

## SEASONING QUALITY AND THE LUMBER MARKET

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Almost every newspaper published in the West these days carries some news items concerning the present state of the lumber market. These articles are filled with suggestions for improvement, ranging from changes in governmental policies on tariffs to repeal of certain shipping acts. Little is said about the things the mills can do themselves to remedy the situation, particularly how it affects each of us as individuals except perhaps its influence on the amount of unemployment in the lumber industry.

Each individual working in lumber is affected, to be sure, and I believe that most of us feel that there should be some part we can take to improve the situation. As seasoning specialists in the production phase of lumbering you do have a part. You are expected to get the most production for the cost of operation that is consistent with good quality. The amount of production per unit of cost strongly affects the difference between profit and loss for your company and the quality of the product determines whether the customers are sufficiently satisfied to continue buying your company's products.

There is considerable challenge in reaching this goal. In order to do this you may have to suggest changes in some of the procedures that have been followed through the years. If this takes any additional expenditure beyond the usual cost figures you will be called to show what it will do for the money spent. Unless you have some facts and figures to back up your requests you can expect to be turned down. But if you do have the proof, or know how to get it, you will be helping both your company and yourself by bringing it to their attention.

Today I want to illustrate some ways to meet this challenge. The ideas are not new. However, they have seldom been utilized to their fullest extent. I hope that each contains something useful to you, or at least stimulates your thinking along similar lines. My first suggestion has many possibilities.

### SEGREGATION

One of the surest ways to improve the seasoning quality for the least cost is through good segregation. Good segregation simplifies the job by keeping lumber of similar drying characteristics together for drying. Greater uniformity of final moisture content, lower degrade, and better final conditioning are among the many qualities derived. The easiest benefit to sell your management should be the economy of shorter kiln drying time. Any mill with enough stock to permit sorting into

similar charges within a reasonable accumulation time can justify segregation.

One of the more common sorting procedures that will illustrate the method is Mill Run Ponderosa Pine Common. As long as 72 hours are needed to dry it as a mixture. The Sap sort takes about 60 hours, the Half and Half 36 to 44 and the Heart 20 to 30 depending upon the stock and the kilns.

For purposes of illustration assume a cost of kiln drying at 3¢ per M' per hour, exclusive of stacking and unstacking. At a kiln drying time of 72 hours this comes to \$.16/M'. Approximately 10% of this mixture will fall into a Sap sort, 40% Half and Half and 50% Heart.

Thus	10%	x	\$0.03	x	60 hrs.	=	\$0.18
	40%	"	"		40 "	=	\$0.48
	50%	"	"		24 "	=	<u>\$0.36</u>

Total Cost Sorted	\$1.02/M'
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This means a cost advantage of \$.14/M' in favor of the sorted stock, compared to drying as a mixture. A savings in cost not previously mentioned is the reduction in pulling and redrying the high moisture content pieces that develop when kiln drying mixed charges. These can be reduced by extra long kiln drying schedules at very mild conditions, but this means extra drying cost, and the danger of overdrying the bulk of the charge with excessive degrade losses and lowered quality. If your plant kiln dries species that contain much slow drying sinker, the savings in time should be easy to show.

#### KILN SCHEDULES

Considerable effort has been expended through the years toward better kiln drying schedules. Equipment limitations have been a bar to the efficient use of optimum drying conditions in the past. Many of these restrictions have been removed one at a time until now the modern dry kiln can handle almost any seasoning requirement except temperatures above the boiling point of water which still require special kilns. Many are using higher temperatures on species that will take them and report good results. In one instance, research by the Western Pine Laboratory has made it possible to use more modern schedules on a species that resisted such treatment for years because of the resulting brown stain. Results have been so good that brown stain in Sugar Pine has now been practically eliminated except in areas of board defects containing holes, shakes, etc.

The savings in kiln drying time has been impressive. Riggs (1) reported a savings of 1 day for 4/4 Sugar Pine Sinker and 4 to 5 days for 6/4. Only a few mills dry this species now without a sodium azide dip. If your plant is one of these, I suggest that you tell your management about its high quality results. Unfortunately no such dip is available for Ponderosa Pine. Until some preventative treatment is found we are faced with the fact that this species must continue to be kiln dried at wet bulb temperatures low enough to prevent excessive staining.

The cause and effect of each step in schedule design is so important that it is desirable for the new kiln operator to make a thorough study of seasoning principles. With this knowledge, blind schedule trading is avoided and eventually real quality achieved through step by step planning. Properly designed schedule revisions have often been the real answer to many of our kiln drying needs.

#### RECORDS

In order to make the most of schedule revisions it is necessary that good records be kept of every step of the way. Record keeping is so essential that the general lack of it at times among kiln operators is quite unfortunate. Moisture content records are valuable aids towards the reduction of

kiln drying time. A check on the casehardening stresses is an absolute necessity with lumber that must meet remanufacturing needs. The buyers of stock in which these requirements are critical generally know how well each shipment purchased meet their needs in this respect. When there is a questionable choice between producers, you can be sure that they will base their purchases on their records of these qualities.

However, claims are not always made when stock is questionable. If seasoning claims have not been made for some time, it may come as a shock for the sales manager to one day report that a valued account is unaccountably lost. There is also the type of buyer who is continually filing claims on the possibility that these claims may be paid by the shipper rather than for him to make an issue of it. Good records are an excellent protection against this type of annoyance.

### DEGRADE STUDIES

The practice of studying production practices comparatively should cover all phases of the operation. There is considerable value to a study of the sawing thicknesses. This can be extended to correlate the percentage of planer skip in dressing compared to the amount of overrun. There is more to this type of study than is first apparent. Problems of seasoning stem from poor sawing control. Thick and thin lumber is difficult to pile, and results in excessive warp as well as variability in moisture content between boards of different thicknesses. Some mills have made studies of blanking the green lumber in order to overcome this problem of variable sawing sizes. I am not aware of their findings but it would seem more logical to control the green sawing sizes than to blank away the oversize.

One of the most dramatic examples of changes in production practices has been the trend toward resawing the 2 inch common to 1 inch before seasoning rather than after. This is a case where over all production through the plant is increased and seasoning quality improved, often by a small expenditure. Studies of this type can be very profitable to a plant.

There are several types of seasoning studies that should prove profitable to an operation. To show you how these types of studies often develop, I am reminded of the problem of excessive roller split and other seasoning defects brought about by overdrying of common lumber in Western Pine mills some years ago. It was necessary to make a degrade study of this condition in order to compare the loss by degrade to the savings in underweights secured at low moisture content levels. The study showed a net savings of \$3.10/M' in increased grade recovery by kiln drying to 13% rather than 9%. This proved that it was false economy to dry to excessively low moisture contents to secure the underweights. Since this study was made there have been similar degrade studies made in order to check the results at a mill level. Ailport (3) reported on one made to study the degrade that developed throughout a plant from sawing and seasoning to planing. This study showed how degrade was inter-related between different departments of the operation. It also pointed out the need for additional degrade studies to answer problems uncovered by the first one.

Peck (4) reported on a study of air seasoning in the Southwest. Of special interest was the loss due to the lack of roofs on the air drying units. This was found to be \$1.15/M' for 4/4 Common, \$5.36 for 8/4 Common and \$3.94 for 6/4 Shop.

Degrade studies are an area in which more work could be profitably done. Made at your own plant on problems that particularly concern you, the results are particularly applicable to your own situation.

### QUALITY CONTROL

Quality control has always been a part of lumber production procedures. Examples of this can be found in the measurements made of lumber size, moisture content, stress relief etc. The

inspection of lumber grader accuracy is another form of quality control.

True quality control should be more than a routine use of these procedures. It should be used to insure a level of quality or to change quality to meet new standards. Such controls become doubly important as new production tools are introduced.

High production rates designed to increase sawmill, seasoning and machining output are needed in order to keep production costs down. One way to insure quality under high production schedules is through systematic inspection of lumber throughout the production line. With more and more end uses requiring close control of quality, hit and miss methods are fast being replaced by more positive controls. New tools include continuous moisture meters, electronic thickness measurement and now machine inspection of finger joints and stress grading of lumber.

### MAINTENANCE

Another must in the reduction of seasoning costs and the continuance of drying quality is good maintenance. A new dry kiln, like a new automobile is likely to give its best performance early in life. With age it develops innumerable faults which without repair get continually worse as time goes on. With dry kilns there eventually comes a time when roofs are too far gone to repair and leaky coils too thin to weld. Usually the need for such major repairs can be easily shown. It will help if records have been kept. Has conditioning time increased appreciably? How does the airflow compare to original flow patterns when baffles were in good repair? How even is the temperature of the kilns, zone by zone, compared to earlier performance. These and other signs of age may not necessarily mean that the kiln is past its usefulness. Often it can be put back into good repair with reasonable cost. But if the equipment is of poor design, maintenance can do no more than put it close to its new performance condition, substandard at best. If so, it may be cheaper to remodel or buy new rather than spend more money on maintenance.

### MODERNIZATION

There have been many instances when kiln production and quality has been measurably increased by modernization. New fan systems to replace the old blower or zig zag baffled ones, shortened runs of coils and pressure reducers to improve temperature control and uniformity, are examples of the possibilities. A study of the factors involved can be made much more factual if modernization is done on a comparative basis. For example, rebuild one kiln unit and keep careful records of the performance before and after. If a new kiln is installed, keep a separate record of its production compared on the same basis with the old ones. This can become a valuable tool to use in the appraisal of any modernization program. Before putting new equipment into old buildings, make sure that the dimensions of the kilns will lend themselves to modernization. If it will do so, a moderate expenditure may more than pay for itself. If not, completely new equipment may be the better choice.

### GREEN PROTECTION

Often times the kiln operator is called on to go beyond his normal duties to insure quality. A sure way of doing this is to see that all possible preventive measures are taken to avoid poor practices. One of the most common forms of seasoning loss is the seasoning check that starts in the green lumber. Cover boards and sheds are a help to prevent this. Sprinkling the green lumber may be even better for species that season check easily. Bircher (5) reported that the percentage of season checking in 4/4 Douglas Fir and Larch Moulding stock was reduced from 16.5% to 5.8% after he had installed sprinklers in the green storage area ahead of the kilns. He figured that the \$306 cost of installation was returned in the first two cars that were shipped after its installation. How can you prove the need for sprinkling or cover boards without going to the expense of making an installation? A good

way is to examine the unprotected green lumber accumulating ahead of the kilns. You have seen valuable lumber season check in every top board containing flat grained heart center. This can amount to a sizable loss for the higher grades. It amounts to a considerable sum even in the lower value Commons. If the top courses of cribs loaded with 12 inch Ponderosa Pine No. 2 Common were to drop one grade the loss would amount to approximately \$17 per 6 crib charge. These losses are not hard to show. Check with your head grader, he will generally cooperate with you if you tell him the nature of your proposed study. Contact your Association for help. The Western Pine Association assists its member mills in setting up studies of production methods.

### GOOD PILING

We have all been told the merits of good piling practices so many times that I expect that most of you are getting tired of hearing about it. Degrade losses of this type are apparent to us all, but few examples are known to us that quote dollars and cents figures that we can use to justify spending a little time and effort to insure good piling quality. One plant I know of kept before and after records of the amount of trim loss that occurred by two piling methods, one which left the ends of the boards in the air seasoning yards extending a few inches past the end stickers and another in which the stickers were placed directly over the ends of the boards. Piling with the stickers flush resulted in a reduction of trim loss of approximately 1300'/25M' of lumber. This is another example of records put to good use.

### FINAL MOISTURE CONTENT

The end use needs of a lumber product may be more important than the degrade that occurs from the incorrect final moisture content. Solid green, no seasoning degrade has taken place at the time of sale. The rule should be to dry to the required final moisture content and no lower. Anyone who has tried to add moisture by an equalization process to wood that has been overdried knows how difficult this is. Fortunately the range in moisture content becomes narrower the lower the final moisture content level.

This works to advantage in drying to specific low moisture content end use needs. On the whole, shop lumber seasoned for the millwork industry is now so consistently well dried that practically all millwork plants have abandoned the kilns once maintained for redrying purposes. Mills drying for laminating purposes are becoming increasingly aware of the close moisture content tolerance that must be met. This is not an impossible task but does require special techniques. Schedules are time consuming, but must be met in order to hold this valuable market.

### PROTECTION AFTER KILN DRYING

Most lumber mills that produce a properly seasoned product are concerned with keeping it that way in order to serve their customers best. Good storage sheds for the dry product are a valuable aid. However, at times there will be accumulations of lumber beyond their capacity. Lumber covers are a help toward keeping lumber dry and clean in this situation. Hickman (6) found that stock stored under lumber covers in rainy Portland, Oregon, remained within 2-1/2% of the original dry level through alternate wet and dry seasons for the year. In addition variable moisture content stock tended to equalize to a desirable level. Millwork plants have many hundreds of thousands of feet of lumber stored outdoors under lumber covers. Even cut stock has been found to retain its quality indefinitely when stored in this way.

### CONCLUSION

I hope that today I have given you some ideas that will stimulate your thinking on the problems of seasoning quality and the lumber market.

We are on the brink of new procedures in the building field that can use a great many lumber products if only the lumbering industry can furnish material of the required characteristics. In order to meet these demands you may be called upon to make fuller use of precision in seasoning than ever before.

As seasoning specialists you have the technical know how. You can be of considerable aid to your company in meeting these precision standards. This is the type of job on which many of you have built a fine reputation. If the job is done right, the results will be very rewarding.

#### REFERENCES

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