DEGRADE FORMATION BETWEEN THE GREEN CHAIN AND THE DRY KILN
(A slide lecture contrasting poor and good practices)

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Introduction

Mr. Sawmill Manager, somewhere in your operation there is a situation which is consistently degrading 4-6 percent of your lumber, reducing dry kiln production by 5-8 percent and increasing production costs by $0.50 - $0.75 per thousand board feet of lumber. If a multiple of these situations exist, there is a proportionate effect on degrade, production and costs.

The following set of slides were assembled to illustrate the cause and solution for these commonly consistent and costly situations. As you will see, these slides are not an artist's drawing to dramatize a point; these slides are of actual conditions found in mill yards from Southern California to Northern British Columbia. Due to the limited time allowed for this presentation we will discuss only a few specific topics; but it is hoped that I can acclimate you to better milling practices for improved quality, more kiln production and lower drying costs.

(Author's note: Two series of slides were presented which contrasted poor and good practices of sorting, piling, transporting and stacking of lumber. For the purpose of this publication, allow me to outline the salient points of commentary.)

Sorting of Lumber

Sorting of lumber into uniform groups will help to assure a uniform drying rate. In so far as possible, sorting should include species, grade, thickness, width, length and, perhaps, special groupings such as sapwood, vertical grain or sinker stock (water core). But each has its economic purpose.

To illustrate a case in point, let's discuss briefly the merits of sorting to length. Sorting to one length of lumber per package is a major step toward optimizing kiln production, planer production, volume recovery, and grade recovery. Sorting of this type is usually practiced in those mills which cut mostly dimension sizes of one or two species. As the mill cut becomes more complex (various grades, thicknesses and species), most mills are forced to compromise their sorting--generally into length groups such as 10/12, 14/16 and 18/20. Length grouping and other compromises are common with automatic systems such as tray and J-bar sorters. Perhaps the worst offense of length sorting is negligence by the operators when a package is allowed to contain a few untrimmed long pieces (source: wrong length or lack of proper trimming).

Economic forces are causing many mill managers to re-evaluate their sorting practices, including length sorting, and for good reasons. This practice is essential for increased production and improved quality since it affects every stage of processing from the sorter to the boxcar. Each of the following are affected by sorting:
1) piling practices
2) stacking practices
3) kiln capacity
4) exposure to heat energy
5) exposure to circulating air
6) drying rates
7) final range of moisture contents
8) planer production
9) vertical distribution of weight
10) trim loss
11) grade recovery
12) sticker damage, breakage and loss

Piling of Lumber

Generally speaking, there are two types of piling techniques: solid piling for storage or transport and sticker piling for air seasoning or kiln drying. We are interested in sticker piling which refers to separating lumber courses with a series of stickers such that air can move laterally through the package. Piling practices affect drying production and costs as well as volume and grade recovery in several ways:

1) Vertical alignment of the lumber in a package and the tiers of stickers is essential to minimize degrade, reduce trim loss and avoid sticker breakage.
2) Drying rates are reduced and degrade increased if stickers are absent, misplaced, broken, uneven in size, or compressed to a narrower size.
3) A sufficient number and width of stickers are needed to minimize warp, distribute the vertical forces of weight and avoid indentation into the lower density woods.
4) If packages contain more than one length of lumber, box piling helps to support the vertical weight and unify the air flows.

Transporting

Stickered lumber packages are transported by carrier or fork lift. The efficiency of these operators is affected by the quality of sorting and piling.

A common error of carrier operators occurs as they drive away from a load and nudge it askew and/or misalign the stickers. Sticker breakage (a significant cost to drying) is not uncommon if they protrude from the package.

Fork lift operators often combine speed with a bumpy yard to bounce their loads askew, drop boards into the mud, rearrange sticker alignment, and lose stickers from the ends. Inevitably these all add to the cost of drying.

Transportation costs are somewhat fixed and are expensive due to labor and machinery. The unnecessary additional costs indicated above can be reduced as the operators are given ample time, training and supervision; and if they have a well maintained yard to work in.
Stacking of Stickered Packages

Stickered packages are stacked onto kiln buggies of tunnel type kilns or directly into side loading kilns. Stacking is usually done with a fork lift and thus the operator plays an important role in the overall dry kiln operations:

1) The quality of sorting, piling and transporting has an affect on stacking.
2) Alignment of sticker tiers over the bunks is needed to prevent kink in the bottom course of lumber.
3) Vertical alignment of bolsters (spacers) with sticker tiers is needed to transfer the weight downward without causing kinks in the lumber.
4) To allow the passage of air from package to package, a chimney of several inches should separate the packages.

Results

This list of do's and do not's may sound very general--and it is. But therein lies the fact that almost every mill has some type of situation which is consistently causing less production, increased costs and reduced recovery. Mr. Sawmill Manager, perhaps your operation can be improved with better milling practices, proper personnel training and adequate supervision.

I may be interesting to note the improvements by some mill managers. While some mills have effective quality control programs, others have utilized outside help (grading associations, extension agents, consultants). From my own files and records, let's see what progress has been made:

- sorting to length - upwards of 35% more volume per kiln charge
  - 15-20% less trim loss
  - 40% less drying costs
  - $1/M lower planing costs

- improved piling - 7% more recovery
  - 3% better grade
  - 8% more planer production

- improved stacking - 15-20% less drying time

- 5-10% less degrade

Can you expect results like these? This depends upon the quality of your current operation and whether mill management is prepared to improve their operation. Every day we walk around, look beyond or even stumble over commonly consistent, but costly situations. Perhaps it is timely to look for these and take corrective action.