A, which are liable to check and warp, is simplified. Sometimes the separation of stock with respect to length is not feasible. Random length stock may be "box piled", that is, the long boards are placed in the outer tiers and the shorter boards in tiers in between, the shorter boards being staggered on the stickers to provide proper support under each end of every board.

As a general rule lumber is piled perpendicular to the main alley with pile spacings of various amounts depending upon the species being dried and the general yard arrangement. The closer the piles are together the more the drying rate is slowed down, which for beech is desirable as a surface checking control measure. A pile spacing of 4 feet for beech should be a maximum with a 2-foot spacing preferred. Piles for beech lumber should be fairly wide as another surface checking control measure. In the South the hardwood pile is usually 6 feet wide because of the large number of items being cut. For beech a pile 8 or 10 feet wide is more suitable. The pile should be pitched 1 inch to the foot of height towards the alley. Such inclination permits the rain to drip from the front face of the pile. Dry heartwood stickers of uniform thickness, 1-1/4 inch in width should be used for piling the lumber and depending on the number necessary to control warp in the various thicknesses as many as 9 tiers for a 16-foot pile are recommended. The stickers should be aligned so that the tiers are parallel to the front face of the pile and they should be supported directly by a foundation beam. Special stickers, 2 inches wide for 1-inch lumber and wider for thicker lumber, should be placed at the ends of the pile of boards. It has been found that if these wider stickers are placed so that their outer edges project beyond the ends of a pile of boards, the drying rate of the wood covered by the stickers is retarded sufficiently to effect a material reduction in end checking.

The main air movement in a pile of seasoning lumber is downward. In piling the lumber flues should be provided at least every 12 inches of pile width. These flues should be straight and about 2 inches wide.

Except for low-grade lumber some form of pile covering is advantageous in decreasing depreciation from alternate exposure to sun and rain which causes checking and warping of the boards in the top courses. Roofs should always be made of low-grade material, in order to minimize costs. The roof should consist of two layers of boards, the boards in the upper layer staggered in respect to the boards in the lower layer, acting as battens. The roof should project about 1 foot at the front and 2-1/2 feet at the rear to aid in keeping snow and rain from the ends of the pile. A typical air seasoning pile as shown in plate 1, B, is an example of good piling practice except that the roof does not extend as far as it should and more space than shown between the roof and top layer of boards should be provided. This space should be ample to allow plenty of air to enter the top of the pile. An average of 5 inches is considered sufficient for this purpose. If a pile of a certain grade, thickness, or length does not go up very fast some sort of temporary shelter should be provided to prevent surface checking of the top layer.

End piling, end racking, and crib piling are not suitable yard practices for the air seasoning of beech.

Dimension Stock

Dimension stock is the wood stock of the different sizes and shapes required by wood-using industries in the manufacture of fabricated articles, such as furniture and turnings. Most of the stock consists of sizes less than 3 inches square, or the equivalent in cross-sectional area, and less than 4 feet in length. To facilitate handling, it is more or less common practice to bundle the smaller sizes.

Dimension stock may be "crib piled", that is, stickered with itself and having the same number of pieces for all layers. Crib piling permits a larger number of pieces of stock to be stored in a given space, but it is conducive to slow drying. To modify the drying rate the stock can either be separated by special stickers, or it can be self stickered using only a few pieces as stickers between layers. The placing of stickers at the ends of the stock and the vertical alignment of stickers in between are essential to reduce end checking and warping.

Plate 2, A illustrates a piling method sometimes used for flat stock. Each successive piece overlaps the one below it, so that only two tiers of sticks, one at each end of the pile, are required.

High-grade dimension stock should be seasoned in a shed such as that illustrated in plate 2, B. In localities where driving rains are common it is advisable to provide louvered sides for the shed extending from 3 feet above the ground to within 3 feet of the eaves. As with unsheltered lumber, the foundations should be firm, durable, and high enough to afford ample circulation of air under the piles.

As beech end checks readily end coating of dimension stock is advisable and should be applied to the green material as soon as possible after cutting. As a means of reducing losses due to warp, which includes bow, crook, cup, twist, and diamond, beech stock can be air dried as flitch or in multiple lengths and widths. Piling practices for lumber are applicable.

The sapwood of beech is susceptible to fungous attack and insect infestation particularly during the warm months of the year. Blue stain fungus can be largely controlled by chemical treatment and correct piling practice. The powder post beetle, which infects hickory, ash, and oak, will also attack beech and can be killed by heat treatment. General yard and shed sanitation measures are imperative in controlling either fungi or insects.

Kiln Drying

Lumber

Beech lumber can be satisfactorily kiln dried green from the saw. A successful kiln drying operation, however, demands that the kiln be under automatic temperature and relative humidity control and be provided with an adequate rate of circulation. If modern forced-circulation dry kilns are not available the lumber should be air seasoned to a moisture content of 18 to 20 percent. Air-dried stock at this moisture condition can be kiln dried with considerably reduced liability of surface checking and can be successfully kiln dried in dry kilns of the natural-circulation type. Natural circulation kilns of the progressive type, however, are not readily adapted for conditioning treatments for the relief of casehardening.

Piling of the lumber for kiln drying whether the lumber is green or air dried must be done with care and for 1-inch lumber at least 9 tiers of stickers should be used for 16-foot stock. The lumber should be separated as to thickness and piling is facilitated if separated as to length. Most kiln installations are designed for flat piling and if forced-circulation kilns of the cross-flow type are available, the

lumber can be piled edge to edge. If natural circulation dry kilns are being used the boards must be spaced to allow for the circulation of air vertically in the pile. Stickers should be made from clear, straight-grained stock, entirely free from both stain and decay, and should be dressed to a uniform thickness. Seven-eighths inch stickers are common for most classes of stock. The supports necessary for the tiers of stickers should be firm and even, and when possible one should be directly under each tier. Perfect alignment of stickers above the supports that actually carry the weight of lumber is essential, since the eccentric loading caused by poor sticker alignment tends to deform the lumber. Having in each pile boards of only one length is the ideal condition, but where this is impossible the stock should be box piled.

The general schedule for kiln drying beech lumber is given in table 1. This schedule can be used for either green or air-dried beech up to and including 6/4 inches in thickness. If it is necessary to kiln dry 8/4 beech the schedule given in table 2 should be used. In kiln drying green lumber it is essential that the kiln be controlled and maintained at the schedules indicated or surface checking is apt to result. Air-dried lumber having a moisture content of 18 to 20 percent is not apt to surface check in subsequent kiln drying unless the kiln conditions are much more severe, particularly as to lower relative humidities, than those indicated in the schedule. As the schedules are based on the moisture condition of the lumber some sort of moisture sampling system should be used to determine when changes in conditions are necessary. The initial conditions for air-dried stock indicated in the schedule should be established without preliminary steaming.

To prevent excessive warp of the top layers in the load it is desirable to weight down the load with painted railroad iron or any other suitable heavy material. These weights should be placed directly over the tiers of stickers to prevent deforming the lumber.

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Table 1.--General schedule for kiln drying beech up to 6/4 inches thick

Moisture content at which changes should be made	Dry bulb	Wet bulb	Relative humidity
Percent	°F.	°F.	Percent
45 or more	130	125	85
40	135	126	75
30	140	128	70
25	145	128	60
20	150	127	50
15	155	124	40
10 to final	160	115	25

Table 2.--Schedule for 8/4-inch beech

Moisture content at which changes should be made	Dry bulb	Wet bulb	Relative humidity
Percent	°F.	°F.	Percent
45 or more	125	120	85
40	130	121	75
30	135	123	70
25	140	123	60
20	145	122	50
15	150	120	40
10 to final	155	111	25

Dimension Stock

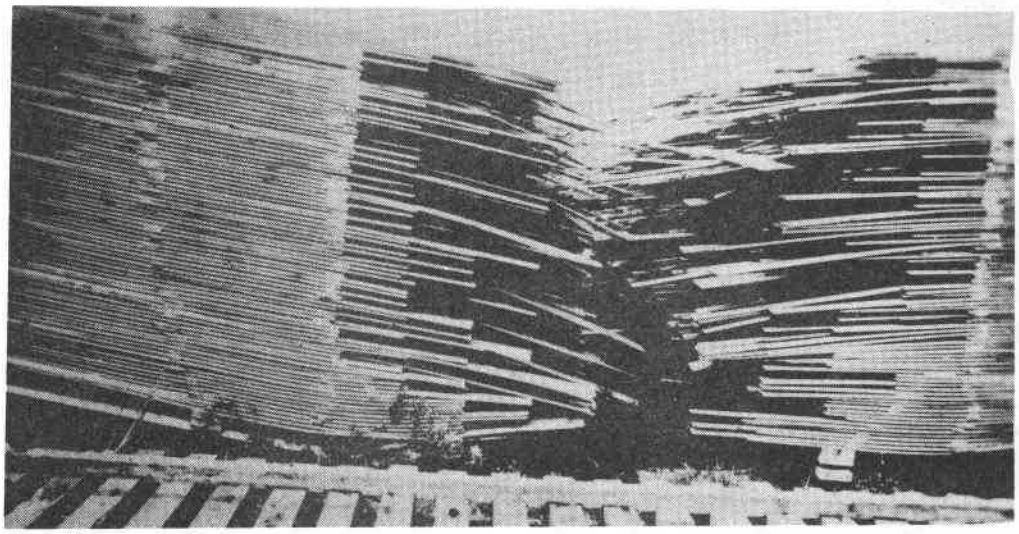
In general, kiln drying schedules satisfactory for lumber are satisfactory for dimension stock. As beech end checks readily the stock should be end coated or the losses may be prohibitive. If the stock is to be kiln dried directly from the saw dry kilns with forced-circulation and good control are essential to prevent excessive surface checking. The stock should be piled to conform to the direction of circulation of air in the kiln. For flitches and multiple-length and multiple-width stock, piling practices for lumber apply.

PLATE 1

PILING OF YARD LUMBER

A, Poor practice. Note overhanging ends, inadequate stickering, insufficient and improper foundations, weeds, and narrow and obstructed alley all of which cause degrade, with its resulting loss.

B, Good practice with the exception of the roof. Each tier of stickers in the pile is firmly supported by a beam, which in turn rests solidly on three stringers.



A

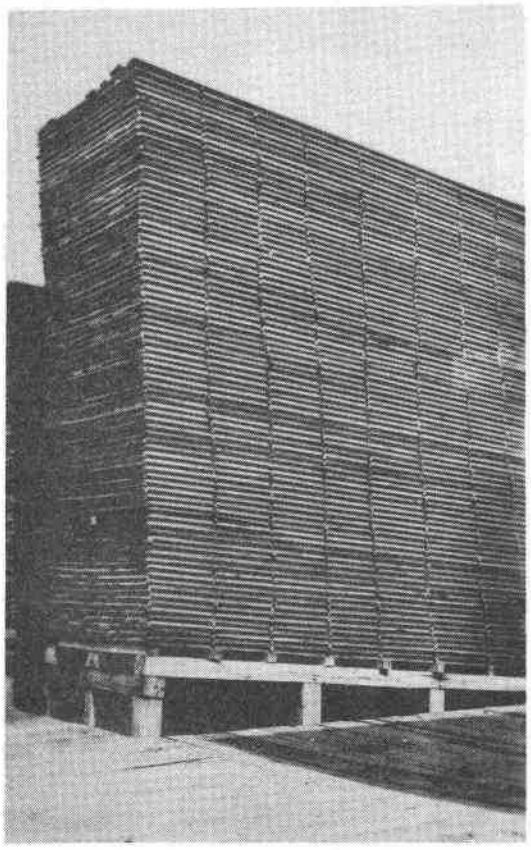


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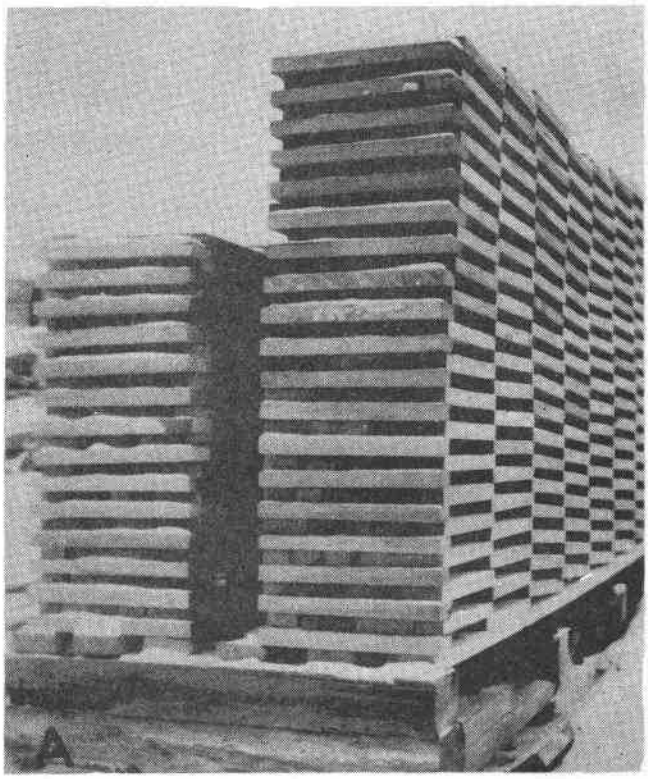
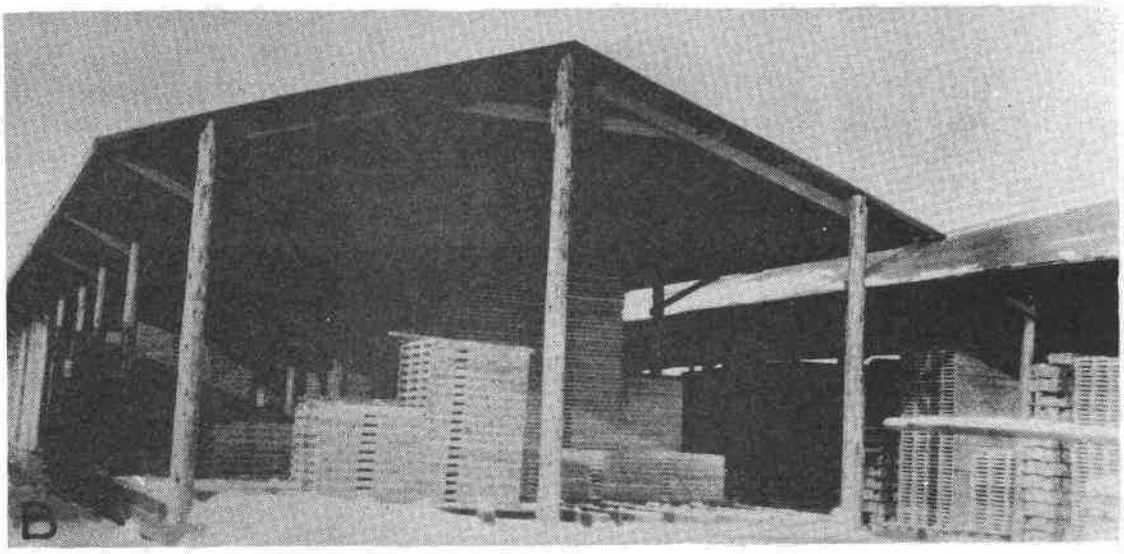
PLATE 2

PILING OF DIMENSION STOCK

A, Lap-piled flat dimension stock.

B, A general view of an open shed sheltering dimension stock during seasoning.





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