HOW TO TELL WHEN LUMBER IS READY TO BE TAKEN FROM THE KILN

The two things which a dry kiln operator must be able to prove at the end of a kiln run are that his lumber is as dry as is required and that it is free from invisible seasoning stresses which would cause warping when the wood is resawed and shaped into furniture or other products. Neither of these points can be proved by examination of the outside of the lumber. They are easily determined, however, by the following tests which have been devised by the U. S. Forest Products Laboratory, Madison, Wisconsin:

Before the lumber is removed from the kiln, choose a fairly representative board from each truck load of stock. Cut four 1-inch cross-sections (A,B,C,D) from the board at least 2 feet from the end.

Use section A to find the average moisture content of the dried stock. To do this, weigh the section immediately after cutting, on a balance accurate to 1/10 of 1 per cent, and then dry it on a steam pipe or in an oven at 212°F. until it reaches constant weight. The weight lost during this drying is the weight of the moisture which was in the section. Divide the weight of the moisture by the weight of the oven-dry section and multiply by 100. This will give the percentage of moisture in the section and also in the stock in that part of the kiln from which the sample was taken.

For furniture manufacture and other high grade uses, the moisture content of any board in the kiln should not vary by more than 2 or 3 per cent from the final moisture content specified.
Use section B to find out whether the stock is uniformly dry from center to outside. In order to do this the section must be cut apart and the moisture content of the inside and outside found separately. If the stock is 1\(\frac{1}{2}\) inches or more in thickness, cut the section parallel to its edges to get an outer shell of material 1/4 inch thick. Trim the remaining block equally on all four sides to leave a core 1/2 inch thick. If the stock is less than 1\(\frac{1}{2}\) inches thick, cut section B so as to get an outer shell and inner core each 1/5 the total thickness of the section. Find the moisture content of each piece by the method used for finding the moisture content of section A.

The moisture content of the inside and outside of the stock should be equalized, by steaming if necessary, to within 2 per cent before the lumber leaves the kiln.

The third and fourth sections, C and D, are for casehardening and moisture distribution tests. Saw section C parallel to the wide faces of the original board to form tongues or prongs, leaving about 1/2 inch of solid wood at one end of the section. If the stock is less than 2 inches thick, make 2 saw cuts; if it is more than 2 inches thick, make 5 saw cuts. From sections having 6 prongs break out the second prong from each side, leaving two outer and two central prongs. From sections having only 3 prongs remove the center prong. In section D saw one central saw kerf to form two prongs. Stand the sections on end in some convenient place in the shop to dry.

Observe carefully the action of the prongs from the moment of sawing. Do they bow in or out or remain straight on the saw? Do they change shape after room drying?

If the prongs remain straight both on the saw and after room drying, the lumber is perfectly seasoned, being free from stresses and uniformly dry throughout.

If the prongs remain straight on the saw but turn in after room drying, the moisture distribution is uneven, the surface being drier than the inside. A short steaming treatment to balance the moisture content should relieve all stresses.

If the prongs turn in on the saw and do not turn out after room drying, the lumber is "casehardened" and is drier outside than inside. Use a steaming or high humidity treatment to moisten and soften the surface. The shrinkage of the outside in redrying should relieve the interior tension, and cause the stresses to disappear.
METHODS OF CUTTING TEST SECTIONS FROM PLANK

MOISTURE CONTENT SECTIONS

SEC A
MOISTURE CONTENT SECTION
To be weighed, oven dried & reweighed to determine moisture content.

SEC B
MOISTURE DISTRIBUTION SECTION
Outer margin sawed off as shown. Outer & center portions weighed, dried & re-weighed separately to determine moisture content.

CASE HARDENING SECTIONS
Sections to be room dried before conclusion as to case hardening is made.

SEC C
Thick stock sawed as shown for case hardening test. Prongs 2 & 3 to be broken out.

Not "Case Hardened" "Case Hardened" Permissible "Case Hardened" Permissible "Case Hardened" Not Permissible Effect of overhardening Not Permissible

SEC D
Resawed for case hardening test. Saw not to be broken out.

Not "Case Hardened" "Case Hardened" Permissible "Case Hardened" Permissible "Case Hardened" Not Permissible Effect of overhardening Not Permissible

TEST SECTIONS FOR MOISTURE CONTENT & CASE HARDENING