

A photograph of a modern, multi-story apartment building at dusk. The building has a light-colored facade with large windows and balconies. The sky is a deep blue, and the building is illuminated by warm interior lights. Palm trees and other tropical plants are visible in the foreground. The overall mood is sophisticated and contemporary.

DESIMONE

RENCO USA

INNOVATION

4280
LAKEWOOD

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1. FLOORING SYSTEM SPECIFICATIONS

The flooring system created by Mineral Composite Fiber Reinforced (MCFR) takes the characteristics of various elements shapes (Joists and Decks) to create a complete system that has several advantages over the traditional RC slabs, faster speed of construction and lower weight & cost.

2. Deck System Description.

For the deck there are two different MCFR elements: a 4 1/2" wide and an 8" wide. These elements are supported on 3' max. span.

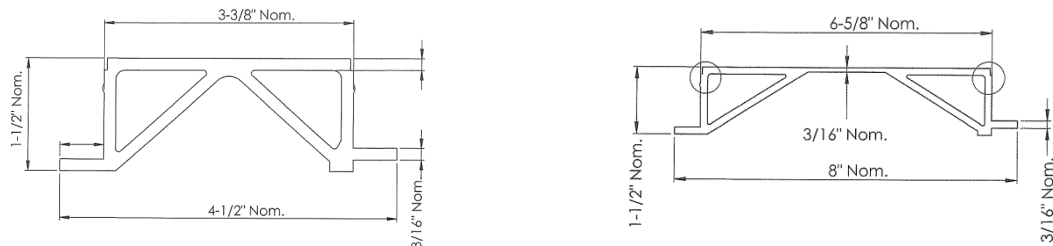


Figure 1 Dimensions Deck Elements

2.1. Technical and Mechanical Specifications

MCFR 4-1/2"		MCFR 8"	
Weight [lb/ft]	1.58	Weight [lb/ft]	2.20
Weight [lb/ft ²]	4.82	Weight [lb/ft ²]	3.62
Inertia [in ⁴]	0.4836	Inertia [in ⁴]	0.682 2

2.2. Modulus of Elasticity

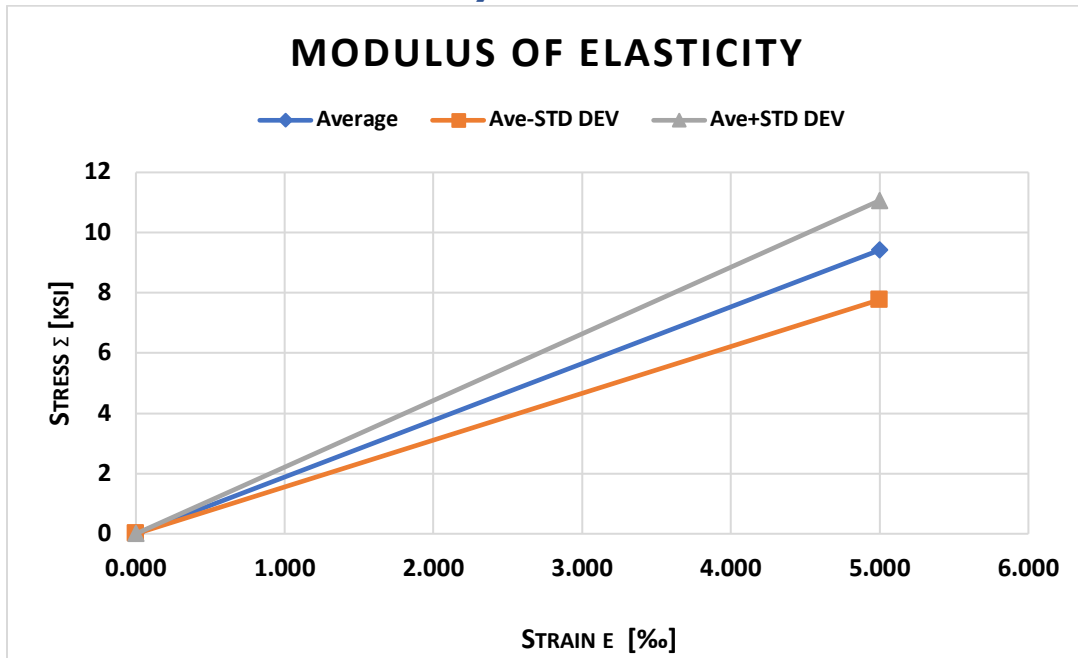


Figure 2 Variation of Modulus of Elasticity for Deck Elements

Appendix A shows the Strain-Stress curves for various deck elements. The previous image shows the Standard Deviation plot for the Modulus of Elasticity. The data was taken from the Performance Test Reports for a Transverse Load performance by Farabaugh Engineering and Testing Inc.

With this data, the Modulus of Elasticity for decks ranges from a minimum of 9,850 MPa (1,430 ksi) to a maximum of 16,000 MPa (2,325 ksi). For analysis purposes, the Modulus of Elasticity used in this guide is obtained from subtracting the standard deviation from the average E value, which equals 10,700 MPa (1,554 ksi)

3. Joist Description

Structural Joist made of MCFR thin sheets, work together with deck elements to create a lightweight floor system.

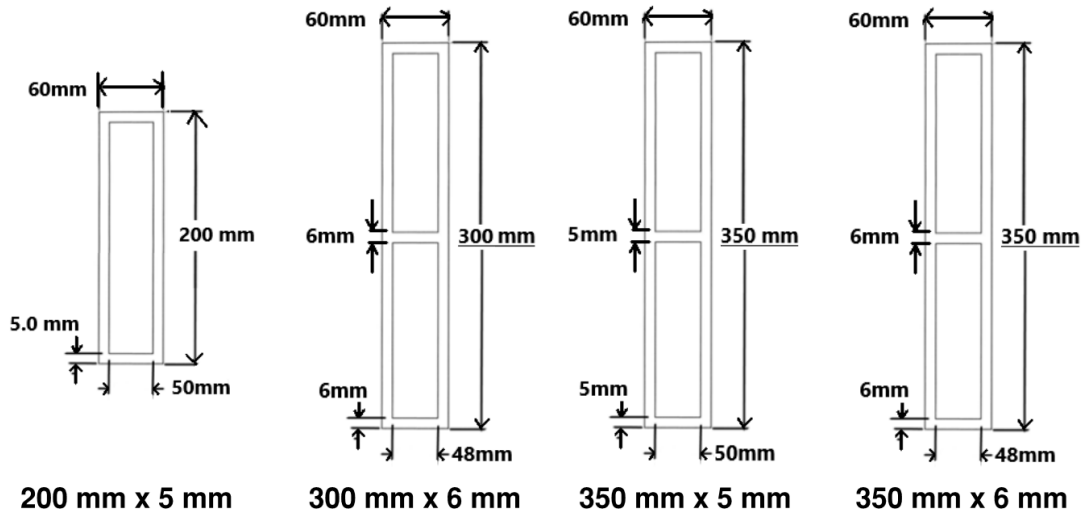


Figure 3 Dimensions Joist Elements

3.1. Technical and Mechanical Specifications

200 mm x 5 mm		300 mm x 6 mm	
Weight [lb/ft]	3.00	Weight [lb/ft]	5.36
Inertia [in ⁴]	27.43	Inertia [in ⁴]	94.77

350 mm x 5 mm		350 mm x 6 mm	
Weight [lb/ft]	5.11	Weight [lb/ft]	6.08
Inertia [in ⁴]	121.58	Inertia [in ⁴]	143.95

3.2. Modulus of Elasticity

Appendix A shows the Strain-Stress curves for various joist elements. The graph below shows the Modulus of Elasticity variation based on different test results.

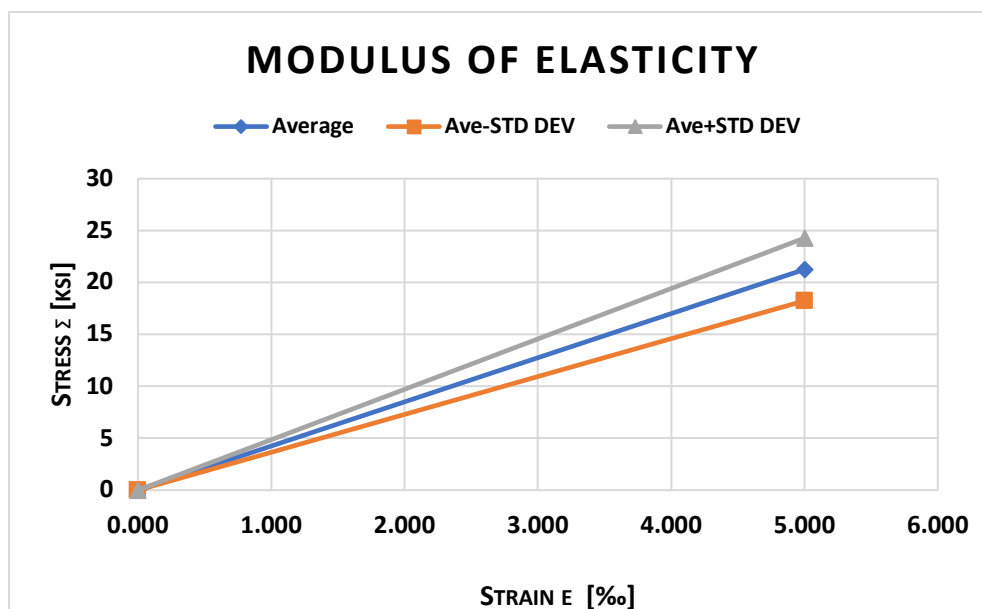


Figure 4 Variation of Modulus of Elasticity for Joist Elements

Graphs in Appendix B shows an ample data dispersion for elements J350X5X78, J300X6X54 & J200X5X30. Thus, this data was excluded from the Modulus of Elasticity calculation.

With this data, the Modulus of Elasticity for joists ranges from a minimum of 23,370 MPa (3,390 ksi) to a maximum of 37,920 MPa (5,500 ksi). For analysis purposes, the Modulus of Elasticity used in this guide is obtained from subtracting the standard deviation from the average E value, which equals 25,130 MPa (3,645 ksi)

Since the modulus of elasticity for the joist elements is large in comparison with the modulus of elasticity for decks, the analysis for every type of element was perform with his respective modulus of elasticity.

4. Load Table

Load tables are a helpful tool to determine a joist type based on the span, distributed load and deflection limits.

Table 3 and Table 4, the largest load applied to a joist element can be found for service and ultimate load conditions.

The (*) symbol means that the element will reach service deformations with less than 20 psf so the element cannot be use for that span length.

Table 1 Service Condition – Deck

Deck		Service Condition - Deck											
		L/240				L/360				L/480			
		2'	2.5'	3'	3.5'	2'	2.5'	3'	3.5'	2'	2.5'	3'	3.5'
Δ [in]		0.17"	0.21"	0.26"	0.30"	0.17"	0.21"	0.26"	0.30"	0.17"	0.21"	0.26"	0.30"
$\frac{4}{1/2}$ "	Q_s [psf]	200	180	105	65	200	120	70	45	175	90	50	30
8.0"	Q_s [psf]	200	140	80	50	185	95	55	35	140	70	40	25

Q_s = Maximum allowable imposed area load, unfactored (including self-weight of deck elements)

Table 2 Ultimate Condition – Deck

Deck		Ultimate Condition - Deck											
		L/240				L/360				L/480			
		2'	2.5'	3'	3.5'	2'	2.5'	3'	3.5'	2'	2.5'	3'	3.5'
Δ [in]		0.17"	0.21"	0.26"	0.30"	0.17"	0.21"	0.26"	0.30"	0.17"	0.21"	0.26"	0.30"
$\frac{4}{1/2}$ "	Q_u [psf]	290	261	152	94	290	174	102	65	254	131	73	44
8.0"	Q_u [psf]	290	203	116	73	268	138	80	51	203	102	58	36

Q_u = Maximum allowable imposed area load, factored (including self-weight of deck elements)

Table 3 Service Condition - Joists

Joist		Service Condition - Joists									
		L/240									
		4'	6'	8'	10'	12'	14'	16'	18'	20'	22'
Δ [in]		0.20"	0.30"	0.40"	0.50"	0.60"	0.70"	0.80"	0.90"	1.00"	1.10"
J200X5	q_s [lb/ft]	600	450	255	165	105	75	*	*	*	*
J300X6	q_s [lb/ft]	600	600	525	330	225	165	135	105	90	60
J350X5	q_s [lb/ft]	600	600	540	345	240	180	135	105	90	75
J350X6	q_s [lb/ft]	600	600	600	600	420	315	240	180	135	105

Joist		Service Condition - Joists									
		L/360									
		4'	6'	8'	10'	12'	14'	16'	18'	20'	22'
Δ [in]		0.13"	0.20"	0.27"	0.33"	0.40"	0.47"	0.53"	0.60"	0.67"	0.73"
J200X5	q_s [lb/ft]	600	450	255	135	75	*	*	*	*	*
J300X6	q_s [lb/ft]	600	600	525	330	225	165	120	75	*	*
J350X5	q_s [lb/ft]	600	600	540	345	240	180	135	105	75	*
J350X6	q_s [lb/ft]	600	600	600	600	405	255	180	120	90	60

Joist		Service Condition - Joists									
		L/480									

		4'	6'	8'	10'	12'	14'	16'	18'	20'	22'
	Δ [in]	0.10"	0.15"	0.20"	0.25"	0.30"	0.35"	0.40"	0.45"	0.50"	0.55"
J200X5	q_s [lb/ft]	600	450	195	105	*	*	*	*	*	*
J300X6	q_s [lb/ft]	600	600	525	330	195	120	90	*	*	*
J350X5	q_s [lb/ft]	600	600	540	345	240	165	105	75	*	*
J350X6	q_s [lb/ft]	600	600	600	525	300	195	135	90	60	*

q_s = Maximum allowable imposed linear load, unfactored (including self-weight of joist elements)

Table 4 Ultimate Condition - Joists

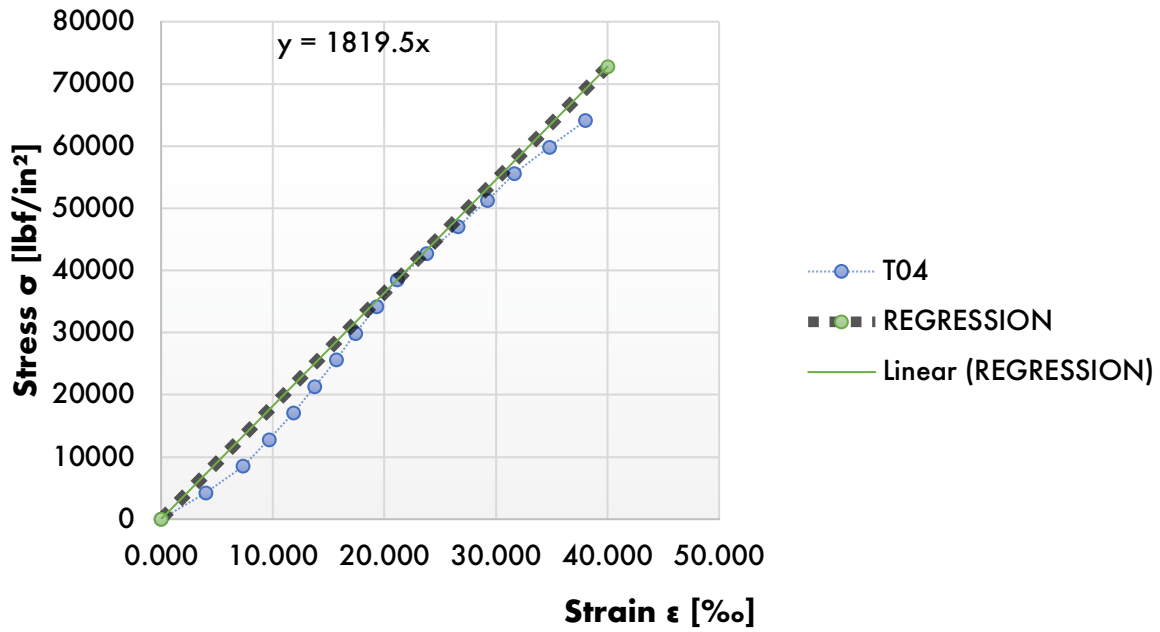
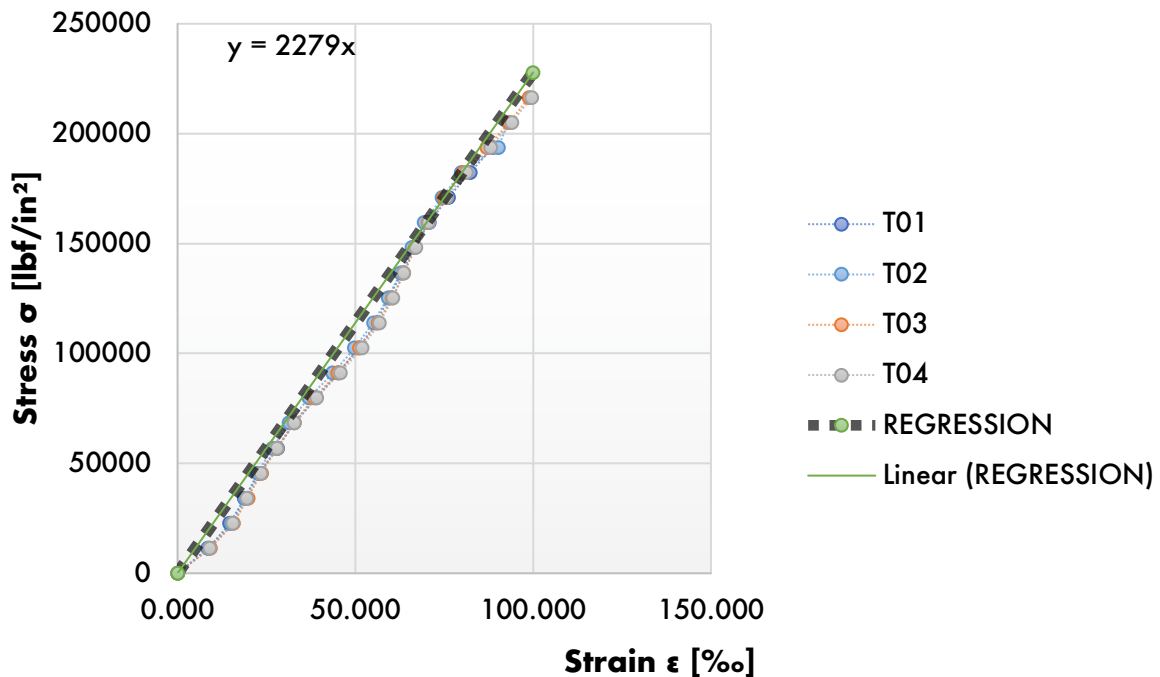
Joist		Ultimate Condition - Joists									
		L/240									
		4'	6'	8'	10'	12'	14'	16'	18'	20'	22'
	Δ [in]	0.20"	0.30"	0.40"	0.50"	0.60"	0.70"	0.80"	0.90"	1.00"	1.10"
J200X5	q_u [lb/ft]	870	653	370	239	152	109	*	*	*	*
J300X6	q_u [lb/ft]	870	870	761	479	326	239	196	152	131	87
J350X5	q_u [lb/ft]	870	870	783	500	348	261	196	152	131	109
J350X6	q_u [lb/ft]	870	870	870	870	609	457	348	261	196	152

Joist		Ultimate Condition - Joists									
		L/360									
		4'	6'	8'	10'	12'	14'	16'	18'	20'	22'
	Δ [in]	0.13"	0.20"	0.27"	0.33"	0.40"	0.47"	0.53"	0.60"	0.67"	0.73"

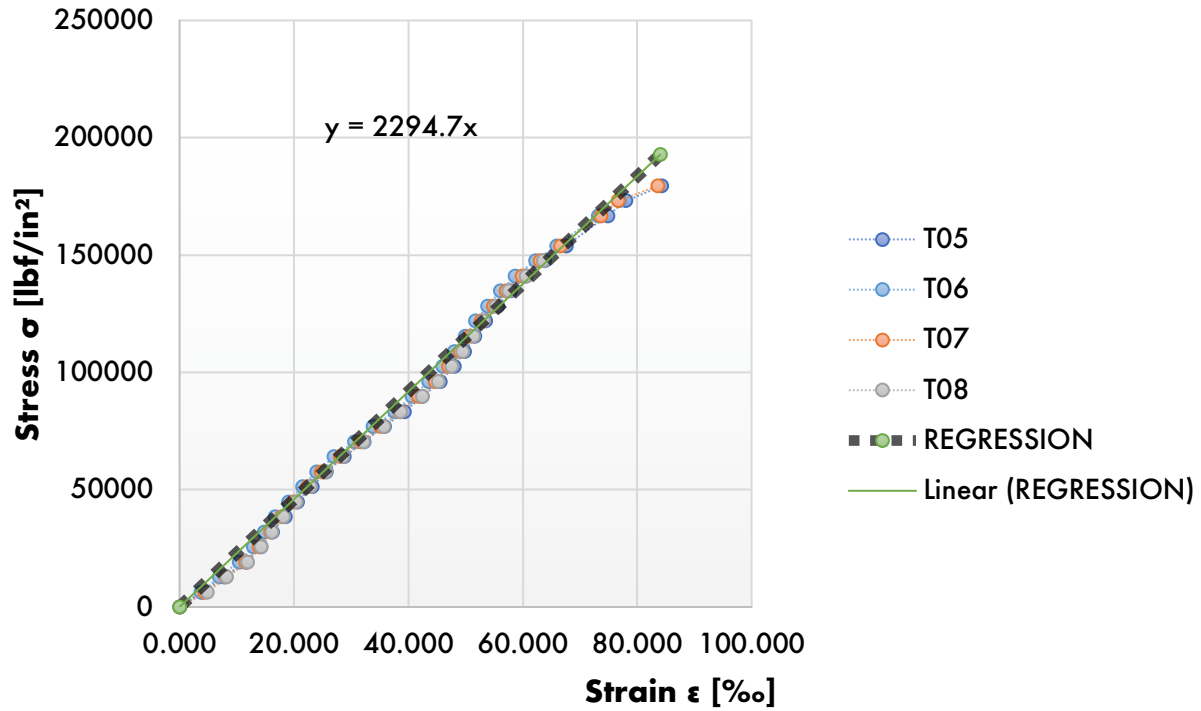
J200X5	q_u [lb/ft]	870	653	370	196	109	*	*	*	*	*
J300X6	q_u [lb/ft]	870	870	761	479	326	239	174	109	*	*
J350X5	q_u [lb/ft]	870	870	783	500	348	261	196	152	109	*
J350X6	q_u [lb/ft]	870	870	870	870	587	370	261	174	131	87

Joist		Ultimate Condition - Joists									
		L/480									
		4'	6'	8'	10'	12'	14'	16'	18'	20'	22'
Δ [in]		0.10"	0.15"	0.20"	0.25"	0.30"	0.35"	0.40"	0.45"	0.50"	0.55"
J200X5	q_u [lb/ft]	870	653	283	152	*	*	*	*	*	*
J300X6	q_u [lb/ft]	870	870	761	479	283	174	131	*	*	*
J350X5	q_u [lb/ft]	870	870	783	500	348	239	152	109	*	*
J350X6	q_u [lb/ft]	870	870	870	761	435	283	196	131	87	*

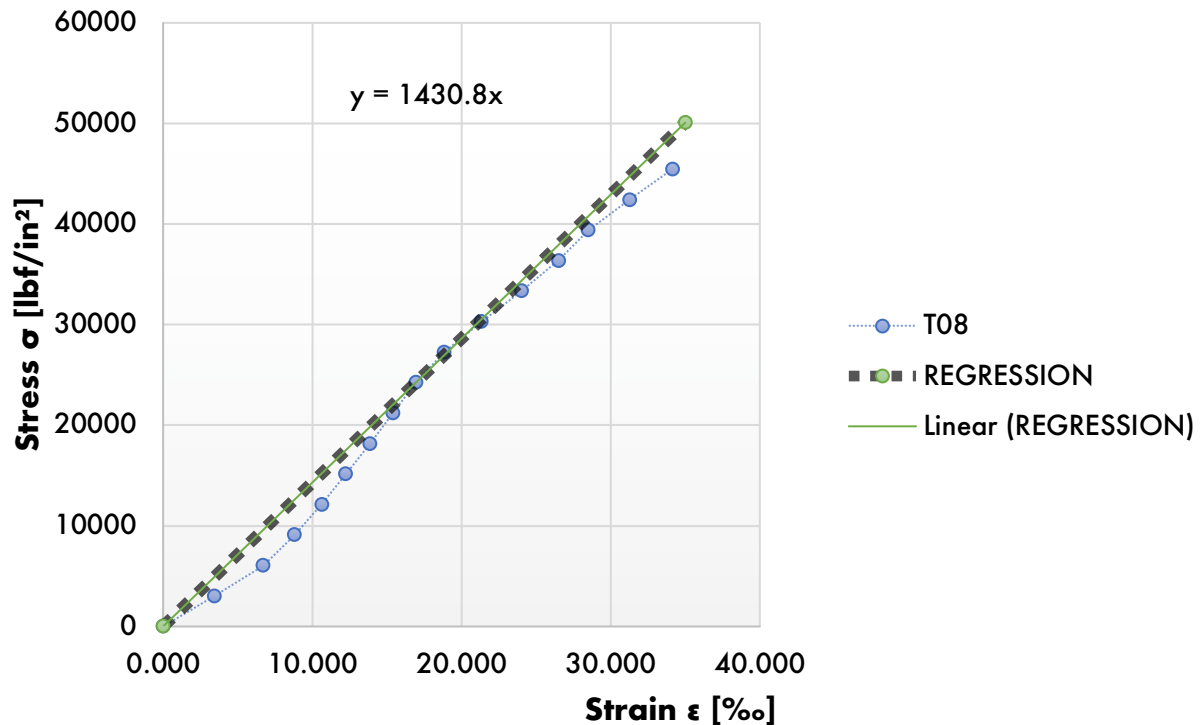
q_u = Maximum allowable imposed linear load, factored (including self-weight of joist elements)

5.APPENDIX A.**Elasticity Modulus for Deck elements****Modulus of Elasticity-4.5"X24****Modulus of Elasticity-4.5"X32**

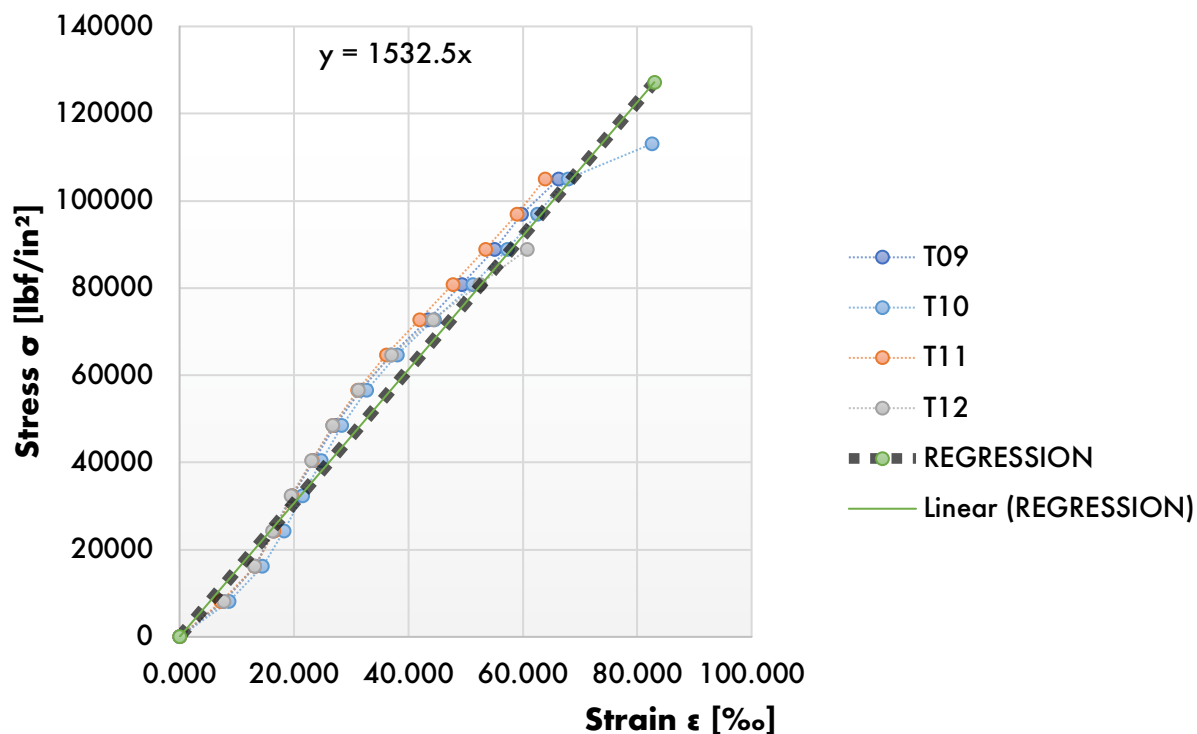
Modulus of Elasticity-4.5"X36



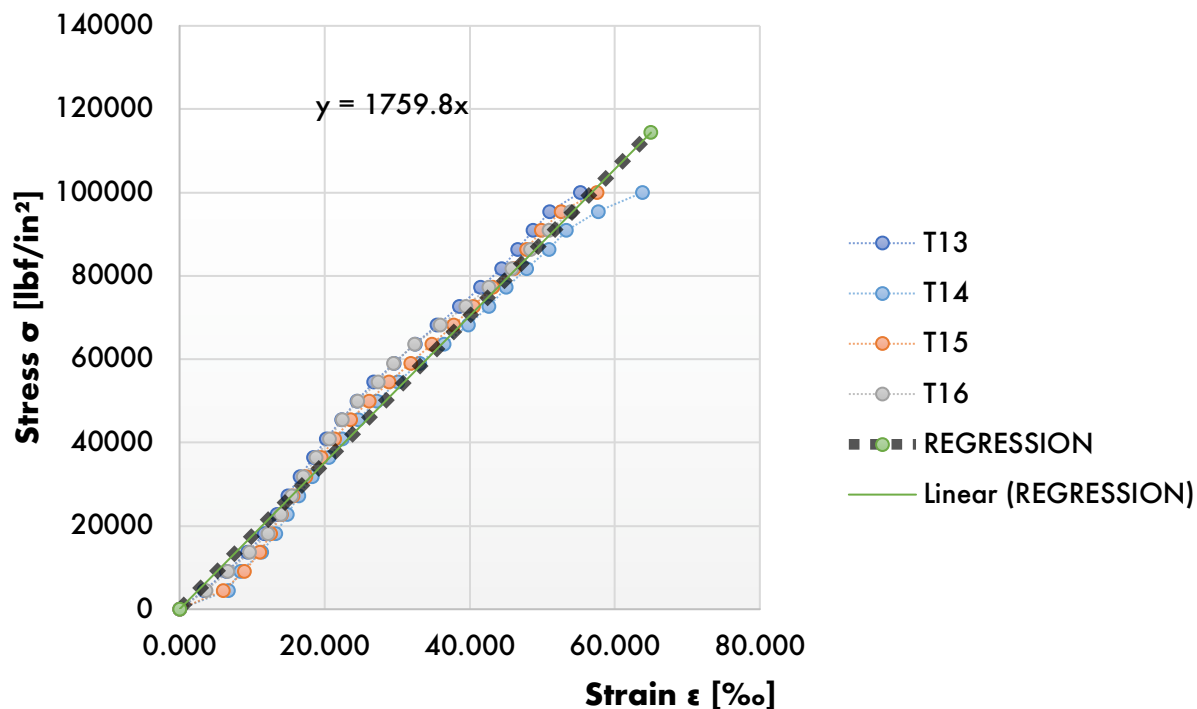
Modulus of Elasticity-8.0"X24

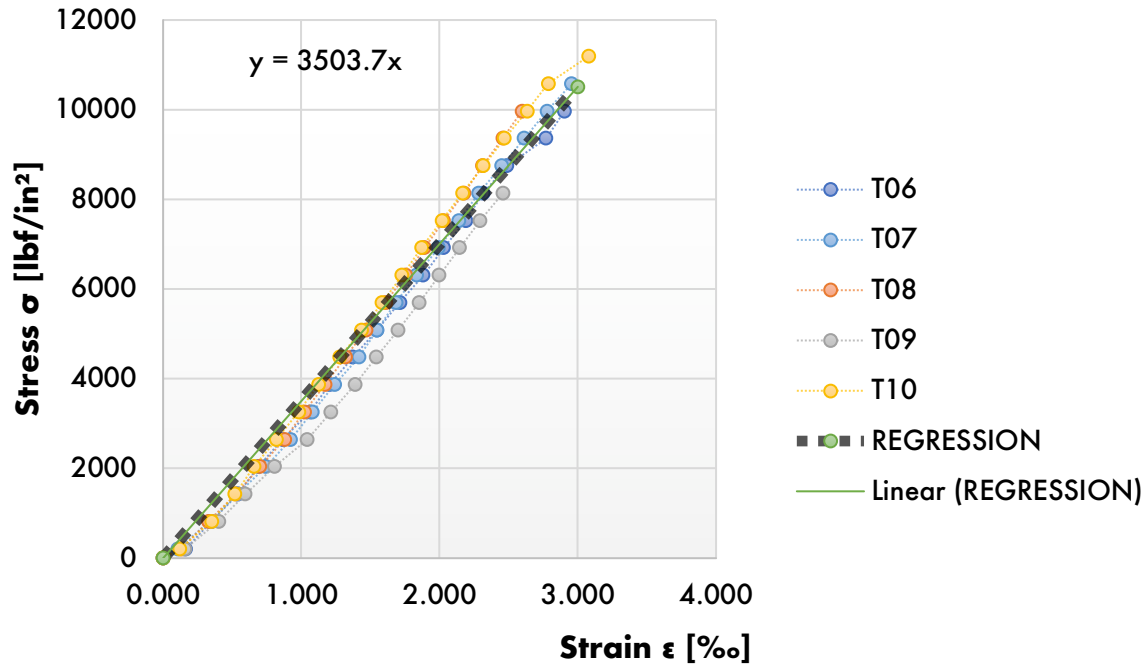
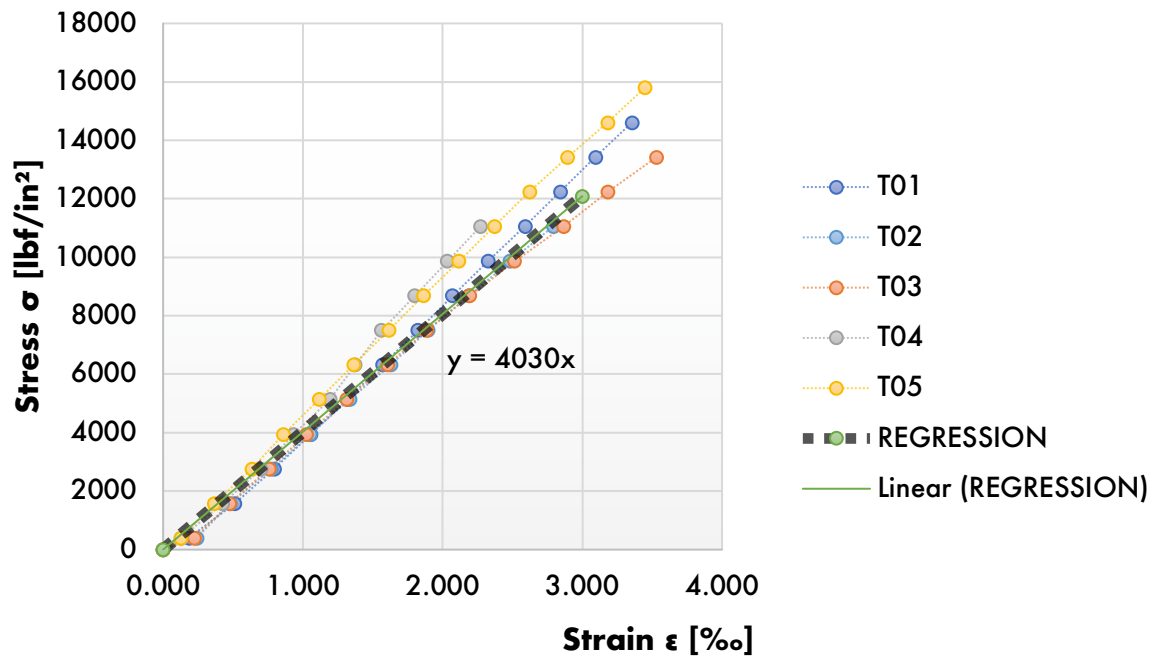


Modulus of Elasticity-8.0"X32

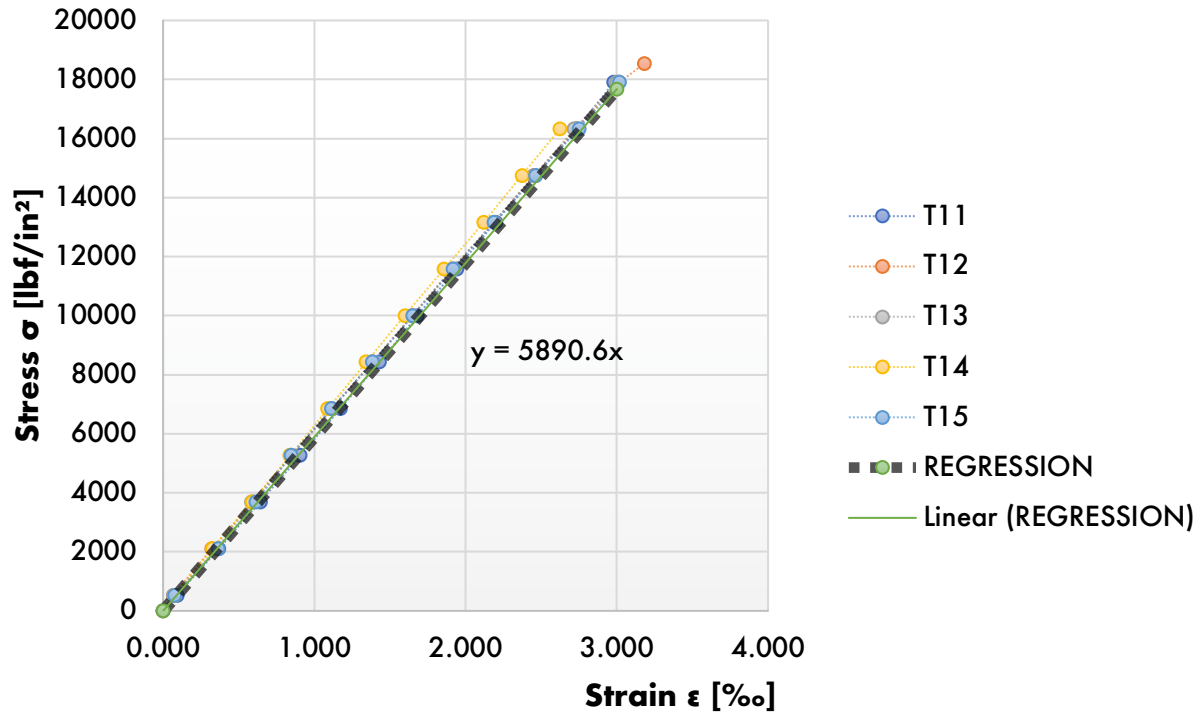


Modulus of Elasticity-8.0"X36

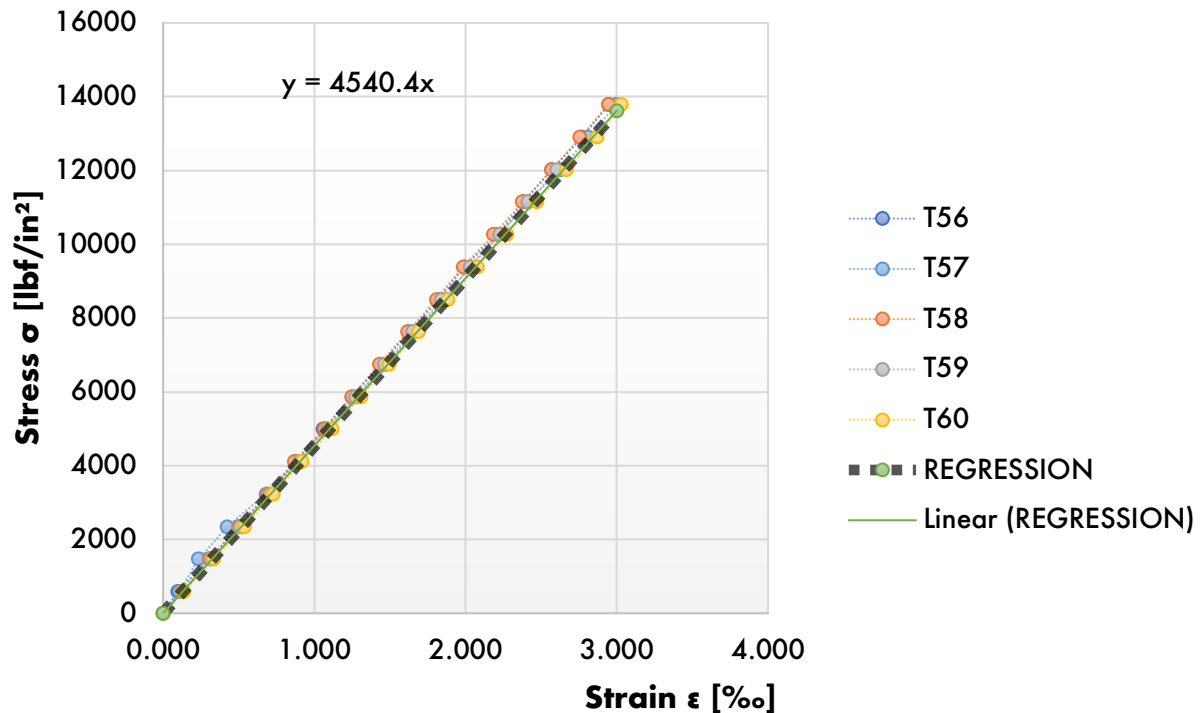


6.APPENDIX B.**Elasticity Modulus for Joist elements****Modulus of Elasticity-J350X6X102****Modulus of Elasticity-J350X6X198**

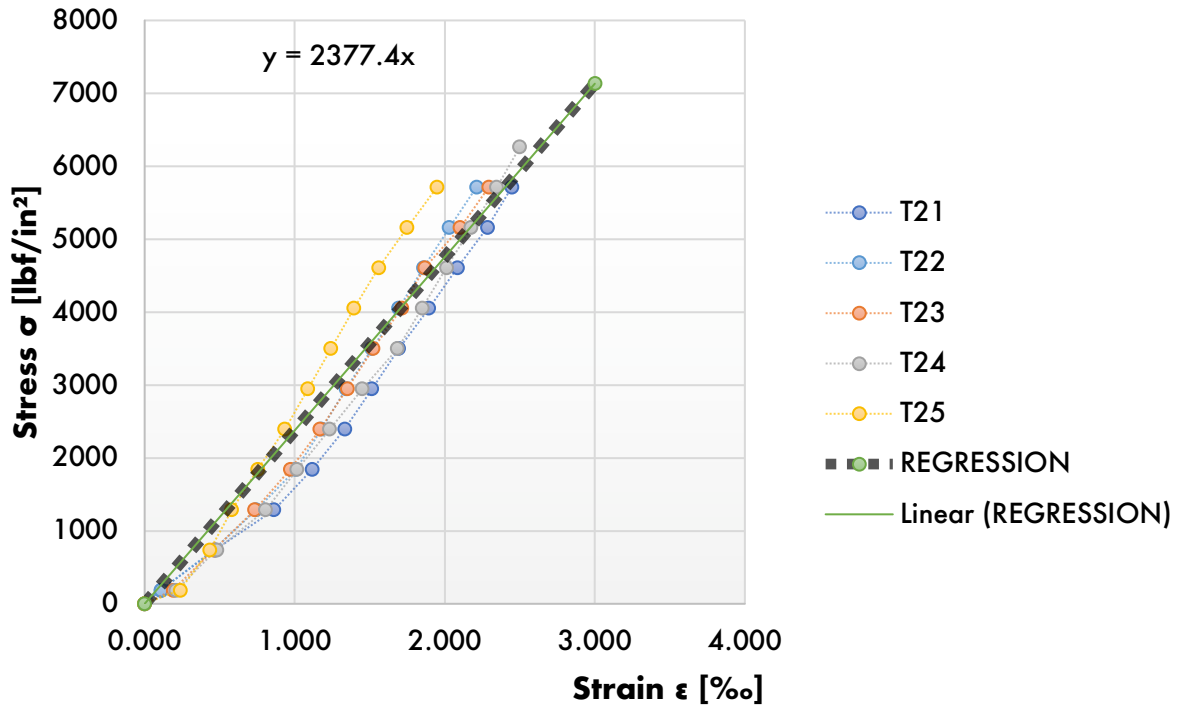
Modulus of Elasticity-J350X6X264



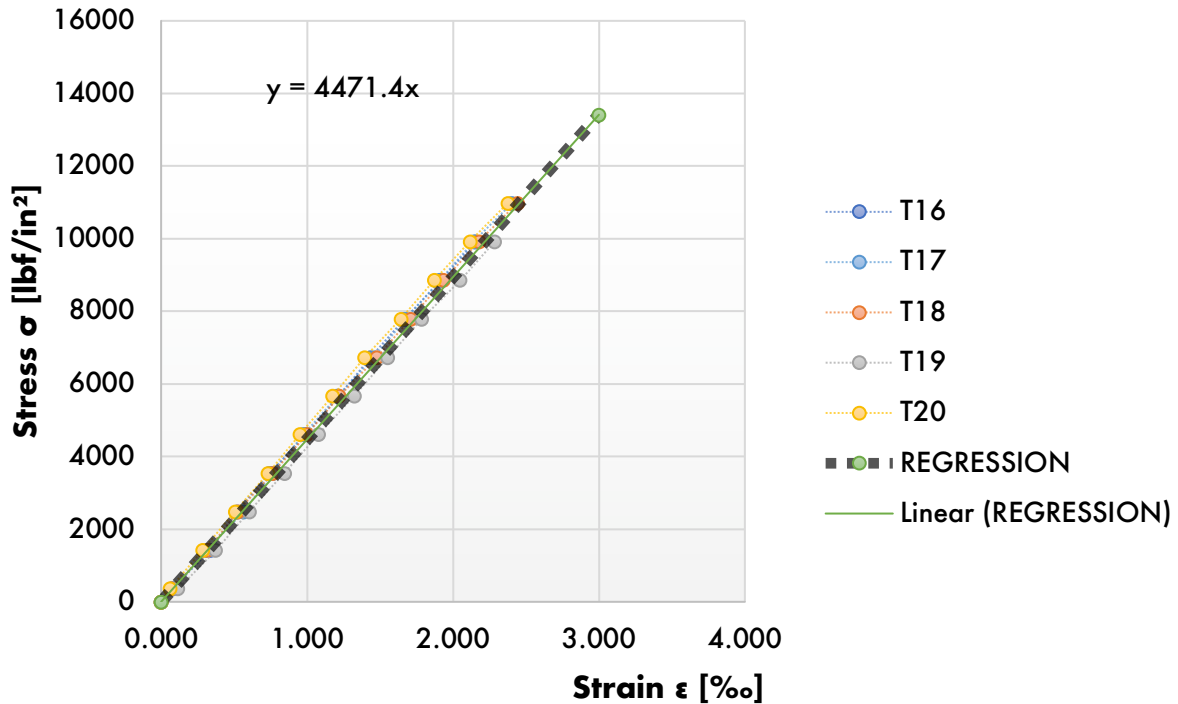
Modulus of Elasticity-J350X6X294



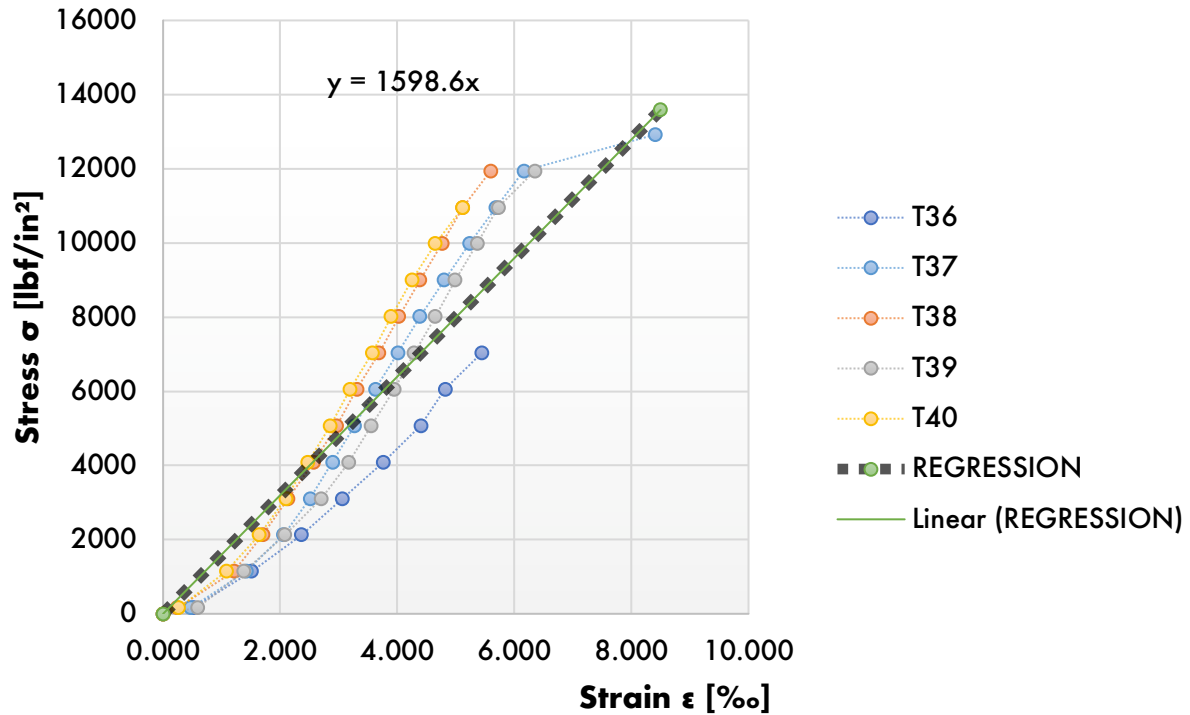
Modulus of Elasticity-J350X5X78



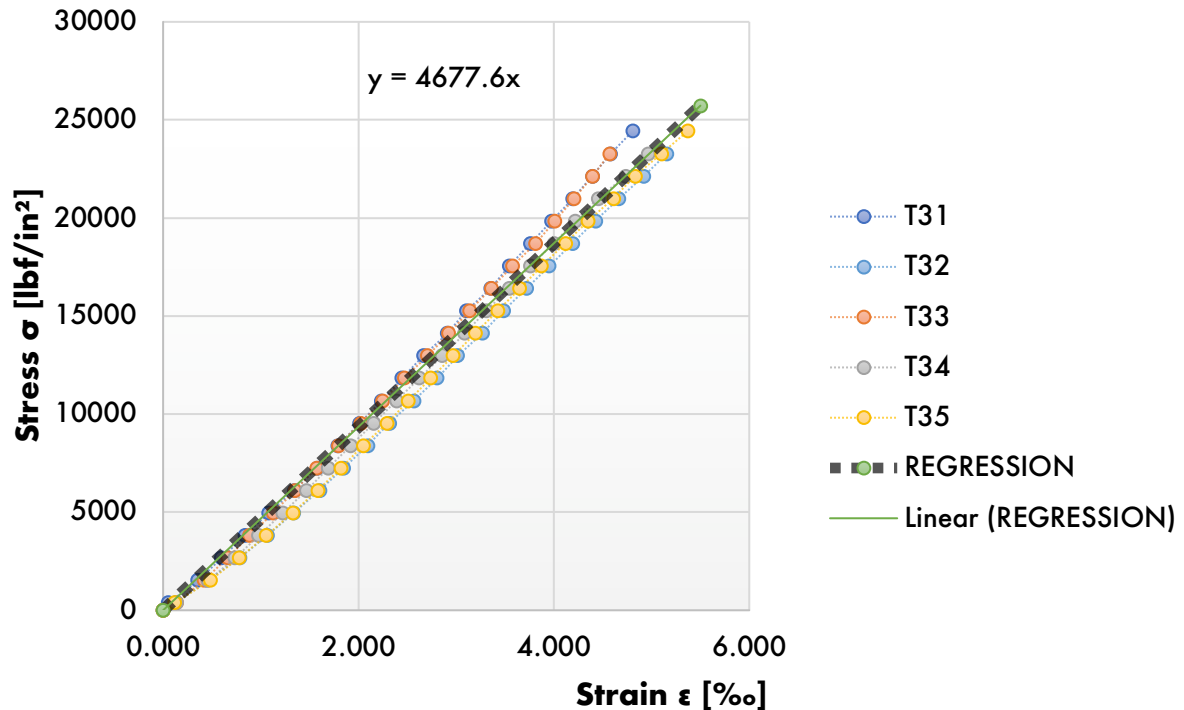
Modulus of Elasticity-J350X5X150



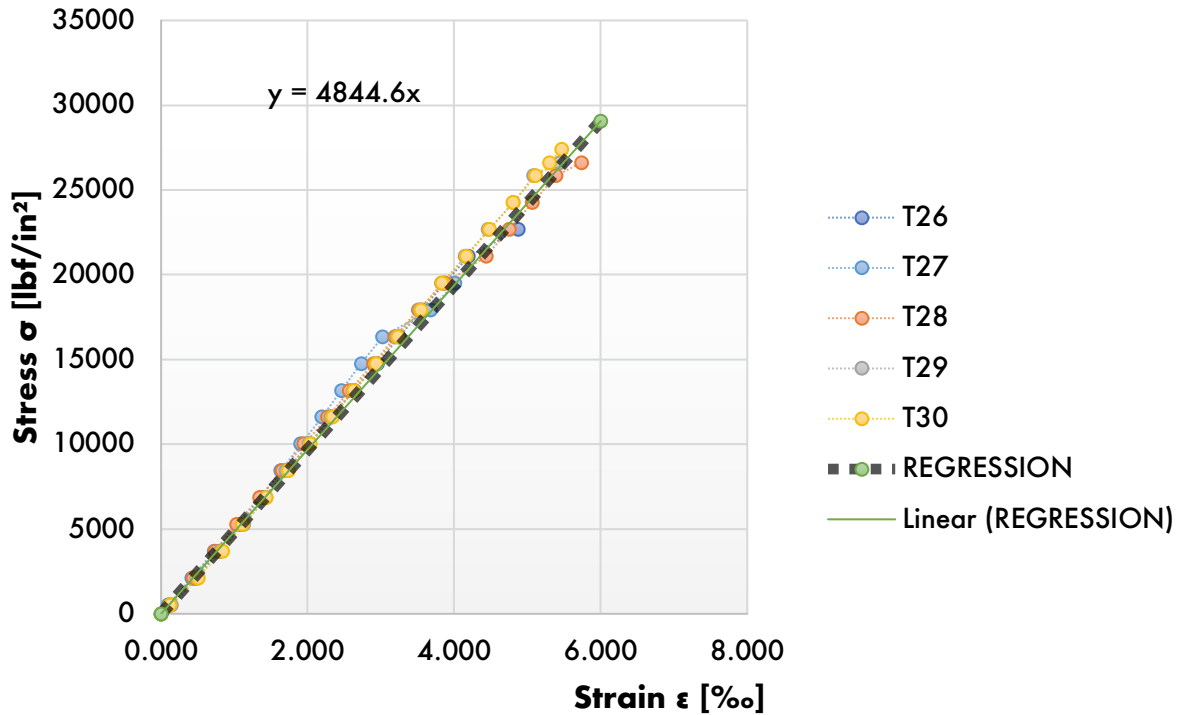
Modulus of Elasticity-J300X6X54



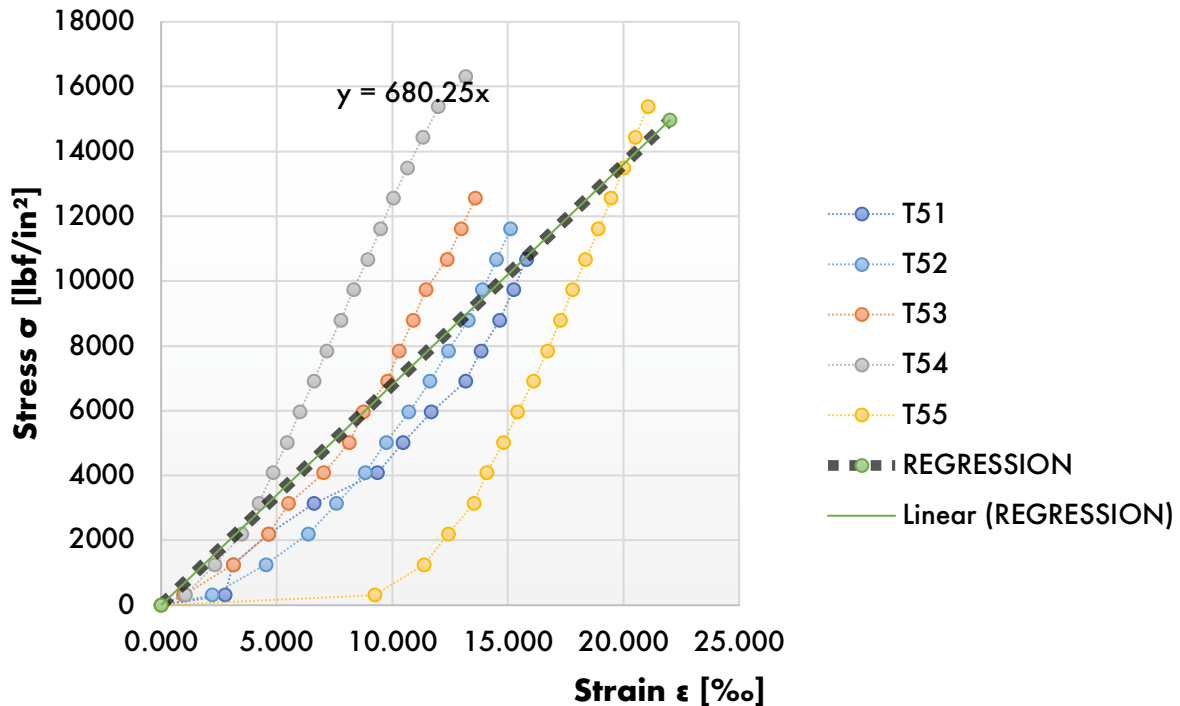
Modulus of Elasticity-J300X6X126



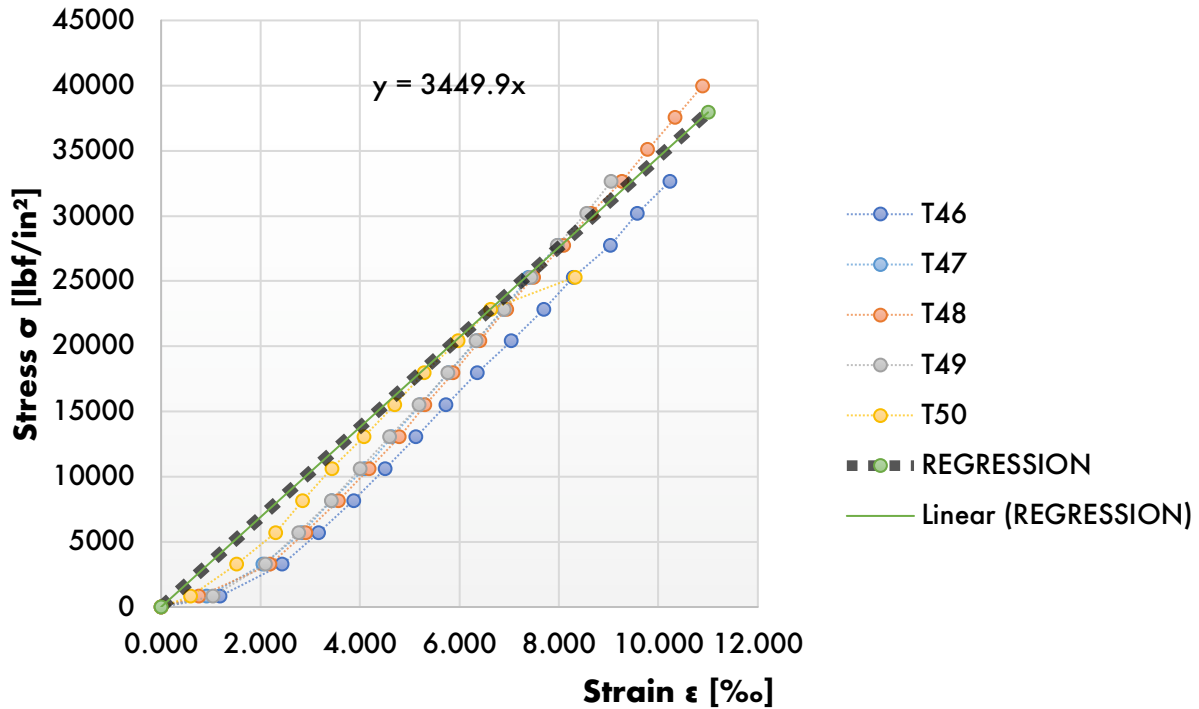
Modulus of Elasticity-J300X6X174



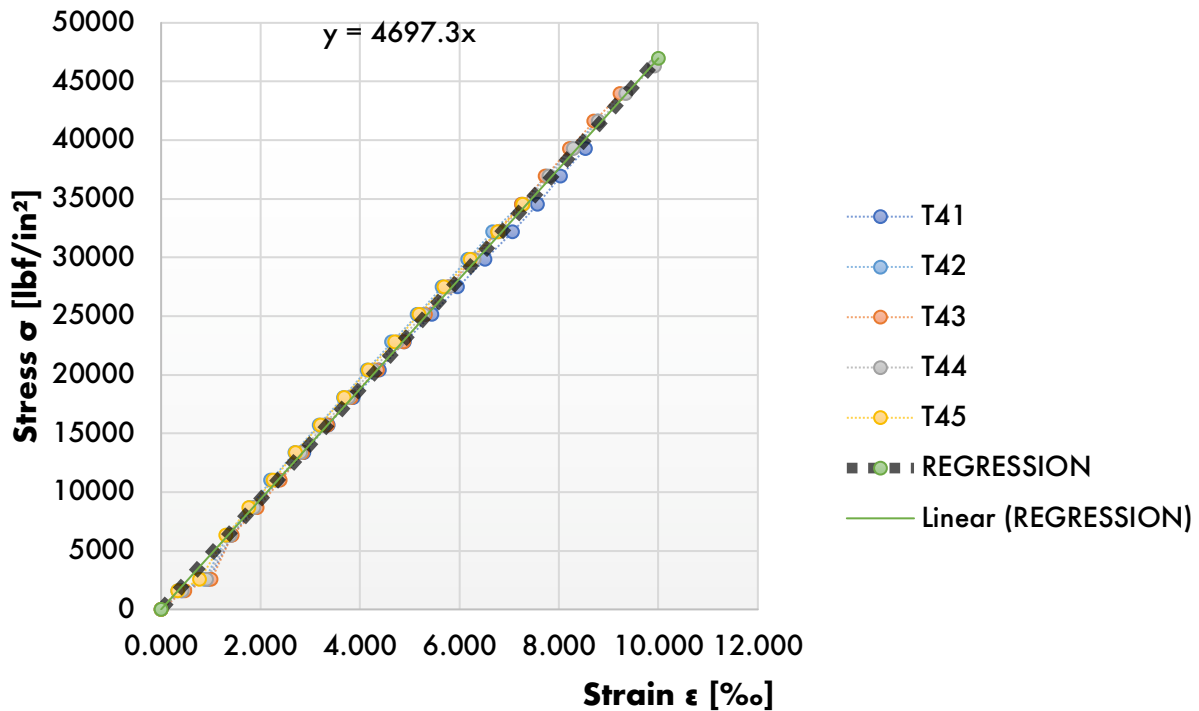
Modulus of Elasticity-J200X5X30



Modulus of Elasticity-J200X5X78



Modulus of Elasticity-J200X5X150



7.APPENDIX C.**Statistical Analysis for Deck elements**

4 1/2" Element X 24" SPAN - Tests #4						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
0	0.000	0.000	0.000	0.000	0.000	0.0%
100	0.042	0.042	0.000	0.042	0.042	0.0%
200	0.077	0.077	0.000	0.077	0.077	0.0%
300	0.101	0.101	0.000	0.101	0.101	0.0%
400	0.124	0.124	0.000	0.124	0.124	0.0%
500	0.144	0.144	0.000	0.144	0.144	0.0%
600	0.164	0.164	0.000	0.164	0.164	0.0%
700	0.182	0.182	0.000	0.182	0.182	0.0%
800	0.202	0.202	0.000	0.202	0.202	0.0%
900	0.221	0.221	0.000	0.221	0.221	0.0%
1000	0.249	0.249	0.000	0.249	0.249	0.0%
1100	0.278	0.278	0.000	0.278	0.278	0.0%
1200	0.306	0.306	0.000	0.306	0.306	0.0%
1300	0.331	0.331	0.000	0.331	0.331	0.0%
1400	0.364	0.364	0.000	0.364	0.364	0.0%
1500	0.398	0.398	0.000	0.398	0.398	0.0%

4 1/2" Element X 32" SPAN - Tests #1 to #4						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
0	0.000	0.000	0.000	0.000	0.000	0.0%
200	0.170	0.165	0.004	0.169	0.160	2.6%
400	0.293	0.284	0.007	0.291	0.276	2.6%
600	0.368	0.358	0.007	0.365	0.351	2.1%
800	0.438	0.430	0.008	0.437	0.422	1.7%
1000	0.523	0.515	0.010	0.525	0.504	2.0%
1200	0.612	0.604	0.012	0.615	0.592	2.0%
1400	0.727	0.714	0.016	0.730	0.697	2.3%
1600	0.852	0.836	0.014	0.851	0.822	1.7%
1800	0.966	0.949	0.014	0.963	0.935	1.5%
2000	1.059	1.045	0.012	1.057	1.034	1.1%
2200	1.131	1.119	0.011	1.130	1.107	1.0%

4 1/2" Element X 32" SPAN - Tests #1 to #4						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
2400	1.188	1.181	0.007	1.188	1.174	0.6%
2600	1.251	1.244	0.008	1.251	1.236	0.6%
2800	1.323	1.314	0.010	1.324	1.304	0.8%
3000	1.425	1.408	0.013	1.421	1.395	0.9%
3200	1.543	1.517	0.018	1.535	1.499	1.2%
3400	1.695	1.661	0.022	1.684	1.639	1.4%
3600	1.782	1.764	0.012	1.776	1.752	0.7%
3800	1.875	1.868	0.007	1.875	1.861	0.4%

4 1/2" Element X 36" SPAN - Tests #5 to #8						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
0	0.000	0.000	0.000	0.000	0.000	0.0%
100	0.114	0.100	0.010	0.110	0.089	10.3%
200	0.193	0.182	0.012	0.193	0.170	6.4%
300	0.280	0.268	0.014	0.282	0.254	5.1%
400	0.336	0.325	0.013	0.338	0.312	4.0%
500	0.382	0.371	0.014	0.385	0.357	3.7%
600	0.435	0.418	0.016	0.434	0.402	3.7%
700	0.486	0.471	0.015	0.486	0.456	3.2%
800	0.545	0.529	0.015	0.544	0.514	2.8%
900	0.603	0.588	0.016	0.603	0.572	2.6%
1000	0.678	0.662	0.016	0.678	0.646	2.5%
1100	0.759	0.745	0.016	0.761	0.729	2.1%
1200	0.844	0.828	0.018	0.846	0.810	2.2%
1300	0.926	0.908	0.014	0.922	0.893	1.6%
1400	1.002	0.986	0.018	1.004	0.968	1.8%
1500	1.074	1.056	0.018	1.074	1.038	1.7%
1600	1.133	1.114	0.017	1.131	1.096	1.6%
1700	1.177	1.160	0.016	1.176	1.144	1.4%
1800	1.220	1.203	0.016	1.219	1.187	1.3%
1900	1.265	1.248	0.016	1.263	1.232	1.3%
2000	1.314	1.298	0.016	1.314	1.281	1.2%
2100	1.370	1.352	0.016	1.368	1.335	1.2%
2200	1.434	1.418	0.018	1.436	1.399	1.3%
2300	1.512	1.496	0.015	1.510	1.481	1.0%

4 1/2" Element X 36" SPAN - Tests #5 to #8						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
2400	1.601	1.580	0.016	1.596	1.564	1.0%
2600	1.777	1.754	0.017	1.771	1.738	1.0%
2700	1.855	1.835	0.015	1.849	1.820	0.8%
2800	2.007	1.999	0.009	2.007	1.990	0.4%

8.0" Element X 24" SPAN - Tests #8						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
0	0.000	0.000	0.000	0.000	0.000	0.0%
100	0.036	0.036	0.000	0.036	0.036	0.0%
200	0.070	0.070	0.000	0.070	0.070	0.0%
300	0.092	0.092	0.000	0.092	0.092	0.0%
400	0.111	0.111	0.000	0.111	0.111	0.0%
500	0.128	0.128	0.000	0.128	0.128	0.0%
600	0.145	0.145	0.000	0.145	0.145	0.0%
700	0.161	0.161	0.000	0.161	0.161	0.0%
800	0.177	0.177	0.000	0.177	0.177	0.0%
900	0.197	0.197	0.000	0.197	0.197	0.0%
1000	0.223	0.223	0.000	0.223	0.223	0.0%
1100	0.251	0.251	0.000	0.251	0.251	0.0%
1200	0.277	0.277	0.000	0.277	0.277	0.0%
1300	0.298	0.298	0.000	0.298	0.298	0.0%
1400	0.327	0.327	0.000	0.327	0.327	0.0%
1500	0.357	0.357	0.000	0.357	0.357	0.0%

8.0" Element X 32" SPAN - Tests #9 to #12						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
0	0.000	0.000	0.000	0.000	0.000	0.0%
200	0.160	0.145	0.009	0.155	0.136	6.4%
400	0.269	0.251	0.011	0.261	0.240	4.3%
600	0.339	0.314	0.015	0.328	0.299	4.7%
800	0.399	0.373	0.015	0.388	0.358	4.0%
1000	0.461	0.440	0.013	0.452	0.427	2.9%
1200	0.528	0.508	0.012	0.520	0.495	2.4%

8.0" Element X 32" SPAN - Tests #9 to #12						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
1400	0.608	0.589	0.011	0.601	0.578	1.9%
1600	0.708	0.690	0.012	0.702	0.677	1.8%
1800	0.830	0.812	0.019	0.831	0.792	2.4%
2000	0.979	0.936	0.034	0.970	0.902	3.6%
2200	1.135	1.058	0.052	1.109	1.006	4.9%
2400	1.168	1.129	0.028	1.157	1.100	2.5%
2600	1.270	1.234	0.031	1.266	1.203	2.5%
2800	1.550	1.550	0.000	1.550	1.550	0.0%

8.0" Element X 36" SPAN - Tests #13 to #16						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
0	0.000	0.000	0.000	0.000	0.000	0.0%
100	0.158	0.117	0.034	0.151	0.082	29.2%
200	0.210	0.179	0.025	0.204	0.154	14.0%
300	0.266	0.244	0.020	0.263	0.224	8.1%
400	0.312	0.292	0.014	0.306	0.279	4.7%
500	0.350	0.331	0.012	0.343	0.319	3.7%
600	0.386	0.367	0.013	0.380	0.355	3.4%
700	0.430	0.408	0.015	0.423	0.393	3.6%
800	0.485	0.455	0.020	0.475	0.435	4.3%
900	0.529	0.499	0.020	0.519	0.479	4.0%
1000	0.580	0.547	0.023	0.570	0.524	4.1%
1100	0.640	0.602	0.027	0.629	0.575	4.4%
1200	0.709	0.666	0.031	0.697	0.635	4.6%
1300	0.780	0.731	0.036	0.767	0.694	4.9%
1400	0.860	0.802	0.040	0.843	0.762	5.0%
1500	0.938	0.878	0.040	0.918	0.838	4.6%
1600	1.006	0.950	0.036	0.986	0.914	3.8%
1700	1.063	1.017	0.031	1.047	0.986	3.0%
1800	1.130	1.087	0.029	1.116	1.058	2.7%
1900	1.202	1.143	0.037	1.180	1.106	3.3%
2000	1.260	1.198	0.040	1.239	1.158	3.4%
2100	1.365	1.273	0.059	1.331	1.214	4.6%
2200	1.511	1.392	0.087	1.479	1.306	6.2%

APPENDIX D.

Statistical Analysis for Joist elements

350 mm X 6 mm X 102" SPAN - Tests #6 to #10						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
0	0.000	0.000	0.000	0.000	0.000	0.0%
336	0.031	0.026	0.004	0.030	0.022	16.1%
1336	0.076	0.067	0.005	0.072	0.062	7.2%
2336	0.112	0.102	0.005	0.107	0.097	4.9%
3336	0.152	0.136	0.010	0.145	0.126	7.1%
4336	0.197	0.171	0.014	0.185	0.157	8.4%
5336	0.229	0.202	0.015	0.217	0.188	7.3%
6336	0.262	0.231	0.017	0.248	0.214	7.4%
7336	0.291	0.261	0.017	0.279	0.244	6.6%
8336	0.321	0.291	0.017	0.308	0.273	6.0%
9336	0.350	0.319	0.018	0.337	0.301	5.6%
10336	0.377	0.347	0.018	0.365	0.329	5.3%
11336	0.405	0.375	0.019	0.394	0.356	5.0%
12336	0.433	0.403	0.019	0.422	0.383	4.8%
13336	0.464	0.430	0.020	0.450	0.410	4.7%
14336	0.469	0.451	0.015	0.466	0.436	3.3%
15336	0.523	0.487	0.024	0.510	0.463	4.9%
16336	0.548	0.515	0.023	0.538	0.492	4.5%
17336	0.558	0.542	0.016	0.558	0.526	3.0%
18336	0.581	0.581	0.000	0.581	0.581	0.0%

350 mm X 6 mm X 198" SPAN - Tests #1 to #5						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
0	0.000	0.000	0.000	0.000	0.000	0.0%
336	0.172	0.129	0.034	0.163	0.095	26.3%
1336	0.365	0.322	0.036	0.359	0.286	11.3%
2336	0.566	0.522	0.041	0.563	0.480	7.9%
3336	0.754	0.703	0.054	0.757	0.648	7.7%
4336	0.951	0.893	0.061	0.955	0.832	6.9%
5336	1.159	1.074	0.082	1.156	0.992	7.6%
6336	1.348	1.249	0.100	1.349	1.150	8.0%
7336	1.562	1.440	0.116	1.556	1.323	8.1%

350 mm X 6 mm X 198" SPAN - Tests #1 to #5						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
8336	1.790	1.633	0.137	1.770	1.496	8.4%
9336	2.041	1.835	0.165	1.999	1.670	9.0%
10336	2.266	1.987	0.181	2.168	1.806	9.1%
11336	2.514	2.187	0.207	2.393	1.980	9.5%
12336	2.388	2.264	0.101	2.366	2.163	4.5%
13336	2.588	2.449	0.116	2.564	2.333	4.7%
14336	2.841	2.841	0.000	2.841	2.841	0.0%
15336	3.029	3.029	0.000	3.029	3.029	0.0%
16336	3.229	3.229	0.000	3.229	3.229	0.0%

350 mm X 6 mm X 246" SPAN - Tests #11 to #15						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
0	0.000	0.000	0.000	0.000	0.000	0.0%
336	0.117	0.097	0.011	0.108	0.086	11.6%
1336	0.468	0.441	0.025	0.466	0.416	5.7%
2336	0.812	0.765	0.026	0.792	0.739	3.4%
3336	1.146	1.084	0.031	1.115	1.053	2.9%
4336	1.482	1.417	0.035	1.452	1.382	2.5%
5336	1.810	1.752	0.036	1.787	1.716	2.0%
6336	2.127	2.082	0.033	2.115	2.049	1.6%
7336	2.456	2.416	0.035	2.450	2.381	1.4%
8336	2.783	2.755	0.036	2.791	2.719	1.3%
9336	3.118	3.088	0.043	3.132	3.045	1.4%
10336	3.479	3.431	0.057	3.488	3.374	1.7%
11336	3.821	3.802	0.019	3.820	3.783	0.5%
11736	4.028	4.028	0.000	4.028	4.028	0.0%

350 mm X 6 mm X 294" SPAN - Tests #56 to #60						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
0	0.000	0.000	0.000	0.000	0.000	0.0%
336	0.215	0.188	0.024	0.212	0.164	12.8%
836	0.524	0.470	0.054	0.524	0.416	11.5%
1336	0.845	0.774	0.060	0.834	0.715	7.7%

350 mm X 6 mm X 294" SPAN - Tests #56 to #60						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
1836	1.140	1.098	0.025	1.123	1.073	2.3%
2336	1.441	1.392	0.029	1.421	1.363	2.1%
2836	1.750	1.695	0.031	1.726	1.664	1.8%
3336	2.051	1.994	0.034	2.028	1.960	1.7%
3836	2.346	2.291	0.036	2.328	2.255	1.6%
4336	2.651	2.587	0.041	2.628	2.545	1.6%
4836	2.952	2.890	0.043	2.933	2.847	1.5%
5336	3.259	3.173	0.052	3.225	3.120	1.6%
5836	3.564	3.488	0.044	3.532	3.444	1.3%
6336	3.878	3.784	0.053	3.837	3.732	1.4%
6836	4.182	4.091	0.056	4.147	4.034	1.4%
7336	4.505	4.396	0.063	4.458	4.333	1.4%
7836	4.757	4.679	0.051	4.730	4.628	1.1%

350 mm X 5 mm X 78" SPAN - Tests #21 to #25						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
0	0.000	0.000	0.000	0.000	0.000	0.0%
336	0.026	0.019	0.006	0.025	0.013	30.7%
1336	0.053	0.051	0.002	0.053	0.049	3.3%
2336	0.095	0.082	0.010	0.093	0.072	12.7%
3336	0.123	0.107	0.013	0.120	0.094	12.3%
4336	0.147	0.129	0.014	0.143	0.115	11.2%
5336	0.167	0.149	0.016	0.165	0.133	10.8%
6336	0.187	0.169	0.018	0.187	0.151	10.7%
7336	0.209	0.189	0.019	0.208	0.169	10.2%
8336	0.230	0.207	0.020	0.227	0.187	9.6%
9336	0.252	0.228	0.020	0.248	0.208	8.7%
10336	0.270	0.248	0.019	0.267	0.230	7.5%
11336	0.276	0.276	0.000	0.276	0.276	0.0%

350 mm X 5 mm X 150" SPAN - Tests #16 to #20						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
0	0.000	0.000	0.000	0.000	0.000	0.0%

350 mm X 5 mm X 150" SPAN - Tests #16 to #20						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
336	0.047	0.033	0.007	0.041	0.026	22.4%
1336	0.153	0.132	0.012	0.145	0.120	9.3%
2336	0.247	0.222	0.015	0.237	0.208	6.6%
3336	0.345	0.314	0.016	0.330	0.298	5.2%
4336	0.440	0.408	0.018	0.425	0.390	4.3%
5336	0.540	0.501	0.021	0.522	0.481	4.1%
6336	0.634	0.598	0.021	0.619	0.577	3.6%
7336	0.729	0.693	0.020	0.713	0.672	2.9%
8336	0.837	0.791	0.025	0.815	0.766	3.1%
9336	0.933	0.888	0.024	0.912	0.864	2.7%
10336	0.997	0.983	0.011	0.994	0.972	1.1%

300 mm X 6 mm X 54" SPAN - Tests #36 to #40						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
0	0.000	0.000	0.000	0.000	0.000	0.0%
336	0.031	0.022	0.007	0.029	0.015	32.8%
2336	0.080	0.070	0.008	0.078	0.062	11.8%
4336	0.125	0.104	0.014	0.118	0.090	13.5%
6336	0.162	0.132	0.019	0.151	0.113	14.4%
8336	0.199	0.157	0.025	0.182	0.133	15.6%
10336	0.233	0.180	0.029	0.210	0.151	16.2%
12336	0.255	0.200	0.031	0.231	0.169	15.4%
14336	0.288	0.222	0.035	0.258	0.187	16.0%
16336	0.246	0.224	0.016	0.240	0.208	7.0%
18336	0.264	0.244	0.016	0.260	0.228	6.5%
20336	0.284	0.265	0.016	0.281	0.249	6.1%
22336	0.303	0.287	0.016	0.302	0.271	5.4%
24336	0.336	0.319	0.017	0.336	0.302	5.3%
26336	0.445	0.445	0.000	0.445	0.445	0.0%

300 mm X 6 mm X 126" SPAN - Tests #31 to #35						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
0	0.000	0.000	0.000	0.000	0.000	0.0%

300 mm X 6 mm X 126" SPAN - Tests #31 to #35						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
336	0.039	0.033	0.009	0.042	0.024	26.3%
1336	0.139	0.125	0.013	0.138	0.112	10.4%
2336	0.226	0.205	0.021	0.226	0.184	10.2%
3336	0.307	0.278	0.026	0.304	0.252	9.4%
4336	0.385	0.352	0.030	0.381	0.322	8.4%
5336	0.462	0.423	0.032	0.455	0.391	7.6%
6336	0.533	0.490	0.034	0.524	0.456	7.0%
7336	0.603	0.556	0.036	0.592	0.520	6.5%
8336	0.668	0.623	0.037	0.660	0.585	6.0%
9336	0.739	0.688	0.038	0.727	0.650	5.6%
10336	0.808	0.753	0.041	0.795	0.712	5.5%
11336	0.869	0.819	0.040	0.859	0.779	4.9%
12336	0.941	0.886	0.041	0.927	0.845	4.7%
13336	1.004	0.948	0.044	0.992	0.905	4.6%
14336	1.072	1.016	0.043	1.059	0.973	4.2%
15336	1.139	1.078	0.046	1.124	1.031	4.3%
16336	1.208	1.146	0.048	1.194	1.098	4.2%
17336	1.276	1.210	0.052	1.261	1.158	4.3%
18336	1.345	1.276	0.057	1.333	1.219	4.5%
19336	1.418	1.342	0.064	1.405	1.278	4.7%
20336	1.486	1.405	0.073	1.478	1.332	5.2%
21336	1.548	1.467	0.082	1.548	1.385	5.6%

300 mm X 6 mm X 174" SPAN - Tests #26 to #30						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
0	0.000	0.000	0.000	0.000	0.000	0.0%
336	0.079	0.067	0.010	0.076	0.057	14.5%
1336	0.276	0.253	0.018	0.271	0.235	7.1%
2336	0.459	0.429	0.023	0.451	0.406	5.3%
3336	0.620	0.597	0.019	0.615	0.578	3.1%
4336	0.788	0.764	0.021	0.785	0.743	2.8%
5336	0.953	0.927	0.021	0.948	0.906	2.2%
6336	1.116	1.090	0.026	1.116	1.064	2.4%
7336	1.284	1.258	0.029	1.287	1.229	2.3%
8336	1.449	1.420	0.036	1.456	1.384	2.5%

300 mm X 6 mm X 174" SPAN - Tests #26 to #30						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
9336	1.621	1.588	0.045	1.633	1.543	2.8%
10336	1.786	1.749	0.045	1.794	1.703	2.6%
11336	2.023	1.959	0.033	1.993	1.926	1.7%
12336	2.202	2.134	0.036	2.169	2.098	1.7%
13336	2.437	2.329	0.063	2.392	2.266	2.7%
14336	2.680	2.553	0.096	2.649	2.456	3.8%
15336	2.788	2.691	0.069	2.759	2.622	2.6%
16336	2.962	2.857	0.075	2.931	2.782	2.6%
16836	3.157	3.022	0.100	3.122	2.922	3.3%
17336	3.006	3.006	0.000	3.006	3.006	0.0%

200 mm X 5 mm X 30" SPAN - Tests #51 to #55						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
0	0.000	0.000	0.000	0.000	0.000	0.0%
336	0.151	0.053	0.050	0.103	0.003	94.8%
1336	0.186	0.080	0.054	0.134	0.026	67.8%
2336	0.203	0.103	0.052	0.155	0.051	50.5%
3336	0.221	0.122	0.053	0.175	0.070	43.0%
4336	0.230	0.144	0.050	0.194	0.094	34.7%
5336	0.242	0.159	0.050	0.209	0.109	31.6%
6336	0.252	0.172	0.051	0.223	0.121	29.8%
7336	0.263	0.187	0.052	0.239	0.135	27.8%
8336	0.273	0.197	0.053	0.250	0.145	26.7%
9336	0.282	0.209	0.053	0.261	0.156	25.3%
10336	0.291	0.218	0.053	0.271	0.165	24.3%
11336	0.300	0.229	0.052	0.281	0.177	22.8%
12336	0.309	0.231	0.056	0.287	0.175	24.2%
13336	0.318	0.235	0.064	0.298	0.171	27.1%
14336	0.327	0.251	0.077	0.327	0.174	30.5%
15336	0.335	0.260	0.075	0.335	0.185	28.8%
16336	0.344	0.270	0.074	0.344	0.196	27.4%
17336	0.215	0.215	0.000	0.215	0.215	0.0%

200 mm X 5 mm X 78" SPAN - Tests #46 to #50						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
0	0.000	0.000	0.000	0.000	0.000	0.0%
336	0.130	0.099	0.023	0.122	0.076	23.0%
1336	0.269	0.227	0.033	0.260	0.194	14.8%
2336	0.350	0.309	0.031	0.340	0.278	10.0%
3336	0.427	0.378	0.037	0.415	0.342	9.7%
4336	0.498	0.447	0.039	0.485	0.408	8.7%
5336	0.566	0.513	0.038	0.550	0.475	7.3%
6336	0.633	0.577	0.037	0.614	0.541	6.3%
7336	0.702	0.642	0.038	0.679	0.604	5.8%
8336	0.778	0.709	0.038	0.747	0.671	5.4%
9336	0.850	0.774	0.040	0.814	0.734	5.1%
10336	0.919	0.860	0.047	0.907	0.813	5.5%
11336	0.998	0.913	0.049	0.962	0.864	5.4%
12336	1.058	0.986	0.051	1.037	0.935	5.2%
13336	1.130	1.051	0.057	1.108	0.994	5.4%
14336	1.081	1.072	0.009	1.081	1.063	0.8%
15336	1.142	1.126	0.016	1.142	1.110	1.4%
16336	1.203	1.186	0.017	1.203	1.169	1.4%

200 mm X 5 mm X 150" SPAN - Tests #41 to #45						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
0	0.000	0.000	0.000	0.000	0.000	0.0%
336	0.192	0.161	0.022	0.183	0.139	13.6%
536	0.412	0.370	0.032	0.402	0.338	8.7%
1336	0.583	0.561	0.020	0.581	0.540	3.6%
1836	0.789	0.753	0.025	0.778	0.727	3.4%
2336	0.979	0.943	0.029	0.972	0.914	3.1%
2836	1.172	1.136	0.031	1.167	1.105	2.7%
3336	1.370	1.335	0.030	1.364	1.305	2.2%
3836	1.577	1.536	0.032	1.568	1.504	2.1%
4336	1.794	1.740	0.040	1.780	1.700	2.3%
4836	1.996	1.948	0.041	1.989	1.907	2.1%
5336	2.224	2.154	0.042	2.197	2.112	2.0%
5836	2.437	2.359	0.044	2.403	2.315	1.9%
6336	2.663	2.572	0.049	2.621	2.523	1.9%

200 mm X 5 mm X 150" SPAN - Tests #41 to #45						
Load	Max. Defle.	Average	Std. Dev.	Avg + SD	Avg - SD	SD/Ave
(lb)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	DEFL(IN)	%
6836	2.891	2.785	0.056	2.841	2.729	2.0%
7336	3.095	2.994	0.051	3.045	2.944	1.7%
7836	3.283	3.199	0.050	3.249	3.149	1.6%
8336	3.490	3.404	0.051	3.455	3.353	1.5%
8836	3.703	3.613	0.054	3.667	3.559	1.5%
9336	3.910	3.837	0.055	3.892	3.782	1.4%
9836	4.061	4.061	0.000	4.061	4.061	0.0%