



**MISSISSIPPI STATE
UNIVERSITY™**

**FOREST AND WILDLIFE RESEARCH CENTER
DEPARTMENT of SUSTAINABLE BIOPRODUCTS**

Twelfth Annual Evaluation of MSU/RTA Alternative Preservative Study

Submitted To:

**Mr. Ashley Goodin
Executive Director
Railway Tie Association
115 Commerce Drive, Suite C
Fayetteville, GA 30214
Email: agoodin@rta.org .**

Submitted By:

**M.G. Sanders, H. M. Barnes and C. E. Stokes
Department of Sustainable Bioproducts
Box 9820
Mississippi State, MS 39762
Phone: (662) 325-8097
Fax: (662) 325-8986
Email: mgs3@msstate.edu**

August 04, 2020

Twelfth Annual Evaluation of MSU/RTA Alternative Preservative Study

This report covers the twelfth annual evaluation of the full-length cross-ties exposed as part of the MSU/RTA alternative preservative study. A visual evaluation of the exposed top surface was conducted for all ties at both exposure sites.

General Observations: No unexpected results were found but biological deterioration in the controls indicates the testing is valid. As in the past checks and/or splits were noted to be worse at Site 2 probably due to more direct sunlight exposure. Termite activity has increased at this site. Ties at Site 1 were much more moist/wet due to the increased rain fall, shade and leaf litter as well as the clay soil at this site and these ties showed an increased amount of decay in the controls and more vigorous termite activity (*Reticulitermes flavipes*) due to these conditions. A few photographs documenting the condition of the sites and some of the noted deterioration can be seen below (Figures 1 - 11). The tie number denotes the position of exposure as recorded on the plot-maps. Copies of the inspection forms can be found in the appendix.



Figure 1 - An overall view of exposure Site 2 illustrating the conditions at the time of inspection.



Figure 2 - A general photograph of Site 1 at the time of inspection.

Site 1 - Dorman Lake Test Site



Figure 3 - Tie #25 with slight decay.



Figure 4 – Another overall view showing the abundant vegetation growth around ties due to the heavy rainfall.

Site 2 – Formosan Termite Research Facility



Figure 5 - Tie #89 with heavy decay and termite damage.



Figure 6 - Tie #131 with extensive decay.



Figure 7 - Tie #186 with "alligator" end.



Figure 8 - Tie #187 with active Formosan subterranean termites (FST).

APPENDIX:

Plot Map RTA Ties (Dorman - installed 4-08)
 Position Row 1 runs North - South (Eastern most row)
 May-20

			Decay	Termite	Decay	Termite	Comments
1	wo-2	Cedar	x	x	x	x	Cut 5/10
2	wo-3		x	x	x	x	Cut 5/12
3	wo-4		x	x	x	x	Cut 5/14
4	wo-5		x	x	x	x	Cut 5/16
5	wo-7		x	x	x	x	Cut 5/19
6	wo-6		0	0	0	0	Failed
7	wo-1		8	10			
8	wo-10		8	10			check
9	wo-8		0	0	0	0	Failed
10	wo-9		4	10			
11	wo-21		6	9			live termites/DK top&bottom
12	ro-18		x	x	x	x	Cut 5/10
13	ro-19		x	x	x	x	Cut 5/12
14	ro-20		x	x	x	x	Cut 5/16
15	ro-7		x	x	x	x	Cut 5/19
16	ro-6		7	10			check
17	ro-5		6	10			alligator
18	ro-21		8	10			
19	ro-4		4	10			check
20	ro-3		6	10			check
21	ro-2						check
22	ro-1		x	x	x	x	Cut 5/14
23	5	Turada	x	x	x	x	Cut 5/10
24	6		x	x	x	x	Cut 5/16
25	7		9	10			
26	4		x	x	x	x	Cut 5/19
27	2		x	x	x	x	Cut 5/14
28	9		9.5	10			
29	8		9.5	10			edge
30	10		9.5	10			
31	1		10	10			
32	3		x	x	x	x	Cut 5/12
33	SROBC-7	Seaman	x	x	x	x	Cut 5/10
34	SROBC-7		x	x	x	x	Cut 5/12
35	SROBC-7		x	x	x	x	Cut 5/19
36	SROBC-7		10	10			
37	SROBC-7		10	10			check
38	SROBC-7		10	10			check
39	SROBC-7		x	x	x	x	Cut 5/14
40	SROBC-5		x	x	x	x	Cut 5/10
41	SROBC-7		x	x	x	x	Cut 5/16
42	SWOCEF		x	x	x	x	Cut 5/10
43	SWOCEF		x	x	x	x	Cut 5/12
44	SWOCEF		10	10			check
45	SWOCEF		x	x	x	x	Cut 5/19

46	SWOCEF	10	10			check
47	SWOCEF	10	10			
48	SWOCEF	10	10			check
49	SWOCEF	10	10			
50	SWOCEF	x	x	x	x	Cut 5/14
51	SROC-7	x	x	x	x	Cut 5/10
52	SWOC-5	x	x	x	x	Cut 5/10
53	SROBC-5	7	9			LP
54	SWOBCREF	x	x	x	x	Cut 5/10
55	SWOBCREF	x	x	x	x	Cut 5/14
56	SWOBCREF	x	x	x	x	Cut 5/16
57	SWOBCREF	x	x	x	x	Cut 5/19
58	SWOBCREF	10	10			check
59	SWOBCREF	10	10			check
60	SWOBCREF	10	10			
61	SWOBCREF	x	x	x	x	Cut 5/12
62	SROC5	x	x	x	x	Cut 5/10
63	SROC5	x	x	x	x	Cut 5/12
64	SROC5	x	x	x	x	Cut 5/16
65	SROC5	x	x	x	x	Cut 5/19
66	SROC5	10	10			check
67	SROC5	10	10			
68	SROC5	10	10			
69	SROC5	10	10			check
70	SROC5	x	x	x	x	Cut 5/14
71	SROBC5	x	x	x	x	Cut 5/12
72	SROBC5	x	x	x	x	Cut 5/16
73	SROBC5	x	x	x	x	Cut 5/19
74	SROBC5	10	10			check
75	SWOBCREF	10	10			check
76	SWOCREF	x	x	x	x	Cut 5/16
77	SROC5	10	10			check
78	SROBC5	10	10			check
79	SROBC5	10	10			check
80	SROBC5	10	10			check
81	SROBC5	10	10			check
82	SWOBCREF	10	10			check
83	SROBC5	10	10			check
84	SROBC5	x	x	x	x	Cut 5/14
85	wo-136	Lonza	x	x	x	Cut 5/10
86	wo-130		x	x	x	Cut 5/12
87	wo-129		x	x	x	Cut 5/14
88	wo-121		x	x	x	Cut 5/19
89	wo-127	9.5	10			
90	wo-124	9	9			DK around knot
91	wo-128	x	x	x	x	Cut 5/16
92	wo-122	9.5	10			
93	wo-123	9.5	10			
94	wo-125	9.5	10			

95	ro-105	x	x	x	x	Cut 5/10
96	ro-104	x	x	x	x	Cut 5/12
97	ro-103	x	x	x	x	Cut 5/14
98	ro-102	x	x	x	x	Cut 5/16
99	ro-110	x	x	x	x	Cut 5/19
100	ro-107	9.5	10			
101	ro-106	9.5	10			
102	ro-109	8	10			
103	ro-101	9	10			DK pocket
104	ro-108	9	10			check
105	wo-135	x	x	x	x	Cut 5/10
106	wo-134	x	x	x	x	Cut 5/12
107	wo-138	x	x	x	x	Cut 5/19
108	wo-139	10	10			
109	wo-137	10	10			
110	wo-132	10	10			
111	wo-136	9	10			
112	wo-140	x	x	x	x	Cut 5/16
113	wo-133	x	x	x	x	Cut 5/14
114	wo-131	10	10			LP
115	ro-182	0	0	0	0	FAILED
116	wo-181	7	10			
117	ro-114	x	x	x	x	Cut 5/10
118	ro-120	10	10			
119	ro-117	x	x	x	x	Cut 5/12
120	ro-112	x	x	x	x	Cut 5/19
121	ro-113	10	10			
122	ro-115	9.5	10			check
123	ro-119	10	10			
124	ro-116	10	10			
125	ro-111	x	x	x	x	Cut 5/16
126	ro-118	x	x	x	x	Cut 5/14
127	P3RO7-39	KMG	x	x	x	Cut 5/16
128	P3RO7-36		x	x	x	Cut 5/19
129	P3RO7-37		10	10		
130	P3RO7-38		10	10		
131	P3RO7-23		10	10		
132	P3RO7-40		10	10		
133	P3RO7-26		10	10		
134	P3RO7-42		x	x	x	Cut 5/14
135	P3RO7-35		x	x	x	Cut 5/12
136	P3RO7-41		x	x	x	Cut 5/10
137	P3WO7-5		x	x	x	Cut 5/10
138	P3WO7-4		x	x	x	Cut 5/12
139	P3WO7-6		x	x	x	Cut 5/14
140	P3WO7-7		10	10		check
141	P3WO7-11		10	10		check
142	P3WO7-17		x	x	x	Cut 5/19
143	P3WO7-20		x	x	x	Cut 5/16

144	P3WO7-2		10	10				
145	P3WO7-8		10	10				
146	P3WO7-3		10	10				
147	Woctrl-21		8	9				live termites/check
148	Roctrl-43		x	x	x	x		Cut 5/16
149	WO122	Nisus	x	x	x	x		Cut 5/14
150	WO14		x	x	x	x		Cut 5/19
151	WO128		x	x	x	x		Cut 5/16
152	WO61		10	10				check
153	WO5		10	10				check
154	WO1		10	10				check
155	WO71		10	10				check
156	WO98		10	10				
157	WO139		x	x	x	x		Cut 5/14
158	WO135		10	10				check
159	WO144		10	10				check
160	WO126		x	x	x	x		Cut 5/19
161	WO131		x	x	x	x		Cut 5/16
162	WO138		10	10				split/LP
163	WO130		10	10				split
164	WO125		x	x	x	x		Cut 5/12
165	WO29		x	x	x	x		Cut 5/12
166	WO52		x	x	x	x		Cut 5/10
167	WO137		10	10				check
168	WO134		x	x	x	x		Cut 5/10
169	WO44ctrl		x	x	x	x		Cut 5/14
170	WO94ctrl		x	x	x	x		Cut 5/12
171	RO6ctrl		x	x	x	x		Cut 5/12

172	RO-51ctrl	x	x	x	x	Cut 5/14	
173	RO21	x	x	x	x	Cut 5/14	
174	RO22	x	x	x	x	Cut 5/19	
175	RO15	10	10			check	
176	RO62	10	10			check	
177	RO46	10	10				
178	RO2	9.5	10			check	
179	RO24	x	x	x	x	Cut 5/12	
180	RO20	x	x	x	x	Cut 5/10	
181	RO37	x	x	x	x	Cut 5/10	
182	RO31	10	10				
183	RO59	x	x	x	x	Cut 5/14	
184	RO89	10	10			check	
185	RO13	x	x	x	x	Cut 5/16	
186	RO58	10	10			check/LP	
187	RO57	10	10				
188	RO12	x	x	x	x	Cut 5/16	
189	RO56	10	10			check/LP	
190	RO25	x	x	x	x	Cut 5/19	
191	RO43	10	10			check	
192	RO10	x	x	x	x	Cut 5/12	
193	RO54	x	x	x	x	Cut 5/10	
194	RO38	x	x	x	x	Cut 5/12	
195	RO45	x	x	x	x	Cut 5/14	
196	RO16	7	10				
197	RO72	x	x	x	x	Cut 5/16	
198	RO77	8	9				
199	RO40	8	10				
200	RO55	7	10			check	
201	RO18	x	x	x	x	Cut 5/19	
202	RO3	8	10				
203	WO49	x	x	x	x	Cut 5/10	
204	WO121	x	x	x	x	Cut 5/12	
205	WO68	x	x	x	x	Cut 5/14	
206	WO11	8	10			check	
207	WO65	x	x	x	x	Cut 5/19	
208	WO92	x	x	x	x	Cut 5/16	
209	WO60	7	10				
210	WO47	9	8				
211	WO90	8	10				
212	WO69	7	9				
213	MRO8	Merichem	x	x	x	x	Cut 5/10
214	MRO8		x	x	x	x	Cut 5/14
215	MROB8		x	x	x	x	Cut 5/10
216	MROB8		x	x	x	x	Cut 5/19
217	MROB8		10	10			check
218	MROB8		10	10			check
219	MROB8		10	10			check
220	MROB8		10	10			check

221	MROB8	x	x	x	x	Cut 5/16
222	MROB8	x	x	x	x	Cut 5/14
223	MROB8	x	x	x	x	Cut 5/12
224	MWO8ctrl	x	x	x	x	Cut 5/16
225	MWO8ctrl	0	0	0	0	FAILED
226	MRO8ctrl	0	0	0	0	FAILED
227	MRO8	x	x	x	x	Cut 5/12
228	MRO8	x	x	x	x	Cut 5/16
229	MRO8	x	x	x	x	Cut 5/19
230	MRO8	9.5	10			check
231	MRO8	10	10			check
232	MRO8	10	10			
233	MRO8	10	10			
234	MRO8	9.5	10			check
235	MWOB8	x	x	x	x	Cut 5/10
236	MWOB8	x	x	x	x	Cut 5/14
237	MWOB8	x	x	x	x	Cut 5/16
238	MWOB8	x	x	x	x	Cut 5/19
239	MWOB8	10	10			check
240	MWOB8	10	10			check
241	MWOB8	10	10			check
242	MWOB8	10	10			check
243	MWOB8	10	10			check
244	MWOB8	x	x	x	x	Cut 5/12

Row 2 runs North - South (West row)

		Decay	Termite	Decay	Termite	Comments
245	6	x	x	x	x	Cut 5/10
246	14	x	x	x	x	Cut 5/14
247	79	x	x	x	x	Cut 5/19
248	73	x	x	x	x	Cut 5/12
249	75	x	x	x	x	Cut 5/14
250	6	10	10			
251	80	10	10			check
252	?	10	10			
253	62	x	x	x	x	Cut 5/16
254	78	10	10			
255	63	10	10			check
256	74	10	10			
257	37	x	x	x	x	Cut 5/10
258	26	x	x	x	x	Cut 5/14
259	53	x	x	x	x	Cut 5/10
260	59	x	x	x	x	Cut 5/14
261	52	x	x	x	x	Cut 5/19
262	48	x	x	x	x	Cut 5/16
263	45	10	10			
264	57	x	x	x	x	Cut 5/10
265	50	10	10			

266	54		10	10			
267	58		10	10			
268	46		x	x	x	x	Cut 5/12
269	12		x	x	x	x	Cut 5/16
270	20		x	x	x	x	Cut 5/12
271	18		x	x	x	x	Cut 5/12
272	17		x	x	x	x	Cut 5/19
273	4		10	10			
274	10		10	10			
275	16		10	10			
276	5		10	10			
277	27		x	x	x	x	Cut 5/19
278	36		10	10			
279	24		x	x	x	x	Cut 5/16
280	30		10	10			
281	22		10	10			check
282	39		10	10			
283	25		10	10			check
284	40		10	10			
285	WO30	Enviro	x	x	x	x	Cut 5/10
286	RO6		x	x	x	x	Cut 5/10
287	RO7		x	x	x	x	Cut 5/19
288	RO8		7	10			
289	RO9		0	0	0	0	Failed
290	RO1		x	x	x	x	Cut 5/14
291	RO2		9	10			
292	RO3		8	10			check
293	RO4		9	10			
294	RO5		8	9.5			
295	RO10		x	x	x	x	Cut 5/12
296	6	BioP					
297	1						
298	7						
299	8						
300	9						
301	10						
302	2						
303	3						
304	4						
305	5						
306	12						control?
307	9469						
308	9459						
309	9460						
310	9471						
311	9472						
312	9470						
313	9464						
314	11						control?

315	9468							
316	9466							
317	9467							
318	roctrl	Enviro	0	0	0	0		FAILED
319	roctrl		x	x	x	x		Cut 5/19
320	woctrl		x	x	x	x		Cut 5/19
321	woctrl		4	8				fruiting body
322	WO22		x	x	x	x		Cut 5/14
323	WO23		x	x	x	x		Cut 5/19
324	WO24		8	10				
325	WO25		7	10				
326	WO27		8	9				
327	WO28		8	10				
328	WO29		8	10				
329	WO21		7	10				check
330	WO26		x	x	x	x		Cut 5/12
331	MWO8	Meri	x	x	x	x		Cut 5/12
332	MWO8		x	x	x	x		Cut 5/16
333	MWO8		x	x	x	x		Cut 5/19
334	MWO8		10	10				
335	MWO8		9	10				
336	MWO8		10	10				
337	MWO8		10	10				
338	MWO8		10	10				check
339	MWO8		10	10				check
340	MWO8		x	x	x	x		Cut 5/14
341	MWO8		x	x	x	x		Cut 5/10/heart rot

LP = loose plate
dropped from study

Plot Map RTA Ties (McNeill)
 Position Row 1 runs East - West (Northern most row)
 May-20

			Decay	Termite	Decay	Termite	Comments
Turada	1	1	x	x	x	x	cut 4/10
	2	2	x	x	x	x	cut 3/16
	3	3		10			
	4	4		9			large check/FB
	5	5		9			FB
	6	6		9.5			FB
	7	7	x	x	x	x	cut 4/19
	8	8	x	x	x	x	cut 4/14
	9	9		8			Dk on top/FB
	10	10	x	x	x	x	cut 5/12
Envirosaft	11	11RO	x	x	x	x	cut 5/12
	12	15RO	x	x	x	x	cut 3/16
	13	14RO	x	x	x	x	cut 4/19
	14	13RO		9		10	large check
	15	12RO		9		10	large check/FB
	16	20RO		10		10	
	17	19RO		8		10	large check/FB in check
	18	18RO		9.5		10	split
	19	17RO	x	x	x	x	cut 4/14
	20	16RO	x	x	x	x	large check/cut 4/10
	21	35WO	x	x	x	x	cut 4/10
	22	34WO	x	x	x	x	cut 4/14
	23	33WO	x	x	x	x	cut 3/16
	24	32WO	x	x	x	x	cut 4/19
	25	31WO		9.5		10	large check/FB
	26	40WO		9.5		10	large check
	27	39WO		8		10	large check/FB in check
	28	38WO		9.5		10	
29	37WO		8		8	large check/FST	
Seaman	30	36WO	x	x	x	x	cut 5/12
	31	SROC5	x	x	x	x	cut 4/10
	32	SROC5	x	x	x	x	cut 4/14
	33	SROC5	x	x	x	x	cut 3/16
	34	SROC5	x	x	x	x	cut 4/19
	35	SROC5		10		10	large check
	36	SROC5		10		10	
	37	SROC5		10		10	
	38	SROC5		10		10	
	39	SROC5		10		10	large check
	40	SROC5	x	x	x	x	cut 5/12
	41	SROBC5	x	x	x	x	split/cut 4/10
	42	SROBC5	x	x	x	x	cut 4/14
	43	SROBC5	x	x	x	x	cut 3/16
	44	SROBC5	x	x	x	x	cut 4/19
	45	SROBC5		10		10	large check
	46	SROBC5		10		10	
	47	SROBC5		10		10	
	48	SROBC5		10		10	check

	49	SROBC5	10	10			check
	50	SROBC5	x	x	x	x	cut 5/12
	51	SWOCREF	x	x	x	x	cut 4/10
	52	SWOCREF	x	x	x	x	cut 4/14
	53	SWOCREF	x	x	x	x	cut 4/19
	54	SWOCREF	10	10			large check
	55	SWOCREF	10	10			check
	56	SWOCREF	10	10			check
	57	SWOCREF	10	10			check
	58	SWOCREF	10	10			check
	59	SWOCREF	x	x	x	x	cut 3/16
	60	SWOCREF	x	x	x	x	cut 5/12
	61	SWOBCREF	x	x	x	x	cut 4/10
	62	SWOBCREF	x	x	x	x	cut 4/14
	63	SWOBCREF	x	x	x	x	cut 4/19
	64	SWOBCREF	10	10			check/loose plate
	65	SWOBCREF	10	10			large check
	66	SWOBCREF	10	10			
	67	SWOBCREF	10	10			large check
	68	SWOBCREF	10	10			large check
	69	SWOBCREF	x	x	x	x	cut 3/16
	70	SWOBCREF	x	x	x	x	cut 5/12
	71	SROBC7	x	x	x	x	cut 4/10
	72	SROBC7	x	x	x	x	cut 4/14
	73	SROBC7	x	x	x	x	cut 4/19
	74	SROBC7	10	10			
	75	SROBC7	10	10			large check/IS
	76	SROBC7	10	10			check
	77	SROBC7	10	10			large check/IS
	78	SROBC7	10	10			check
	79	SROBC7	x	x	x	x	cut 3/16
	80	SROBC7	x	x	x	x	cut 5/12
	81	ctrlSROC7	x	x	x	x	cut 4/10
	82	ctrlSWOC5	x	x	x	x	cut 4/10
	83	ctrlSWOC5	6	9			pic 09/active DK/FB/LP
Lonza	84	209	x	x	x	x	cut 4/10
	85	206	x	x	x	x	cut 3/16
	86	204	x	x	x	x	cut 4/19
	87	201	x	x	x	x	cut 4/14
	88	208	8	10			large check
	89	203	4	8			FB
	90	205	6	9			large check/FB on side
	91	207	8	10			FB/LP
	92	210	0	0	0	0	Failed
	93	202	x	x	x	x	cut 5/12
Nisus	94	240	x	x	x	x	cut 4/10
	95	237	x	x	x	x	cut 5/12
	96	243	x	x	x	x	cut 4/14
	97	238	x	x	x	x	cut 4/19
	98	245	10	10			large check
	99	239	10	10			large check
	100	247	x	x	x	x	cut 3/16

101	241	10	10			check	
102	233	10	10			large check	
103	242	10	10			large check	
104	203	x	x	x	x	cut 4/10	
105	227	x	x	x	x	cut 5/12	
106	207	x	x	x	x	cut 4/14	
107	200	x	x	x	x	cut 4/19	
108	229	10	10			check	
109	206	10	10			split/LP	
110	216	x	x	x	x	cut 4/19	
111	220	x	x	x	x	cut 3/16	
112	212	10	10			large check/LP	
113	222	10	10				
114	217	x	x	x	x	cut 4/10	
115	264	x	x	x	x	cut 3/16	
116	287	10	10			large check/LP	
117	253	x	x	x	x	cut 4/19	
118	283	10	10			large check/LP	
119	219	x	x	x	x	cut 5/12	
120	276	10	10			large check	
121	292	10	10				
122	269	10	10			large check	
123	289	x	x	x	x	cut 4/14	
124	225	x	x	x	x	cut 4/10	
125	204	x	x	x	x	cut 5/12	
126	234	x	x	x	x	cut 4/14	
127	215	7	10			large check/Dk around plate	
128	231	7	10			large check/Dk around plate	
129	213	6	10			Dk around plate	
130	205	x	x	x	x	cut 4/19	
131	208	6	8			large check/Dk around plate/FB	
132	210	7	10			split/Dk around plate/FB	
133	226	6	9			Dk around plate/FB	
134	305	x	x	x	x	cut 4/10	
135	201	x	x	x	x	cut	
136	313	x	x	x	x	cut 4/14	
137	294	x	x	x	x	cut 4/19	
138	308	x	x	x	x	cut 3/16	
139	301	10	10			LP	
140	291	10	10			large check/LP	
141	309	10	10			split	
142	296	10	10				
143	314	10	10				
Lonza	144	236	x	x	x	x	cut 5/12
	145	232	x	x	x	x	cut 4/14
	146	238	x	x	x	x	cut 4/19
	147	234	6	8			IS/FB/FST
	148	231	7	9			large check/IS
	149	233	8	10			large check/IS
	150	235	7	10			large check/IS/LP
	151	239	x	x	x	x	cut 4/19
	152	240	x	x	x	x	cut 3/16

Nisus	153	237	x	x	x	x	cut 4/10
	154	272	x	x	x	x	cut 4/10
	155	223	x	x	x	x	cut 4/14
	156	256	x	x	x	x	cut 5/12
	157	297		8		10	
	158	295		7		9	split/FB
	159	267	x		x		cut 4/19
	160	299		9		10	check
	161	261		8		10	FB
	162	214		8		10	FB
Lonza	163	275		8		10	LP
	164	281		7		10	FB/LP
	165	282	0	0	0	0	Failed
Nisus	166	315	x	x	x	x	cut 3/16
	167	316	x	x	x	x	cut 4/14
	168	249	x	x	x	x	cut 3/16
	169	248	x	x	x	x	cut 4/14

Row 2 runs East - West (middle row)

			Decay	Termite	Decay	Termite	Comments
Lonza	170	220	x	x	x	x	cut 4/10
	171	218	x	x	x	x	cut 4/14
	172	214		9.5	10		large check
	173	219		9	10		
	174	212		9	10		
	175	217		9	10		large check
	176	216	x		x	x	cut 4/19
	177	211		10	10		
	178	213	x	x	x	x	cut 3/16
	179	215	x	x	x	x	cut 5/12
	180	224	x	x	x	x	cut 4/10
	181	228	x	x	x	x	cut 3/16
	182	221		9	10		large check/FB
	183	222		10	10		LP
	184	230		8	10		large check/FB/LP
	185	225		8	10		large check/LP
	186	226		9.5	10		large check/LP/alligator
	187	229		7	8		large check/FB/FST
	188	223	x	x	x	x	cut 4/14
	189	227	x	x	x	x	cut 5/12
	Cedarcide	190	19W	x	x	x	x
191		20W	x	x	x	x	cut 4/14
192		15W	x	x	x	x	cut 3/16
193		16W	x	x	x	x	cut 4/19
194		18W		0	8	0	0 Failed
195		17W		0	9	0	0 Failed
196		10R	x	x	x	x	cut 4/10
197		9R		0	0	0	0 cut 4/19
198		8R	x	x	x	x	cut 5/12
199		11W	x	x	x	x	cut 5/12
200		12W		0	0	0	0 Failed
201		13W		7	10		split/FB
202		14W		7	10		split/FB
203		11R	x	x	x	x	cut 4/14
204		12R	x	x	x	x	cut 3/16
205		13R		0	10		split/FB
206		14R		6	10		FB
207		15R		6	9		split/FB
208		16R		0	9	0	0 Failed
209		17R		0	0	0	0 Failed
210	22R		0	0	0	0 Failed	
211	22W		7	10		split	
Merichem	212	MWOB8	x	x	x	x	cut 4/10
	213	MWOB8	x	x	x	x	cut 4/14
	214	MWOB8	x	x	x	x	cut 4/19
	215	MWOB8		10	10		iron sickness
	216	MWOB8		10	10		large check/iron sickness
	217	MWOB8	x	x	x	x	cut 3/16

	218	MWOB8	x	x	x	x	cut 5/12
	219	MRO8	x	x	x	x	cut 5/12
	220	MRO8	x	x	x	x	cut 4/10
	221	MRO8	x	x	x	x	cut 4/14
	222	MRO8	x	x	x	x	cut 4/19
	223	MRO8	x	x	x	x	cut 3/16
	224	MRO8	10	10			
	225	MRO8	10	10			large check/IS
	226	MRO8	9	10			split/IS
	227	MWOB8	10	10			IS
	228	MWOB8	10	10			large check/IS
	229	MRO8	10	10			
	230	MRO8	10	10			large check
	231	MRO8	8	10			iron sickness/DK center
	232	MWO8	x	x	x	x	cut 4/10
	233	MWO8	x	x	x	x	cut 4/14
	234	MWO8	x	x	x	x	cut 4/19
	235	MWO8	10	10			IS
	236	MWO8	9.5	10			IS
	237	MWO8	10	10			
	238	MWO8	10	10			large check
	239	MWO8	9	10			large check/IS
	240	MWO8	x	x	x	x	cut 3/16
	241	MROB8	x	x	x	x	cut 4/10
	242	MROB8	x	x	x	x	cut 4/14
	243	MROB8	x	x	x	x	cut 5/12
	244	MWO8	x	x	x	x	cut 5/12
	245	MROB8	x	x	x	x	cut 3/16
	246	MROB8	x	x	x	x	iron sicknes/FST active
	247	MROB8	10	10			large check/iron sickness
	248	MROB8	10	10			large check/iron sickness
	249	MROB8	10	10			large check/iron sickness
	250	MROB8	10	9			spike kill/iron sickness
	251	MROB8	9.5	9			pic 09/DK/iron sickness
	252	MROCONT	0	0	0	0	Failed
BioPres	253	MWOCONT	7	10			pic 09/DK top side/FB
	254	MWOCONT	6	10			FB
	255	75					
	256	67					
	257	68					DK top side
	258	69					DK top side
	259	71					
	260	74					DK top side
	261	82					
	262	77					
	263	93					
	264	?					DK top side
	265	66					
	266	65					
	267	73					
KMG	270	1	x	x	x	x	cut 5/12
	271	14	x	x	x	x	cut 4/14

	272	12	x	x	x	x	cut 3/16	
	273	16	x	x	x	x	cut 4/19	
	274	15		10	10		large check	
	275	18		10	10		check	
	276	19		10	10		check	
	277	10	x	x	x	x	cut 4/10	
	278	30	x	x	x	x	cut 4/10	
	279	33	x	x	x	x	cut 4/14	
	280	34		10	10	10	10	IS
	281	24	x	x	x	x	cut 3/16	
	282	27	x	x	x	x	cut 4/19	
	283	28		10	10			
	284	29		10	10		large check	
	285	32		10	10		large check	
	286	13		10	10		large check	
	287	31	x	x	x	x	cut 5/12	
	288	9		10	10		large check	
	289	25		10	10			
	290	22(Woctrl)	x	x	x	x	cut 4/19	
	291	44(Roctrl)	x	x	x	x	cut 4/19	
Koppers	292	11	x	x	x	x	cut 5/12	
	293	2	x	x	x	x	cut 4/19	
	294	?		10	10			
	295	?		10	10			
	296	19	x	x	x	x	cut 4/10	
	297	15	x	x	x	x	cut 4/14	
	298	13		10	10			
	299	3		10	10		large check	
	300	47	x	x	x	x	cut 4/10	
	301	44	x	x	x	x	cut 4/14	
	302	41	x	x	x	x	cut 3/16	
	303	55	x	x	x	x	cut 4/19	
	304	60		10	10			
	305	56	x	x	x	x	cut 5/12	
	306	43		10	10			
	307	51		10	10			
	308	76	x	x	x	x	cut 3/16	
	309	65	x	x	x	x	cut 4/19	
	310	61	x	x	x	x	cut 4/10	
	311	70	x	x	x	x	cut 4/14	
	312	72		10	10			
	313	71		10	10			
	314	77		10	10			
	315	64		10	10		large check	
	316	28	x	x	x	x	cut 4/19	
	317	34	x	x	x	x	cut 4/10	
	318	38	x	x	x	x	cut 5/12	
	319	33		10	10			
	320	29	x	x	x	x	cut 4/14	
	321	52		10	10			
	322	21?		10	10			
	323	31	x	x	x	x	cut 3/16	

	324	35	10	10				
	325	23	10	10			large check	
	326	66	x	x	x	x	cut 5/12	
	327	67	10	10				
	328	42	10	10			check	
	329	49	10	10				
	330	7	10	10			check	
	331	8	x	x	x	x	cut 3/16	
	332	WO	x	x	x	x	cut 5/12	
	333	RO	x	x	x	x	FST Alate wings found/cut 5/12	
	334	RO		0	0	0	0 Failed	
Enviro	335	ctrl		0	0	0	0 Failed	
	336	ctrl	7	10			large check/FB	
	337	ctrl	7	10			FB	

dropped from study

Report Authorized By:



Date: 8/04/20

H. M. Barnes, PhD
Thompson Professor of Wood Science & Technology
Department of Sustainable Bioproducts
Wood Protection Testing Laboratory
Phone: 662-325-3056
Fax: 662-325-8126
Email: mbarnes@cfr.msstate.edu

Report Prepared By:



Date: 8/04/20

Michael G. Sanders
Senior Research Associate
Department of Sustainable Bioproducts
Wood Protection Testing Laboratory
Phone: 662-325-8097
Fax: 662-325-8126
E-mail: mgs3@msstate.edu

Applicable Standards:
None: