

DRYING WHITE FIR

The kiln drying of Western White Fir is becoming of greater importance to the kiln operators due to the fact that more and more of the different species of White Firs are being manufactured into lumber and other wood products.

By a quick review of the sawmill production of the various member mills of the Western Pine Association, you will probably be surprised that the cut of White Firs now constitute about thirteen percent of the total annual production.

The percentage of White Fir lumber produced is also increasing, as shown from the following annual mill production records:

<u>Year</u>	<u>Total Production Millions of Board Feet</u>	<u>White Fir Production Millions of Board Feet</u>	<u>Approximate Percentage of White Fir</u>
1949	6,660	568	8.5%
1950	7,687	866	11.2%
1951	7,260	948	13.0%

Many of you older kiln men can recall former days when White Fir was only brought into the mill and kilns as a clean-up measure. A number of mills in the mountainous regions of California particularly made a practice for many years of leaving the White Fir in the woods and only taking out the Sugar Pine and Ponderosa Pine which could be logged and manufactured at a profit.

Oldtimers in the mill-game had disdain for White Fir because of economic operating problems, and also because of the fact that White Firs produced mostly low grade lumber. It was a common saying for a long time that the White Firs should be left on the stump for future generations, and for utilization by paper mills.

With the increase in demand for lumber and also higher stumpage valuation and also higher logging costs, it has become necessary for sawmills to give more consideration to the logging, milling, seasoning and merchandising of their White Fir lumber.

The U. S. Forest Service, because of their sales and cutting policy with reference to the White Fir and so-called other inferior species, has made it necessary for lumbermen to buy White Fir stumpage and also cut out the White Fir if they are to operate on government controlled areas.

Under the classification of White Firs there generally are grouped a number of species of true Firs. Among the better known species of these are White Fir, Noble Fir, Silver Fir and California Red Fir. In order to give a visual idea of the stands of White Fir available, stands in the States of Oregon and Washington are as follows:

	<u>Stands in Washington</u> <u>Billions of Bd. Feet</u>	<u>Stands in Oregon</u> <u>Billions of Bd. Ft.</u>
Noble Fir	3	5.6
White Fir	practically- 0	5.6
Grand Fir	1.7	6.5
Silver Fir	36.9	3.4
California Red Fir	<u>0</u>	<u>2.5</u>
Total	42	24.0
The Douglas Fir stands by comparison are	114	266.0

The mills in the State of California produce more White Fir lumber than in any other state or region. The largest of white Fir trees also are found in the mountain regions of California. The percentage of White Fir produced at many large California mills range from 20% to 40% of their

annual mill production.

The White Firs are a type of forest tree known as the "tolerant" species. This means these trees grow under shade or in dense stands. The trees retain their limbs and, as a rule, produce very knotty type or low grade lumber. Several species, however, like Noble Fir and California Red Fir, produce considerable clears or better grades of lumber.

The lumber produced from White Fir species is generally light in weight. The strength characteristic of White Fir lumber is lower than Spruce or Hemlock.

The better logs of our White Firs produce high quality lumber, such as aircraft grades from Noble Fir. This lumber is straight grained, and also can be used for ladder stock, mouldings, and other specialties such as venetian blinds.

The common grades of White Fir lumber are primarily for dimension or framing lumber. The 1" boards are usable in the construction trade on a par with Douglas Fir or Pine lumber. Much of the low grades of white Fir lumber are used in the manufacture of boxes, fruit and vegetable crates, etc.

All the White Fir species are of high water content in the tree. Typical ranges of sapwood and heartwood are as follows:

	Moisture Content	
	<u>Sap Wood</u>	<u>Heart Wood</u>
Noble Fir	115%	34%
Grand Fir	136%	91%
Silver Fir	164%	55%
White Fir	160%	98%

This means that about one-half the original weight of White Fir lumber is water, which must be removed in the kiln drying process.

DRYING WHITE FIR--- Continued

As to kiln drying characteristics, the White Fir grades of lumber are in a class that are comparatively easy to dry. The wood is generally of soft texture and gives up its water content quite rapidly. Checks are not a serious problem, except in wide flat-grain boards. In certain localities the White Firs are subject to "shake", especially in the heart wood. The knots in White Fir are very generally small and of the intergrown type. White Fir lumber from small trees has some tendency to warp and twist in drying and must be carefully stickered in the drying process. One of the biggest problems in the drying of White Fir is the problem of slow drying of lumber cut from butt logs. There are streaks of moisture in some of the butt logs which take twice as long as the adjacent wood to dry out.

Because of the number of species and variation in size of the White Fir trees there, of course, is bound to be variation in drying schedules as employed in the different parts of the country where White Fir lumber is kiln dried. Following is a typical drying schedule on 2" White Fir dimension from an Eastern Oregon mill:

<u>Hours in Kiln</u>	<u>Dry Bulb</u>	<u>Wet Bulb</u>
0 - 24	150	145
25 - 48	160	149
49 - 72	170	144
73 - 76	180	170

15% final average moisture content

For handling the heavier, or sinker type of 2" White Fir dimension in California, more severe drying schedules are followed:

DRYING WHITE FIR-- Continued

Form No. 775
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<u>Hours in Kiln</u>	<u>Dry Bulb</u>	<u>Wet Bulb</u>
1 - 36	160	140
37 - 60	170	140
61 - 84	180	135
85 - 90	180	170

Final moisture content- 15 to 18%

The 1" White Fir common boards are also dried on relatively low drying temperatures, as illustrated in the following typical schedule:

4/4 WHITE FIR COMMON

<u>Hours in Kiln</u>	<u>Dry Bulb</u>	<u>Wet Bulb</u>
0 - 24	140	130
25 - 48	150	135
49 - 72	160	130

Final moisture content- 12 to 15%

The clears, or factory lumber, produced from the White Fir is generally dried on higher temperatures in order to secure the desired low final moisture content for machining or factory purposes. Typical schedule for 1" clears is as follows:

4/4 WHITE FIR, CLEARS & SELECTS

<u>Hours in Kiln</u>	<u>Dry Bulb</u>	<u>Wet Bulb</u>
0 - 24	150	145
25 - 48	160	149
49 - 72	170	150
73 - 96	170	144
97 - 99	180	170

Final moisture content- 8 to 10%

A careful study on drying White Fir made by Western Pine Association in California last year, showed that White Fir dimension can be dried down to a 12 to 18% final moisture content without excessive degrade. The study further showed that drying below 12% caused the degrade to mount rapidly. The study also brought out need for segregation of sinker type from the faster drying floater type lumber, in order to get uniform final moisture content.

If the White Fir lumber going through the kilns is to be resawn, the lumber should be carefully steam reconditioned before being discharged from the kiln.

Because of the low density of the White Firs, the shipping weights of kiln dried White Fir lumber are generally below the shipping weight figured for sales purposes.

The following are typical weights for White Fir dimension taken from several mills in Eastern Oregon:

	<u>Actual Shipping Weights</u>	<u>Moisture Content</u>
2 x 4 White Fir Dimension	1675- 1700 lbs.	12- 14%
2 x 6 " " "	1900 lbs.	16- 18%
2 x 8 and 2 x 10	1700 lbs.	15%
2 x 12	1900 lbs.	15%
1 x 12 Common	1700 lbs.	15%

Because of estimated shipping weights being higher than actual shipping weights, the underweights generally accrue to the advantage of the sawmill.

The following are examples of underweights reported by several mills in California:

<u>Underweights per M Feet</u>	<u>Freight saving per M on \$1.30 Frt. rate</u>
150 pounds	\$1.95
200 pounds	2.60

At mills where white Fir heavy or sinker stock is quite common, and the lumber going to the kilns is sufficient in quantity, the practice of sorting sinker type lumber from the floaters will give the kiln man a better chance to produce maximum amount of dry lumber from his kilns. Another practice followed by some California mills is to allow the heavy and light White Fir to air dry for 3 to 6 weeks on the kiln trucks ahead of the kiln, or handle packages through an air drying yard before loading into kilns.

Due to the fact that White Fir lumber has a very high initial water content and kiln dries quite rapidly without serious degrade, it is only reasonable that a larger percentage of White Fir lumber production will be handled directly through the kilns in the future. Also due to the increase in annual production of White Fir lumber, the kiln foreman should give more attention to correct handling and drying of these species of lumber.

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5/13/53