

# Operating an Effective Air Drying Yard

## Part 2

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A poorly operated air-drying yard can cause excessive surface checking, splitting, internal checking or honeycomb, non-uniform drying, warping, and staining. These drying defects can occur on the yard just as fast and just as easily as they can in a dry kiln. Any operation that air dries prior to kiln drying and is having drying defects should look at the yard first to solve those problems rather than randomly changing the dry kiln schedule. In most cases, it is a poorly run yard that is causing the problems. How do you minimize drying defects on the air-drying yard? Have a knowledgeable lumber drying operator run the yard as he or she would any piece of drying equipment.

### Sample Boards

Sample boards are used on the yard for two major reasons. The first is to “map” the yard, that is, to determine the fast drying and the slow drying parts of the yard itself. Too often this information is assumed without actually being verified. Drying quality is not improved by “assuming or guessing” at what is happening; it is improved by actually “knowing” what is going on. The wise use of sample boards tells the operator where the fast dry and slow drying parts are the yard are located and how these may change with changing seasons and weather conditions. The second reason is to determine when corrective action is needed to control the drying rate to minimize defects. They alert the operator to potentially damaging changes in drying rates so corrective action can be taken to reduce the potential damage to the lumber. In this situation, someone has to be responsible for interpreting the information from the sample boards and taking the appropriate actions. The sample boards themselves will do no good unless someone acts decisively on the information they provide. It is the action taken on the yard to minimize the drying defects that is important and not the sample boards themselves. They are just a means to that end.



The use of sample boards on the air-drying yard also has one other positive benefit. It requires determining the actual moisture content of the lumber prior to setting the stacks on the yard. This is important because the moisture content of the lumber as it is received is often misjudged. It is often drier than assumed. That means you may have bought some of the drying degrade even though it is not yet visible. The practice of marking the lumber as to the date it was received is a good procedure. However, it must be understood that the date received is not necessarily the date sawn. On any given day, two in-coming loads of lumber of the same species and thickness do not necessarily have to be at the same moisture content and in practice they usually are not.

### **Controlling the Air-Drying Yard**

Obviously, controlling the drying rate on an air-drying yard is not the same as controlling it in a dry kiln. However, there are things that can be done to substantially improve quality on the yard. Those operations that manage their air-drying yard as a part of their total drying operation reap the benefits of improved drying quality, reduced costs, and improved drying times.

Part one of this article discussed some characteristics of the yard itself that impact the drying rate. These factors are (1) the yard surface, (2) the yard location and orientation, and (3) the lumber pile orientation on the yard. The following are operational factors with regard to managing and controlling the drying on the yard.

**Pile Covers.** Pile covers work, and they work best for check and warp prone woods. While not as good as a drying shed, they do help minimize the effects of the rain and sun on the wood. It is this alternating wetting and drying (and thus repetitive shrinking and swelling) that is the source of much of the drying defects (such as checks and warp). To be effective, a pile cover program needs management support and commitment. Broken pile covers lying on the ground do not do the lumber any good.

**End Coating.** End coating substantially reduces the risk of end splits and cracks. The sooner it is applied after sawing, the more effective it is. Applying the end coating the same day as the lumber was sawn is better than applying it three days



later. However, I believe that for lumber being placed on an air-drying yard for a long period of time, applying end coating at any time is better than not applying it at all. This is especially true for the check prone woods and for the thicker lumber. However, the sooner it is applied, the larger the gains (reduction in end splits and thus improvement in rough mill yield). Waiting to apply end coating for 3 to 5 days after sawing substantially reduces its effectiveness. The reason for this is that end coating is best at stopping the formation of new checks and splits. It does not necessarily stop existing ones from getting deeper.

**Pile Wraps.** Shade cloth and burlap have long been used to reduce the drying rate of lumber on the yard when the weather conditions become unfavorable (hot, dry, and windy or some combination of these conditions). In this case, pile wraps reduce the air velocity and create a microclimate in and around the lumber piles of a slightly higher relative humidity. Together, these tend to reduce the drying rate and the risk of checking and splitting. I prefer pile wraps as a windscreen rather than a total wrapping of each individual lumber stack. However, some operations prefer the latter and are pleased with the results. The proper and timely use of shade cloth or burlap as a windscreen or pile wrap can significantly reduce drying defects on the yard during those periods of adverse weather conditions. The important aspect is that someone needs to know what is happening on the yard and take appropriate and timely action to reduce the risk.

**Sunscreens.** Shade cloth and burlap can also be used as a sunscreen to protect the lumber ends from direct sun and thus the risk of increased end splits and checks. There can even be the risk of increased surface checks along on the sides of some of the lumber piles. Depending on the yard orientation, the sun may in fact work against you. If it strikes the lumber piles in such a way as to increase the risk of end checks and surface checks, then a sunscreen can improve quality.

**Yard Maintenance and Sanitation.** Good maintenance of the yard surface insures proper drainage and minimal dust. Both of these are critical to maintaining good drying quality and drying rates. Good sanitation practices reduce the risk of an insect infestation in the green lumber.



**Pile Weights.** Although not typically used on hardwoods in this country, pile weights are sometime used on softwoods and used more extensively in other countries because of the species involved. To really be effective, pile weights need to be in the range of about 75 to 150 pounds per square foot. For most of our domestic hardwoods, I do not believe that pile weights are necessary.

**Pile Foundations.** This is one of the major factors for warp control. You cannot produce flat lumber without a solid, flat, straight foundation for the lumber piles to sit on. To promote good air flow within the lumber piles and to minimize the occurrence of wet lumber in the bottom layers, the piles should be raised off the ground at least 10 to 12 inches, with 12 to 16 inches even better.

**Pile Spacing.** A slow drying yard for check-prone species would have the lumber piles closer together (edge-to-edge) to promote less airflow and a microclimate around the lumber piles with a greater humidity. A fast drying yard for easy-to-dry species, warp-prone species, and stain-prone species would have the lumber piles further apart to promote greater airflow and more rapid drying.

**Time on the Yard.** An important management question is how long do you wish to air dry. I would suggest that the answer to that is not time dependent but moisture content dependent. Two months on the yard in the mid summer is much different than two months on the yard in late fall. I would suggest for many situations, lumber should be air-dried to about 30 percent on the yard prior to putting it into the kilns. Drying the lumber much below about 28 percent increases the risk for more drying defects and more severe defects. Whereas, only partly air-drying the lumber creates extensive problems in the kilns due to the mixed moisture contents of the entering lumber. A good rule of thumb for many species and for many operations is to air dry uniformly to about 30 percent moisture content before going into the kilns.

### **The Key**



Air-drying is not just stacking lumber outside on the yard and hoping it dries in a reasonable manner. Air-drying is operating the yard in such a way as to hold the drying defects to a minimum while encouraging a reasonable drying rate for the species and thickness involved. It is practicing those techniques and procedures that allow us to control to some extent what is happening to the lumber on the yard.

***This Bulletin...***

This Technical Bulletin is a reprint of the second of a two-part article written by Dr. Fred Lamb, of the Department of Wood Science and Forest Products at Virginia Tech. The articles originally appeared in *Modern Woodworking* in December of 1999 and January of 2000.

***CSU/CSFS Wood Utilization and Marketing Bulletins...***

The Technical Bulletins produced by the CSU/CSFS Wood Utilization and Marketing Efforts are aimed at addressing needs and questions raised by industry members throughout the state on the topics of wood processing and marketing. The first four Technical Bulletins will be focused on drying of lumber, specifically on air drying. The first will “quiz” you, the air drying operator, on how your air dry yard stacks up, and where there might be room for improvement. This bulletin includes a checklist taken from the *Lumber Drying Sourcebook*, published by the Forest Products Society.

The second and third Technical Bulletins will be reprints of a two-part article written by drying expert Dr. Fred Lamb, of the Department of Wood Science and Forest Products at Virginia Tech. These articles are entitled *Operating and Effective Air Drying Yard*, and although were originally focused on drying hardwoods, the same principles covered hold true for softwoods. The fourth Technical Bulletin will cover drying defects, and will include an article entitled *Causes and Cures for Warp in Drying*, written by drying expert Gene Wengert and Dan Meyer of the University of Wisconsin.

These first four Technical Bulletins supplement *Air Drying of Lumber* (FPL-GTR 117), a comprehensive, guidebook for air drying lumber. The guide is highly recommended for operators of any size and scale, and can be obtained for free from the Wood Education and Resource Center by calling (304) 487-1510, or emailing: [education@werc-hdw.com](mailto:education@werc-hdw.com).

If you have specific questions, please feel free to contact us: Chris Jennings (970)-491-2958, Tim Reader (970) 247-5250, or Kurt Mackes (970) 491-4066, or check out our website at:

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