

Decay Resistance and Bonding Properties of Structural Flakeboard



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Objectives

- Evaluate the decay resistance, internal bond, linear expansion, and thickness swell of flakeboard made from furnishes consisting of either (a) mixed U.S. southern hardwood, (b) untreated southern pine (*Pinus* sp.), and (c) recycled CCA-treated southern pine

Objectives

- Evaluate the effect of a co-reacted soy-flour resin on panel properties.

Furnish

- (1) Recycled CCA-treated SYP wood
- (2) Mixed hardwood
- (3) Untreated SYP

Resins

- Commercial PF (4.5%) (recycled CCA panels)
- Commercial PF (4.5%) with and a laboratory prepared resin consisting of co-reacted soy-flour and PF resin were used, which included 30% substitution of phenol with soy flour in the resin system (mixed hardwood and untreated SYP panels)

Methods

- Mechanical and physical testing was performed in accordance with ASTM D1037-93 (ASTM 1993).
- Testing for brown rot (*Gloeophyllum trabeum*, ATCC 11539) and white rot (*Trametes versicolor*, ATCC 42462) in accordance with AWPA E10-91 (AWPA 2000).

Group	Virgin Wood (%)	Recycled CCA-Treated Wood (%)
1	0	100
2	25	75
3	50	50
4	75	25
5	100	0
6	Pine sapwood (for decay tests only)	
7	Pine guard rail (for decay tests only)	

Group	MC (%)	Density (pcf)	IB (psi)	IB _{ODVPS} (psi)
1	7.8	47.0	84.8	48.6
2	7.6	48.4	65.1	34.9
3	7.3	47.5	74.4	44.4
4	7.6	46.4	72.2	33.0
5	7.1	49.5	89.3	55.7

Group	ODVPS LD (%)	ODVPS TS (%)	WA (%)
1	0.0032	26.2	103
2	0.0031	28.4	100
3	0.0020	31.3	94
4	0.0026	33.2	98
5	0.0027	32.0	99

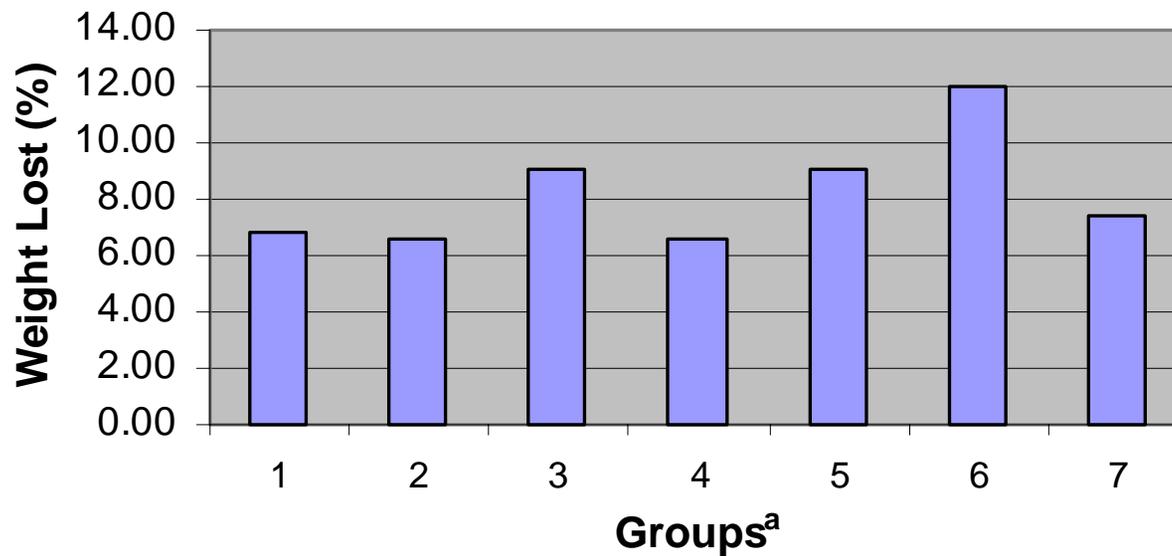
Group	Furnish/Resin	MC (%)	Density (pcf)	IB (psi)		LE (%)		TS (%)	
				PT (min.)	PT (min.)	PT (min.)	PT (min.)	PT (min.)	PT (min.)
<i>Pine Flakeboard</i>				3.5	5.0	3.5	5.0	3.5	5.0
8	Soy/PF I	7.7	47.1	72.0	82.5	0.493	0.489	36.3	36.8
9	Soy/PF II	7.5	47.5	73.3	88.7	0.472	0.450	35.3	33.9
10	PF Resin (face) ³	7.6	47.5	46.6	58.7	0.537	0.545	35.9	37.6
11	PF Resin (core) ⁴	7.6	46.7	74.8	80.2	0.480	0.416	33.8	31.9

PT = Press Time

Group	Furnish/Resin	MC (%)	Density (pcf)	IB (psi)		LE (%)		TS (%)	
<i>Hardwood Mix</i>				PT (min.)		PT (min.)		PT (min.)	
12	Soy/PF-1	7.8	47.0	107	132	0.591	0.625	30.5	30.7
13	Soy/PF II	7.6	47.3	107	116	0.572	0.569	32.1	30.9
14	PF Resin (face) ³	7.6	47.3	76	103	0.546	0.527	25.9	25.7
15	PF Resin (core) ⁴	7.7	46.7	94	117	0.559	.0559	30.5	29.6

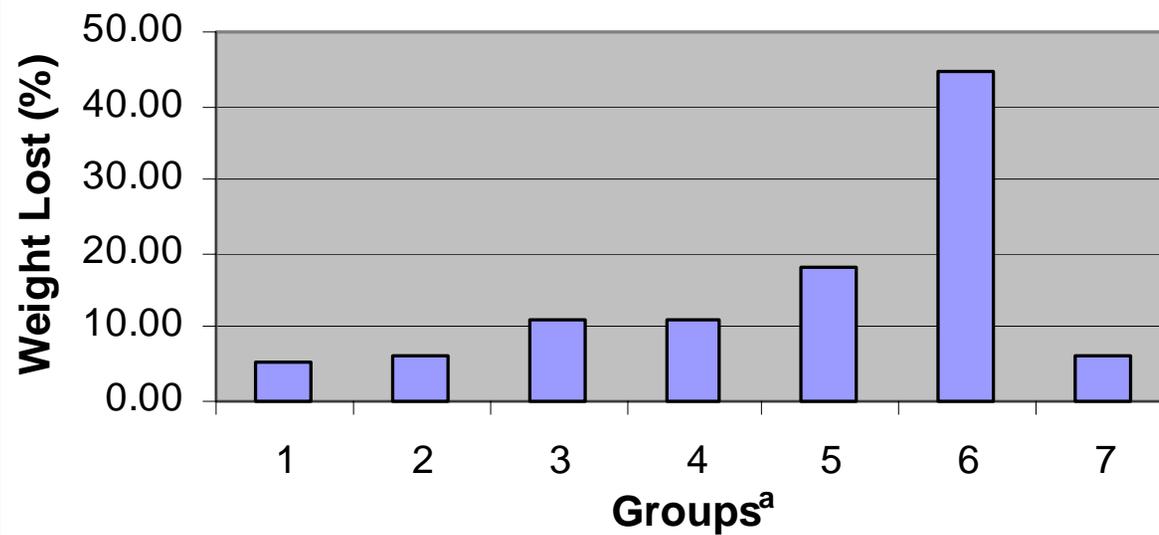
1-A

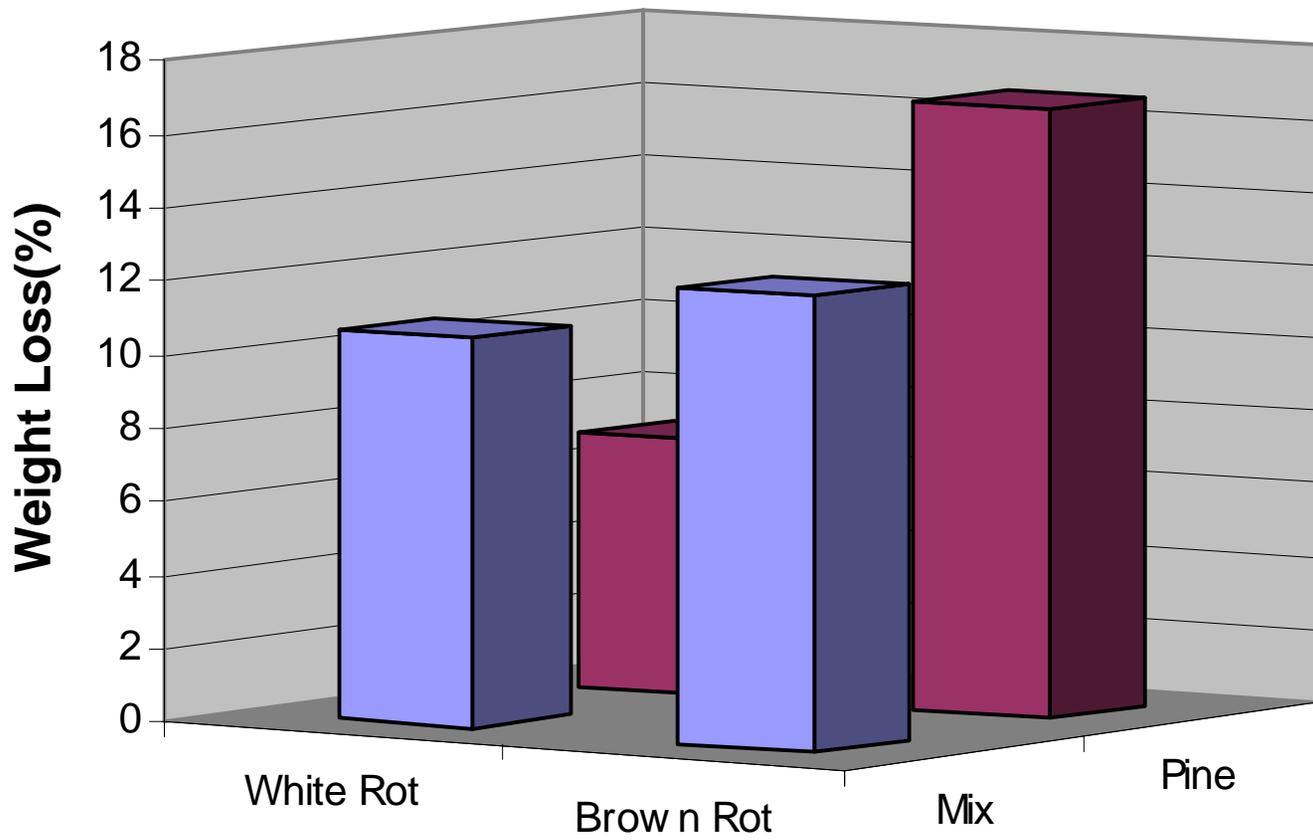
Soil Decay Test - White Rot



1-B

Soil Decay Test - Brown Rot





Conclusions

- Mechanical and physical properties do not substantially decrease with as much as 50 percent treated material in the furnish of the panels.
- Tests on the panels bonded with co-reacted soy flour PF indicated that 30% substitution of phenol with soy flour in the resin system did not appreciably promote decay or reduce IB strength.

Conclusions

- As expected, the weight loss of the recycled CCA-panels was highest for those panels with lower amounts of treated wood in the furnish.

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Questions?

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