MOISTURE CONTENT OF LUMBER IN USE

By
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Southern California Lumber Seasoning Association

How many times have each of you operators asked, "I wonder what the EMC is in that locality this time of the year?"

Or, how many requests have you had to dry lumber to 8% MC. Nothing else, just 8%. The builders have requested the 8% and don't know why they want it 8%, except that someone, someplace, has said that lumber is no good unless it is dried to 8%; so they are stuck with that stock phrase. This is also very true with architects.

Mr. Arthur Koehler, formerly a Division Head at the Forest Products Laboratory in Madison, Wisc., has made some EMC tests in the Los Angeles area to check the present published information on EMC in our area. The test was carried on at Port Hueneme, which is on the Coast below Ventura, and another one in the eastern portion of Los Angeles (Fig. 1). Port Hueneme experienced a high of 11% and a low of 6.8% with a yearly average of about 9%. Remember, this is on the Coast. In Los Angeles there was a high of about 12% with a low of 8.45% and a yearly average of about 10%.

Published charts show the coastal area of California from San Francisco south has an annual average EMC of 11%. This is the recommended moisture content for interior finishing and woodwork. With a little imagination we can see that covering that much territory and with the wide variety of weather conditions there must be a great variation in the EMC to which lumber will level off. Remember, also, that conditions indoors will vary considerably with those outdoors. For instance, in the winter homes are heated. In this area most of the heating is done with gas which is a very dry heat. Even though the EMC outdoors could be very high, the house inside will be heated and the EMC will be low. We must dry lumber to suit the conditions under which it will be used.

We will lose many more customers for our products, if we dry lumber to 8% as specified, and it goes on the exterior of a house in an area where the EMC might be 12% or 13%. Also, we would be in trouble if we were to dry lumber for interior panelling to 12% and it went into a house during the winter months when the house is heated most of the time and the EMC is 6% or lower.

The Woodwork Institute of California acts as a fact gathering and disseminating agency and a liaison between the architects and builders on one hand and the manufacturers and suppliers on the other. Their technologist, Les Harter, is continually being called out to examine installations where wood has not done what it was supposed to do. At one time it might be doors that warp; the next time it may be kitchen cabinets that have shrunk, and the next time it may be very expensive wall panelling that is not laying flat on the wall. These conditions are not necessarily the fault of the kiln operator, but rather a lack of information being supplied the kiln operator. At least, with more information we, as operators, can do a better job. Each time something like this happens, it means a disgruntled customer. This means a gradual closing down of our markets and a strangling of our industry.
The Woodwork Institute and other associations in our industry need a chart showing more detailed EMC conditions throughout the year. What a difference it will make to the home builder and to us who are doing the lumber drying! This is information the kiln operator should have. How better to get this information than for us to do it ourselves. We in the Southern California Lumber Seasoning Association feel that it is high time that a study be made of existing EMCs throughout the country, and that this study should be quite specific as to area.

Our Association has started such a study because we feel that we have in southern California just about as many climatic conditions as is possible. All the way from the desert where the EMC is very low the year around to the Coast where the EMC can vary considerably and be quite high most of the year. It would be of great value to you who are in the lumber producing areas to know where your kiln dried lumber is going and to what the lumber should be dried to. Obviously, one moisture content couldn't be right for Palm Springs, Indio, and Long Beach.

We feel that this is important, and we hope to interest the other western dry kiln clubs in extending the study. Each Club covers an area that has a variety of weather conditions. Complete figures of EMC for the West Coast in some detail could be of tremendous value to the lumber industry. Our Association invites the other clubs present here to join in this study. With the help of Mr. Arthur Koehler, Harvey Smith, and the Forest Products Laboratory, Madison, we have set up a Method of Procedure. We also have forms for recording the experimental data, and we would appreciate the opportunity of coordinating this study through the West Coast. If we in the West complete the study with good results, other areas of the country will follow suit. If that should happen, and we hope it does, everyone will have comprehensive information on EMCs throughout the country. We feel that it will do a tremendous good for the lumber industry and the home-owner of America.
1. Select the areas that should be covered. Keeping in mind to get each area where there could be a difference in humidity and also in the large population areas.

2. Select species of wood for samples—such as redwood heartwood, Douglas-fir heartwood. Then some hardwoods such as maple sapwood or oak heartwood. It should be medium textured. They should be kiln dried and, if possible, with a heat not over 140 degrees.

3. Get one board of sufficient length to be able to cut as many samples as needed. It is important that all samples of one species come from one board, because the texture and graining should be the same so the rate of pickup and giving off of moisture will be the same at all points.

4. Cut samples approximately 1/2" thick by 3" wide by 4" long. The samples should weigh less than 1/4-pound to be weighed on any type of balance scales.

5. Do not end-coat, seal or paint the samples.

6. Suggest drilling small hole in one end so that samples can be hung on a nail, hook or by a string.

7. Give each participant two (2) sets of samples. One set for out-of-doors and one set for indoors.

8. Out-of-doors samples: Place them in a location where the sun will not hit them and where the rain will not fall directly on them. The north side of a building under an eave or other point of protection is suggested. Do not let samples touch the wall they are hung on.

9. The samples that are indoors should be hung in a room or building where it resembles that of a house or living quarters that is heated in the winter. This could be in an office or a home. In other words, this experiment should tell us what the EMC is indoors as well as outdoors, so that it will resemble that which lumber should be dried to for your area in regards to interiors and exteriors.

10. Each participant will be furnished with a set of instructions plus a sufficient number of forms to enter on the results of each weighing.

11. Be sure to record the date of the day samples are weighed.

12. Each sample has two (2) columns under it. The first column is for the weight and the second is for the weather conditions the DAY BEFORE THE SAMPLES ARE WEIGHED. This is very important.

13. For the weather conditions, use the following terminology:

- Hot and Dry
- Hot and Moist
- Medium and Dry
- Medium and Moist
- Cold and Dry
- Cold and Moist.
14. It is most important that these samples be weighed each week. Pick out the day in the week that is the most convenient for you and make this weighing a habit as part of the day's work. The experiment will lose a lot of its value, if weeks are missed.

15. When one sheet is complete, please send it to the party below.

16. At the end of the year, or after the 52 weighings (weekly), cut a one-inch section from half way between the ends of each sample right after the last weighing. Determine the moisture content of the sections by first weighing them and then oven-drying them and reweighing. Assuming the moisture content of each section to be representative of the moisture content of the whole sample, calculate the oven-dry weight of the whole sample by dividing its last weight by 1 plus the percentage of moisture expressed in decimal fraction. For example: suppose that the calculated moisture content of the sample at the time of the last weighing was 9 percent and that it weighed 87.2 grams, then 87.2 / 1.09, or 80 grams, is its oven-dry weight. This oven-dry weight will then be used to calculate the moisture content of each sample for each weighing throughout the past year.

17. If there are any further questions from time to time, please contact:

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We look forward to your cooperation and help in this project. We know that this will conclude one year from now with a lot of very worthwhile information that we can all use.