OPTIMIZING THE KILN SCHEDULE BY MOISTURE SEGREGATION

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A. Introduction
   1. Brief Description of LSI
      a. Lumber sorting, computer controls, stacking and drying equipment.
      b. Unique combination.
      c. Combined our engineering expertise of sorting and lumber drying for the optimum system.
   2. Mills have long sorted moisture contents on the pullchain.
      a. Better sorting desirable.
      b. More sorts to a more finite degree at high speeds.

B. First Step Was Better Sorting
   1. Primary and Secondary Sorts.
      a. Primary by size - 20 at Columbia Falls/18 at Colville.
      b. Secondary by moisture content - 17 at Columbia Falls/14 at Colville.
      c. Re: Arden and Plum Creek.

C. Mechanics of the Weight Scales System
   1. Display overall sorter transparency.
   2. Display sense zone transparency.
   3. Utilizes dead skids with load cells.
   4. Precision thickness sensor.
   5. Computer to calculate density.

$$\frac{\text{Weight}}{\text{Volume}} = \text{Density}$$

D. In Actual Practice at Colville
   1. Segregating by 3 MC's.
      a. Super sap
      b. Sap
      c. Heart
   2. Plus 2 density ranges.
      a. One density range for ponderosa pine (P.P.); spruce; cedar; fir; white pine and lodgepole pine (L.P.)
      b. One density range for bull pine/larch/white fir.
      c. These 2 categories have similar dry weight characteristics for proper sorting.
   3. Above 100% MC - super sap
      60 - 100% - sap
      Below 60% - heart

E. Results From Dry Kilns

1. Pine common boards - drying times have been reduced by 17%:

	Now	Was
a. Super Sap (28% of volume)	52-53 hours	60 hours
b. Sap (34% of volume)	44-48 hours	60 hours
c. Heart (38% of volume)	24-26 hours	36 hours

2. If new plant - with 6 kilns typical requirement: could now go with 5 (250,000).
3. If old plant - get 17% more production for same steam costs.
   a. Plum Creek increased production through automatic sorting and didn't add kilns.
4. Increased recovery on P.P.; L.P.; and Bull Pine.
   a. Average recovery over last three years on #2 common (best grade of common board) was 47% (47% of all pine boards was #2 common).
   b. Now is 55%.
   c. #3 common was 41% - now 36%.
   d. #4 and #5 common was 12% - now 9%.
5. Equating $$ figures to grade recovery, plus 2% less trim loss due to end check - at increase of $14.25/1,000 bd. ft.
6. On a 30 million bd. ft./yr. operation on this 1 specie only: 30,000 x 14.23 = $427,500 increase in profit.

F. Initial Investment of 20 Bin Sorter

1. Price:	$600,000.00
2. Plus Moisture Segregation System:	$100,000.00
3. Investment:	$700,000.00
4. Avoid one (1) kiln:	$250,000.00
5. Profit Increase:	$430,000.00
	$680,000.00
6. Payback:	Slightly over one (1) year