

THE LUMBER INDUSTRY LOOKS AT FUTURE WOOD REQUIREMENTS

by

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Any industry which employs a fourth of a million workers is important to the well-being of any nation. And, when it is concentrated in a particular area, its value to that area is enhanced. The southern pine lumber industry occupies this impressive position.

According to unofficial industry estimates, the total 1956 production of southern pine lumber will approximate 8,556,000,000 board feet, enough to build more than a million homes. This figure is only 1.7 per cent under the estimated 8,696,000,000 board foot figure of 1955. And in 1955, the southern lumbermen had a boom on their hands rather than a housing slump, that we now have. New housing starts during the first 10 months of 1956 were 16 percent less than for the corresponding period last year, so the 1956 estimated production, shipments and orders are all the more remarkable. Shipments and orders were close to actual production, indicating a healthy balance between supply and demand. This production has been maintained with fewer operating units as increased operating costs have caused many units, some large as well as small, to close down.

To what do we attribute the apparently minor effect on production caused by a 16% decline in the industry that uses more than 70% of our production?

Vigorous campaigns in the South for the proper seasoning and grading of lumber are generally credited for the stronger appeal southern pine exerted among more selective buyers. Conducted by groups of lumbermen in various southern states with the help of the Southern Pine Association, these campaigns have pressed hard for high standards within and without the lumber industry. For consumer protection, the use of grade-marked lumber has been urged. These localized programs are in addition to the SPA advertising program.

You gentlemen are modifying our natural product through selection and breeding. It would be helpful if you knew how much and what kind of wood will be needed when the seedlings you are developing will be mature and ready for harvest. You need a prophet. I am not it. Many have tried and a large part were made to appear ridiculous. Many delivered a funeral oration for the southern pine lumber industry with slow music. But it is still strong and has indications of becoming stronger. Any prediction that does not consider the tremendous power and initiative of our free enterprise system has two strikes against it.

The fallacy of timber famine predictions was illustrated by the

recent TRR. Members of our industry had their beliefs verified when it was reported that southern pine sawtimber is growing 22% faster than it is being harvested. This feat was accomplished while southern pine sawtimber furnished 24% of the Nation's requirements for sawtimber.

Do not think that all is serene in the southern pine lumber industry. It is plagued by the selfsame rising production costs that plague all industries, and in addition some that are unique to the lumber industry. Even though wages in our industry may be low compared to other sections and other industries, labor costs per thousand board feet of production are higher here. It has not been easy to pass along increased costs to the consumer because competitive products and other species that have lower stumpage costs, lower labor costs, and lower freight costs are ready and willing to take our market.

When we realize that stumpage cost may be from 20 to 40 percent of the total production cost, depending on type operation, we can readily see that quality trees are of utmost importance to lumber manufacturers. Mills that purchase all or part of their sawlog requirements say they are having a difficult time. As we can not economically change the tree we have today, one avenue for cost reduction has been in man-power requirements. It is difficult to give a figure for our entire industry, but it is believed that about 35 man hours are required to manufacture a thousand board feet of southern pine. This is 2 1/2 times that required in other sections. The increase in minimum wage from 75¢ to \$1.00 an hour resulted in an average increase in manufacturing cost of about \$7.

A few years ago the southern pine industry embarked on a large scale mechanization program. This trend is continuing. One firm of consulting engineers reported their clients alone have invested more than 80 million dollars in plant modernization and improvement during the past three years. Other sources believe our industry will spend as much as half a billion dollars on mechanization in the next few years.

Of course, the industry is far from anything approaching automation, but, in the past few years we have witnessed the reduction of man-power required for many mill operations. Sawmill carriages required four men to operate them. Now the Sawyer can do the entire job. Hand stacking has been replaced by automatic stacking. Lumber buggies replaced by fork lifts or straddle trucks.

Part of the mechanization program consists of installing barking and chipping equipment. The first barking and chipping unit was installed in 1952. By the end of 1954, 23 units were in operation. Then at the end of 1955, 63 units were in operation with an annual capacity of chips equal to more than 400,000 cords. Now their number is well over a hundred and still increasing rapidly. It is estimated that the southern pine lumber industry will eventually achieve a pulp chip capacity of 2,500,000 cords per year. If lumber production increases, or improvements are made in barkers, and many believe both will happen, that potential is higher.

In the pre World War II era most southern pine lumber was shipped

outside the South. Since that time the South has seen rapid industrialization which requires tremendous quantities of lumber.

During the first six months of 1956, 72.8% of southern pine production has been utilized in the South. Illinois, Indiana, and Ohio, once major consumers, used only 10.37% of production during this period.

Of total southern pine production 71% is used for house construction 10% for box and crating, and 17% for industrials and railroads.

It might be well to stop and consider just what qualities are desirable for specific uses. Southern pine is a preferred species. It justly merits the designation "Supreme Structural Wood of the World." It ranks first among softwoods in the various strength properties.

HOUSE FRAMING LUMBER requires strength to carry the loads imposed and stiffness to prevent deflection. It should have high nail holding power because the joints are the weakest part of the framework. The high specific gravity of southern pine gives it advantages for this use. Specific gravity is important because if it is increased 25%, the crushing strength as a post is increased 257%, but the strength as a beam is increased 37½ % and the hardness increases 100%.

As a general rule, the specific gravity of southern pine ranges from .40 upward. It is figured as weight oven dry and volume green. Only occasionally is a piece lower than .40 encountered, although the strength calculations contemplate that some pieces may be as low as 35.

Dense lumber has much higher bending, compression and tension stresses. The calculations for dense quality contemplate the possibility of some pieces being as low as .40 specific gravity, yet most of the lumber that is excluded by the application of the density rule will be well over .40. The average for dense southern pine is .54.

The grading rules for southern: pins dimension require: MEDIUM GRAIN lumber to average on either one end or the other not less than four annual rings per inch.

DENSE lumber to average on either one end or the other not less than 6 annual rings per inch with not less than one-third summerwood, and the contrast in color between summerwood and springwood must be distinct. Pieces averaging less than 6 rings per inch and not less than 4 meet the requirements of dense if averaging one-half or more summerwood.

LONGLEAF to be produced from trees of the botanical species of *Pinus ellottii* and *Pinus palustris*, and average on either one end or the other not less than 6 annual rings per inch and not less than one-third summerwood and the summerwood must be dark in color, except in pieces having considerably above the minimum requirements for summerwood.

These requirements are made in order that the exceptionally weak pieces may be excluded from dimension. Also, tests have shown that those pieces having less than 4 annual rings per inch have abnormal longitudinal

shrinkage. This abnormal shrinkage may result in crooking, especially in those pieces exhibiting unequal growth rate.

Research has shown that the fibril angle is greater in the faster grown material. Fibril angles of 10° or less are associated with small longitudinal shrinkage, while relatively large fibril angles and abnormal compression wood are associated with excessive longitudinal shrinkage. It is this abnormal longitudinal shrinkage that results in crooking--a serious problem of the southern pine industry.

As the correlation between fibril angle and width of annual rings is essentially linear, the restriction of 4 or more annual rings per inch for dimension should stop excessive crooking.

However, that is not the case because not all southern pine production is graded according to the SPIB rules. Also the grading rules require that dimension be dried to 19% or less and that should cause most of the shrinkage and any resultant crooking to occur before the lumber is shipped, but not all lumber is dry before shipment.

The desirability of southern pine for piling and poles is due to its high specific gravity.

Box and crate lumber should be strong, tough, hard and have high nail holding power. Here again Southern pine fills the bill, and about one billion board feet per year is used for this purpose. Of course the high specific gravity that gives Southern Pine its desirable characteristics also results in increased weight that must be considered. Usually though, the shipper's primary thought is safe delivery and they prefer southern pine. The U. S. Army Ordnance Department recognized the superior nail-holding power of southern pine and permits the use of pointless nails for southern pine which give only 59% of the nail-holding power of diamond point nails.

In finish lumber for siding, window and door frames, interior trim and millwork, appearance is an important factor. Many users want clear lumber. This lumber will be finished natural or painted so paintability is important. Specific gravity probably has very little effect on paintability. The important thing is to have a minimum of wide bands of summerwood, so again extremely fast growth is not the most desirable.

From these uses and desirable characteristics we might theorize and describe what might be called the ideal sawlog tree. It might be a tree in which the average log is about 18" in diameter at the small end. It could have approximately 6 to 8 rings per inch for the first 6 inches of diameter and 4 to 6 rings per inch for the remainder of the diameter. That could give a diameter of about 6" dbh at 21 years and a dbh of 24 inches in 66 years.

This hypothetical tree could be expected to yield a high percentage of finish grades and produce dimension that would be strong and remain straight. The growth rate is such that there would be a good return on the volume. We must realize that this ideal tree is somewhat like full

stocking, that is, it is a goal and although we may not attain it, the nearer we get to it the better.

Foresters, for the most part, have been concerned primarily with growing volume. Forestry in the U. S. is young. We are learning more about forest management and are realizing more and more that we must manage our forests not for volume alone, but for quality which denotes value. The lumber industry forester must be conscious of what the consumer wants and needs in his lumber. He is demanding quality. If we are to retain and expand markets, we must furnish that quality.

Some foresters in the lumber industry are acutely aware of the requirements for quality lumber, and are so managing their forest stands. One is aiming toward a uniform growth rate of about 6 rings per inch. On one area of natural reproduction he clear cut a small area for a house site. This area seeded in 1909 with a well stocked stand. At the age of 25 it was thinned for pulpwood and at 35 it had a light sawlog cut followed by another pulpwood cut to remove tops and some smaller trees. It received another sawlog cut in 1956 and is scheduled for final harvest in 1966. From this clear cut area, three random truck loads of logs were selected and followed through the mill. They produced 99.97% useable lumber. The lumber graded 30% #1 and better, and the stand was only 46 years old. The remaining growth will have a very high percent of clear lumber.

Of course that was a well stocked natural stand. It might not be the same in a plantation. Plantation management for maximum value return is a fertile area for serious study. We know that if we thin heavy there will be increased diameter growth, but are we getting the maximum growth per acre not only in volume but in value in grade yield or in pounds of pulp.

We have been considering the needs of the lumber industry. The pulp and paper industry forester must satisfy his consumer the paper mill, Let us study the qualities that made an ideal sawlog tree. How do they compare with an ideal pulpwood tree?

Specific gravity, all important to the lumber industry, is also important to the pulp mill. A cord of low specific gravity Southern Pine wood will yield about 847 pounds of kraft pulp, whereas a cord of high specific gravity wood of the same species will produce about 1,477 pounds --- almost twice as much.

The fibril angle is important because it determines the tear strength of pulp -- large fibril angles result in lower tear strength.

Knot free wood is of less relative importance to pulp production but it cannot be considered a detriment.

But what of the volume growth rate. Tests on Loblolly Pine show that an unthinned stand gives more volume at age 33 than thinned stands. Then, mortality causes a loss in volume. It would be helpful if we had

information on the average specific gravity of these test stands and could calculate the yield of pulp.

From this it appears that what is good for lumber is also good for pulp. It is fortunate that is the case because many companies, both lumber and pulp, some of which are intergrated, are growing both. Pulp and paper companies have a greater stake in growing quality sawlogs because in many cases they are getting the slabs and edgings back in the form of chips.

It is entirely feasible that the future may bring more methods of changing some physical characteristics of the wood after it is cut. There are ways to do that now, but they are expensive. Would it not be better to grow it right.

It will be tragic if we fail to recognize the consumer needs, because he holds our future be he a contractor, do-it-your-selfer, or pulp mill.

Private forest management is controlled by economics. It must show a profit. Forest managers have a golden opportunity to demonstrate their worth. Some are doing so. Others will follow.

You, the geneticist, may produce strains of trees that will astound us. But let us not lose sight of what our customers need and demand --- it may be easier to change our trees than to change our customers.