Eco RED SHIELD PROTECTED LUMBER ™

Technical Specifications
Strength Testing

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Red Shield[tm] Coatings Have No Adverse Effect on Wood Fiber Strength

Testing Via ASTM D198 Protocol Reveal…

New testing reveals that Red Shield[tm] coatings have no adverse effect on wood fiber strength therefore no degradation of flexural properties must be taken into account. Eco Building Products employed Louisiana State University Wood Durability Lab at Louisiana Forest Products Development Center to perform testing of Red Shield coatings in accordance with American Society for Testing and Materials (ASTM) D198 Standard Test Methods of Static Tests of Lumber in Structural Sizes.

ECOB choose to use Laminated Veneer Lumber (LVL) as the substrate due to the high strength and uniformity of manufacturing. Two groups where tested, treated vs. untreated. Each sample was tested for Modulus of Elasticity (MOE - Bending Stiffness) and Modulus of Rupture (MOR - Bending Strength) using an Instron model 5582a device to deflect the samples. Test results indicated no significant difference among the two groups.

Based upon the testing results and third party evaluation Eco Building Products will stand behind any claims that the application of Red Shield Coatings by an authorized treatment facility will have no short or long term effects on the strength of wood fibers.

Attached please find complete test results including third party opinions and various wood manufacture acknowledgments.

Any questions can be directed towards Mark Vuozzo, Chief Technical Officer – Eco Building Products, Inc. mvuozzo@ecob.net

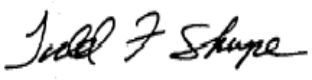
August 18, 2011

TO: Whom it may concern:

RE: Eco Red Shield Bending Data

I supervised the testing of LVL samples tested in three point bending in accordance with ASTM D-198. It was my understanding that the objective of the test was to determine the effect of the Eco Red Shield product on LVL bending properties. Toward this end, a comparison of any differences between the treated to untreated samples would be appropriate. The results clearly showed that the Eco Red Shield product does not have any adverse affect on the modulus of elasticity (MOE) nor modulus of rupture (MOR) of LVL. The mean values of the treated samples are not significantly different from the corresponding untreated samples. Therefore, the treatment did not have an adverse affect on the bending properties.

Sincerely,



Todd F. Shupe, Ph.D.
President, Society of Wood Science and Technology
Fellow, International Academy of Wood Science

Flexure Testing of LVL Treated With Eco Red Shield Protection vs. Untreated LVL

Report #: WDL-2011-12

Final Report To:

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Submitted By:

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August 19, 2011

We kindly request that all public references to the contents of this report be attributed to "LSU AgCenter's Wood Durability Lab"

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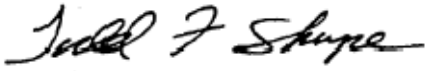

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BACKGROUND

The Wood Durability Laboratory (WDL) at the LSU AgCenter became an ISO 17025 accredited laboratory through the International Accreditation Services (IAS) accreditation system on March 1, 2008. Additional test standards were added by IAS to the WDL approved scope of services on July 24, 2008 (Table 1). The lab essentially has been operating under ISO 17025 Guidelines for over five years. This report is an AC-85 compliant report as determined by IAS guidelines the report has not been reviewed by a licensed professional engineer.

Samples and information sheets on traceability of samples were provided by the sponsor. The results from this test only relate to the items tested.

Table 1. Current WDL test methods accredited by IAS.

Wood testing	ASTM Standards D 143[2], D 1037[2]; Test methods referenced in Section 4.0 of ICC-ES Acceptance Criteria AC257[3]
Wood preservatives	ASTM Standards D 1413[1], D 1758[1],D2481[3], D 3273, D 3345[1], and D 4445[3]; AWPA Standards E1[1], E5[3], E7[1], E9[3], E10[1], E11[1], E12[1], E16[3], E18[3], E22[2], E23[2] and E24[1]; WDMA Standards TM-1[1] and TM-2[1]

[1]Approved March 1, 2008.
[2]Approved July 24, 2008.
[3]Approved November 20, 2009.

OBJECTIVES

The objective of this study was to perform the ASTM D198 standard test method of static test of lumber in structural size (flexure). The product we tested was cut from ILevels Microlam 1.9 E Douglas-fir LVL 1 3/4" x 11 7/8" which was procured by the test sponsor from Pine Tree Lumber and sent to the LSU WDL. The LVL was treated by the LSU WDL with Eco Red Shield Protection at the 15% retention level. Also included in this test was an untreated ILevel Microlam (LVL) control. The test included 20 samples of each treated and untreated LVL.

MATERIALS AND METHODS

Procedure

The tests were performed in accordance with American Society for Testing and Materials (ASTM) D198 Standard Test Methods of Static Tests of Lumber in Structural Sizes. The Flexure procedure was followed for this test method.

Treatments

The test preservatives used were provided to the WDL by Eco Building Products. One concentration level of Eco Red Shield Protection product was used at a 15% mix. The LVL samples were dipped in the mixture for 30 seconds each. After dipping the samples were set to dry using a box fan. The specimens were conditioned to a constant weight to moisture equilibrium in the desired environment (Appendix I). Mixing and application instructions for Eco Red Shield Protection solution were as follows.

Add X lbs of water to a bucket be sure to use 80 to 120 F hot water
Add X lbs of DOT to the bucket and blend to homogenization
Add X lbs of AF21 to the bucket and mix for minimum of 1 minute
Add X lbs of Wood Surface Concentrate to the bucket and mix for minimum of 1 minute

D198 Flexure Testing Procedures:

Flexure Testing

This test is used to determine the flexural properties of laminated wood, such as beams of rectangular cross section. The beams were deflected at a rate of outer strain of 0.0010in./in. per min. and a maximum load until rupture occurred. The device used to deflect the samples was an Instron model 5582.

Wood Samples

Wood selected for this test was cut from ILevels Microlam 1.9E Douglas-fir. LVL 1 3/4" x 11 7/8". The testing samples were milled to 1 3/4" x 3" x 30" and received by the LSU WDL at these dimensions. Two shipments of LVL samples were received by the WDL. The two shipments had different densities therefore they were kept separate as two individual groups for treating purposes. Each group contained 20 specimens that were separated into 10 specimens each. Of those 20 specimens, 10 were dip treated with Eco Red Shield and 10 were untreated. The total testing consisted of 20 specimens that were treated and 20 that were untreated.

Moisture Content (MC)

After each bending test, 1" samples were cut from the middle of the testing specimens. The samples were dried down in a microwave oven with three consecutive thirty second bursts. Weights were taken during this process. The samples were then put into a convention drying oven over night and a weight was taken 24 hours later (Appendix II).

Figure 1. Typical untreated ILevels Microlam 1.9E Douglas-fir LVL. These samples were received by LSU WDL milled down to the actual testing size of 1 3/4” x 3” x 30”.

RESULTS

Table 2 provides individual flexural data for the primary data of interest (i.e., MOE, MOR, and energy). Table 3 and 4 provides information on means and standard deviations of the treated and untreated groups. Table 5 provides significant differences determined between treatments for the experimental variables using the LSD test procedure. Table 6 shows no significant differences when the data is grouped based on sample density. This table was added to provide proof that combining the data sets as one treated and one untreated group will yield the same statistical results Figures 2-5 provide graphs of the data for this test.

Modulus of Elasticity (MOE - Bending Stiffness)

The mean MOE data for both untreated and treated samples was very closely related. The mean MOE value for untreated samples was 1,661,206.10 psi vs. 1,690,850.48 psi resulting in no significant difference among these two groups. The standard deviation for the treated samples 117,120.68 psi had a large spread among all samples compared to the untreated samples 101,844.85 psi which had a smaller spread.

Modulus of Rupture (MOR - Bending Strength)

The mean MOR data for both untreated and treated samples was also closely related. The mean MOR value for the untreated samples was 9961.3 psi vs. 9986.5 psi for the treated samples resulting in no significant difference among these two groups. Again the same can be said here, for the treated samples had a large spread among all samples 1356.81 psi compared to the untreated samples 1087.70 psi, which had a smaller spread. After breaking sample T2 was found to contain a 1” knot on the tension face of the specimen. The data could be culled but was not for this report.

Energy (foot pounds)

The mean energy data for both untreated and treated samples was also closely related. The mean energy value for the untreated samples was 56.7 ft lbs vs. 56.4 ft lbs for the treated samples resulting in no significant difference among these two groups. With this measurement the range for the untreated group was slightly higher than the treated group, 16.16 ft lbs for the untreated vs. 15.84 ft lbs for the treated group.

Table 2. Individual flexural data.

ID	Depth (in)	Width (in)	Weight (lbs)	MOE (psi)	MOR (psi)	Energy (ft. lbs)
C1	1.710	3.048	3.01	1627612.8	9108.37	47.93
C2	1.709	3.024	3.18	1759155.4	11595.76	83.26
C3	1.727	3.038	3.13	1559421.4	8346.92	42.46
C4	1.725	3.046	3.15	1572317.5	8857.45	42.96
C5	1.722	3.044	3.12	1579131.5	9396.99	37.94
C6	1.714	3.037	3.07	1646932.1	8635.54	46.44
C7	1.710	3.028	3.22	1842919.7	11656.68	85.41
C8	1.709	3.030	3.04	1525505.1	8288.90	41.62
C9	1.713	3.048	3.07	1499996.4	9378.14	53.29
C10	1.712	3.039	3.23	1672590.4	9259.21	44.97
T1	1.711	3.082	3.17	1538377.4	9518.82	56.45
T2	1.715	3.046	3.27	1575391.6	7282.34	n/a
T3	1.729	3.046	3.13	1543311.3	7173.56	n/a
T4	1.720	3.033	3.17	1507941.9	10254.17	71.43
T5	1.720	3.043	3.09	1675043.9	8768.98	37.81
T6	1.706	3.044	3.21	1794464.9	11668.28	n/a
T7	1.707	3.024	3.21	1857923.6	11266.53	74.23
T8	1.744	3.031	3.25	1589090.5	7472.34	31.31
T9	1.721	3.040	3.33	1718224.1	11497.14	77.16
T10	1.706	3.028	3.19	1813014.4	10268.67	54.68
C11	1.723	3.068	3.37	1672054.0	8680.51	42.10
C12	1.767	3.048	3.63	1748393.7	10419.51	60.69
C13	1.767	3.060	3.47	1680669.9	10874.93	81.30
C14	1.749	3.039	3.47	1500312.2	10307.83	70.01
C15	1.747	3.055	3.53	1824220.7	10850.27	66.68
C16	1.740	3.058	3.36	1805511.2	10497.83	67.33
C17	1.758	3.095	3.37	1720166.2	10624.01	72.01
C18	1.739	3.068	3.40	1585456.6	10496.38	71.85
C19	1.741	3.046	3.49	1690244.7	10901.03	n/a
C20	1.722	3.061	3.47	1711510.5	11048.97	75.39
T11	1.722	3.064	3.48	1683023.3	10016.30	64.26
T12	1.728	3.064	3.43	1693372.2	11069.28	84.71
T13	1.724	3.062	3.57	1884323.2	10188.90	60.17
T14	1.755	3.041	3.54	1681192.9	10828.51	85.25
T15	1.751	3.046	3.65	1820444.6	10563.10	76.91
T16	1.732	3.090	3.40	1613015.5	9576.84	53.19
T17	1.738	3.060	3.67	1654143.5	10325.23	73.02
T18	1.747	3.066	3.46	1593449.4	10595.00	80.84
T19	1.717	3.048	3.53	1905572.5	11372.41	82.26
T20	1.776	3.066	3.68	1675688.9	10023.56	64.51

Table 3. Means for untreated and treated LVL samples.

Untreated LVL Control Samples						
ID	**MOE (psi)**	**Means**	**MOR (psi)**	**Means**	**Energy (ft. lbs)**	**Means**
C1	1627612.8		9108.37		47.93	
C2	1759155.4		11595.76		83.26	
C3	1559421.4		8346.92		42.46	
C4	1572317.5		8857.45		42.96	
C5	1579131.5		9396.99		37.94	
C6	1646932.1		8635.54		46.44	
C7	1842919.7		11656.68		85.41	
C8	1525505.1		8288.90		41.62	
C9	1499996.4		9378.14		53.29	
C10	1672590.4	1661206.1	9259.21	9961.3	44.97	56.7
C11	1672054.0		8680.51		42.10	
C12	1748393.7		10419.51		60.69	
C13	1680669.9		10874.93		81.30	
C14	1500312.2		10307.83		70.01	
C15	1824220.7		10850.27		66.68	
C16	1805511.2		10497.83		67.33	
C17	1720166.2		10624.01		72.01	
C18	1585456.6		10496.38		71.85	
C19	1690244.7		10901.03		n/a	
C20	1711510.5		11048.97		75.39	

Treated LVL Samples						
ID	**MOE (psi)**	**Means**	**MOR (psi)**	**Means**	**Energy (ft. lbs)**	**Means**
T1	1538377.4		9518.82		56.45	
T2	1575391.6		7282.34		n/a	
T3	1543311.3		7173.56		n/a	
T4	1507941.9		10254.17		71.43	
T5	1675043.9		8768.98		37.81	
T6	1794464.9		11668.28		n/a	
T7	1857923.6		11266.53		74.23	
T8	1589090.5		7472.34		31.31	
T9	1718224.1		11497.14		77.16	
T10	1813014.4	1690850.5	10268.67	9986.5	54.68	56.4
T11	1683023.3		10016.30		64.26	
T12	1693372.2		11069.28		84.71	
T13	1884323.2		10188.90		60.17	
T14	1681192.9		10828.51		85.25	
T15	1820444.6		10563.10		76.91	
T16	1613015.5		9576.84		53.19	
T17	1654143.5		10325.23		73.02	
T18	1593449.4		10595.00		80.84	
T19	1905572.5		11372.41		82.26	
T20	1675688.9		10023.56		64.51	

Table 4. Standard deviations for untreated and treated LVL.

Untreated LVL Control Samples						
ID	**MOE (psi)**	**Std Dev**	**MOR (psi)**	**Std Dev**	**Energy (ft. Lbs)**	**Std Dev**
C1	1627612.8		9108.37		47.93	
C2	1759155.4		11595.76		83.26	
C3	1559421.4		8346.92		42.46	
C4	1572317.5		8857.45		42.96	
C5	1579131.5		9396.99		37.94	
C6	1646932.1		8635.54		46.44	
C7	1842919.7		11656.68		85.41	
C8	1525505.1		8288.90		41.62	
C9	1499996.4		9378.14		53.29	
C10	1672590.4	104490.61	9259.21	1087.70	44.97	16.16
C11	1672054.0		8680.51		42.10	
C12	1748393.7		10419.51		60.69	
C13	1680669.9		10874.93		81.30	
C14	1500312.2		10307.83		70.01	
C15	1824220.7		10850.27		66.68	
C16	1805511.2		10497.83		67.33	
C17	1720166.2		10624.01		72.01	
C18	1585456.6		10496.38		71.85	
C19	1690244.7		10901.03		n/a	
C20	1711510.5		11048.97		75.39	

Treated LVL Samples						
ID	**MOE (psi)**	**Std Dev**	**MOR (psi)**	**Std Dev**	**Energy (ft. Lbs)**	**Std Dev**
T1	1538377.4		9518.82		56.45	
T2	1575391.6		7282.34		n/a	
T3	1543311.3		7173.56		n/a	
T4	1507941.9		10254.17		71.43	
T5	1675043.9		8768.98		37.81	
T6	1794464.9		11668.28		n/a	
T7	1857923.6		11266.53		74.23	
T8	1589090.5		7472.34		31.31	
T9	1718224.1		11497.14		77.16	
T10	1813014.4	120163.29	10268.67	1356.81	54.68	15.84
T11	1683023.3		10016.30		64.26	
T12	1693372.2		11069.28		84.71	
T13	1884323.2		10188.90		60.17	
T14	1681192.9		10828.51		85.25	
T15	1820444.6		10563.10		76.91	
T16	1613015.5		9576.84		53.19	
T17	1654143.5		10325.23		73.02	
T18	1593449.4		10595.00		80.84	
T19	1905572.5		11372.41		82.26	
T20	1675688.9		10023.56		64.51	

Table 5. Summary data for flexure testing & corresponding LSD grouping values.

Untreated vs. Treated LVL Samples							
ID	ANOVA	MOE (psi)	LSD	MOR (psi)	LSD	Energy (ft. Lbs)	LSD
C1	1	1627612.8		9108.37		47.93	
C2	1	1759155.4		11595.76		83.26	
C3	1	1559421.4		8346.92		42.46	
C4	1	1572317.5		8857.45		42.96	
C5	1	1579131.5		9396.99		37.94	
C6	1	1646932.1		8635.54		46.44	
C7	1	1842919.7		11656.68		85.41	
C8	1	1525505.1		8288.90		41.62	
C9	1	1499996.4		9378.14		53.29	
C10	1	1672590.4	A	9259.21	A	44.97	A
C11	1	1672054.0		8680.51		42.10	
C12	1	1748393.7		10419.51		60.69	
C13	1	1680669.9		10874.93		81.30	
C14	1	1500312.2		10307.83		70.01	
C15	1	1824220.7		10850.27		66.68	
C16	1	1805511.2		10497.83		67.33	
C17	1	1720166.2		10624.01		72.01	
C18	1	1585456.6		10496.38		71.85	
C19	1	1690244.7		10901.03		n/a	
C20	1	1711510.5		11048.97		75.39	
T1	2	1538377.4		9518.82		56.45	
T2	2	1575391.6		7282.34		n/a	
T3	2	1543311.3		7173.56		n/a	
T4	2	1507941.9		10254.17		71.43	
T5	2	1675043.9		8768.98		37.81	
T6	2	1794464.9		11668.28		n/a	
T7	2	1857923.6		11266.53		74.23	
T8	2	1589090.5		7472.34		31.31	
T9	2	1718224.1		11497.14		77.16	
T10	2	1813014.4	A	10268.67	A	54.68	A
T11	2	1683023.3		10016.30		64.26	
T12	2	1693372.2		11069.28		84.71	
T13	2	1884323.2		10188.90		60.17	
T14	2	1681192.9		10828.51		85.25	
T15	2	1820444.6		10563.10		76.91	
T16	2	1613015.5		9576.84		53.19	
T17	2	1654143.5		10325.23		73.02	
T18	2	1593449.4		10595.00		80.84	
T19	2	1905572.5		11372.41		82.26	
T20	2	1675688.9		10023.56		64.51	

*Note: groups containing the same capital letter in the LSD Group column are not significantly different from one another at alpha = 0.05.

Table 6. Summary data for flexure testing & corresponding LSD grouping values. This table groups samples based on density groups.

1st Data Set							
ID	**ANOVA**	**MOE (psi)**	**LSD**	**MOR (psi)**	**LSD**	**Energy (ft. Lbs)**	**LSD**
C1	1	1627612.8		9108.37		47.93	
C2	1	1759155.4		11595.76		83.26	
C3	1	1559421.4		8346.92		42.46	
C4	1	1572317.5		8857.45		42.96	
C5	1	1579131.5	**A**	9396.99	**A**	37.94	**A**
C6	1	1646932.1		8635.54		46.44	
C7	1	1842919.7		11656.68		85.41	
C8	1	1525505.1		8288.90		41.62	
C9	1	1499996.4		9378.14		53.29	
C10	1	1672590.4		9259.21		44.97	
T1	2	1538377.4		9518.82		56.45	
T2	2	1575391.6		7282.34		n/a	
T3	2	1543311.3		7173.56		n/a	
T4	2	1507941.9		10254.17		71.43	
T5	2	1675043.9	**A**	8768.98	**A**	37.81	**A**
T6	2	1794464.9		11668.28		n/a	
T7	2	1857923.6		11266.53		74.23	
T8	2	1589090.5		7472.34		31.31	
T9	2	1718224.1		11497.14		77.16	
T10	2	1813014.4		10268.67		54.68	
2nd Data Set							
ID	**ANOVA**	**MOE (psi)**	**LSD**	**MOR (psi)**	**LSD**	**Energy (ft. Lbs)**	**LSD**
C11	1	1672054.0		8680.51		42.10	
C12	1	1748393.7		10419.51		60.69	
C13	1	1680669.9		10874.93		81.30	
C14	1	1500312.2		10307.83		70.01	
C15	1	1824220.7	**A**	10850.27	**A**	66.68	**A**
C16	1	1805511.2		10497.83		67.33	
C17	1	1720166.2		10624.01		72.01	
C18	1	1585456.6		10496.38		71.85	
C19	1	1690244.7		10901.03		n/a	
C20	1	1711510.5		11048.97		75.39	
T11	2	1683023.3		10016.30		64.26	
T12	2	1693372.2		11069.28		84.71	
T13	2	1884323.2		10188.90		60.17	
T14	2	1681192.9		10828.51		85.25	
T15	2	1820444.6	**A**	10563.10	**A**	76.91	**A**
T16	2	1613015.5		9576.84		53.19	
T17	2	1654143.5		10325.23		73.02	
T18	2	1593449.4		10595.00		80.84	
T19	2	1905572.5		11372.41		82.26	
T20	2	1675688.9		10023.56		64.51	

*Note: groups containing the same capital letter in the LSD Group column are not significantly different from one another at alpha = 0.05.

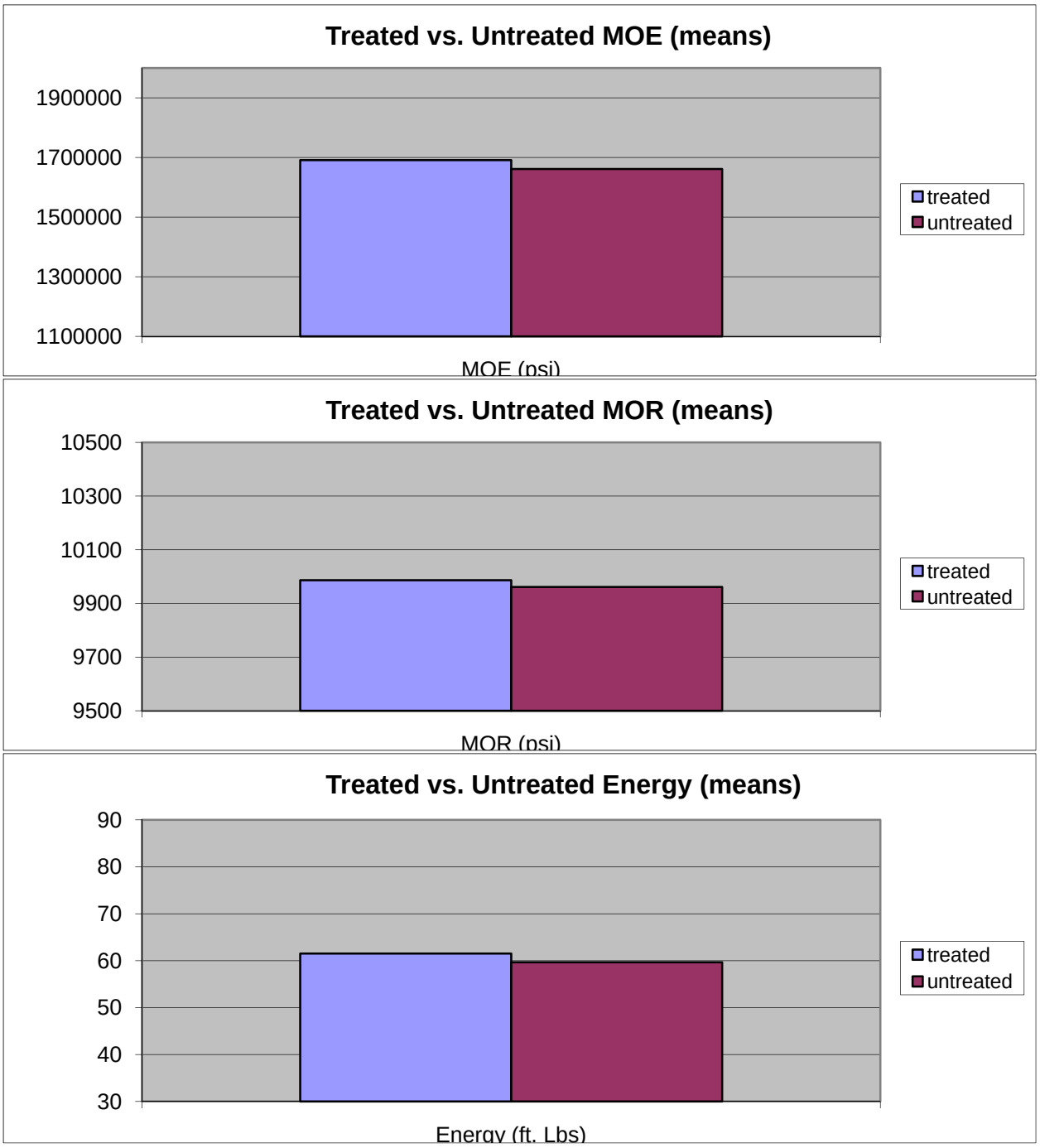

Figure 2. MOE, MOR, & Energy of treated vs. untreated samples for mean values.

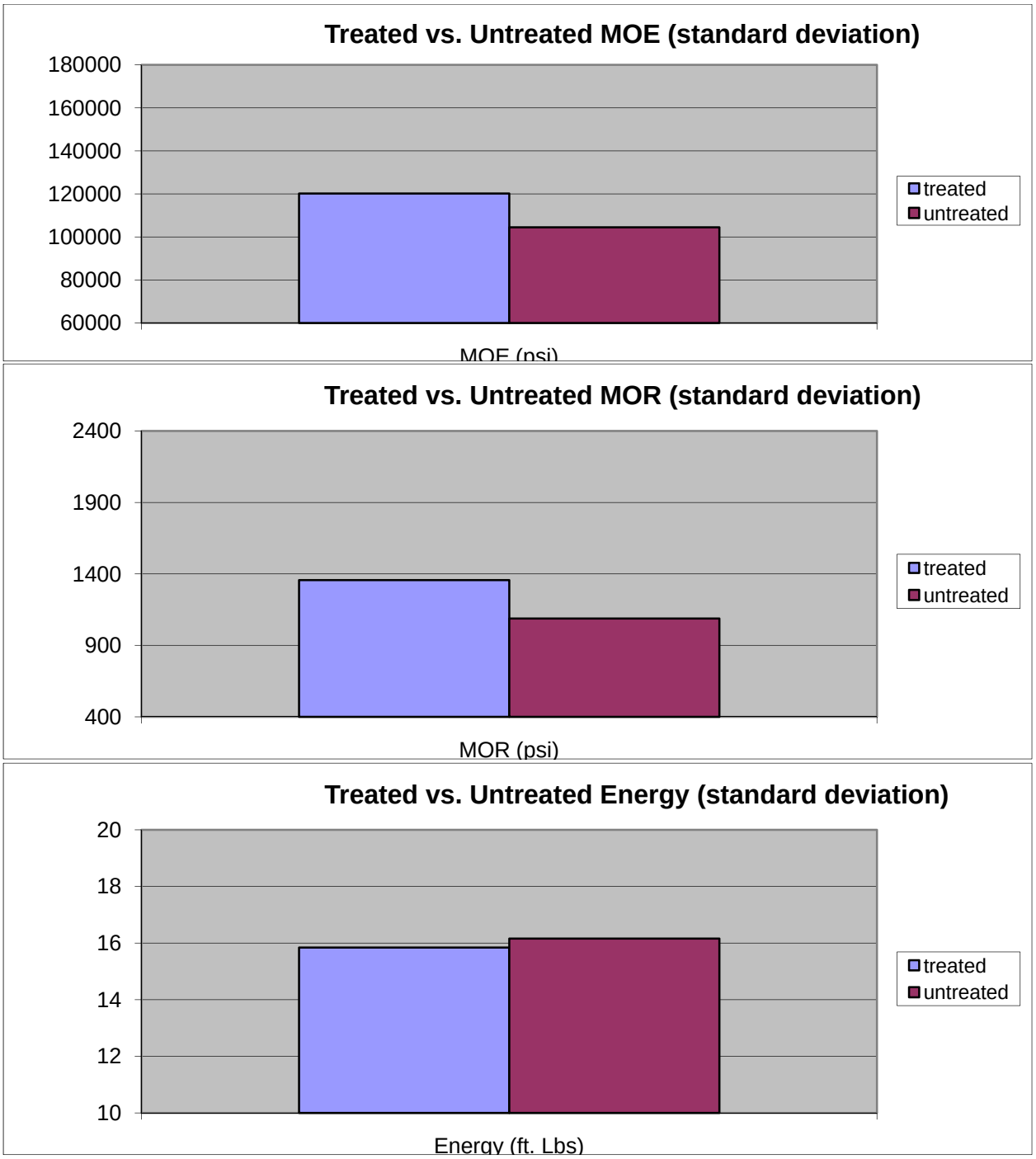

Figure 3. MOE, MOR, energy of treated vs. untreated samples for standard deviations.

CONCLUSIONS

The results showed that there was no significant difference between the treated and untreated groups for MOR, MOE, and energy. The treated samples did have a larger standard deviation among the samples. The treated mean values were slightly higher than corresponding untreated values for MOR and MOE but were slightly lower for energy. The determination can be made that the Eco Red Shield Protection treatment had no significant effect on MOE, MOR, and energy based on the results of this testing.

REFERENCES CITED

American Society for Testing and Materials (ASTM) 2002. Standard Test Methods of Static Tests of Lumber in Structural Sizes (D198-02). 2002 book of standards. West Conshohocken, PA

SPSS For Windows. 2006. Chicago, IL.

Steel, R.G.D. and J.H. Torrie. 1980. Principle and procedures of statistics – A biometrical approach. 2nd edition. McGraw Hill. New York. 633 p.

Appendix I. Treating data for ASTM D198 flexure testing on Douglas-fir LVL.

ID	Initial Wt (lbs)	Treated Wt (lbs)	Wt Gain (lbs)	H2O Gain (lbs)	Solid Gain (lbs)	AM Wt. (lbs) 8/9/11	PM Wt. (lbs) 8/9/11	AM Wt. (lbs) 8/10/11
T1	3.14	3.2	0.06	0.05	0.02	3.2	3.2	3.2
T2	3.23	3.3	0.07	0.05	0.02	3.3	3.3	3.3
T3	3.10	3.2	0.06	0.04	0.02	3.1	3.1	3.1
T4	3.12	3.2	0.09	0.06	0.02	3.2	3.2	3.2
T5	3.05	3.1	0.08	0.06	0.02	3.1	3.1	3.1
T6	3.18	3.2	0.07	0.05	0.02	3.2	3.2	3.2
T7	3.18	3.2	0.06	0.04	0.02	3.2	3.2	3.2
T8	3.21	3.3	0.08	0.06	0.02	3.2	3.2	3.2
T9	3.29	3.4	0.06	0.05	0.02	3.3	3.3	3.3
T10	3.15	3.2	0.07	0.05	0.02	3.2	3.2	3.2
T11	3.41	3.5	0.10	0.07	0.03	3.5	3.5	3.5
T12	3.37	3.5	0.10	0.07	0.03	3.4	3.4	3.4
T13	3.51	3.6	0.09	0.07	0.03	3.6	3.6	3.6
T14	3.49	3.6	0.09	0.06	0.02	3.5	3.5	3.5
T15	3.58	3.7	0.12	0.08	0.03	3.7	3.6	3.6
T16	3.34	3.4	0.09	0.07	0.03	3.4	3.4	3.4
T17	3.61	3.7	0.12	0.09	0.03	3.7	3.7	3.7
T18	3.41	3.5	0.08	0.06	0.02	3.5	3.5	3.5
T19	3.49	3.6	0.08	0.06	0.02	3.5	3.5	3.5
T20	3.62	3.7	0.10	0.07	0.03	3.7	3.7	3.7

Appendix II. Moisture content data for ASTM D198 flexure testing on Douglas- fir LVL.

ID	Initial Wt (lbs)	1st dry wt (lbs) 8/11/11	2nd dry wt (lbs) 8/11/11	final OD wt (lbs) 8/12/11	MC
C1	0.095	0.094	0.091	0.090	5.67%
C2	0.098	0.097	0.095	0.094	4.18%
C3	0.104	0.102	0.100	0.099	4.83%
C4	0.105	0.104	0.102	0.100	5.45%
C5	0.098	0.097	0.095	0.093	5.19%
C6	0.103	0.102	0.099	0.097	5.86%
C7	0.109	0.107	0.104	0.103	5.79%
C8	0.109	0.107	0.105	0.102	6.39%
C9	0.110	0.108	0.106	0.103	6.84%
C10	0.106	0.104	0.101	0.098	7.95%
C11	0.104	0.102	0.100	0.098	6.45%
C12	0.117	0.115	0.112	0.109	7.55%
C13	0.119	0.117	0.114	0.111	7.44%
C14	0.120	0.117	0.114	0.111	7.61%
C15	0.117	0.116	0.113	0.110	6.88%
C16	0.108	0.106	0.105	0.103	5.10%
C17	0.115	0.113	0.110	0.107	6.70%
C18	0.119	0.116	0.113	0.110	7.66%
C19	0.116	0.114	0.112	0.108	7.21%
C20	0.122	0.120	0.117	0.114	6.94%

ID	Initial Wt (lbs)	1st dry wt (lbs) 8/11/11	2nd dry wt (lbs) 8/11/11	final OD wt (lbs) 8/12/11	MC
T1	0.105	0.104	0.101	0.099	6.66%
T2	0.113	0.111	0.109	0.106	6.45%
T3	0.104	0.102	0.100	0.097	6.49%
T4	0.106	0.105	0.103	0.099	6.69%
T5	0.104	0.103	0.101	0.098	6.87%
T6	0.104	0.103	0.101	0.098	6.55%
T7	0.102	0.100	0.098	0.096	6.85%
T8	0.109	0.107	0.105	0.102	7.12%
T9	0.113	0.111	0.108	0.106	6.58%
T10	0.107	0.105	0.102	0.100	6.86%
T11	0.114	0.112	0.107	0.106	7.55%
T12	0.118	0.115	0.112	0.109	7.91%
T13	0.107	0.105	0.103	0.099	7.43%
T14	0.125	0.122	0.119	0.115	8.15%
T15	0.119	0.116	0.114	0.110	8.10%
T16	0.113	0.111	0.110	0.105	7.69%
T17	0.126	0.124	0.121	0.115	9.36%
T18	0.117	0.116	0.113	0.108	7.63%
T19	0.118	0.117	0.115	0.110	7.34%
T20	0.117	0.115	0.113	0.108	8.83%