Lumber Drying

Lumber drying in general

Wood is one of the oldest building materials on the planet. Before wood can be used as a construction material whether it be a structural support in a building or to manufacture furniture, it has to undergo treatment to gain the required properties defined by the application where the wood is used. The first and most important treatment is the drying process.

The fastest and most effective way to dry lumber is achieved with a kiln. **Kiln drying** is accomplished in a closed chamber in which air temperature, relative humidity and airflow are controlled to dry lumber to a specified moisture content. The temperature for the drying is usually between 40-90°C depending on type, size and the later use of the lumber. There are many different types of kilns such as vacuum systems, traditional heat and vent type kilns and radio frequency dryers. The cost of installing and maintaining kilns may often be prohibitive unless a large amount of lumber is processed. However, if the market value of a specific species is high enough, it becomes more feasible to kiln dry green lumber.

Some other options to drying lumber are: **Solar drying** where the green lumber is placed in a glass house taking advantage of the free heat generated through solar radiation. This option is typically used for drying small amounts of lumber. **Air drying** is used more often for larger volume drying operations. One drawback to both solar and air drying options is the limited amount of control since they strongly depend on weather conditions.

Facts & Figures

- One cubic meter of freshly felled oak contains approximately 540 litres of water.
- Examples of air drying times:
- Softwoods. 25mm thick Scots pine that is stacked in April can reach 20 % moisture content by July to August if the summer months are warm and dry.
- Hardwoods. 25mm thick English oak stacked in early autumn can reach 20 % moisture content in about 10 months.
- A 75mm thick log will take 3 years to reach equilibrium moisture content.

Why the need to measure humidity?

Controlling humidity during the lumber drying process is essential because an incorrect level of moisture content in wood will have the following deleterious effects on product and process:

Dimensional changes

Without a controlled drying process, the lumber is susceptible to unacceptable shrinkage after the field installation. Since wood is naturally hygroscopic, it will always change its size to a minor extent, but controlled humidity and temperature during the drying process will minimize dimensional changes.

Strength

Drying the lumber below a moisture content of 25% to 30%will maximize structural strength. Properly dried lumber is nearly twice as strong and twice as stiff as lumber that is not dried.

Decay

Proper drying reduces susceptibility to decay caused by microorganisms which tend to grow best when the lumber contains more than 20% moisture content.

Preservation

Various lumber treatments are applied to lumber as preservatives. Many preservatives should only be applied when the humidity of the lumber has been reduced with proper drying.

Corrosion

Dry lumber prevents the corrosion of metal fixings such as metallic foundation, holders, nails and screws.

Weight

Dry wood is much lighter in weight than wet wood. For many species, dry wood is nearly half the weight of wet wood.

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