



Progressive Engineering Inc.

LUDLOW COATED PRODUCTS

Evaluation of Sheathing Materials -
Racking Load on Single Sided Walls
3/8" Oriented Strand Board (OSB)

5/13/2005

Revised on
1/17/2006
and
10/6/2011

This test report contains fourteen (14) pages, including the cover sheet. Any additions to, alterations of, or unauthorized use of excerpts from this report are expressly forbidden.

2005-0911

1. TITLE

Evaluation of sheathing materials on a standard wood frame as described in ASTM E 72-98, Section 14 Racking Load.

2. OBJECTIVE

To determine the ability of a standard wood frame to resist racking when sheathed with 3/8" OSB.

This report pertains to the specimens tested. It remains the sole responsibility of the manufacturer to provide a product consistent to that was tested.

3. TESTED FOR

Ludlow Coated Products
700 Centreville Road
Constantine, MI 49042

4. TESTING ORGANIZATION

Progressive Engineering Inc.
58640 State Road 15
Goshen, IN 46528
www.p-e-i.com

See IAS Evaluation Report No. TL-178 for ISO 17025 Accreditation

5. TESTING PERSONNEL

Test Engineer	- Timothy A. Baldridge, P.E.
Director of Testing	- Greg A. Weeden
Laboratory Manager	- Jason R. Holdeman
Technician	- Norm Amstutz
Technician	- Rodd Lehman

6. TEST SPECIMEN

A. Materials

- I. Studs - 2 x 4 stud grade SPF at 16" o.c.
- II. Plates - 2 x 4 stud grade SPF
- III. 4 ft. x 8 ft. x 3/8" OSB Exposure 1, APA 24/O Rated Sheathing. The OSB was manufactured by Georgia Pacific Corporation.

B. Fasteners

- I. Plate to stud attachment with two (2) 16d common nails per stud end.
- II. Double top plate to top plate with two (2) 10d common nails per stud end.
- III. Stud to spacer with six (6) 16d common nails per spacer.
- IV. 3/8" thick OSB attached using 6d nails spaced 6" o.c. around the board perimeter and 12" o.c. in the field.

C. Construction Steps

- I. The previously constructed framework was laid flat on a concrete floor.
- II. Two (2) pieces of 3/8" thick OSB were laid onto the frame.
- III. The .112" x 2 lg. 6d common nails were spaced at 6" o.c. on the sheathing perimeter studs and plates. The .112" X 2" lg. 6d common nails were spaced at 12" o.c. along field studs.
- IV. The wall was turned over and the 4 x 4's were attached according to Section 7 of this report.

7. TEST SAMPLE SECUREMENT

A 4 x 4 was attached to the top plate of the wall sample with three (3) 1/2" - 13 x 5" lg. bolts for load application. A second 4 x 4 was attached to the bottom plate of the wall sample with three (3) 1/2" - 13 x 5" lg. bolts for sample securement. The 4 x 4 attached to the bottom plate was then secured to the test fixture with 3/8" lag screws. See attached fixture drawings F384 and F893 for details.

8. PROCEDURE

A. Load was applied horizontally to the 4 x 4 which was fastened to the top plate of the wall. Dial indicators were placed at the end of the top and bottom plates opposite the load side of the wall. A dial indicator was also placed on the load side of the wall near the bottom of the first stud. See attached drawing for details.

B. Load in 400 pound increments, up to 2,400 pounds, was applied at 400 lbs./minute and released while taking load deflections and residual deflections. The residual deflections were taken one minute after the load was released. Load was then applied at 400 lbs./minute until a failure was reached.

9. TEST RESULTS

3/8" OSB - Ultimate Shear

Test No. 1	=	3,585 lbf
Test No. 2	=	3,922 lbf
Test No. 3	=	4,157 lbf
Average	=	3,888 lbf

$$3,888 \text{ lbf} / 8\text{ft.} = \mathbf{486.0 \text{ PLF}}$$

Per the client's request the information below was added to this test report.

3/8" OSB - Load at .200" Deflection Limit


Test No. 1	=	1,314 lbf
Test No. 2	=	1,259 lbf
Test No. 3	=	1,582 lbf
Average	=	1,385 lbf

$$1,385 \text{ lbf} / 8\text{ft.} = 173.1 \text{ PLF} \times 1.4 = \mathbf{242.4 \text{ PLF}}$$

10. CONCLUSION

Based on the data obtained from this test; an ultimate shear load of **486.0 PLF** can be obtained from a wall constructed as follows:

- A. 2 x 4 stud grade SPF studs at 16" o.c. with double 2 x 4 Stud Grade SPF studs at wall end and double 2 x 4 Stud Grade SPF top plate and a 2 x 4 bottom plate as framing.
- B. OSB fastened with .112" x 2" lg. 6d common nails 6" o.c. around perimeter and 12" o.c. in the field. See attached drawings for details.
- C. 4' x 8' x 3/8" OSB Exposure 1, APA 24/0 Rated Sheathing. The OSB was manufactured by Georgia Pacific Corporation.


Timothy A. Baldrige
Date Signed: Oct 07, 2011

Progressive Engineering, Inc.
ASTM E 72 Wall Racking Test

Date: 5/2/2005

Client: Ludlow Coated Products

Sheathing: 3/8" OSB

Test No. 1								Resultant
Time	Load in Pounds	Indicator No. 1		Indicator No. 2		Indicator No. 3		Deflection at Ind. No. 1*
		Reading	Defl.	Reading	Defl.	Reading	Defl.	
7:30	0	.143	----	.146	----	.451	----	----
7:31	400	.213	.070	.150	.004	.462	.011	.055
7:32	0	.157	.014	.147	.001	.453	.002	.011
7:34	800	.303	.160	.157	.011	.477	.026	.123
7:35	0	.171	.028	.148	.002	.454	.003	.023
7:38	1200	.376	.233	.162	.016	.491	.040	.177
7:39	0	.190	.047	.152	.006	.456	.005	.036
7:43	1600	.482	.339	.169	.023	.509	.058	.258
7:44	0	.214	.071	.156	.010	.458	.007	.054
7:49	2000	.590	.447	.178	.032	.529	.078	.337
7:50	0	.245	.102	.159	.013	.460	.009	.080
7:56	2400	.721	.578	.184	.038	.551	.100	.440
7:57	0	.288	.145	.162	.016	.462	.011	.118

Ultimate Load = **3,585** lbs. or **448.1**** PLF

Mode of Failure: OSB rotated with nail withdrawal at top and bottom plate as well as center stud.

* - Resultant deflection is equal to the sum of the deflections at Ind. No. 2 and 3 subtracted from the deflection at Ind. No. 1.

** - This value does not include a safety factor.

Test Conditions

Temperature: 67.0 °F

Humidity: 29.0 %

Moisture Content

Studs: 10.6 %

Plates: 11.6 %

Sheathing: - %

Sheathing Details

Thickness: .375"

Orientation: Vertical

Fastening: 6" o.c. / 12" o.c.

Adhesive: -

Thickness: -

Orientation: -

Fastening: -

Adhesive: -

Framing Details

Studs: 2x4 SPF

Plates: 2x4 SPF(Double)

Grade: Stud

Spacing: 16" o.c.

Progressive Engineering, Inc.
ASTM E 72 Wall Racking Test

Date: 5/13/2005

Client: Ludlow Coated Products

Sheathing: 3/8" OSB

Test No. 2								Resultant
Time	Load in Pounds	Indicator No. 1		Indicator No. 2		Indicator No. 3		Deflection at Ind. No. 1*
		Reading	Defl.	Reading	Defl.	Reading	Defl.	
1:00	0	.340	----	.300	----	.330	----	----
1:01	400	.410	.070	.304	.004	.345	.015	.051
1:02	0	.357	.017	.302	.002	.331	.001	.014
1:04	800	.487	.147	.308	.008	.365	.035	.104
1:05	0	.378	.038	.305	.005	.335	.005	.028
1:08	1200	.607	.267	.313	.013	.395	.065	.189
1:09	0	.423	.083	.305	.005	.345	.015	.063
1:13	1600	.718	.378	.319	.019	.425	.095	.264
1:14	0	.457	.117	.307	.007	.352	.022	.088
1:19	2000	.838	.498	.326	.026	.447	.117	.355
1:20	0	.515	.175	.310	.010	.358	.028	.137
1:26	2400	.975	.635	.332	.032	.473	.143	.460
1:27	0	.548	.208	.313	.013	.365	.035	.160

Ultimate Load = **3,922** lbs. or **490.3**** PLF

Mode of Failure: OSB rotated with nail withdrawal at top and bottom plate as well as center stud.

* - Resultant deflection is equal to the sum of the deflections at Ind. No. 2 and 3 subtracted from the deflection at Ind. No. 1.

** - This value does not include a safety factor.

Test Conditions

Temperature: 71.0 °F

Humidity: 55.0 %

Moisture Content

Studs: 11.4 %

Plates: 12.7 %

Sheathing: - %

Sheathing Details

Thickness: .375"

Orientation: Vertical

Fastening: 6" o.c. / 12" o.c.

Adhesive: -

Thickness: -

Orientation: -

Fastening: -

Adhesive: -

Framing Details

Studs: 2x4 SPF

Plates: 2x4 SPF(Double

Grade: Stud

Spacing: 16" o.c.

Progressive Engineering, Inc.
ASTM E 72 Wall Racking Test

Date: 5/13/2005

Client: Ludlow Coated Products

Sheathing: 3/8" OSB

Test No. 3								Resultant
Time	Load in Pounds	Indicator No. 1		Indicator No. 2		Indicator No. 3		Deflection at Ind. No. 1*
		Reading	Defl.	Reading	Defl.	Reading	Defl.	
4:00	0	.340	----	.317	----	.328	----	----
4:01	400	.395	.055	.322	.005	.341	.013	.037
4:02	0	.351	.011	.318	.001	.330	.002	.008
4:04	800	.468	.128	.327	.010	.362	.034	.084
4:05	0	.369	.029	.320	.003	.335	.007	.019
4:08	1200	.550	.210	.334	.017	.385	.057	.136
4:09	0	.411	.071	.324	.007	.339	.011	.053
4:13	1600	.643	.303	.338	.021	.407	.079	.203
4:14	0	.426	.086	.327	.010	.343	.015	.061
4:19	2000	.742	.402	.345	.028	.430	.102	.272
4:20	0	.465	.125	.332	.015	.347	.019	.091
4:26	2400	.865	.525	.351	.034	.455	.127	.364
4:27	0	.515	.175	.336	.019	.352	.024	.132

Ultimate Load = **4,157** lbs. or **519.6**** PLF

Mode of Failure: OSB rotated with nail withdrawal at top and bottom plate as well as center stud.

* - Resultant deflection is equal to the sum of the deflections at Ind. No. 2 and 3 subtracted from the deflection at Ind. No. 1.

** - This value does not include a safety factor.

Test Conditions

Temperature: 71.0 °F

Humidity: 55.0 %

Moisture Content

Studs: 11.8 %

Plates: 12.0 %

Sheathing: - %

Sheathing Details

Thickness: .375"

Orientation: Vertical

Fastening: 6" o.c. / 12" o.c.

Adhesive: -

Thickness: -

Orientation: -

Fastening: -

Adhesive: -

Framing Details

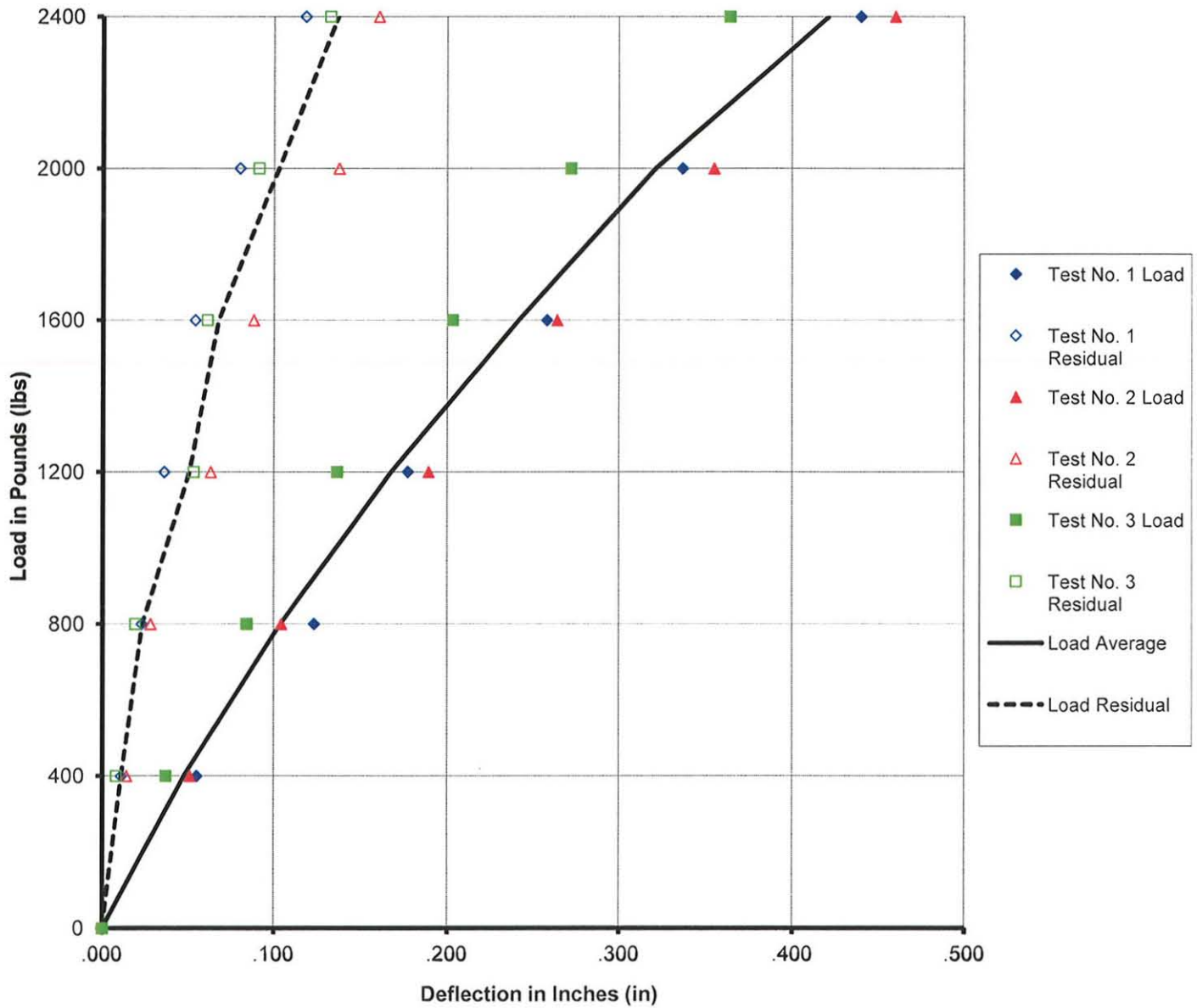
Studs: 2x4 SPF

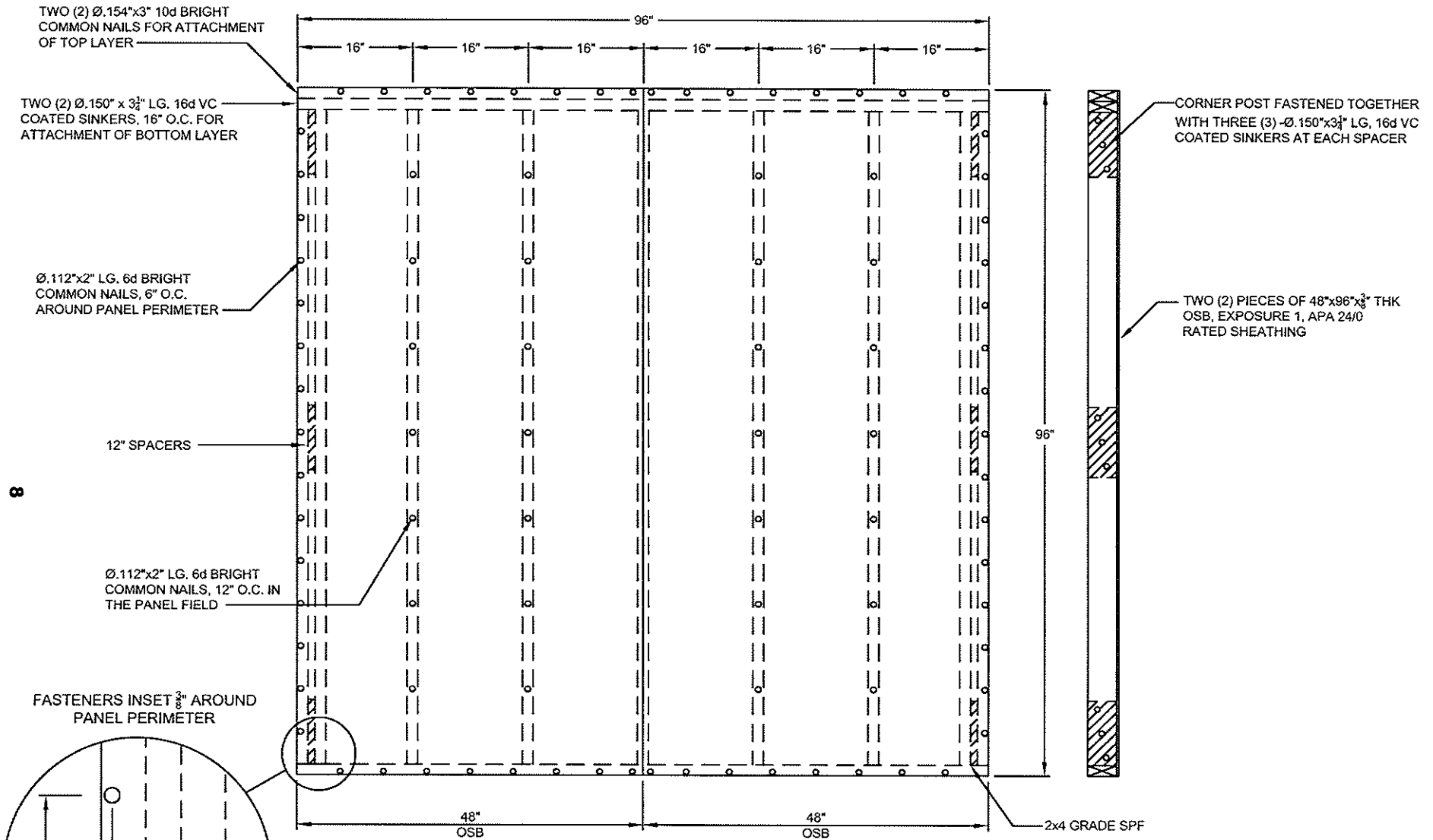
Plates: 2x4 SPF(Double

Grade: Stud

Spacing: 16" o.c.

Ludlow Coated Products
3/8" OSB
Load vs. Deflection





THIS DRAWING IS A PART OF TEST REPORT NO. 2005-0911

DWN. BY: A.BENDER	REVISED ON:	CLIENT: LUDLOW COATED PRODUCTS
DATE: 5/10/05		
SCALE:		
JOB NO. 2005-0911		TITLE: WALL PANEL
DWG. NO. B1		

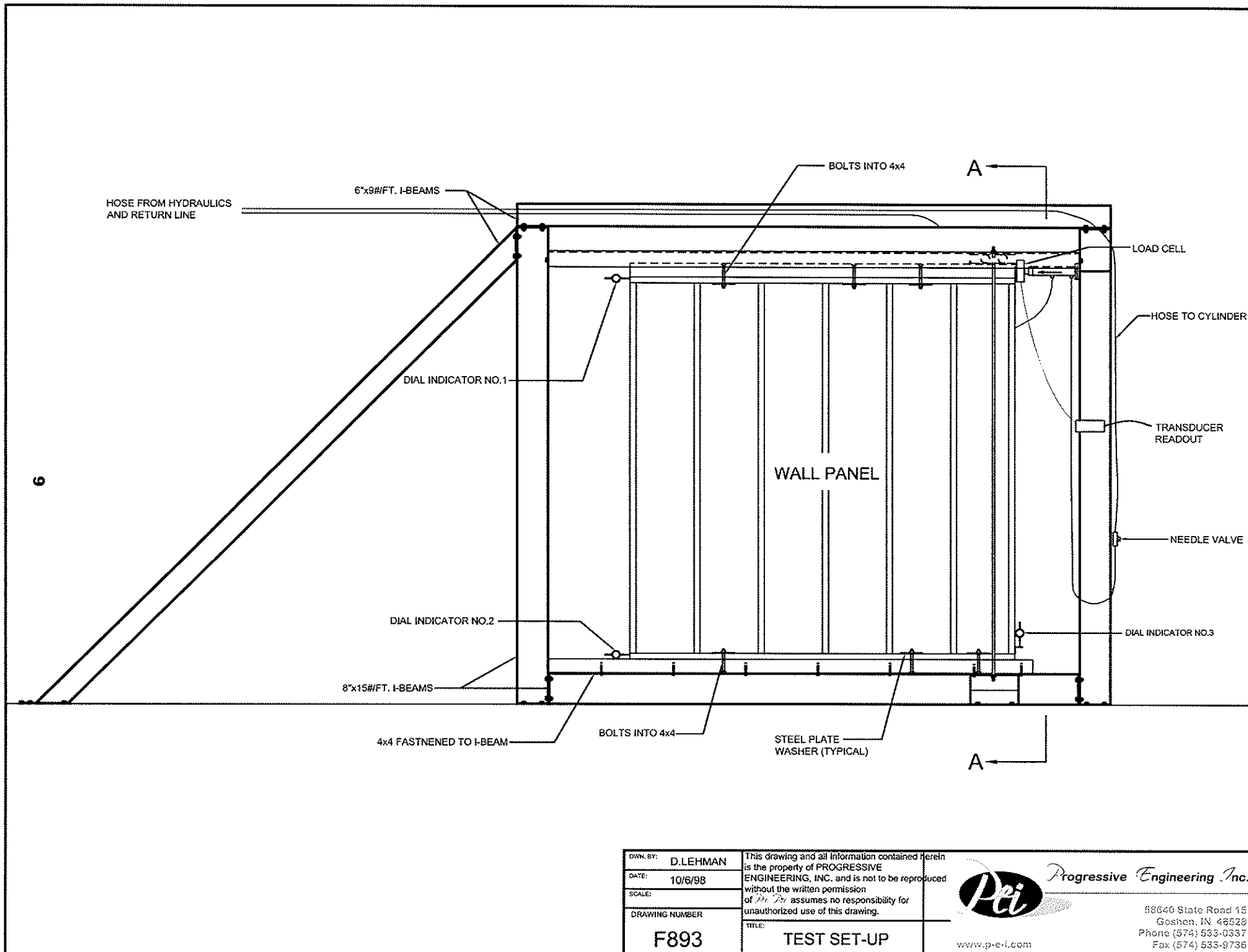
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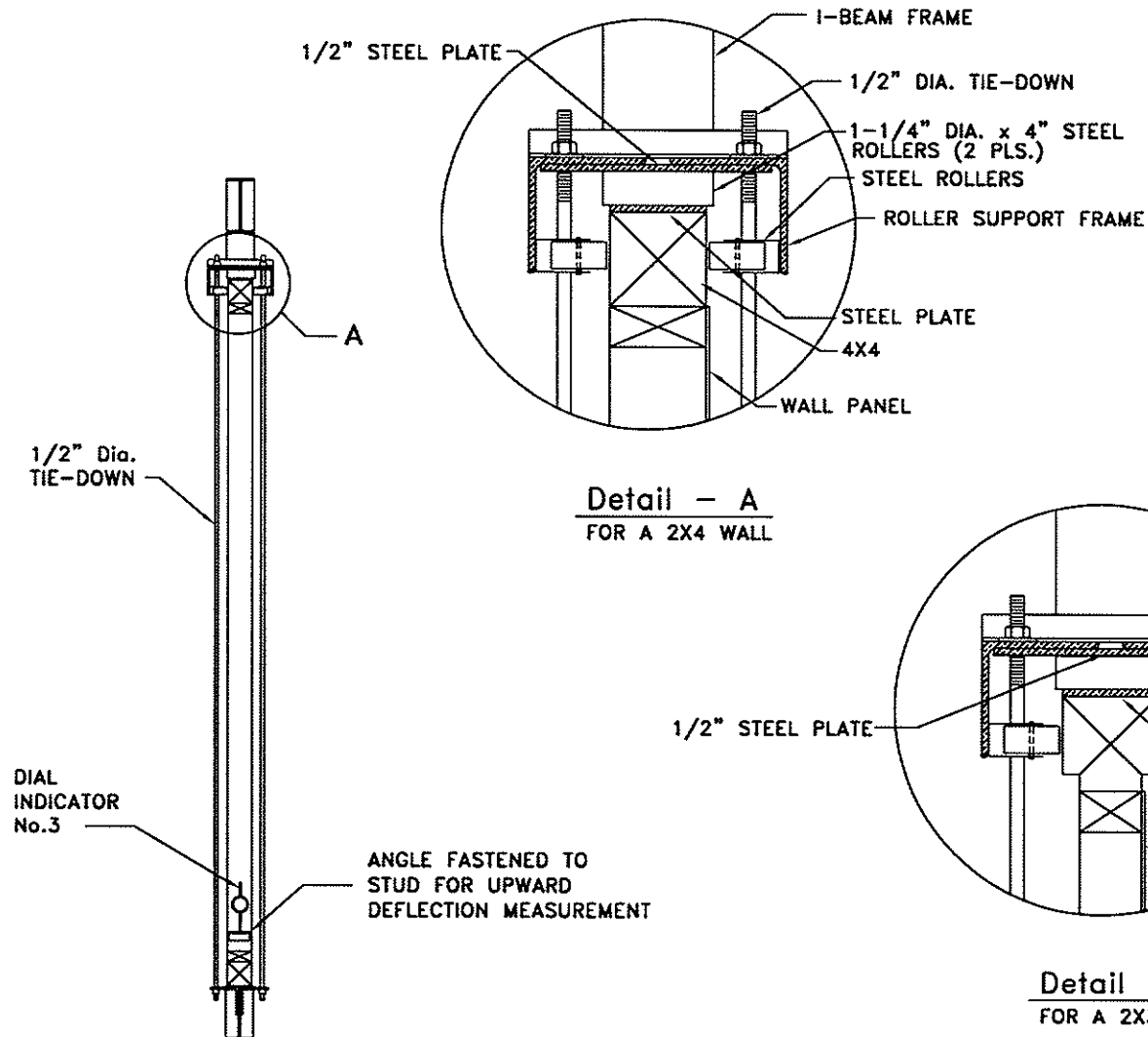


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DATE:	12/6/94	
SCALE:		
DRAWING NUMBER	F384	
	TEST SET-UP	



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Test #1 3/8" OSB - Set-up



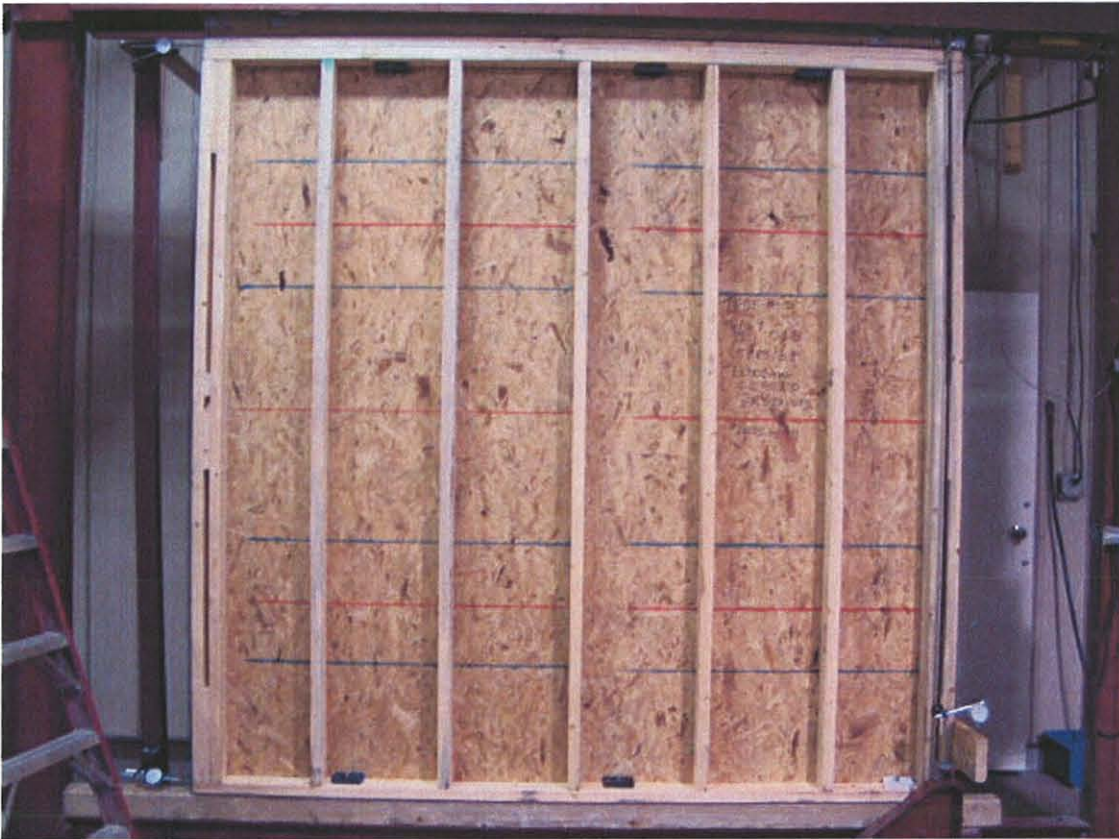
Test #1 3/8" OSB - Failure



Test #2 3/8" OSB - Set-up



Test #2 3/8" OSB - Failure



Test #3 3/8" OSB - Set-up



Test #3 3/8" OSB - Failure