

OK, IT WORKS. WHAT IS IT WORTH?

Clyde A. Lofdahl
Product Manager
Forest Products Industry
Cryodry Corporation
San Ramon, California

In recent years there have been numerous research projects (1) on the electromagnetic (radio frequency, high frequency, dielectric, and microwave) drying of lumber. All of these have reported some degree of technical success. In addition to the fundamental extraction of moisture, this technical success has included less checking, end splits, warping, case hardening and a more uniform final moisture content.

The advent of high-power tubes in the microwave frequencies has enhanced this production technique from the technical standpoint. Higher power densities at lower field voltages means more efficient power utilization, reduced machine size, and less operational difficulties due to equipment tuning and field arcing.

The concept of multiple heat sources has been expanded. Cryodry Corporation's prototype veneer redryer (2) combining hot air and microwave energy in a synergistic manner whereby the result of both sources exceeds the sum of each operating independently is probably the most advanced machine using this concept. Beyond a doubt it works, and it works very well. The recent work by Cech and Goulet on the compression treatment of wood (3) points out another technique that could be combined with other advanced concepts to produce a lumber drying system of truly revolutionary impact. The ability to go from mill pond to boxcar on a continuous basis is now technically possible. If that isn't revolutionary to the lumber manufacturer, what is?

After a brief review of this information, the following question inevitably arises: Why doesn't someone put these techniques together and get on with it? The answer is the interrogative portion of this paper's title, "What Is It Worth?". It isn't enough to develop such techniques; such a system has to be justified in terms of the benefits that will accrue to a user. Such benefits can only be defined by comparison with the economic results of present drying and processing methods, and generally speaking, these economic results are not known. Without this information--particularly from the major producers of lumber--there can be no justification for the further development of such a system into a representative prototype unit. This next step is financially a big six figure project, and one is well advised to take such steps cautiously and only after very thorough justification research.

In the modern vernacular, that's the hangup. To compound the problem, the data required are not simply drying costs. Since continuous flow will exist from mill pond to boxcar, various sorts, interim storage points and transfer functions will be eliminated or combined. Plant space requirements will be reduced and flow patterns changed. The definition of what could be the net effect upon total mill economics takes more than an afternoon with the bookkeeper; it will take a thorough evaluation project in which everyone bares his soul.

The problem includes the marketing function as well as production. What does the customer need, want and expect? Which of the three should we tool up to provide? It is counter-productive to produce specified moisture content $\pm 2\%$ if $\pm 4\%$ is satisfactory. Yet being able to produce to specification has and always will be good business practice, and in an age of ever-tighter building materials specifications, the lumber manufacturer is rapidly approaching the point where he cannot do so.

Some work of this type has been done (4), but to date this has been limited to economically defining present methods. This is step one. The next step would be to prepare a mill flow layout incorporating the capabilities of electromagnetic drying and cost out this system. How do the two systems compare? Which benefits can be considered certain? Which remain to be proved? Can this be done on a prototype or mock-up basis? How do capital equipment costs compare? What about maintenance? Can breakdowns be circumvented? Answers to these and many other questions will allow the lumber manufacturer to evaluate the benefits of such a system under the following major categories:

1. Drying cost benefits
2. Process cost benefits
3. Grade retention benefits
4. In-process inventory reduction benefits
5. Market responsiveness benefits
6. Market competitive benefits
7. Others

Total

Now we are getting somewhere. Is the goal this total provides worth going after? The cost of a prototype lumber dryer is relatively easy to define, and it will probably be the key go-no go component in the system. Is the financial risk involved acceptable or unacceptable? If unacceptable, would a cooperative effort with other companies be a logical alternative?

Once the big question--WHAT IS IT WORTH--is answered, the proper course of action is relatively easy to define. But equipment manufacturers, research groups or other "outsiders" cannot do it. It must be done by the people who manufacture the product and live with the daily problems if the results are to be meaningful.

What are the chances for success? High, but not 100%. The types of heat to be used (hot air, radio frequency, microwave, others), the intensity and percentage of each, residence times, and other technical questions must be answered. But the basic homework has been done and a sound systems approach has a high probability of success. To strengthen this position further, the current trends in the electromagnetic industry are all in the right direction. Ever larger generating tubes of longer life and lower operating costs are being produced, and the sophistication with which this energy is being applied is constantly expanding. So even though an expensive justification research project may indicate that you should do nothing now, it will undoubtedly call for action in the not too distant future.

That is the current position. The technical community has spent its dollars to define the technical capabilities. The lumber manufacturers must now spend some dollars to define the value of these capabilities or else a technique of very high potential will continue to stand at parade rest.

The ball is in your hands.

References

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