

LUMBER QUALITY ENTERING THE KILN

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I'm probably not going to mention much that you don't already know, or haven't heard in the past at one time. The emphasis will be on, "are we getting the job done?" Are we maximizing the potential for recovering all dollars that are within our power and maximizing our valuable resource? There are so many combinations that come into play that if we can do what we can, we will reduce the variability within the system. Factors that may reduce our recovery can be found

- at the headrig,
- in maintenance of machine centers,
- in sorting methods,
- in stacking procedures,
- forklift driver operation,
- and at the kiln.

The kiln operators take over to use the proper drying schedules, and make sure the kilns are maintained well enough to provide proper airflow, steam delivery and control of the humidity.

Sizing at the Headrig

There are many conditions that can start the off-size process or keep the lumber square to the world within an acceptable standard deviation. Good saws, rail alignment, scanner calibration, for example: Is the lumber sized uniformly? Thicker lumber mixed with thinner lumber will dry slower and overdry the thinner lumber. Degrade from warping and excessive shrinkage will occur. Snaking and wedge will influence the lumber that is straight.

Maintenance

Feedback from employees and quality control are key to the process. Again, using the size process control tools available are very helpful in determining issues. Information from QC and employees will help maintenance target those areas that cause the machines to produce off-size lumber. Preventive maintenance should be the ideal to prevent long periods of running with machines producing lumber that would be degraded from drying or finishing.

An example of a brief statistical process report is shown below. This is derived from MicroRidge's L-size program. There are many reports that can be derived from SPC, such as histograms, time lines, and shape reports.

Machine Center	Sawline	Target Spec	Avg Size	Min Meas	Max meas	Meas %Low
brdE	@	5.750	5.774	5.762	5.781	0
brdE	s0-1	3.600	3.700	3.688	3.726	0
brdE	sO-1	5.750	5.774	5.781	0	75
brdE	S1-2	3.600	3.605	3.586	3.615	0
brdE	S2-3	3.600	3.704	3.682	3.731	0
Quad	Cant	3.600	3.599	3.570	3.694	0
Quad	jbd1	1.590	1.624	1.572	1.689	0
Quad	jbr4	1.590	1.597	1.535	1.646	1.6
Rsaw	singl	0.875	0.887	0.865	0.928	0
Rsaw	singl	1.590	1.596	1.570	1.640	0

Machine Center	Meas % On	Meas % High	Avg Range	Std Dev Total	Std Dev Within	Std Dev Between
brdE	75	25	0.019	0.009	0.009	
brdE	0	100	0.038	0.017	0.017	
brdE	75	25	0.019	0.009	0.009	
brdE	100	0	0.029	0.013	0.013	
brdE	0	100	0.049	0.021	0.021	
Quad	95.3	4.7	0.035	0.024	0.016	0.019
Quad	50	50	0.048	0.025	0.017	0.020
Quad	85.9	12.5	0.042	0.020	0.014	0.015
Rsaw	87.5	12.5	0.038	0.014	0.014	0.006
Rsaw	92.9	7.1	0.045	0.017	0.017	0.007

Log Quality

Are they green fresh logs or logs that are dry from sitting out in the log yard. Sometimes this can influence the schedule being used. One important factor to consider is how the logs are stored. Are you running logs that are kept in a controlled state? Are the logs fresh out of the woods, or kept in a pond under water? Maybe they've been sitting in the log yard for a long time in hot weather without sprinklers. Sometimes you'll get logs that have been decked in the hills for a longer period of time than usual.

The sorts could be mixed fresh and old dry logs. Awareness of these factors can assist the kiln operator in making better decisions. We don't often have a choice when

they become mixed sorts. Mixed sorts could prove to be very difficult to dry without a high standard deviation. We don't always know what kind of logs we're getting but all the information we can get or keep abreast of from the log yard or sawmill will sometimes benefit us when preparing a charge to dry.

Sorting

Sorting can play a bigger factor in drying than many realize. Sort by sap and heartwood if possible. If you have the capability, this can mean the difference between a high standard deviation and a low one. Weight sensors have been used to automatically sort, but on some species, visual sorting can work very well. Ponderosa pine sorted this way can bring benefits. Hem-fir sorted visually can be very beneficial. Hem-fir, since it is already hard to dry can be visually sorted to dry the heartwood and sapwood under very different schedules to maximize recovery.

Sorting by length can reduce degrade, milling loss, end split, and increase production in the kilns. If sorting is limited, mix the lengths that have the fewest possibilities of the shortest lengths in the units.

Stickers and Stacking

The only thing we have going for us after the lumber is in the kilns is that the airflow can pass unrestricted through the courses of lumber. The three most commonly used stickers are: hardwood, laminated, and Select DF. They should be uniform in thickness. Stickers after awhile begin to break down in size from crushing and once new stickers are mixed in with the old begin to show the variance. The estimated drying time for lumber stacked on thinner sticks can be twice that for lumber stacked on thicker stickers. All of the stickers should be present. If all of the stickers are missing in a course, naturally the lumber will not dry correctly. They should be evenly spaced and straight. Stickers on edge can affect several boards and layers around the offending sticker. (Here's a good place to lose value.)

Missing boards on outside rows will interrupt the airflow causing under-drying and over-drying not to mention warpage. Are the stickers sticking out of the unit? Stickers sticking out of unit can mean two things may be present. Somewhere on the other side of the unit lumber is not supported. Increased chance of sticker breakage.

Yard Storage

Lumber should be properly supported until stacked on carts. Spacer blocks properly supporting the product should be present keeping the units level. Keeping support directly under the sticker lines. Kept out of dirt and mud.

Cart Stacking

The units are stacked uniformly vertically and horizontally the full length of the charge. A chimney of 2" to 5" is best and it should be blocked at the top to force the air through the stickers.

Drivers should not be damaging wood with the forks on the lifts. Bolsters should be uniformly placed under stickers and support the loads evenly.

Carts

Carts should be uniform in height. They should be constructed in a manner that will create a uniform charge. They need to support the unit under the sticker line. Sometimes an overlooked item of maintenance is cart management.

Are carts being greased on a routine basis? Greasing with high-temp grease to withstand the numerous hot drying charges they will endure until the next greasing will lengthen their life span.

Once carts breakdown after being loaded, if in kiln, misalignment may occur. Airflow is diverted and can cause downtime in removing stubborn cribs that sometimes will not budge.

Rails ahead of the kiln should be straight and aligned with the rails inside the kilns to maintain the integrity of the cribs, as they are stacked ahead of the kiln. This will assure us that what we see ahead of the kilns, for alignment will be present inside the kilns.

Accurate Drying

This is where the kiln operators take over to use the proper drying schedules; make sure the kilns are maintained well enough to provide proper airflow, steam delivery and control of the humidity.

A well known fact in the industry and recently noted in a timber processing publication is that for every percent below mc target, there is a potential for a \$5.00 to \$7.00 loss per thousand, depending on the product being dried. For example, on a charge of 100,000 bdft at @ \$300/mbf, this could mean anywhere between \$500-\$700/charge. This may not seem like much, but over a period of 10 charges \$5,000-\$7,000 seems more like a matter of concern to most people.

In summary I would like to quote text written by Dean Huber, from the Quality Control for Lumber Manufacturing book, edited by Professor Terry Brown from OSU, "Lack of tight control over small issues results in extended and uneven drying times. These differences are most evident during the early stages of drying.

"Quality control at the dry kiln can improve both drying uniformity and time (production). This leads to less energy consumption, higher grade recovery, lower drying costs and more effective use of kiln capacity.

"Quality control at the dry kilns begins at the headrig, follows through the sorter and stacker, involves the forklift, requires millwright and maintenance work and only then directly involves the kiln operation. If the preliminaries are not under control, the drying process will not be under control."

I highly recommend, if anybody hasn't purchased a copy of this book, to do so. It is full of information that all of us could use to help us make a better product.