

NEWS AND VIEWS OF THIS KILN DRYING BUSINESS

The Problem: What Are the Advantages and Disadvantages of the Package-loaded Dry Kiln?

The Answer: by Raymond C. Rietz, Engineer, U. S. Forest Products Laboratory

Dry kilns are being installed that are designed for lift-truck loading and unloading with packaged lumber. They are usually side-loaded kilns, but some end-loaded, trackless kilns are being used to dry dimension-stock items piled on pallets for efficient handling by lift trucks.

The charge of long lumber is placed in the side-loaded, trackless kiln by building tiers three or more packages high. Each charge may consist of three or more tiers. Because these tiers of lumber packages are usually higher than ordinary kiln truckloads, the package-loaded kilns are higher than conventional kiln installations. Because the lift trucks require a firm, unobstructed, floor area, air-moving equipment and heating coils are usually placed overhead.

The general arrangement of an internal-fan type of package-loaded kiln is shown in figure 1. The air-moving equipment can be of the long-shaft design with opposed disk fans that are placed in suitable baffles, with the fans operated by a single motor located outside of the kiln; or directly connected disk fans in a vertical baffle, operated with special motors that can withstand high temperatures and high relative humidities when running. External-blower kilns are also designed for this type of lumber dry kiln.

Advantages

1. A track system, transfer units, and kiln trucks are not required for this type of kiln. If packaged lumber is being yarded and stored, the lift trucks can also be used to load and unload the kiln, thus often reducing handling costs.

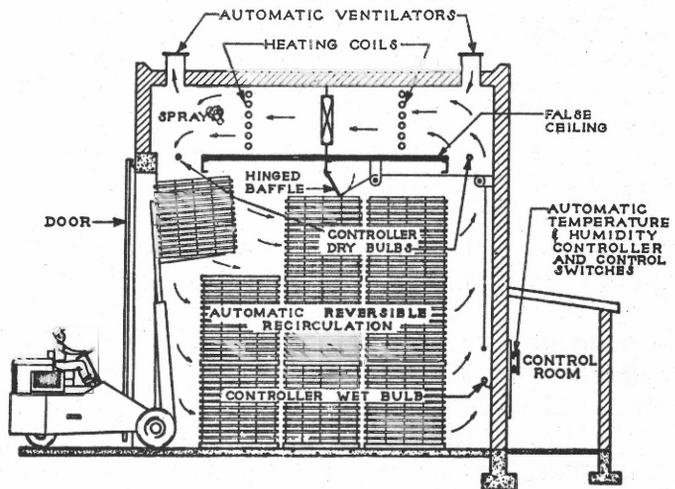


Fig. 1.—General arrangement of package-loaded, trackless lumber dry kiln.

2. Package-loaded kilns can be installed in a rather limited space or within a building.

3. Package-loaded kilns can be of small capacity, thereby providing flexibility of operation. They can be loaded to less than capacity without much additional special baffling.

Disadvantages

1. The package-loaded kiln, loaded and unloaded one package at a time, requires greater down time than the conventional track-type kiln of the same holding capacity. There is nothing about the design of the package-loaded, trackless kiln and its operation that would suggest that the stock could be dried more rapidly to make up for this longer down time.

2. Air losses between the ends of the packages and walls and between the bolstered packages reduce the velocity of air movement between the layers of lumber in the packages. These openings, which allow short circuiting of air delivered by the fans, can be baffled; but this is seldom done. Air can also short circuit over the tops of the tiers of packages if baffling is not properly designed or is not properly used.

3. Package-loaded kilns designed for more than three tiers of packages 4 feet wide introduce problems associated with long air travel. Booster coils cannot be conveniently installed, and even with periodic fan reversal the mid portions of the kiln charge may lag in drying.

4. If packages of different lengths are placed in the package-loaded kiln, differences in resistance to air flow may lead to nonuniformly dried stock. In a kiln designed for 16-foot packages, tiers of shorter packages are placed in a staggered pattern so that large voids are not created through which the air moved by the fans would bypass the load. Staggered tiers, however, produce a difference in resistance to air flow that results in greater air movement through the ends of the staggered kiln charge than through the middle portion. This difference may cause the mid portions of the kiln charge to dry more slowly.

Problems in Kiln Design

The larger kiln loads and resultant greater height and length of air travel call for delivery of more air and increased power input.

One side wall consists mostly of doors that should be well insulated to minimize heat losses. These doors are much larger than those of conventional kilns and require adequate hangers and carrier equipment. They must be kept tight, as at times they are on the pressure side of the fans and excessive leakage of air through them would be wasteful of power.

An associated problem is the building up of the packages, which calls for separation of lumber by lengths and for proper stickering. Proper placement of bolsters to separate the packages is essential to minimize breakage. Lumber damage due to careless manipulation of the forks of the lift truck can be avoided by skilled operators.