THE ADVANTAGES OF AIR DRYING LUMBER FOR A SECONDARY MANUFACTURER

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Executive Summary

Air drying can play a very important role in improving yield and reducing the variability in the final moisture content of kiln dried lumber. As harvested fiber is reduced in British Columbia, it is imperative that we produce "more from less". As manufacturers, we must reduce trim losses, improve grades and produce products for customers who will further process the wood we sell to them; such as mouldings, doors and windows, or furniture. The requirements of these "new" customers (grades, sizes, drying, etc.) are totally different from the requirements of the traditional dimension markets of the B.C. interior mills. These new requirements must be addressed if we, as manufacturers and stewards of the B.C. fiber supply, are to be successful. Our competition for these new markets is coming from the Scandinavian countries and they are "doing it right".

In this report, we will look at two studies that took place in the B.C. Interior. The first was at a primary mill, **West Fraser Mills** in Williams Lake, and the second study took place at a secondary manufacturer, **Canwood Furniture Inc.** in Penticton.

Project # 1

Mill Site: West Fraser Mills Williams Lake, BC

Objective: To Evaluate the Trim Losses and Lumber Degrade Between Air Dried and Kiln Dried Lumber

Method: 2 x 4 x 16 and 2 x 10 x 16 SPF Lumber were sawn at the mill on July 30th, 1996. All the test lumber was produced at the same time to ensure that the stock was from the same batches of logs. Approximately 10,000 BM of rough sawn lumber was used for air drying while the same amount was subjected to the normal kiln drying process used at this mill.

The 2 x 4 and 2 x 10 lumber was stickered and the slings to be air dried were stacked two slings high in the mill yard. These two slings were then draped with a fabric covering on the ends and tops of the stacked slings. (The material used is a material that has been specifically used in the growing of *ginseng* as covers on the cultivation sheds). The period that the lumber was left to air dry was 4 weeks for the 2 x 4 and 6 weeks for the 2 x 10. The outdoor daytime temperatures during these weeks varied from 65 to 80 degrees F with a relative humidity of 60 degrees.

The kiln dried lumber was immediately dried after sawing with the mill's commercial schedule.

Results: **2 x 4 x 16' (see TABLEs 1a and b and FIGURES 1 and 3).** Air dried material produced 1.56% more clears than did the material that was kiln dried. The air dried material had 2.83% less trim loss than the kiln dried material.

2 x 10 x 16' (see TABLEs 2a and b and FIGURES 2 and 4)

Air dried material produced 5.02% more 2 & Btr than did the material that was kiln dried. The air dried material had 4.02% less trim loss than the kiln dried material.

The previous TABLEs show grade improvements and reductions in trim loss after air drying. FIGURES 1a through 4b present the moisture content information found in the previous data in a graphical format.

The interesting aspects of these graphs are how the moisture content of the samples that have been air dried material (2 x 4 or 10), are tightly grouped as opposed to the greater moisture content variations found in the samples that have been kiln dried immediately after sawing the logs into the dimension stock. When supplying a kiln dried product to a remanufacturer, this feature is very important to them.

TABLE 1a. Moisture content readings for 16' 2x4 air dried material.

Sample #1			
MC	MC Corr.	#	
6	6		0
7	8		0
8	10		0
9	11	1	11
10	12	35	420
11	13	51	663
12	14	18	252
13	16	1	16
14	17	3	51
15	18	2	36
16	19	3	57
17	20		0
18	21	3	63
19	22	2	44
20	23		0
21	24	1	24
22	25		0
23	26		0
24	27		0
25	28		0
26	29		0
27	30		0
28	30		0
29	30		0
30	30		0

Sample #2			
MC	MC Corr.	#	
6	6		0
7	8		0
8	10		0
9	11	3	33
10	12	32	384
11	13	52	676
12	14	26	364
13	16	3	48
14	17	4	68
15	18	2	36
16	19	1	19
17	20		0
18	21		0
19	22	1	22
20	23		0
21	24		0
22	25		0
23	26		0
24	27		0
25	28		0
26	29		0
27	30		0
28	30		0
29	30		0
30	30		0

Using Corrected MC Readings

# of Samples	120		124		
MC x #	1637		1650		
Avg. MC	13.6		13.3		
Over 19%	3	3%	1	1%	
Under 11%	0	0%	35	28%	

TABLE 1b. Moisture content readings for 16' 2x4 kiln dried material.

Sample #1 (#108)			
MC	MC Corr.	#	
6	6	1	6
7	8		0
8	10	16	160
9	11	23	253
10	12	30	360
11	13	13	169
12	14	9	126
13	16	2	32
14	17	1	17
15	18	11	198
16	19	1	19
17	20		0
18	21		0
19	22	1	22
20	23		0
21	24		0
22	25		0
23	26		0
24	27		0
25	28		0
26	29		0
27	30		0
28	30		0
29	30		0
30	30		0

Sample #2 (#111)			
MC	MC Corr.	#	
6	6		0
7	8	1	8
8	10	7	70
9	11	20	220
10	12	15	180
11	13	13	169
12	14	16	224
13	16	10	160
14	17	11	187
15	18	12	216
16	19	4	76
17	20		0
18	21		0
19	22	2	44
20	23		0
21	24		0
22	25		0
23	26		0
24	27		0
25	28		0
26	29		0
27	30		0
28	30		0
29	30		0
30	30		0

Using Corrected MC Readings

# of Samples	108		111	
MC x #	1362		1554	
Avg. MC	12.6		14.0	
Over 19%	3	3%	2	2%
Under 11%	0	0%	43	39%

TABLE 2a. Moisture content readings for 16' 2x10 air dried material with tarping.

Sample #1			
MC	MC Corr.	#	
6	6		0
7	8		0
8	10		0
9	11		0
10	12	4	48
11	13	35	455
12	14	16	224
13	16	2	32
14	17	3	51
15	18	1	18
16	19		0
17	20		0
18	21	1	21
19	22		0
20	23		0
21	24	1	24
22	25	1	25
23	26		0
24	27		0
25	28		0
26	29		0
27	30		0
28	30		0
29	30		0
30	30		0

Sample #2			
MC	MC Corr.	#	
6	6		0
7	8		0
8	10		0
9	11		0
10	12	4	48
11	13	36	468
12	14	21	294
13	16	5	80
14	17	1	17
15	18	2	36
16	19		0
17	20		0
18	21		0
19	22		0
20	23		0
21	24		0
22	25		0
23	26		0
24	27		0
25	28		0
26	29		0
27	30		0
28	30		0
29	30		0
30	30		0

Using Corrected MC Readings

# of Samples	64		69	
MC x #	898		943	
Avg. MC	14.0		13.7	
Over 19%	3	5%	0	0%
Under 11%	0	0%	4	6%

TABLE 2b. Moisture content readings for 16' 2x10 kiln dried material.

Sample #1			
MC	MC Corr.	#	
6	6		0
7	8		0
8	10		0
9	11		0
10	12		0
11	13	18	2234
12	14	17	2338
13	16	12	1992
14	17	8	1336
15	18	8	1444
16	19		0
17	20	2	440
18	21	1	221
19	22		0
20	23		0
21	24		0
22	25		0
23	26		0
24	27		0
25	28		0
26	29		0
27	30		0
28	30		0
29	30		0
30	30		0

Sample #2			
MC	MC Corr.	#	
6	6		0
7	8		0
8	10		0
9	11		0
10	12		0
11	13	1	13
12	14	3	42
13	16	7	112
14	17	8	136
15	18	34	612
16	19	7	133
17	20	4	80
18	21	2	42
19	22	3	66
20	23	2	46
21	24	1	24
22	25		0
23	26		0
24	27		0
25	28	1	28
26	29		0
27	30		0
28	30		0
29	30		0
30	30	1	30

Using Corrected MC Readings

# of Samples	66		74	
MC x #	1005		1364	
Avg. MC	15.2		18.4	
Over 19%	3	55%	12	16%
Under 11%	0	0%	0	0%

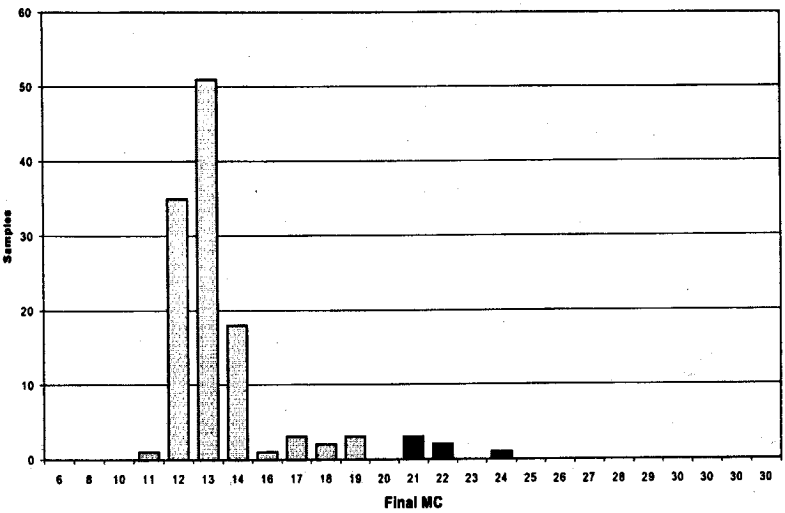

FIGURE 1a. Final moisture content of 2x4 air dried SPF (Sample #1)

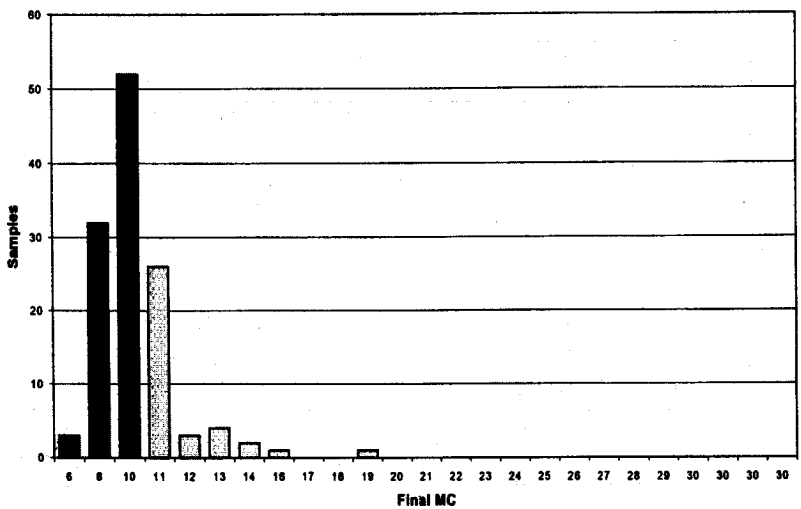

FIGURE 1b. Final moisture content of 2x4 air dried SPF (Sample #2)

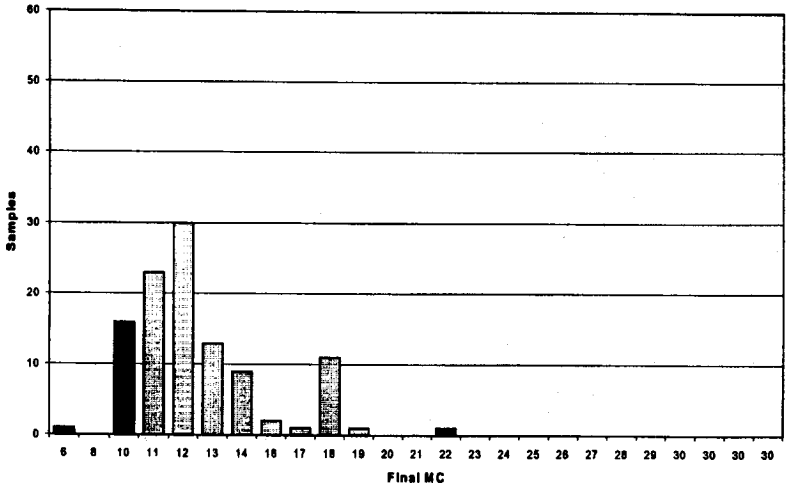

FIGURE 2a. Final moisture content of 2x4 air dried SPF (Sample #1)

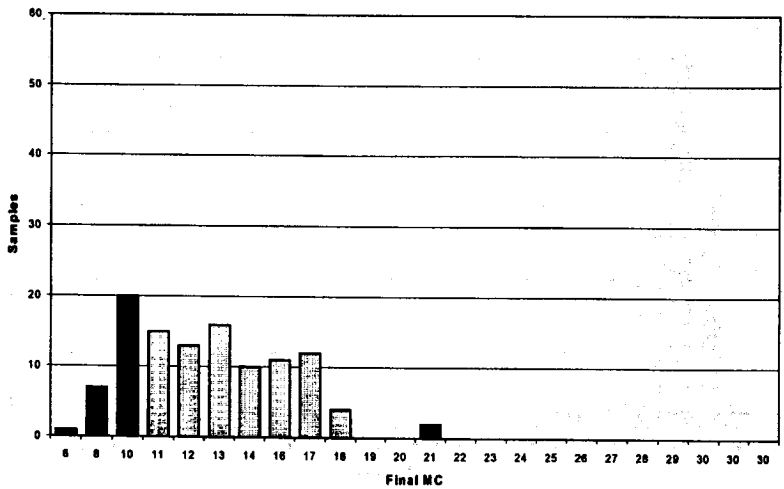

FIGURE 2b. Final moisture content of 2x4 air dried SPF (Sample #2)

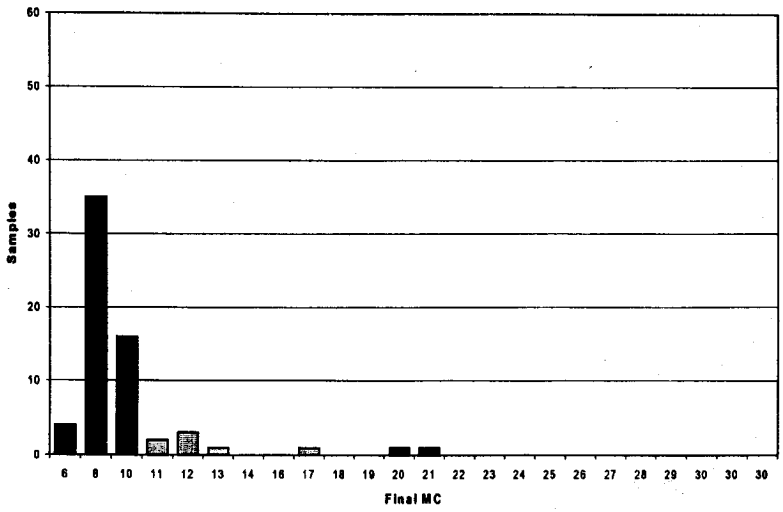

FIGURE 3a. Final moisture content of 2x10 air dried SPF (Sample #1)

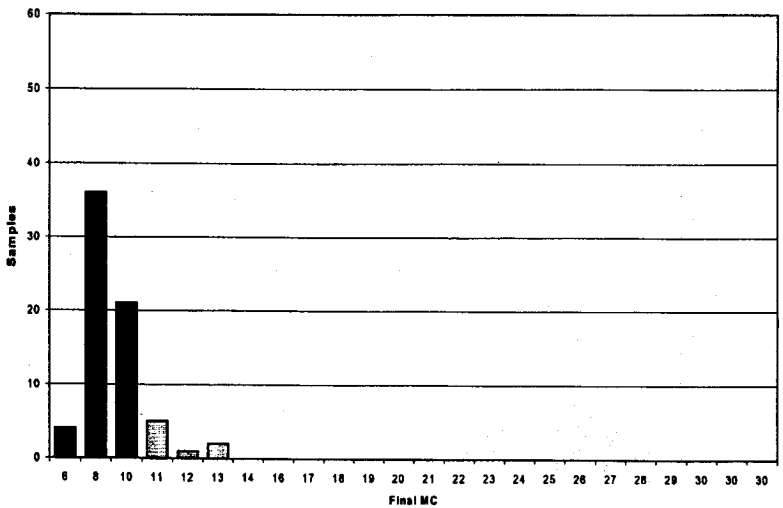

FIGURE 3b. Final moisture content of 2x10 air dried SPF (Sample #2)

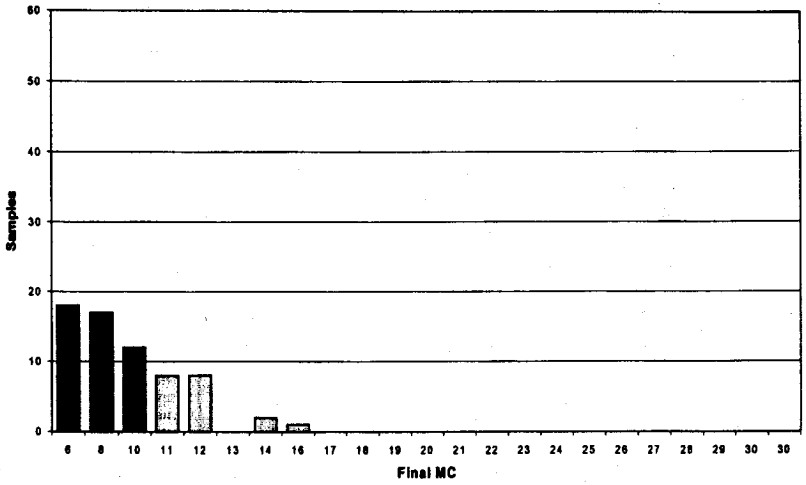

FIGURE 4a. Final moisture content of 2x10 kiln dried SPF (Sample #1)

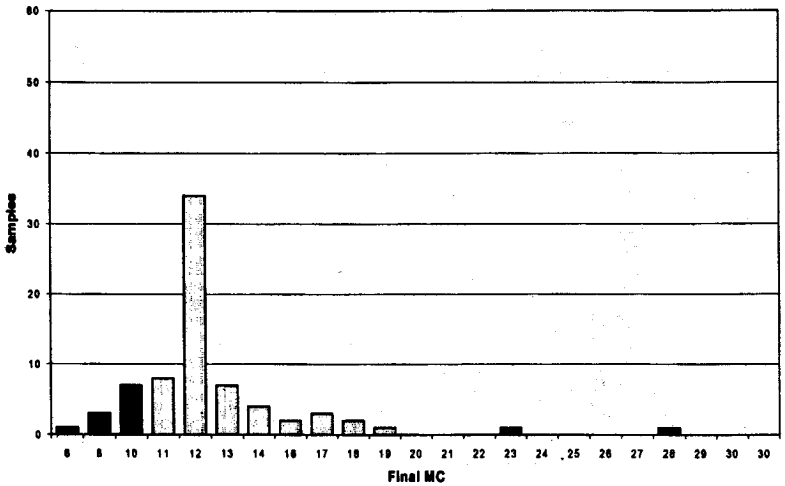

FIGURE 4b. Final moisture content of 2x10 kiln dried SPF (Sample #2)

Project # 2

Mill Site: Canwood Furniture Inc
Penticton, BC

Objective: To Evaluate the Moisture Distribution of
Freshly Cut Lumber
Air Dried Lumber
Kiln Dried Lumber that has been Air Dried

Method: Random moisture content readings will be taken, using a hand held moisture meter, on freshly cut Lodgepole Pine lumber (FIGURE 5A). Moisture readings will be taken again after air drying (after five weeks – FIGURE 5B) and the results will be compared.

Results: The moisture content of freshly cut lumber varies significantly. If that lumber is dried immediately after cutting, the moisture variation will still be great in spite of the lower average moisture content. However, if the wood is allowed to air dry, the variation in products to be kiln dried is greatly reduced and hence the final kiln dried product's moisture content variation is also greatly reduced.

ACKNOWLEDGMENTS

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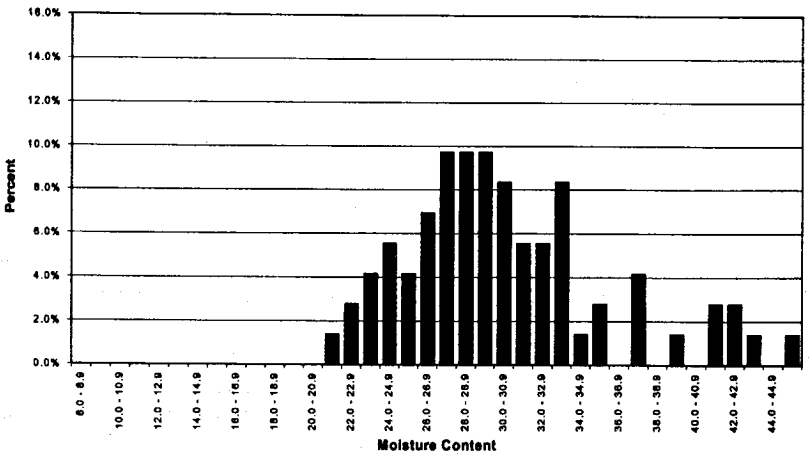

FIGURE 5a. Moisture content of incoming lumber from primary mill.

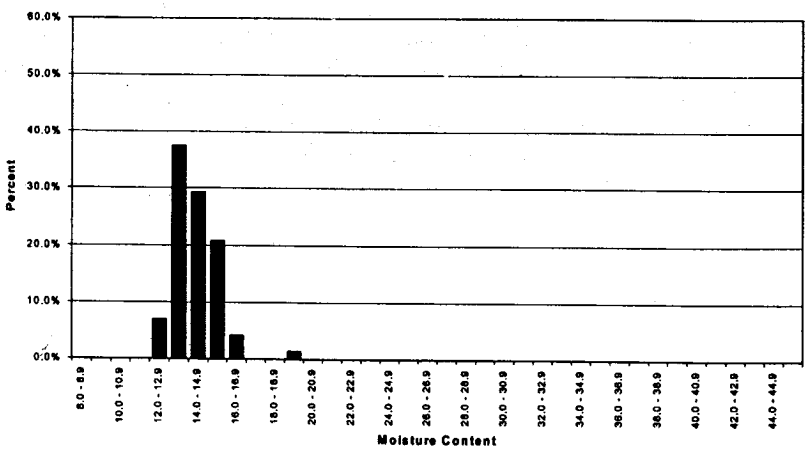

FIGURE 5b. Moisture content of air dried lumber (air dried 5 weeks).