

A MOISTURE METER FOR USE IN OPERATING A LUMBER DRY KILN

By

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Custom kiln operators face many problems in drying all types of lumber of unknown origins, particularly foreign woods such as the hardwoods from Japan and Philippine mahogany, or lauan. Philippine mahogany is a common name for 10 or 12 species of 3 or 4 genera. A shipment usually includes an unknown mixture of several species, some of which may be air dried and some virtually green. All these variables of material make the following of a suitable drying schedule very difficult.

I presented this kiln drying problem to Mr. Phil Hickox, a friend of mine who is an electronics engineer. Together we designed a resistance type moisture meter that could be operated from the control room without entering the kiln.

After many experiments with different types of wire that can stand high temperatures and humidity in the kiln without shorting, we found a shielded wire that has worked out fine. We also experimented with many types of electrodes and have adapted a galvanized lag screw with a hole in the head end to receive a "banana" plug, which is connected to the lead wires to the instrument in the control room. The electrodes are 5" long and are placed 5 feet apart in the edge of the lumber, so the readings are really of the core and give a good representative reading, if wide boards are used.

A check of the meter's accuracy shows good agreement with a portable meter and an oven-scales test, Table 1.

The moisture meter readings, when corrected for the effect of the higher temperature in the kiln (about 1% for each 20° F. above 70° F.), would agree very closely with the oven-scales calculations.

Five other samples in the same kiln charge also showed good agreement, except one sample that consistently showed high readings. Examination of this

Table 1.--Comparison of moisture content readings of two moisture meters and oven-scales calculations

Moisture content (percent)		
Oven-scales test	Large meter	Portable meter
33.9	over 24	over 24
24.6	"	"
20.6	23	23
15.5	18	19
12.6	16	16
9.8	14	14
7.8	12	12

sample at the end of the drying showed a wet streak in the area where the electrodes were placed. I have noticed that certain of the Philippine mahogany contains mineral deposits that affect electrical moisture meter readings and wet streaks that are slow to dry.

Another check of the new meter showed good agreement between six samples (Table 2).

Table 2.--Electrical moisture meter readings, 8/4 Douglas-fir

Moisture content (percent)					
No.	No.	No.	No.	No.	No.
1	2	3	4	5	6
over 24	24	21	over 24	over 24	18
23	20	17	"	21	14
17	15	12	20	17	10
15	12	9	17	14	8
12	9	under 7	15	12	under 7

If the correct moisture content can be determined at all times during the kiln run without any guesswork, the drying time can be reduced. According to our past schedules, the time has been cut from 18 to 24 hours for drying Philippine mahogany. Sometimes the new meter shows slower drying than we expect, and the drying time is actually lengthened. However, in so doing, we have cut down the danger of degrade.

This new moisture meter is definitely a help to me in operating my kilns in the shortest possible time without degrade. I believe such equipment will be a great asset to the industry in general by taking most of the guesswork out of kiln drying.