AIR DRYING LUMBER

Air drying lumber is an inexpensive and energy efficient option to reduce drying time in the kiln while lowering overall drying costs. A portion of the lumber drying process can be accomplished through air drying; however, a kiln is often necessary to complete the process if the lumber will be used in indoor applications such as furniture, flooring, and cabinets. Here are some recommended procedures that can help decrease air drying times and produce a better product.

LUMBER STACKING

Proper lumber stacking is essential in any type of drying. Stacking promotes air circulation and uniform drying.

- Stack lumber within two to three days of sawing.
- Each course of lumber must be of uniform thickness.
- Stack by uniform lengths or use box piling to minimize or eliminate warp and other drying defects.
- **Box piling** includes placing the longest pieces of lumber on the outside edges of each course. The shorter pieces are staggered from one end to the other within the course. Pieces of lumber within each course should be placed tightly edge-to-edge (Figure 1).
- Ends of boards must be supported on stickers.

STICKERS

Stickers are dried narrow strips of material placed between courses of boards to allow proper air flow through the stack.

- Should be of uniform thickness ¾"-1" thick and 1¼"-1½" wide.
- Thinner lumber requires more stickers and smaller spacing.
- Stickers are placed across the stack, starting at the board ends and spaced 12"-18" apart for thinner lumber and up to 24" apart for thicker sizes.
- Place stickers close to the ends of the boards to reduce end checking and other drying defects such as warp.
- Stickers need to be vertically aligned among courses.
- Store stickers in a covered location out of the weather.

END COATING

- The end grain of lumber dries much faster than other faces.
- Applying **end coating** such as a wax emulsifier or latex paint to the ends of freshly sawn lumber helps to slow the drying process from the ends of the boards. This reduces end checking and splitting (Figure 2).
- Apply coating as soon as possible after sawing.

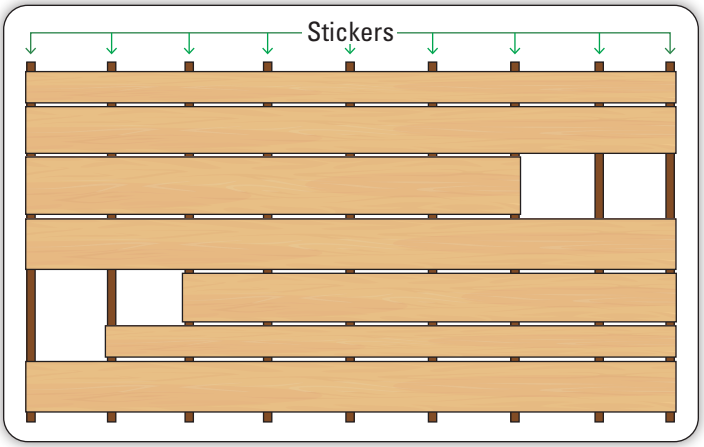

Figure 1: Top view of lumber stacking showing proper stickering and board placement for box piling.

Proper lumber stacking for drying improves air circulation, uniform drying, and reduces drying defects.

An example of proper sticker placement for stacking lumber.

AIR DRYING LUMBER

COVERING

- Place a roof or covering on top of the lumber stacks or use a well-ventilated drying shed. Keeping precipitation and sunlight off the stack will help prevent surface checks and other drying defects (Figure 2).
- Allow a 6" space between the roof and lumber stack for proper airflow.
- Add weights on top of stacks – such as concrete – to reduce warping and cupping. Weights should be at least 50 lbs per square foot.

AIR DRYING YARD LAYOUT AND MAINTENANCE

- Choose an open site with low to moderate prevailing winds. Air movement is necessary for effective drying. Sites with trees tend to have less air flow and higher humidity, which slows the drying process.
- Use winds by placing lumber stacks perpendicular to the prevailing wind direction (Figure 3).
- Raise stacks off the ground (minimum 12") and support by wood bolsters to promote adequate air flow. An uneven base will lead to lumber warp.
- Keep yard well-drained, control vegetation, and avoid dusty areas.
- Allow spacing between stacks of at least 24". Wider spacing promotes faster drying. Closer spacing can slow drying but may be beneficial for some wood species such as oaks. Oaks need to dry slowly to limit defect.
- Add a shade cloth to block direct sun exposure and slow airflow if needed. In some locations, air drying can occur too quickly.

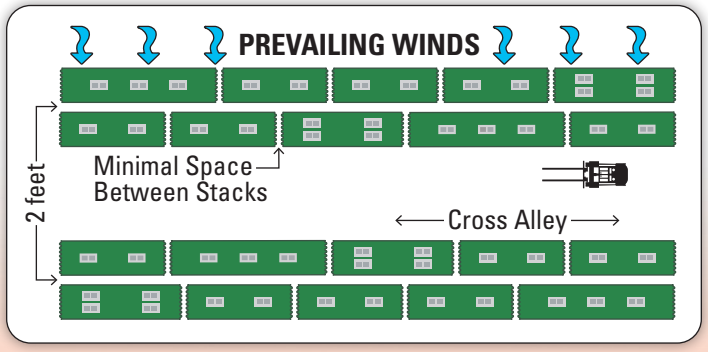

Figure 3: Yard layout showing prevailing wind and optimal lumber stack positioning.

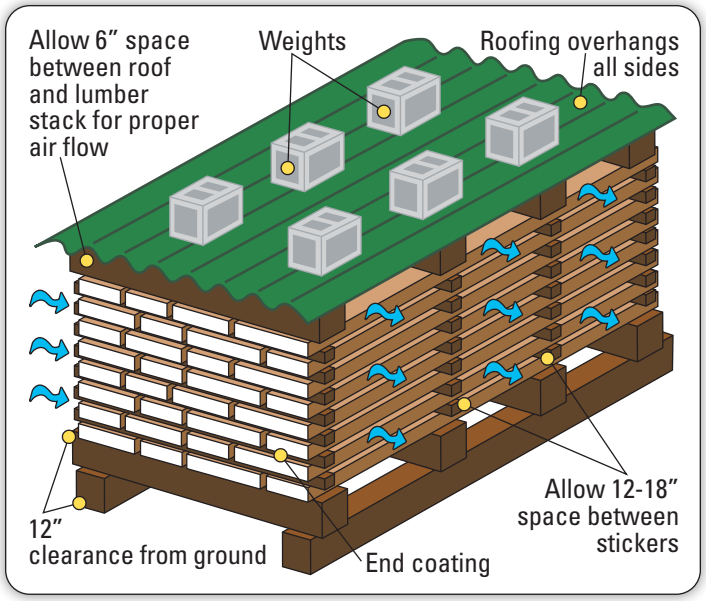

Figure 2: Stack of lumber showing proper stickering, stacking and covering.

LIMITATIONS

Although air drying can be inexpensive and contribute to the overall drying process, kiln drying of freshly sawn lumber may be recommended for some species and/or applications. Air drying time is often unpredictable and highly dependent upon environmental conditions.

- In warm, dry weather, lumber can dry too fast causing checks, splits and warp.
- Temperatures are not hot enough to kill fungi and insects.
- Increased inventory costs may be associated with air drying since lumber will remain in inventory longer during the air drying process.
- Final drying in a kiln after air drying is necessary to equalize and condition the lumber to remove drying stresses.
- Kiln drying includes several benefits for the manufacturer/customer, including faster drying time and more control over environmental conditions and potential for defects.

OTHER RESOURCES

- Denig, J., E. M. Wengert, and W. T. Simpson. 2000. *Drying Hardwood Lumber.* USDA, Forest Service, Forest Products Laboratory. Madison, WI. General Technical Report. FPL-GTR-118.
- Forest Products Laboratory. 1999. *Air Drying of Lumber.* USDA, Forest Service, Forest Products Laboratory. Madison, WI. General Technical Report. FPL–GTR–117.

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