TEST REPORT

REPORT NUMBER: 3083303SAT - 001 REV1
ORIGINAL ISSUE DATE: February 20, 2008
REVISION DATE: January 5, 2009

EVALUATION CENTER
Intertek Testing Services NA, Inc.
16015 Shady Falls Road
Elmendorf, TX 78112

RENDERED TO

Emmedue S.P.A.
Via Toniolo, 39/b
Z.I. Bellocchi
61032 Fano (PU), Italy

PRODUCT EVALUATED: 4' x 8' and 4' x 14' Single Panel PSM80 Wall Systems
EVALUATION PROPERTY: ICC – AC 15, Section 4.2.2.2, ASTM E 72 - 05, Section 9 (**Compressive Load**)

Report of Testing 4' x 8' and 4' x 14' Single Polystyrene PSM80 wall panels for compliance with the applicable requirements of the following criteria: *ICC – AC 15, Acceptance Criteria for Concrete Floor, Roof and Wall Systems and Concrete Masonry Wall Systems, under the general guidelines of ASTM E 72 - 05, Standard Test Methods of Conducting Strength Tests of Panels for Building Construction*

1 Table of Contents

2 Introduction

Intertek Testing Services NA, Inc. (Intertek) has conducted testing for Emmedue S.P.A on 4' x 8' and 4' x 14' Single Polystyrene PSM80 structural wall panels. The test method consisted of the uniform axial-compressive load. Emmedue wall systems are based on a series of foam polystyrene panels and electro-welded steel wire meshes, whose shapes have been specially designed to apply structural plaster during panel installation (Ref, 1, p. 3). These systems are capable of multiple applications, such as quick installation and high thermal and sound capabilities (Ref 1, p. 3). The purpose of these tests was to evaluate compressive load structural applications according to Section 4.2.2.2 of ICC – AC 15, under the general guidelines of *ASTM E 72 - 05, Conducting Strength Tests of Panels for Building Construction*. The results of each test are presented in tabular and graphical form. In total, six specimens were tested under the above loading configuration to measure the deflection and failure characteristics of each of the wall systems. This evaluation began November 1, 2007 and was completed November 15, 2007.

NOTE: This test report is only for the axial-compressive tests performed. Refer to report numbers **3083303SAT - 002, - 003, - 004, - 005, - 006, - 007, and - 008** (designated **REV1, except 008**) for the rest of the testing completed for this project.

3 Test Samples

3.1. SAMPLE SELECTION

Samples were randomly selected on July 1, 2007 by Intertek representative Matt Lansdowne, EIT, at the Emmedue S.P.A manufacturing facility, located at Via Toniolo 39/b, Z.I. Bellocchi, 61032 Fano (PU), Italy. Samples were received at Intertek – San Antonio on August 28, 2007.

The subject test specimens are traceable samples selected from the manufacturer's facility. Intertek selected the specimens and has verified the composition, manufacturing techniques and quality assurance procedures.

Refer to the Pre-Test Inspection Report, dated July 1 – 2, 2007, located in the Appendix.

3.2. SAMPLE AND ASSEMBLY DESCRIPTION

The Emmedue Single Panel PSM80 consists of a foam polystyrene core reinforced with a galvanized steel wire mesh connected on both sides of the foam using corrugated steel bars. The steel bars and mesh are electro-welded together for strength. There are approximately 82 connectors per square meter of foam surface. Below is a list of specifications of the PSM80 panels (Ref 1, p. 7). The numbers below where converted from metric to inch-pounds from the Emmedue Operator's Handbook.

Galvanized Steel Wire Mesh

1) Longitudinal wires with diameter of 0.121 inches spaced every 2.56 inches
2) Transversal wires with diameter of 0.099 inches spaced every 2.56 inches

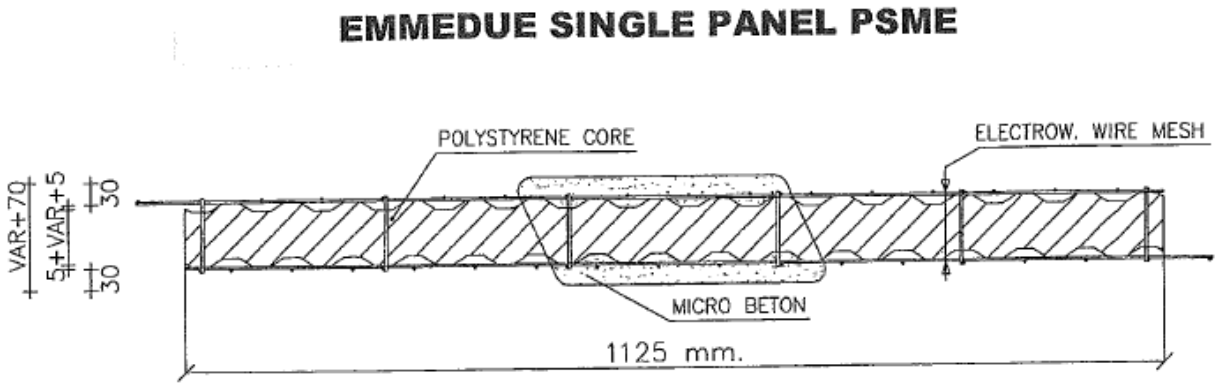


Figure 1: Emmedue Single Panel PSM80 Details (Ref. 1, p.7)

Polystyrene Slab Density: 15 Kg/m^3 (0.936 lb/ft^3)
Polystyrene Slab Thickness: 4”

The Emmedue building system comprises of different wall, floor, and roof arrangements that are finished on-site using sprayed mortar. Although different techniques exist for spray mortar, the mortar mix used for this project consisted of Portland® Cement, sand, and water. The client recommends an average quantity of plaster (or mortar) of about 1 inch sprayed per side. These panels are generally used for buildings of no more than 4 stories high, in seismic areas, for floor slabs and covering slabs whose spans are 4 m (13.12 ft) at maximum (Ref. 1, p. 7).

For these tests, a mortar mix design was provided in order to meet the required wall structural plaster specifications. The mortar mixing ratio (by weight) was provided as followed:

Portland® Cement:	100 lbs
Sand:	280 lbs
Water:	5.0 gallons

The above numbers were provided by the client during sample construction. As indicated by the Emmedue Operator’s Handbook (Ref. 1, p 27), the quantity of water should vary as humidity and temperature changes are observed. Accordingly, modifications to the mixing ratio were made as indicated by the weather conditions during mortar spraying. In all cases, the minimum compressive mortar strength (f’c) was 2500 psi at 28 days curing time. These results were verified by performing mortar cylinder core tests at 7 and 28 days as per ACI 506.2, for each batch made. Additional mortar cylinder core tests were also performed within 48 hours of the completion of each set of three full-scale tests, as per AC 15, Section 4.2.2.2.

From the mortar cylinder core testing results obtained, it was found that no mortar core was lower than 2500 psi at 28 days. Refer to report number **3083303SAT – 008** for a complete listing of all mortar core tests performed.

4 Testing and Evaluation Methods

4.1. Construction of Wall Assemblies

Six axial-compressive walls were tested and all were constructed in the same manner. Construction of the 4' x 8' and 4' x 14' walls consisted the following:

1) Single Panel PSM80
2) 1/8" Rebar tie wire
3) 1x10 #1 yellow pine lumber cut down to 6" wide
4) #8 x 2" wood deck screws
5) Mortar mixture (Portland® Cement, sand, and water)

All of the samples had to be constructed at the Intertek-San Antonio facility. Panel assembly first consisted of constructing a wooden frame around the perimeter of the PSM80 panel using #8 x 2" wood deck screws and 1x10 #1 yellow pine lumber joists cut down to 6" wide. The perimeter frame served two purposes: 1) as a support to assure that each wall was even and plumb before mortar spraying, and 2) as a guide for applied proper mortar thickness. For the 8 foot walls, the 1/8" rebar tire wire was installed 32" from the top and bottom around the panel and frame in order to hold the two pieces together. For the 14 foot walls, the rebar tie wire was installed at 48" from top and bottom. Refer to Figures 2 and 3 for more details.

Figure 2: Finished wood frames with 4' x 8' panels ready for spray mortar application

Figure 3: Lumber support frame (1x8 cut down to exactly 6" wide)

The walls were then sprayed with a mortar mixture of sand, water, and Portland® Cement on both sides using a plaster sprayer for walls provided by the client. Mortar specifications included sand particles with less than 0.20" size and a slump of 2", at the appropriate ratio (refer to Section 3.2, Sample and Assembly Description, for mixing ratio). The three ingredients were mixed using a concrete mixer. A compressor capable of adjustment was used in order to assure the client recommended 90 psi application pressure. Two layers of sprayed mortar were applied to each side until the desired mortar thickness of 1" (+/- ¼") was achieved. The walls were then smoothed out as much as possible using mortar trowels or any other straight smooth device. Refer to Figures 4 through 7 for details.

Figures 4 and 5: Mortar mixing and spraying application on wall assemblies, respectively

Figure 6: Smoothing out mortar after spraying

Figure 7: Finished 4' x 8' PSM80 wall panels

The walls were allowed to cure for at least 28 days prior to testing. Both axial-compressive wall configurations (4' x 8' and 4' x 14') tested were equal in construction techniques.

4.2. ICC-AC 15 and ASTM E 72 - 05 Testing Procedures

Axial-Compressive Load Procedure (Uniform Top Load)

All testing was performed according to ICC – AC 15, Section 4.2.2.2, under the general guidelines of ASTM E72 - 05, Section 9 loading procedure. The axial test rig consisted of an immovable top plate (with rotating capability) and a movable beam which rides on vertical rails. The axial test setup is capable of accommodating rotation of the test specimen at the top of the wall due to the out-of-plane deflection with the load applied throughout the duration of the test with the required eccentricity (Ref. 2, Section 4.4.1). Hydraulic cylinders where placed underneath the movable beam. Load cells were installed between the hydraulic cylinders and the movable beam to accurately measure the applied loads. The specimen was placed on the movable beam with 1/6 eccentricity and adjusted on the top plate such that there is equal 1/6 eccentricity against the top plate, respectively. The walls were carefully lifted into the test frame with proper care in order to avoid any damage due to handling. In order to evenly distribute the applied loads, two pieces of EPDM rubber, 8" wide x 50" long x ¼" thick, were installed at the top and bottom of each wall specimen. The rubber "cap and footer" accounted for any anomalies in the mortar as the walls were axially and eccentrically loaded. The rubber was purchased at the request of the client.

Once the test specimen was installed on the axial frame, four linear transducers (with 0.001 in. resolution) where placed on the specimen 2" from the bottom of the wall – two each on either side of the specimen as per ASTM E 72, Section 9. The linear transducers where placed such that as the load is applied, the axial deformation of the specimen is measured. An additional three linear transducers were placed at the midpoint of the wall to measure the lateral (transverse) deflection of the specimen as it is loaded axially. For the 8 ft high walls, the lateral transducers were installed 4 ft from the top at 21" spacing. For the 14 ft walls, they were installed 7 ft from the top at 21" spacing. A pre-load (not to exceed 10% of the ultimate load) was applied to the wall specimen in order to assure that the wall does not fall out of the axial frame and/or move away from its 1/6 axial eccentric load point. With the pre-load applied to the specimen, an initial reading is made. All set load readings are taken at this pre-load reading, which is labeled as the "zero" mark. Once this measurement is made, the load is increased slightly which in turn applies an initial uniform axial load to the specimen. The load is applied for 5 minutes during which time deflection measurements are made as a function of time (as soon as it is practical after initial loading and at the end of the 5 minute period). After the 5 minute period, the load is decreased to the "zero" load (a.k.a. the predetermined pre-load) for 5 minutes during which time deflection measurements are made as a function of time (as soon as it is practical after initial un-loading, and at the end of the 5 minute period). The process is repeated in increments of "n" of initial load (n = 2, 3, 4,…) until a predetermined number of data points is obtain to effectively plot a load-deflection curve. Once the appropriate number of points is reached, the instruments are removed and the test specimen is loaded to failure. Refer to Figures 8 and 9 for the axial-compressive test setup.

Figure 8: Axial test setup for 4' x 8' walls (overall view)

Figure 9: Axial deformation instrumentation and ¼" EPDM rubber installation

Refer to Appendix C for axial-compressive test photos.

4.2.1. ICC – AC 15 and ASTM E 72 - 05 Notes

These tests were performed in accordance to ICC- AC 15 and under the general guidelines of ASTM E72 – 05. As per ICC – AC 15, six specimens were tested, using two different configurations and/or heights. The tested specimens consisted of equal widths (4 feet), equal thicknesses (6 inches), and two different height configurations (8 feet and 14 feet).

According to AC 15, Section 4.2.2.2, three mortar cylinder cores shall be tested within 48 hours of the completion of each set of full-scale tests. This procedure was performed for each set of constructed walls, in addition to 7 and 28 day mortar cores for each batch of mortar mixed. For example, if a set of walls required two applications of sprayed mortar on each side, then six mortar cylinder cores were made for each batch of sprayed mortar (tested at 7 and 28 days for each batch). The mortar cores were made under the general guidelines of *ACI 506.2 – 95, Specification for Shotcrete*. Under the ACI 506.2 code, Section 1.6.1.1, the preparation of the shotcrete mortar cylinder core panels was to be made according to *ASTM C 1140, Preparing and Testing Specimens from Shotcrete Test Panels*. According to ASTM C 1140, Section 5, "…the forms for making shotcrete mortar cores shall be made of wood or steel construction and sufficiently rigid to prevent dislodging of the shotcrete through vibration or deformation." The forms were constructed of 1x6 #1 yellow pine lumber, 2x4 #2 yellow pine lumber, ¾" plywood, and #8 x 1 ½" wood deck screws. The interior dimensions of the forms constructed were **24" wide x 24" long x 3 ½" deep**, as indicated in Section 5 of ASTM C 1140. One form was constructed for each time a new batch of mortar was made. From each form, a total of approximately 25 cores could be made at one time. Refer to Figure 10 for details.

Figure 10: Wooden form for mortar core sampling

Once the wooden form was made, the mortar was sprayed into the form until it covered the entire 3 ½" depth. The mortar was allowed to settle naturally with no help of any mechanical means (concrete vibrator, mixing rod, etc.). The top of the form was then smoothed out with a trowel (or any other suitable straight smoothing device) and was then moved indoors and allowed to cure for a minimum of 24 hours. Each sprayed form was properly labeled and sealed using plastic sheathing and shrink wrap to maintain the proper moisture. Refer to Figures 11 through 16 for details.

Figures 11 and 12: Application of sprayed mortar into wooden forms

Figures 13 and 14: Smoothing of mortar in wooden form

Figures 15 and 16: Mortar form labeling and sealing with plastic sheathing

After a minimum curing time of 24 hours, the forms were transported to an outside core testing facility and cored for the number of samples indicated. Coring was made using a specialized coring drill with a diamond bit. Once the samples were cored, they were properly labeled, measured, weighed, sulfur capped, and stored in a 100% humidity moisture room until tested. Refer to Figures 17 through 22 for more details.

Figure 17: Drilling of mortar cores

Figure 18: Mortar cores after drilling

Figures 19 and 20: Labeling, weighing, and sulfur capping of mortar cores

Figures 21 and 22: Cylinder core testing machine and placement of cores into apparatus

5 Testing and Evaluation Results

5.1. RESULTS AND OBSERVATIONS

Axial-Compressive Test Results

In total, six axial-compressive tests were performed. Below is a list of the test parameters:

Wall lengths:	96.0 inches and 168 inches
Wall width:	48.0 inches
Nominal wall thickness:	6.0 inches (+/- 0.25 inches)
Load beam weight:	3200 lbs
Initial pre-load:	5000 lbs (8 ft walls) and 2500 lbs (14 ft walls), respectively
Wall offset (eccentricity):	1.0 inch

The results obtained for the axial-compressive tests are tabulated as followed:

Specimen ID	Date Tested	Age of Wall (days)	Ultimate Load (lbs)	Average (lbs)	Average within 15%?	Allowable Load (lbs)
4X8A1	11/1/07	35	126090	104780	NO	93000
4X8A2	11/2/07	36	95250			
4X8A3	11/2/07	36	93000			
4X14A1	11/13/07	46	95250	105487	NO	95250
4X14A2	11/13/07	46	95900			
4X14A3	11/15/07	48	125310			

The Allowable Load for each set of three walls was calculated under the guidelines of AC 15, Section 4.3, Paragraph 2, which states the following:

"The average maximum strength from each set of tests may be the average ultimate value, provided the ultimate value for each test is within 15 percent of the average. Otherwise, the lowest ultimate value shall be used."

Refer to Appendix A for Load vs. Deflection curves for all axial-compressive tests.

Axial testing was performed according to Section 4.2.2.2 of ICC - AC 15, under the general guidelines of Section 9 of ASTM E 72 - 05. Wall eccentricity (or offset) was calculated by dividing the wall thickness by 6:

Eccentricity = Wall Thickness / 6

Statistical analysis calculations were computed using the linear regression analysis method included in Microsoft Excel® (command "LINEST").

A CD copy of all the assembly, setup, and test photos will be provided to the client.

6 Conclusion

Intertek Testing Services NA, Inc. (Intertek) has conducted testing for Emmedue on 4' x 8' and 4' x 14' Single Polystyrene PSM80 structural wall panels. The test method consisted of the uniform axial-compressive load method. The purpose of these tests was to evaluate compressive load structural applications according to Section 4.2.2.2 of ICC – AC 15, under the general guidelines of *ASTM E 72 - 05, Conducting Strength Tests of Panels for Building Construction*. The results of each test were presented in tabular and graphical form. Six specimens were tested under the above loading configuration to measure the deflection and failure characteristics of each of the wall systems. This evaluation began November 1, 2007 and was completed November 15, 2007.

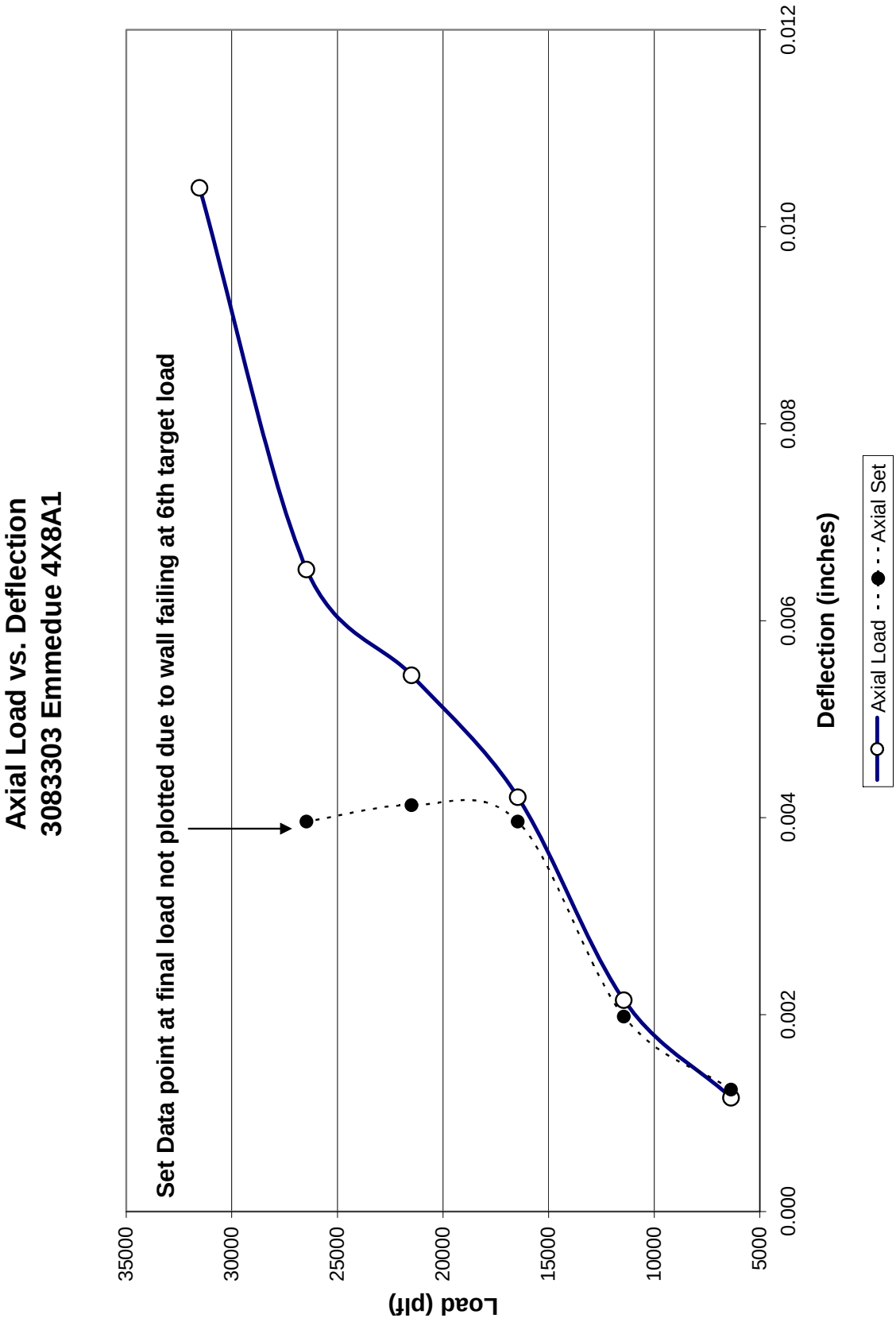
The conclusions of this test report may be used as part of the requirements for Intertek product certification. Authority to Mark must be issued for a product to become certified.

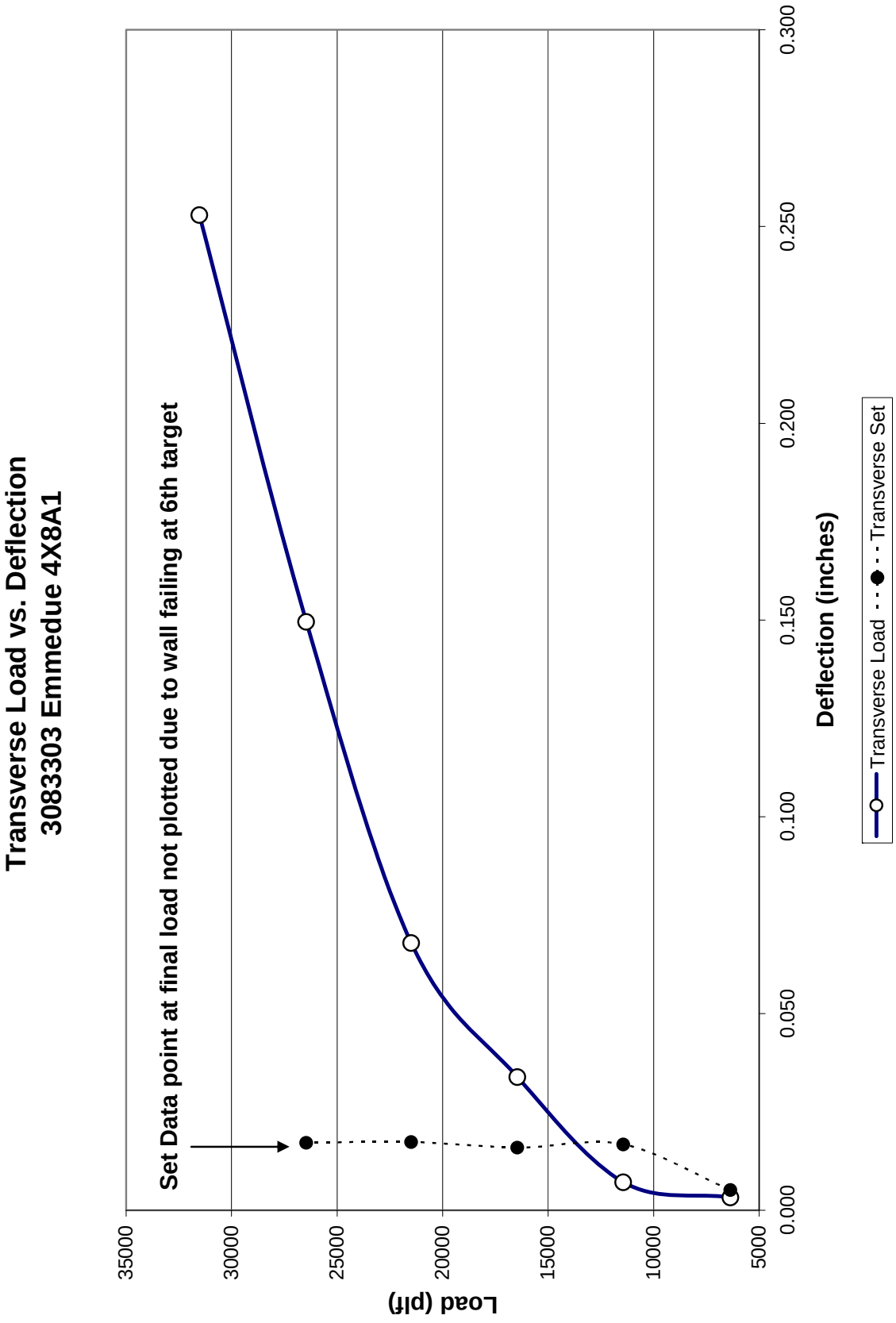
INTERTEK TESTING SERVICES NA, INC.

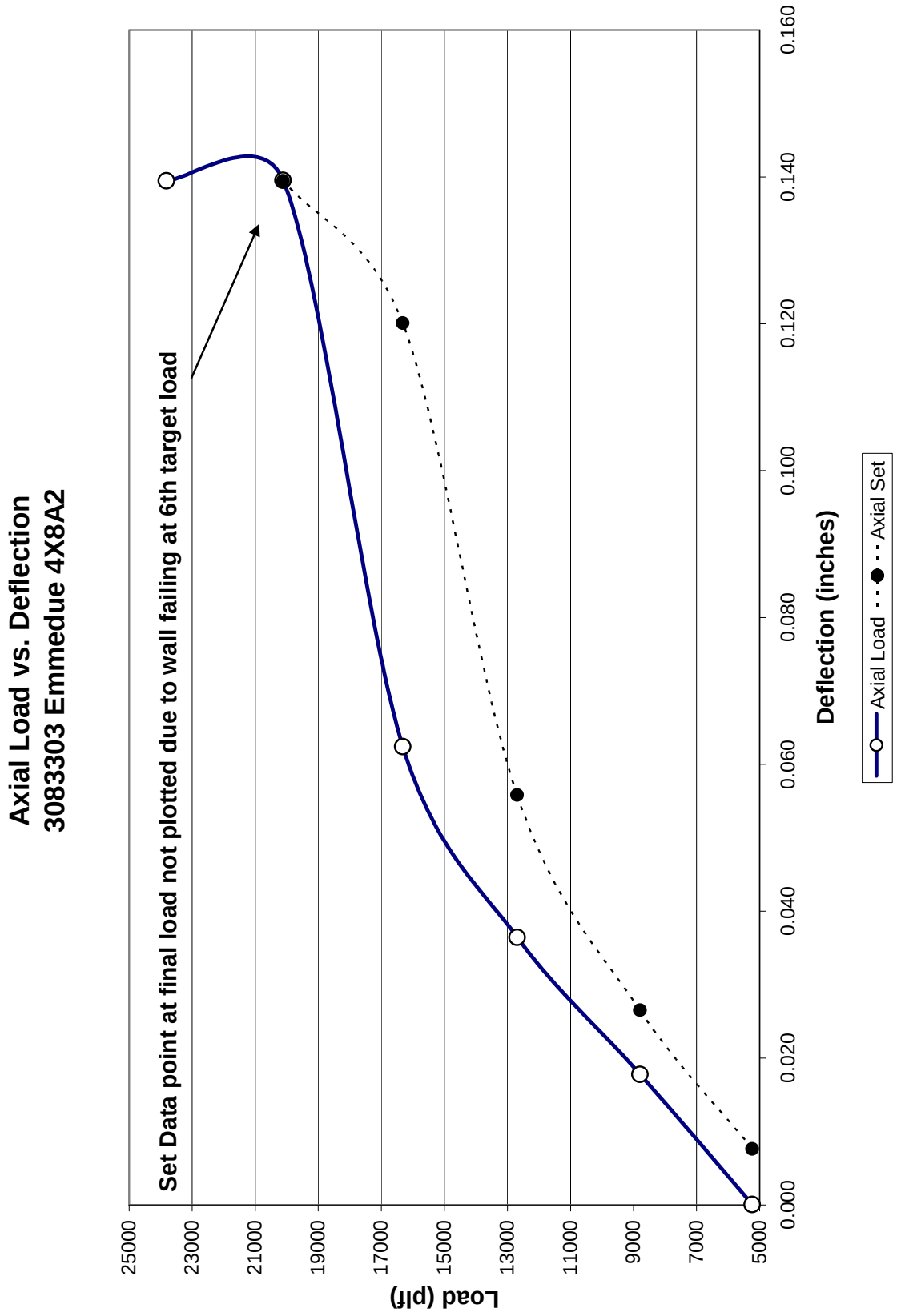
Reported by: _____
Victor M. Burgos
Test Engineer

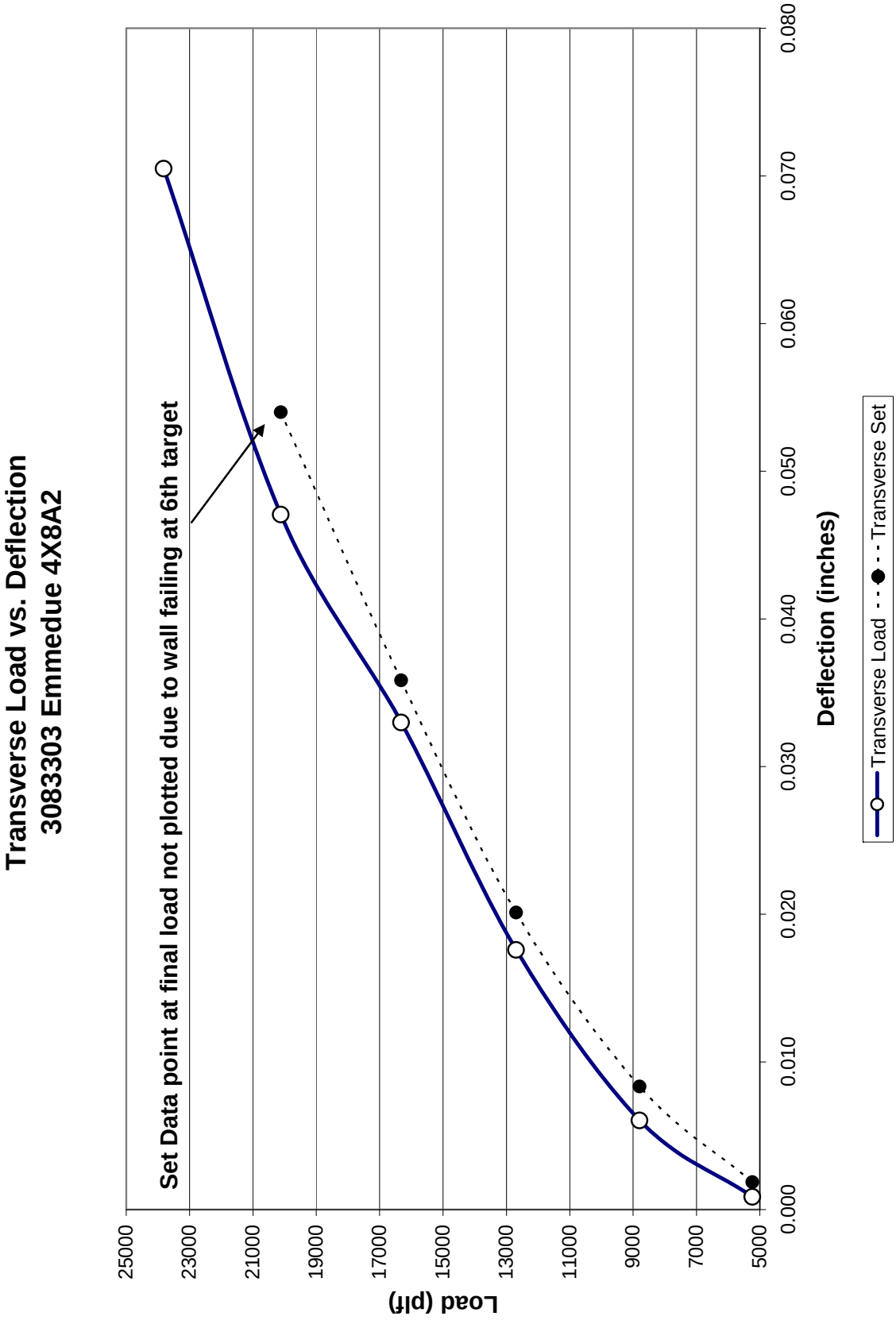
Reviewed by: _____
Michael E. Luna, M.S.
General Manager

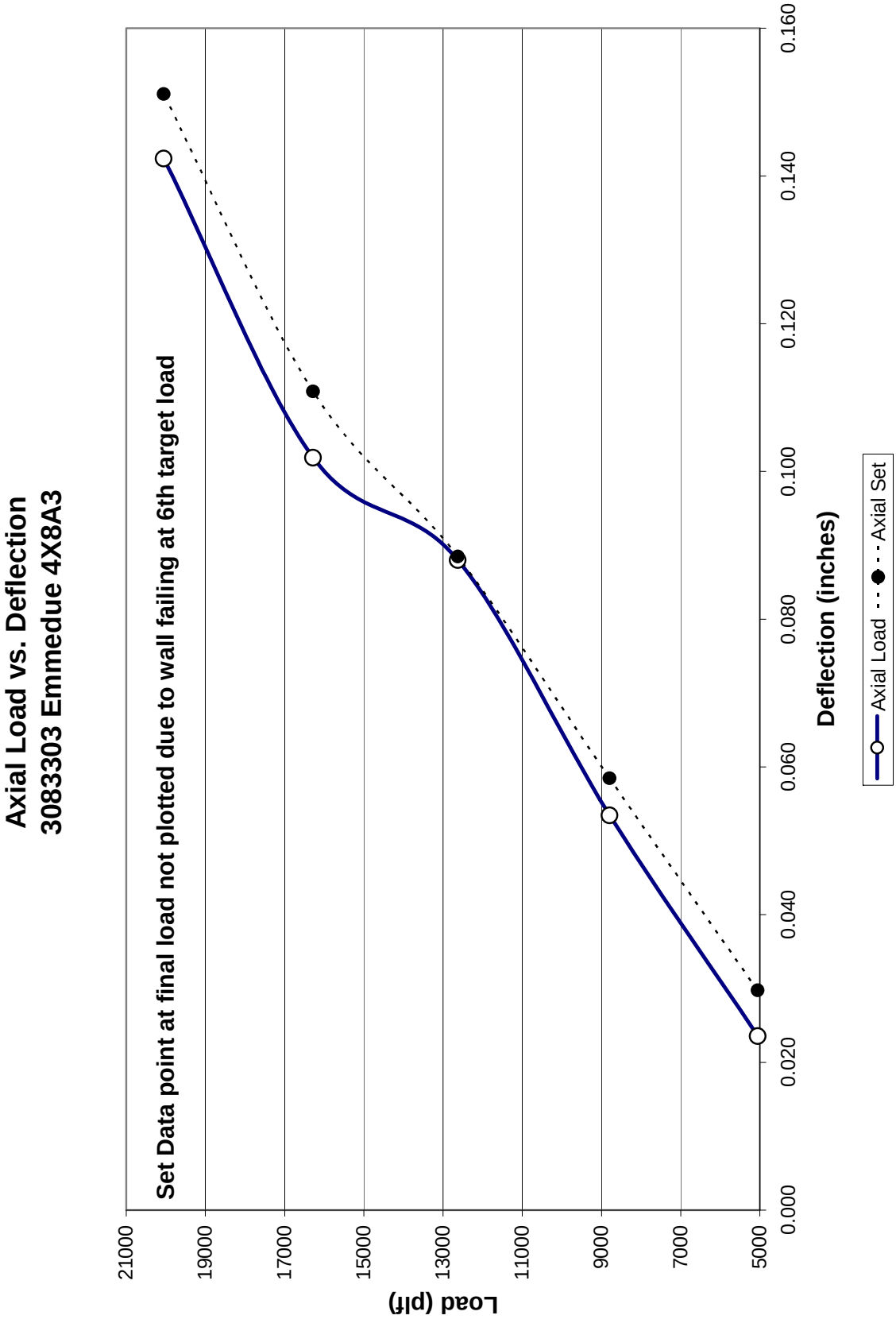
APPENDIX A
Graphs

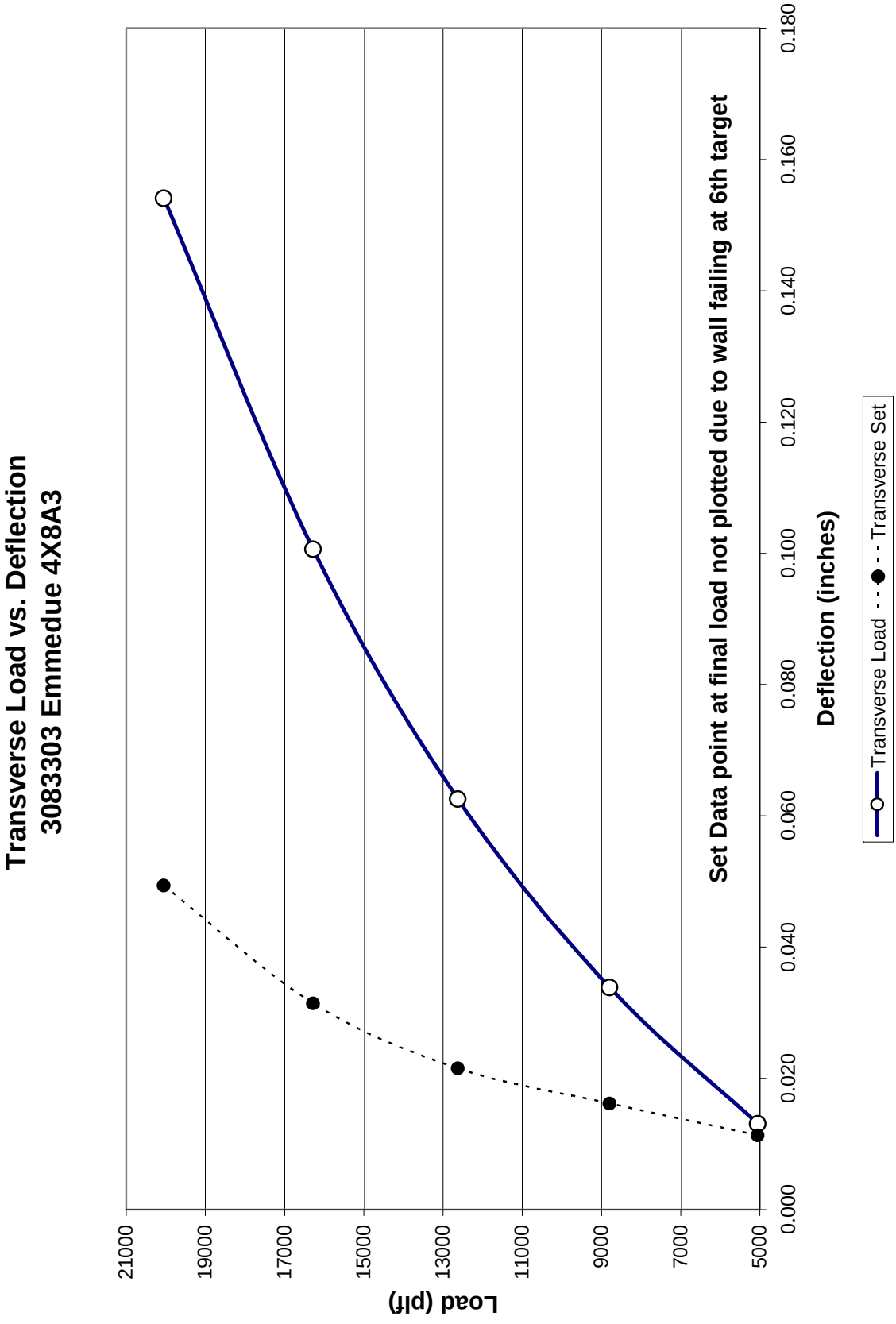

Axial Load vs. Deflection
3083303 Emmedue 4X8A1
Set Data point at final load not plotted due to wall failing at 6th target load
Load (plf)
35000
30000
25000
20000
15000
10000
5000
0.000
0.002
0.004
0.006
0.008
0.010
0.012
Deflection (inches)
Axial Load
Axial Set

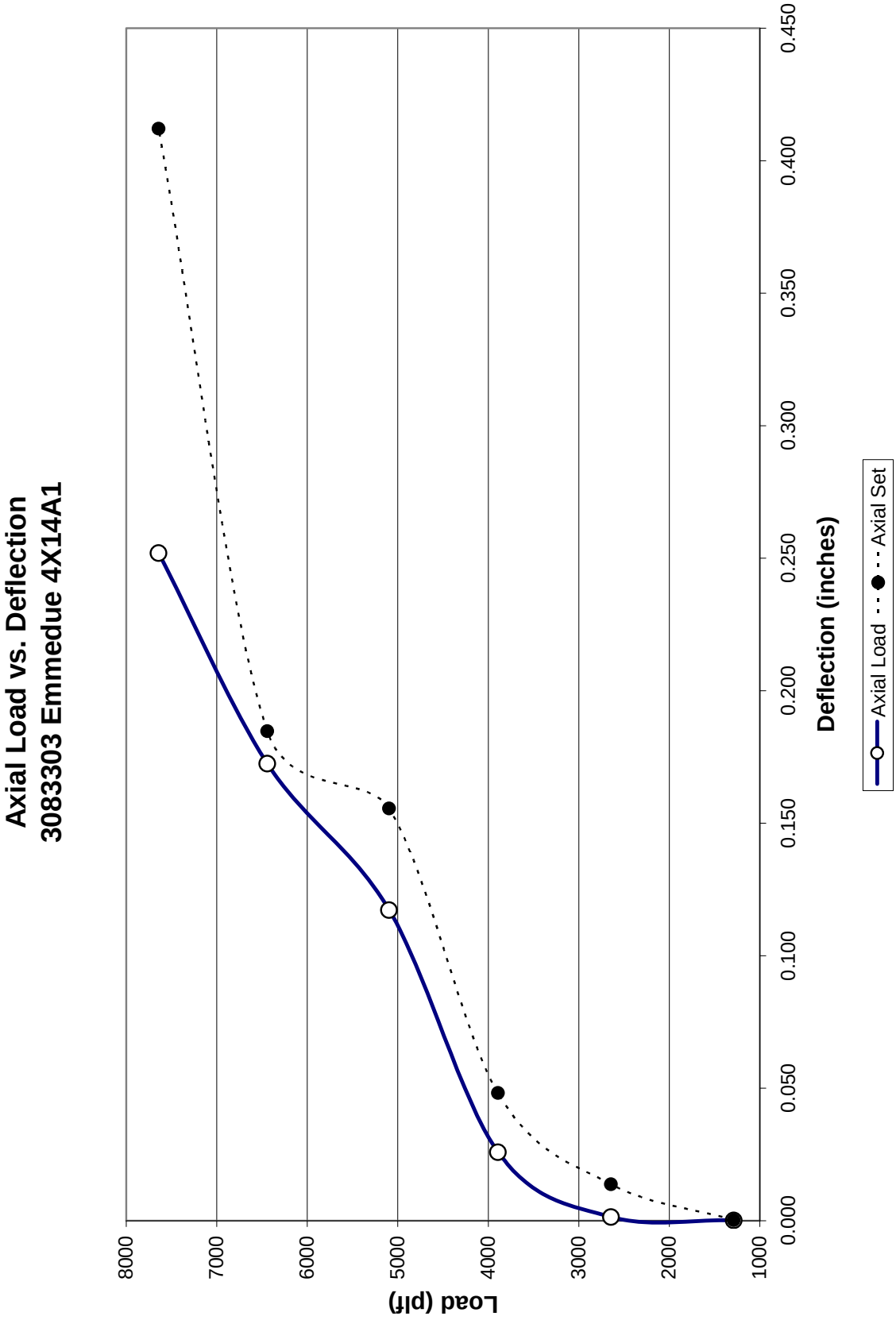

Transverse Load vs. Deflection
3083303 Emmedue 4X8A1
Set Data point at final load not plotted due to wall failing at 6th target
Load (plf)
35000
30000
25000
20000
15000
10000
5000
0.000
0.050
0.100
0.150
0.200
0.250
0.300
Deflection (inches)
Transverse Load
Transverse Set

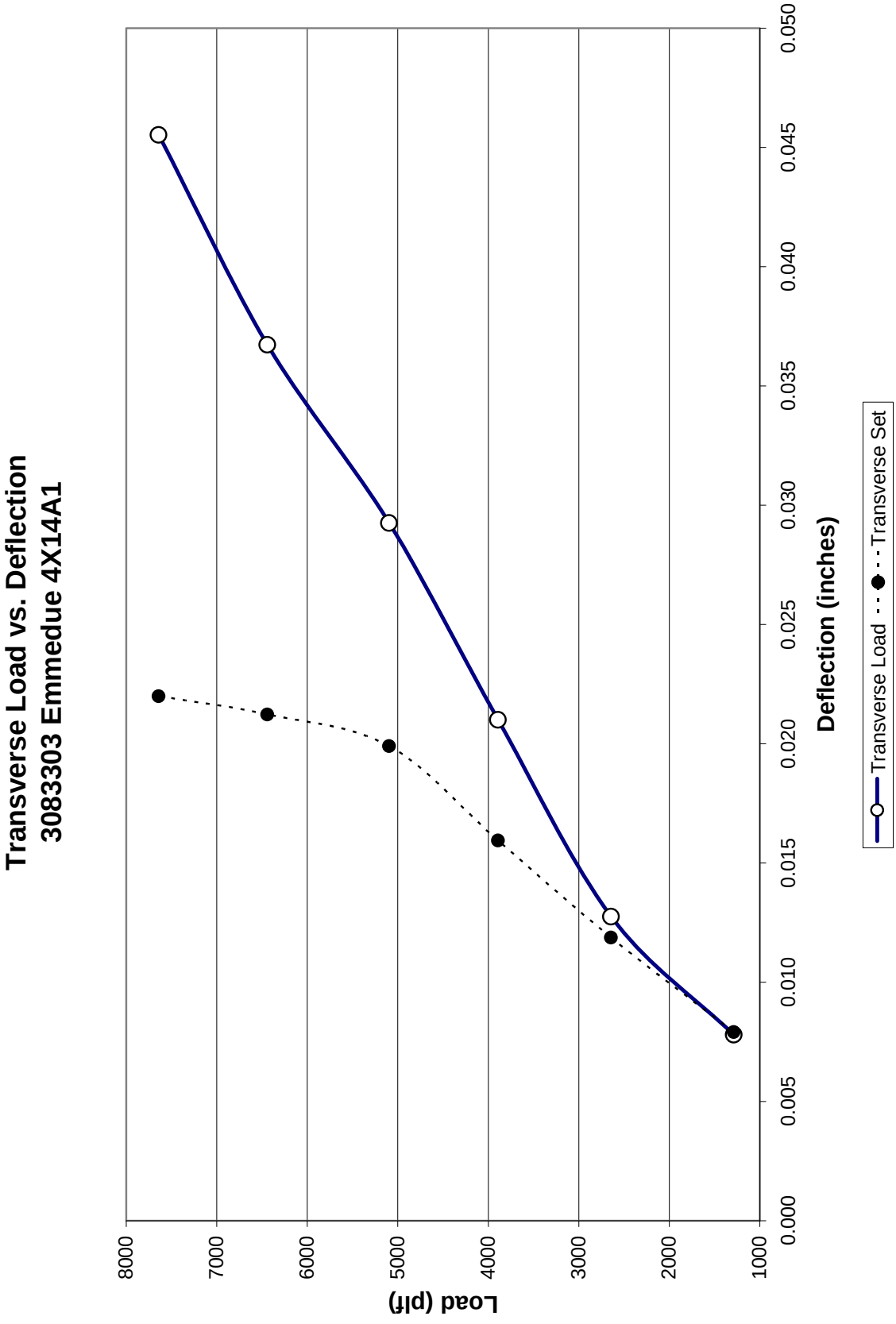

Axial Load vs. Deflection
3083303 Emmedue 4X8A2
Set Data point at final load not plotted due to wall failing at 6th target load
Load (plf)
25000
23000
21000
19000
17000
15000
13000
11000
9000
7000
5000
Deflection (inches)
0.000
0.020
0.040
0.060
0.080
0.100
0.120
0.140
0.160
Axial Load
Axial Set

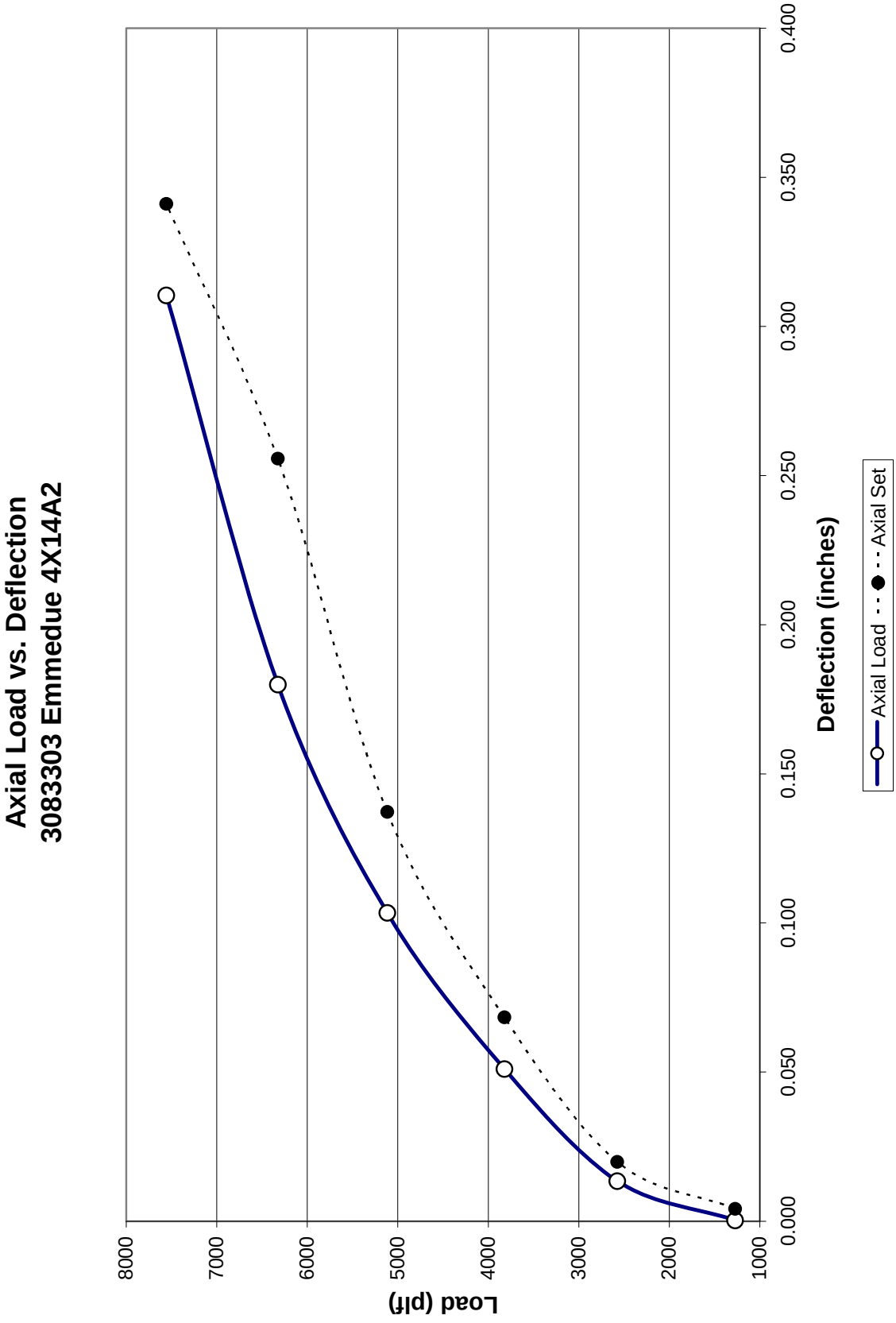

Transverse Load vs. Deflection
3083303 Emmedue 4X8A2
Set Data point at final load not plotted due to wall failing at 6th target
Load (plf)
25000
23000
21000
19000
17000
15000
13000
11000
9000
7000
5000
0.000
0.010
0.020
0.030
0.040
0.050
0.060
0.070
0.080
Deflection (inches)
Transverse Load
Transverse Set

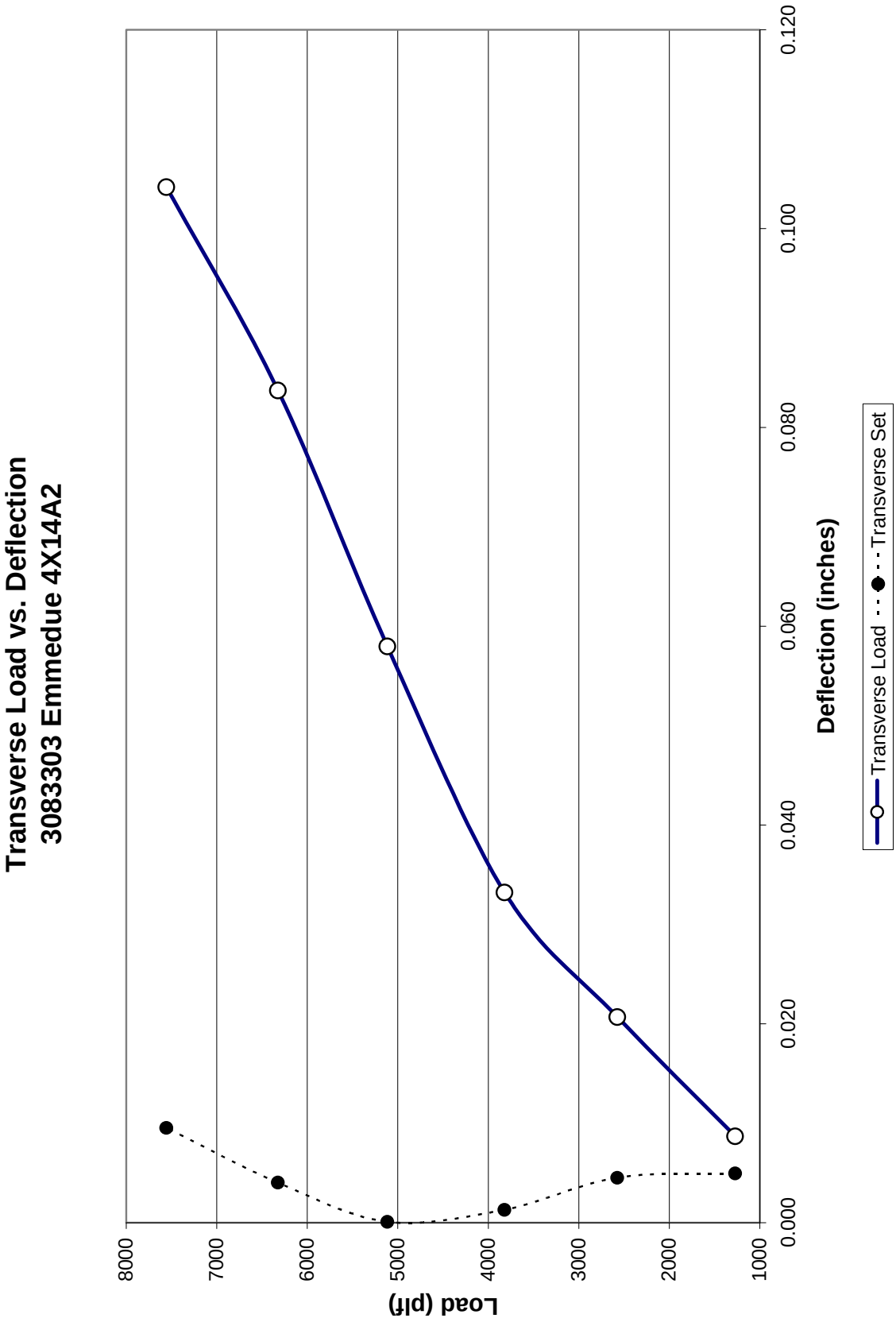

Axial Load vs. Deflection
3083303 Emmedue 4X8A3
Set Data point at final load not plotted due to wall failing at 6th target load
Load (plf)
21000
19000
17000
15000
13000
11000
9000
7000
5000
Deflection (inches)
0.000
0.020
0.040
0.060
0.080
0.100
0.120
0.140
0.160
Axial Load
Axial Set

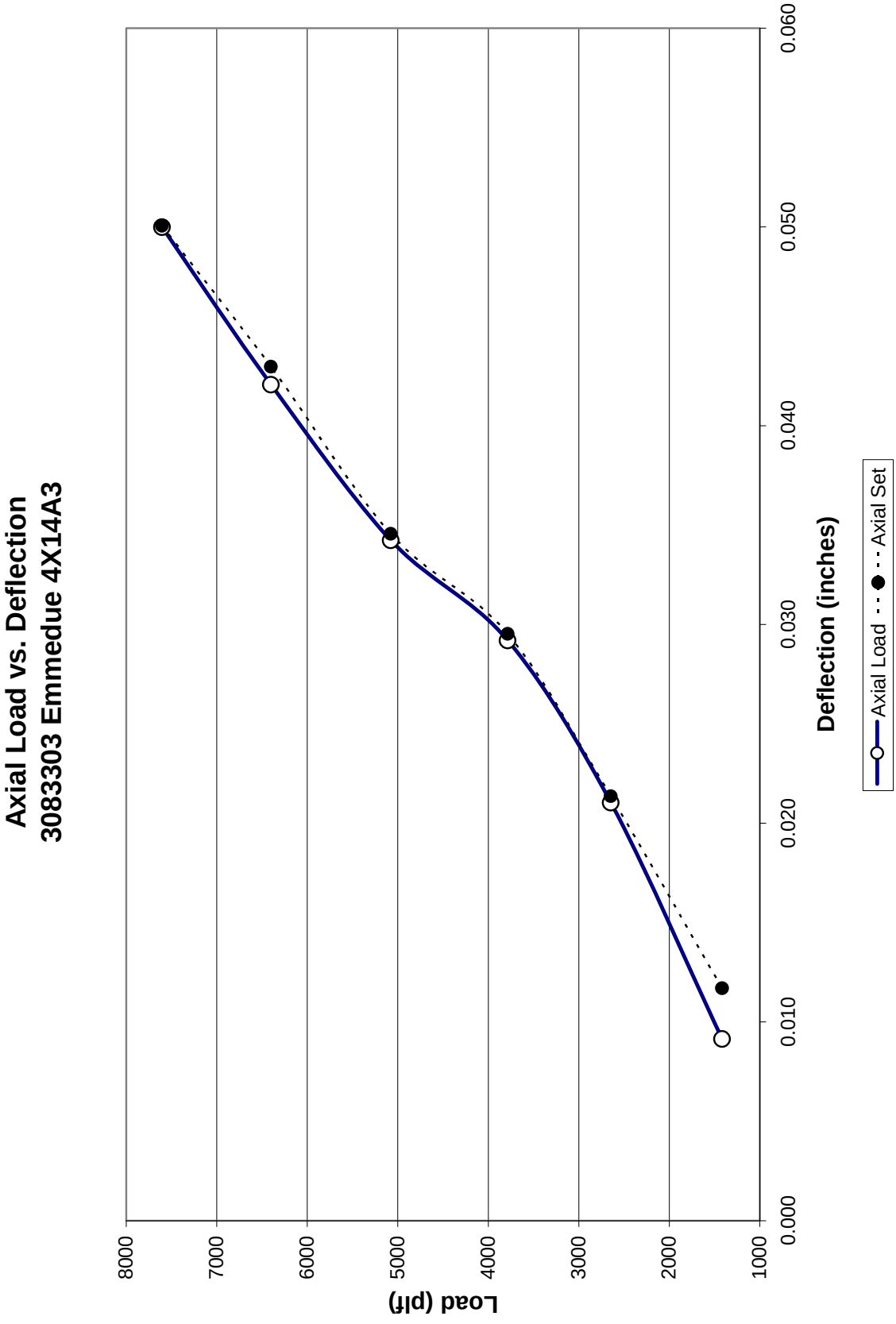

Transverse Load vs. Deflection
3083303 Emmedue 4X8A3
Load (plf)
21000
19000
17000
15000
13000
11000
9000
7000
5000
0.000
0.020
0.040
0.060
0.080
0.100
0.120
0.140
0.160
0.180
Deflection (inches)
Set Data point at final load not plotted due to wall failing at 6th target
Transverse Load
Transverse Set

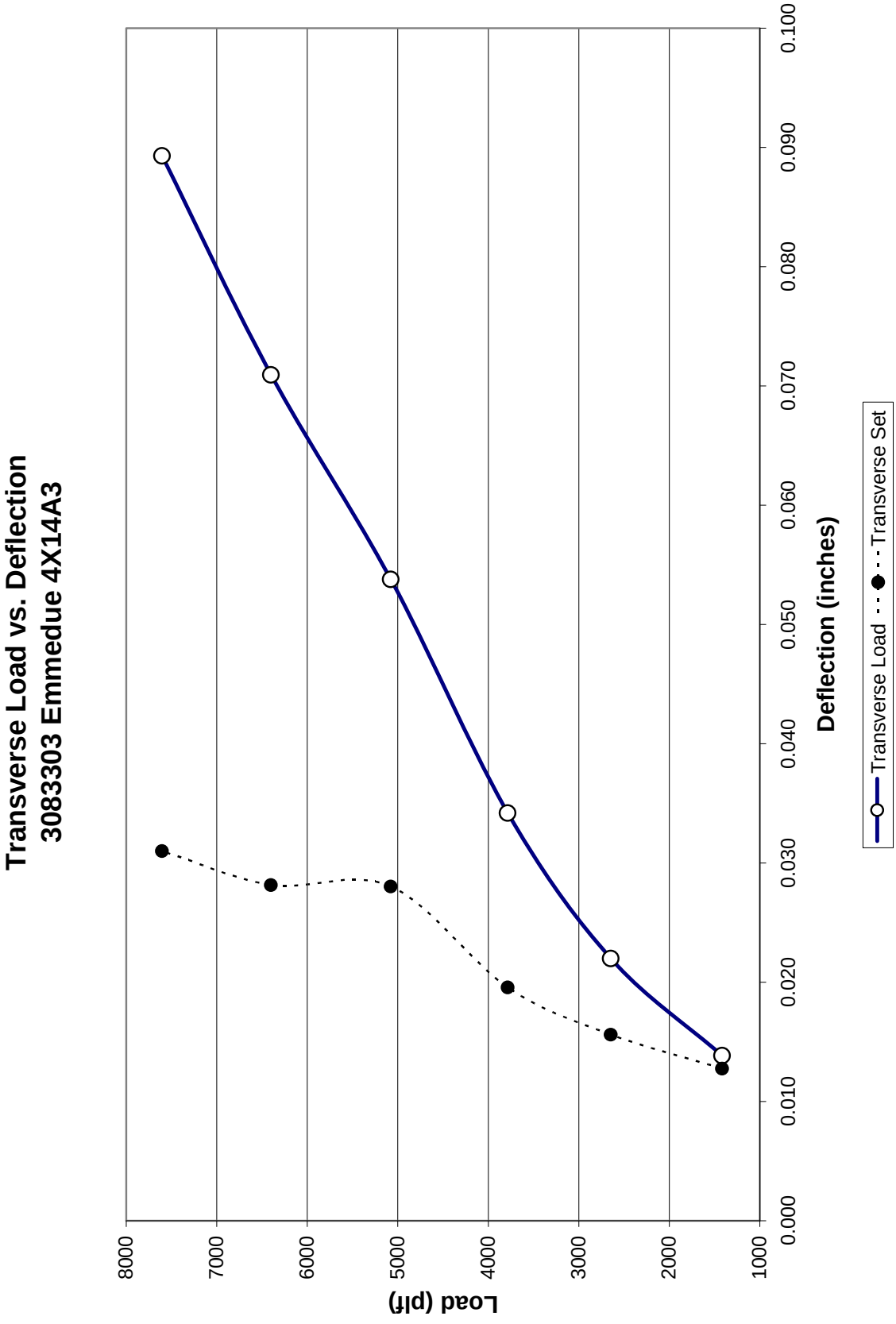

Axial Load vs. Deflection
3083303 Emmedue 4X14A1
Load (plf)
8000
7000
6000
5000
4000
3000
2000
1000
Deflection (inches)
0.000
0.050
0.100
0.150
0.200
0.250
0.300
0.350
0.400
0.450
Axial Load
Axial Set


Transverse Load vs. Deflection
3083303 Emmedue 4X14A1
Load (plf)
8000
7000
6000
5000
4000
3000
2000
1000
0.000
0.005
0.010
0.015
0.020
0.025
0.030
0.035
0.040
0.045
0.050
Deflection (inches)
Transverse Load
Transverse Set


Axial Load vs. Deflection
3083303 Emmedue 4X14A2
Load (plf)
8000
7000
6000
5000
4000
3000
2000
1000
Deflection (inches)
0.000
0.050
0.100
0.150
0.200
0.250
0.300
0.350
0.400
Axial Load
Axial Set


Transverse Load vs. Deflection
3083303 Emmedue 4X14A2
Load (plf)
8000
7000
6000
5000
4000
3000
2000
1000
0.000
0.020
0.040
0.060
0.080
0.100
0.120
Deflection (inches)
Transverse Load
Transverse Set


Axial Load vs. Deflection
3083303 Emmedue 4X14A3
Load (plf)
8000
7000
6000
5000
4000
3000
2000
1000
Deflection (inches)
0.000
0.010
0.020
0.030
0.040
0.050
0.060
Axial Load
Axial Set

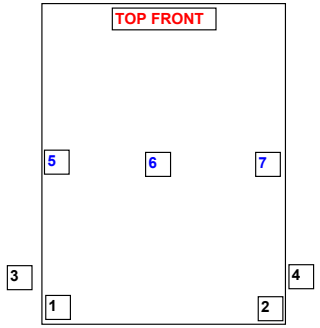

Transverse Load vs. Deflection
3083303 Emmedue 4X14A3
Load (plf)
8000
7000
6000
5000
4000
3000
2000
1000
Deflection (inches)
0.000
0.010
0.020
0.030
0.040
0.050
0.060
0.070
0.080
0.090
0.100
Transverse Load
Transverse Set

APPENDIX B
Test Data

Intertek

Test: **Axial Compressive Load - Specimen Vertical**
Date: 11/1/2007
Client: **Emmedue S.P.A**
Product ID: **M2_4X8A1**
Product: Single Polystyrene PSM80 4' x 8' x 6" Axial 1 Structural Wall Panels
Eng/Tech(s): V. Burgos, Intertek San Antonio
Test Method(s): ICC-AC 15 - Acceptance Criteria for Concrete Floor, Roof and Wall Systems and Concrete Masonry Wall Systems Section 4.2.2.2: Wall Compression Tests in accordance with the general guidelines of ASTM E 72-05
Preload (lbs): 5000
Eccentricity (in): 1.000
Cap/Footer info: 8" wide x 50" long x 1/4" EPDM rubber installed as cap and footer for even load distribution
Age of Wall: 35 days (at test date)
Rams used: 7.00

Project No: **3083303**
Engineer Initials:



Note: Transducers 3 and 4 located on rear side of wall

Panel		
Width (ft)	Length (ft)	Thickness (in)
4.0	8.0	6.000

Ultimate Load: 126090 lbs

				Compression Measurements				Lateral Measurements				
Hydraulic Line Pressure (psi)	Load (lbs)	Load (lbs/ft width)	Measurement Time	Trans 1 (in.)	Trans 2 (in.)	Trans 3 (in.)	Trans 4 (in.)	Trans 5 (in.)	Trans 6 (in.)	Trans 7 (in.)	Comp Mean (in.)	Lateral Mean (in.)
60	5000	1250	immediate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
190	25450	6363	immediate	-0.003	0.000	0.000	-0.001	-0.005	-0.002	-0.003	0.001	0.003
190	25450	6363	after 5 minutes	-0.003	0.000	-0.001	-0.001	-0.005	-0.002	-0.003	0.001	0.003
60	5540	1385	immediate	-0.003	0.000	-0.001	-0.001	-0.010	-0.002	-0.004	0.001	0.005
60	5500	1375	after 5 minutes	-0.003	0.000	-0.001	-0.001	-0.010	-0.002	-0.004	0.001	0.005
325	45750	11438	immediate	-0.007	-0.001	-0.001	-0.001	0.007	0.006	0.008	0.002	0.007
325	45760	11440	after 5 minutes	-0.007	0.000	-0.001	-0.001	0.008	0.006	0.008	0.002	0.007
60	5370	1343	immediate	-0.006	0.000	-0.001	-0.001	-0.020	-0.010	-0.012	0.002	0.014
60	5290	1323	after 5 minutes	-0.006	0.000	-0.001	-0.001	-0.022	-0.013	-0.015	0.002	0.017
455	65810	16453	immediate	-0.007	-0.001	-0.001	-0.001	0.033	0.028	0.033	0.002	0.031
455	65830	16458	after 5 minutes	-0.010	-0.006	-0.001	-0.001	0.036	0.031	0.035	0.004	0.034
60	5870	1468	immediate	-0.010	-0.006	-0.001	-0.001	-0.021	-0.012	-0.014	0.004	0.016
60	5910	1478	after 5 minutes	-0.009	-0.005	-0.001	-0.001	-0.021	-0.012	-0.014	0.004	0.016
580	85750	21438	immediate	-0.012	-0.007	-0.002	-0.001	0.069	0.061	0.066	0.005	0.065
580	85950	21488	after 5 minutes	-0.012	-0.007	-0.002	-0.001	0.071	0.064	0.069	0.005	0.068
60	5380	1345	immediate	-0.007	-0.007	-0.002	-0.001	-0.023	-0.015	-0.016	0.004	0.018
60	5330	1333	after 5 minutes	-0.007	-0.007	-0.002	-0.001	-0.023	-0.014	-0.015	0.004	0.017
720	105950	26488	immediate	-0.011	-0.007	-0.002	0.001	0.145	0.137	0.142	0.005	0.141
720	105850	26463	after 5 minutes	-0.014	-0.011	-0.002	0.000	0.151	0.147	0.150	0.007	0.150
60	5970	1493	immediate	-0.004	-0.010	-0.002	0.000	-0.025	-0.011	-0.014	0.004	0.017
60	5890	1473	after 5 minutes	-0.004	-0.010	-0.002	0.000	-0.026	-0.011	-0.015	0.004	0.017
850	126090	31523	immediate	-0.022	-0.026	-0.002	0.008	0.258	0.248	0.253	0.010	0.253
850	126090	31523	after 5 minutes	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
60	5880	1470	immediate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
60	5880	1470	after 5 minutes	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

ULTIMATE FAILURE DATA				
850	**126090**	**31523**	**Ultimate**	**Panel Failure** Wall failed approximately 26 seconds into 6th target load Some mortar debris began to fall off top of wall 3 to 5 seconds before failure Shear failure at top of wall, approximately 27" down from the top Complete horizontal shear break all along panel 4' width in direction of eccentric load No other visible damage present on wall

Additional Notes: *At Load = 65810 lbs, small pieces of mortar debris were noticed falling off from the top rear of the wall (compression side)
*At Load = 85750 lbs, wall deflection outwards in opposite direction of eccentric load
*At Load = 105950 lbs, small pop heard, some cracks visible at top and bottom left rear of wall. Photos taken. More deflection visible in opposite direction of eccentric load. Small mortar debris continuing to fall from top of wall
*Positive numbers indicate transducers extending **outward**; Negative numbers indicate transducers extending **inward**
*Cesar F. Cordoba, Emmedue Engineer, present during test

	Compression		Lateral		
Load (plf)	**Deformation Mean (in.)**	**Set Mean (in.)**	**Deformation Mean (in)**	**Set Mean (in.)**	
6363	0.001	0.001	0.003	0.005	← Wall not returning to set, possible localized crushing present, exact location not known
11440	0.002	0.002	0.007	0.017	
16458	0.004	0.004	0.034	0.016	← Lateral set readings begginning to equalize
21488	0.005	0.004	0.068	0.017	
26463	0.007	0.004	0.150	0.017	
31523	0.010	0.000	0.253	0.000	

Note: Transducers 1 through 4 measured axial deflections
Transducers 5 through 7 measured lateral deflections

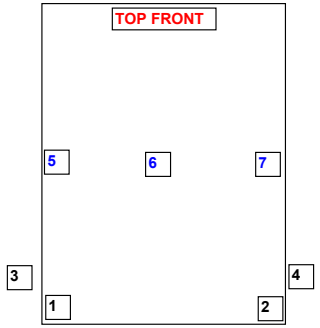
Transducer 1: Lower front left
Transducer 2: Lower front right
Transducer 3: Lower rear left
Transducer 4: Lower rear right
Transducer 5: Midspan left
Transducer 6: Midspan center
Transducer 7: Midspan right

Axial Statistical Analysis		**Lateral Statistical Analysis**	
2758429.42	5218.438	89416.4366	11282.841
317470.340	1851.015	17378.6702	2154.3403
0.950	2357.993	0.86873586	3808.5105
75.494869	4	26.4729069	4
419761428	22240528	383982948	58019008

Intertek

Test: **Axial Compressive Load - Specimen Vertical**
Date: 11/2/2007
Client: **Emmedue S.P.A**
Product ID: **M2_4X8A2**
Product: Single Polystyrene PSM80 4' x 8' x 6" Axial 2 Structural Wall Panels
Eng/Tech(s): V. Burgos, Intertek San Antonio
Test Method(s): ICC-AC 15 - Acceptance Criteria for Concrete Floor, Roof and Wall Systems and Concrete Masonry Wall Systems Section 4.2.2.2: Wall Compression Tests in accordance with the general guidelines of ASTM E 72-05
Preload (lbs): 5000
Eccentricity (in): 1.000
Cap/Footer info: 8" wide x 50" long x 1/4" EPDM rubber installed as cap and footer for even load distribution
Age of Wall: 36 days (at test date)
Rams used: 7.00

Project No: **3083303**
Engineer Initials:



Panel		
Width (ft)	Length (ft)	Thickness (in)
4.0	8.0	6.000

Note: Transducers 3 and 4 located on rear side of wall

Ultimate Load: 95250 lbs

				Compression Measurements				Lateral Measurements				
Hydraulic Line Pressure (psi)	Load (lbs)	Load (lbs/ft width)	Measurement Time	Trans 1 (in.)	Trans 2 (in.)	Trans 3 (in.)	Trans 4 (in.)	Trans 5 (in.)	Trans 6 (in.)	Trans 7 (in.)	Comp Mean (in.)	Lateral Mean (in.)
60	5400	1350	immediate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
165	20940	5235	immediate	0.000	0.000	0.000	0.000	-0.003	0.000	0.002	0.000	0.000
165	20940	5235	after 5 minutes	0.000	0.000	0.000	0.000	-0.004	0.000	0.002	0.000	0.001
60	5420	1355	immediate	0.010	0.000	-0.001	0.000	-0.005	-0.001	0.000	0.002	0.002
60	5120	1280	after 5 minutes	0.025	0.006	0.000	0.000	-0.005	-0.001	0.000	0.008	0.002
250	35680	8920	immediate	0.030	0.007	0.000	0.001	-0.013	-0.004	-0.001	0.009	0.006
250	35190	8798	after 5 minutes	0.044	0.021	0.000	0.007	-0.014	-0.004	-0.001	0.018	0.006
60	5430	1358	immediate	0.056	0.037	0.004	0.008	-0.014	-0.006	-0.004	0.026	0.008
60	5420	1355	after 5 minutes	0.056	0.037	0.004	0.008	-0.014	-0.007	-0.004	0.027	0.008
360	50740	12685	immediate	0.064	0.037	0.004	0.008	-0.026	-0.011	-0.006	0.028	0.015
360	50780	12695	after 5 minutes	0.075	0.043	0.008	0.020	-0.031	-0.014	-0.007	0.036	0.018
60	5660	1415	immediate	0.083	0.054	0.027	0.029	-0.031	-0.018	-0.012	0.048	0.020
60	5700	1425	after 5 minutes	0.089	0.063	0.034	0.036	-0.031	-0.018	-0.012	0.056	0.020
455	65280	16320	immediate	0.089	0.063	0.034	0.036	-0.051	-0.027	-0.017	0.056	0.032
455	65280	16320	after 5 minutes	0.101	0.066	0.034	0.048	-0.053	-0.029	-0.017	0.062	0.033
60	5800	1450	immediate	0.127	0.096	0.059	0.068	-0.051	-0.033	-0.024	0.088	0.036
60	5790	1448	after 5 minutes	0.157	0.129	0.088	0.107	-0.051	-0.033	-0.024	0.120	0.036
550	80520	20130	immediate	0.162	0.137	0.094	0.110	-0.069	-0.036	-0.020	0.126	0.042
550	80460	20115	after 5 minutes	0.178	0.155	0.102	0.124	-0.077	-0.041	-0.023	0.140	0.047
60	4980	1245	immediate	0.178	0.154	0.102	0.124	-0.073	-0.050	-0.039	0.140	0.054
60	5720	1430	after 5 minutes	0.178	0.154	0.102	0.124	-0.073	-0.050	-0.039	0.140	0.054
650	95250	23813	immediate	0.178	0.154	0.102	0.124	-0.108	-0.063	-0.041	0.140	0.071
650	95250	23813	after 5 minutes	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
60	5800	1450	immediate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
60	5800	1450	after 5 minutes	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

ULTIMATE FAILURE DATA				
650	**95250**	**23813**	**Ultimate**	**Panel Failure** Wall failed approximately 1:45 seconds into 6th target load Second layer of sprayed mortar sheared off at top-rear. Compression shear along entire width of wall (at top rear) approximately 12" to 14" down from the top. Crushing at bottom rear approx. 1" from bottom all along panel width No other visible damage present on wall

Additional Notes:
*At Load = 20940 lbs, transducer #1 displayed movement during set, no anomalies or damage visible on wall
*At Load = 35680 lbs, transducers 1 - 4 displayed movement, possibly due to panel mortar debris falling down from the top
*At Load = 50740 lbs, panel deflecting more during set, possibly due to mortar breaks at top of wall
*At Load = 80520 lbs, some popping and cracking heard while taking panel to this load. Panel deflecting in direction of eccentric load
*Positive numbers indicate transducers extending **outward**; Negative numbers indicate transducers extending **inward**
*Cesar F. Cordoba, Emmedue Engineer, present during test

	Compression		Lateral		
Load (plf)	**Deformation Mean (in.)**	**Set Mean (in.)**	**Deformation Mean (in)**	**Set Mean (in.)**	
5235	0.000	0.008	0.001	0.002	← Wall not returning to set, both axially and laterally
8798	0.018	0.027	0.006	0.008	Possible localized crushing present, exact location not known
12695	0.036	0.056	0.018	0.020	← Wall continuing to not return to set
16320	0.062	0.120	0.033	0.036	
20115	0.140	0.140	0.047	0.054	
23813	0.140	0.000	0.071	0.000	

Note: Transducers 1 through 4 measured axial deflections
Transducers 5 through 7 measured lateral deflections

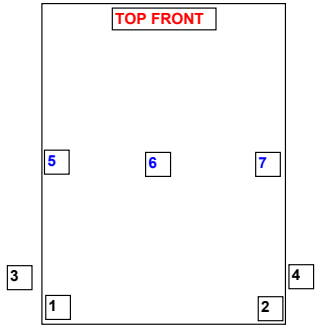
Transducer 1: Lower front left
Transducer 2: Lower front right
Transducer 3: Lower rear left
Transducer 4: Lower rear right
Transducer 5: Midspan left
Transducer 6: Midspan center
Transducer 7: Midspan right

Axial Statistical Analysis		**Lateral Statistical Analysis**	
110509.18	7203.747	258271.294	6957.7552
16011.580	1378.845	25078.7013	950.80604
0.923	2170.155	0.96365543	1486.4615
47.635237	4	106.057697	4
224341640	18838293	234341663	8838270.8

Intertek

Test: **Axial Compressive Load - Specimen Vertical**
Date: 11/2/2007
Client: **Emmedue S.P.A**
Product ID: **M2_4X8A3**
Product: Single Polystyrene PSM80 4' x 8' x 6" Axial 3 Structural Wall Panels
Eng/Tech(s): V. Burgos, Intertek San Antonio
Test Method(s): ICC-AC 15 - Acceptance Criteria for Concrete Floor, Roof and Wall Systems and Concrete Masonry Wall Systems Section 4.2.2.2: Wall Compression Tests in accordance with the general guidelines of ASTM E 72-05
Preload (lbs): 5000
Eccentricity (in): 1.000
Cap/Footer info: 8" wide x 50" long x 1/4" EPDM rubber installed as cap and footer for even load distribution
Age of Wall: 36 days (at test date)
Rams used: 7.00

Project No: **3083303**
Engineer Initials:



Note: Transducers 3 and 4 located on rear side of wall

Panel		
Width (ft)	Length (ft)	Thickness (in)
4.0	8.0	6.000

Ultimate Load: 93000 lbs

				Compression Measurements				Lateral Measurements				
Hydraulic Line Pressure (psi)	Load (lbs)	Load (lbs/ft width)	Measurement Time	Trans 1 (in.)	Trans 2 (in.)	Trans 3 (in.)	Trans 4 (in.)	Trans 5 (in.)	Trans 6 (in.)	Trans 7 (in.)	Comp Mean (in.)	Lateral Mean (in.)
60	5580	1395	immediate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
165	20190	5048	immediate	-0.019	-0.029	-0.018	-0.020	-0.015	-0.014	-0.010	0.021	0.013
165	20230	5058	after 5 minutes	-0.025	-0.031	-0.018	-0.020	-0.015	-0.014	-0.010	0.024	0.013
60	5300	1325	immediate	-0.025	-0.036	-0.018	-0.020	-0.013	-0.012	-0.009	0.025	0.011
60	5230	1308	after 5 minutes	-0.031	-0.044	-0.018	-0.026	-0.013	-0.012	-0.009	0.030	0.011
250	35330	8833	immediate	-0.039	-0.046	-0.032	-0.033	-0.034	-0.035	-0.027	0.038	0.032
250	35170	8793	after 5 minutes	-0.054	-0.059	-0.049	-0.051	-0.037	-0.037	-0.028	0.053	0.034
60	5000	1250	immediate	-0.054	-0.061	-0.052	-0.052	-0.019	-0.018	-0.014	0.055	0.017
60	5160	1290	after 5 minutes	-0.054	-0.071	-0.053	-0.056	-0.019	-0.017	-0.013	0.058	0.016
360	50690	12673	immediate	-0.080	-0.082	-0.081	-0.079	-0.067	-0.066	-0.053	0.080	0.062
360	50520	12630	after 5 minutes	-0.080	-0.090	-0.091	-0.091	-0.068	-0.066	-0.053	0.088	0.063
60	5150	1288	immediate	-0.080	-0.090	-0.091	-0.090	-0.025	-0.024	-0.019	0.088	0.023
60	5190	1298	after 5 minutes	-0.080	-0.093	-0.091	-0.091	-0.023	-0.023	-0.018	0.089	0.022
455	65200	16300	immediate	-0.095	-0.099	-0.107	-0.106	-0.100	-0.102	-0.086	0.102	0.096
455	65120	16280	after 5 minutes	-0.095	-0.099	-0.107	-0.106	-0.106	-0.107	-0.089	0.102	0.101
60	5740	1435	immediate	-0.097	-0.107	-0.108	-0.107	-0.034	-0.033	-0.027	0.105	0.031
60	5810	1453	after 5 minutes	-0.110	-0.119	-0.109	-0.107	-0.034	-0.033	-0.027	0.111	0.031
550	80350	20088	immediate	-0.123	-0.130	-0.145	-0.142	-0.148	-0.151	-0.134	0.135	0.145
550	80200	20050	after 5 minutes	-0.130	-0.133	-0.157	-0.149	-0.159	-0.161	-0.142	0.142	0.154
60	5340	1335	immediate	-0.137	-0.147	-0.158	-0.153	-0.053	-0.054	-0.047	0.149	0.051
60	5050	1263	after 5 minutes	-0.142	-0.151	-0.158	-0.153	-0.051	-0.052	-0.045	0.151	0.049
650	95250	23813	immediate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
650	95250	23813	after 5 minutes	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
60	5800	1450	immediate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
60	5800	1450	after 5 minutes	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

ULTIMATE FAILURE DATA				
				Panel Failure
640	**93000**	**23250**	**Ultimate**	Wall failed while taking panel into 6th target load Second layer of sprayed mortar sheared off at top-rear. Compression shear along 40" from left to right (at top rear) approximately 24" down from the top. Crushing at bottom rear approx. 1" from bottom all along panel width. Crack at top-front, approx 24" long, 4" - 6" from the top Wall failure very similar to 4X8A2. No other visible damage present on wall

Additional Notes:
*At Load = 20190 lbs, wall displayed some movement on transducers 1 - 4 due to crushing at top
*At Load = 35330 lbs, mortar debris falling down from the top-rear as wall entered target load
*At Load = 50690 lbs, additional mortar debris falling down from top-rear of wall, some cracking and popping sounds heard
*At Load = 65200 lbs, some popping and cracking heard while taking panel to this load. Panel deflecting in direction of eccentric load
*During set load after 5th targer Load = 80200 lbs, a 2x6 board was clamped to the top reaction rotating plate in the front of the wall (direction of eccentric load) in order to prevent possible wall slippage from its eccentric position. This was done at the client's request who was present during testing
*Positive numbers indicate transducers extending **outward**; Negative numbers indicate transducers extending **inward**
*Cesar F. Cordoba, Emmedue Engineer, present during test

	Compression		Lateral		
Load (plf)	**Deformation Mean (in.)**	**Set Mean (in.)**	**Deformation Mean (in)**	**Set Mean (in.)**	
5058	0.024	0.030	0.013	0.011	← Wall not returning to set axially
8793	0.053	0.058	0.034	0.016	Possible localized crushing present, exact location not known
12630	0.088	0.089	0.063	0.022	
16280	0.102	0.111	0.101	0.031	← Wall continuing to not return to set axially
20050	0.142	0.151	0.154	0.049	
23813	0.000	0.000	0.000	0.000	

Note: Transducers 1 through 4 measured axial deflections
Transducers 5 through 7 measured lateral deflections

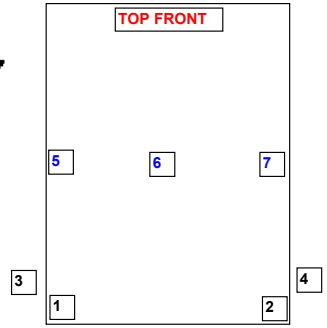
Transducer 1: Lower front left
Transducer 2: Lower front right
Transducer 3: Lower rear left
Transducer 4: Lower rear right
Transducer 5: Midspan left
Transducer 6: Midspan center
Transducer 7: Midspan right

Axial Statistical Analysis		**Lateral Statistical Analysis**	
21947.88	12939.634	36768.2693	12203.84
65613.719	5477.923	57289.1149	4625.7213
0.027	7733.234	0.09336316	7465.6678
0.1118912	4	0.41190982	4
6691420.8	239211647	22958286.5	222944781

Intertek

Test: **Axial Compressive Load - Specimen Vertical**
Date: 11/13/2007
Client: **Emmedue S.P.A**
Product ID: **M2_4X14A1**
Product: Single Polystyrene PSM80 4' x 14' x 6" Axial 1 Structural Wall Panels
Eng/Tech(s): V. Burgos, Intertek San Antonio
Test Method(s): ICC-AC 15 - Acceptance Criteria for Concrete Floor, Roof and Wall Systems and Concrete Masonry Wall Systems Section 4.2.2.2: Wall Compression Tests in accordance with the general guidelines of ASTM E 72-05
Preload (lbs): 2300
Eccentricity (in): 1.000
Cap Plate info: 8" wide x 50" long x 1/4" EPDM rubber installed as cap and footer for even load distribution
Age of Wall: 46 days (at test date)
Wall Designation: 7.00

Project No: **3083303**
Engineer Initials:



Note: Transducers 3 and 4 located on rear side of wall

Panel		
Width (ft)	Length (ft)	Thickness (in)
4.0	14.0	6.000

Ultimate Load: 95250 lbs

				Compression Measurements				Lateral Measurements				
Hydraulic Line Pressure (psi)	Load (lbs)	Load (lbs/ft width)	Measurement Time	Trans 1 (in.)	Trans 2 (in.)	Trans 3 (in.)	Trans 4 (in.)	Trans 5 (in.)	Trans 6 (in.)	Trans 7 (in.)	Comp Mean (in.)	Lateral Mean (in.)
40	2300	575	immediate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
60	5120	1280	immediate	0.000	0.000	0.000	0.000	-0.007	-0.008	-0.007	0.000	0.007
60	5150	1288	after 5 minutes	0.000	0.000	0.000	0.000	-0.007	-0.008	-0.008	0.000	0.008
40	3060	765	immediate	0.000	0.000	-0.001	0.000	-0.008	-0.009	-0.008	0.000	0.008
40	2980	745	after 5 minutes	0.000	0.000	-0.001	0.000	-0.007	-0.008	-0.008	0.000	0.008
100	10630	2658	immediate	0.000	0.000	-0.001	0.000	-0.012	-0.013	-0.012	0.000	0.012
100	10580	2645	after 5 minutes	0.006	0.000	-0.001	0.001	-0.013	-0.013	-0.012	0.001	0.013
40	3200	800	immediate	0.008	0.000	-0.001	0.005	-0.012	-0.013	-0.011	0.003	0.012
40	3160	790	after 5 minutes	0.028	0.000	-0.001	0.028	-0.012	-0.013	-0.011	0.014	0.012
130	15610	3903	immediate	0.028	0.000	-0.001	0.028	-0.020	-0.020	-0.019	0.014	0.020
130	15570	3893	after 5 minutes	0.059	0.000	0.000	0.045	-0.021	-0.022	-0.020	0.026	0.021
40	3210	803	immediate	0.061	0.000	0.004	0.067	-0.017	-0.016	-0.014	0.033	0.016
40	3160	790	after 5 minutes	0.086	0.000	0.019	0.088	-0.017	-0.017	-0.014	0.048	0.016
160	20410	5103	immediate	0.112	0.000	0.062	0.136	-0.029	-0.030	-0.027	0.078	0.029
160	20380	5095	after 5 minutes	0.148	0.046	0.103	0.173	-0.030	-0.030	-0.028	0.117	0.029
40	3180	795	immediate	0.166	0.046	0.115	0.190	-0.021	-0.021	-0.017	0.129	0.020
40	3180	795	after 5 minutes	0.188	0.066	0.146	0.223	-0.021	-0.021	-0.017	0.156	0.020
190	25620	6405	immediate	0.195	0.082	0.163	0.223	-0.035	-0.037	-0.036	0.166	0.036
190	25770	6443	after 5 minutes	0.198	0.106	0.163	0.223	-0.035	-0.038	-0.038	0.173	0.037
40	3070	768	immediate	0.215	0.107	0.168	0.237	-0.021	-0.023	-0.020	0.182	0.021
40	3090	773	after 5 minutes	0.216	0.119	0.168	0.236	-0.021	-0.023	-0.020	0.185	0.021
230	30540	7635	immediate	0.246	0.141	0.169	0.237	-0.040	-0.047	-0.046	0.198	0.044
230	30570	7643	after 5 minutes	0.298	0.179	0.240	0.292	-0.041	-0.048	-0.048	0.252	0.046
40	3090	773	immediate	0.328	0.211	0.282	0.337	-0.024	-0.025	-0.020	0.289	0.023
40	3050	763	after 5 minutes	0.456	0.319	0.410	0.463	-0.023	-0.024	-0.019	0.412	0.022

ULTIMATE FAILURE DATA				
280	40110	10028	Hold 2 min	No change, no visible damage
360	51070	12768	Hold 2 min	Small piece of mortar fell off from top-rear side, no additional visible damage
390	55750	13938	Hold 2 min	Additional mortar debris falling off from top, no additional visible damage
420	60610	15153	Hold 2 min	Mortar debris falling from front side
450	65220	16305	Hold 2 min	No change, no visible damage
470	70110	17528	Hold 2 min	Additional mortar debris falling off from top, no additional visible damage
520	75100	18775	Hold 2 min	Additional mortar debris falling off from top, no additional visible damage
550	80700	20175	Hold 2 min	Panel deflecting more in direction of eccentric load
580	85370	21343	Hold 2 min	Additional mortar debris falling off from top, no additional visible damage
620	90260	22565	Hold 2 min	Mortar debris falling from both sides, no additional visible damage
650	**95250**	**23813**	**Ultimate**	**Panel Failure** Wall began to make popping and cracking sounds while holding load. Failure occurred 1:40 seconds into holding load. Even distribution of crushing at top-rear (compression side) throughout entire wall width. Slight curvature visible at top in direction of eccentric load. Minimal crushing visible at bottom of wall. Second layer of mortar sheared off at top, with the majority of the shear located at top-rear of wall. No additional visible damage present

Additional Notes: *Prior to testing, on 11/7/07, mortar damage was present on lower left-rear and lower left-center of wall. It was repaired using Quikrete Fast Setting Concrete Mix, as requested by the client to use on all repairs from this date forward. Wall was repaired and allowed to cure for 6 days prior to testing
The client, Cesar F. Cordoba, assisted in repair of wall
*At Load = 10630 lbs, wall displayed movement on lower left-side, at location of concrete patch repair (transducer locations 1 and 3)
*At Load = 25620 lbs, wall axial compression began to stabilize (visible on transducers 1 - 4)
*Positive numbers indicate transducers extending **outward**; Negative numbers indicate transducers extending **inward**

	Compression		Lateral		
Load (plf)	**Deformation Mean (in.)**	**Set Mean (in.)**	**Deformation Mean (in)**	**Set Mean (in.)**	
1288	0.000	0.000	0.008	0.008	← Wall not returning to set axially, localized crushing present
2645	0.001	0.014	0.013	0.012	
3893	0.026	0.048	0.021	0.016	
5095	0.117	0.156	0.029	0.020	
6443	0.173	0.185	0.037	0.021	
7643	0.252	0.412	0.046	0.022	← Wall continued not to return to set due to localized axial crushing

Note: Transducers 1 through 4 measured axial deflections
Transducers 5 through 7 measured lateral deflections

Transducer 1: Lower front left
Transducer 2: Lower front right
Transducer 3: Lower rear left
Transducer 4: Lower rear right
Transducer 5: Midspan left
Transducer 6: Midspan center
Transducer 7: Midspan right

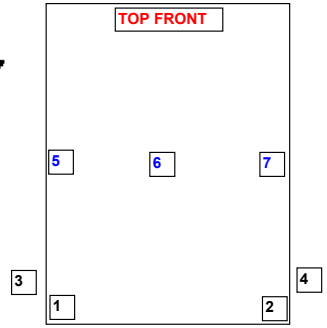
Axial Statistical Analysis	
21932.414	2419.091
3276.404	439.059
0.918	759.191
44.8103164	4
25827385.2	2305485.6

Lateral Statistical Analysis	
164086.339	313.34995
6932.94836	199.03521
0.99290976	223.30963
560.155909	4
27933402.1	199468.77

Intertek

Test: **Axial Compressive Load - Specimen Vertical**
Date: 11/13/2007
Client: **Emmedue S.P.A**
Product ID: **M2_4X14A2**
Product: Single Polystyrene PSM80 4' x 14' x 6" Axial 2 Structural Wall Panels
Eng/Tech(s): V. Burgos, Intertek San Antonio
Test Method(s): ICC-AC 15 - Acceptance Criteria for Concrete Floor, Roof and Wall Systems and Concrete Masonry Wall Systems Section 4.2.2.2: Wall Compression Tests in accordance with the general guidelines of ASTM E 72-05
Preload (lbs): 2500
Eccentricity (in): 1.000
Cap Plate info: 8" wide x 50" long x 1/4" EPDM rubber installed as cap and footer for even load distribution
Age of Wall: 46 days (at test date)
Wall Designation: 7.00

Project No: **3083303**
Engineer Initials:



Note: Transducers 3 and 4 located on rear side of wall

Panel		
Width (ft)	Length (ft)	Thickness (in)
4.0	14.0	6.000

Ultimate Load: 95900 lbs

				Compression Measurements				Lateral Measurements				
Hydraulic Line Pressure (psi)	Load (lbs)	Load (lbs/ft width)	Measurement Time	Trans 1 (in.)	Trans 2 (in.)	Trans 3 (in.)	Trans 4 (in.)	Trans 5 (in.)	Trans 6 (in.)	Trans 7 (in.)	Comp Mean (in.)	Lateral Mean (in.)
40	2190	548	immediate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
60	5210	1303	immediate	0.000	0.000	-0.001	0.000	-0.007	-0.002	-0.004	0.000	0.005
60	5090	1273	after 5 minutes	0.000	0.000	-0.001	0.000	-0.007	-0.009	-0.010	0.000	0.009
40	2720	680	immediate	0.000	0.000	-0.001	-0.009	-0.005	0.000	-0.002	0.002	0.002
40	2650	663	after 5 minutes	0.000	0.000	-0.001	-0.016	-0.005	-0.005	-0.006	0.004	0.005
100	10320	2580	immediate	0.000	-0.018	-0.009	-0.027	-0.016	-0.013	-0.019	0.013	0.016
100	10300	2575	after 5 minutes	0.000	-0.018	-0.009	-0.027	-0.016	-0.020	-0.026	0.014	0.021
40	2800	700	immediate	0.000	-0.018	-0.009	-0.027	-0.005	-0.004	-0.006	0.013	0.005
40	2820	705	after 5 minutes	-0.002	-0.035	-0.016	-0.027	-0.004	-0.004	-0.006	0.020	0.005
130	15370	3843	immediate	-0.017	-0.050	-0.032	-0.053	-0.029	-0.034	-0.044	0.038	0.035
130	15280	3820	after 5 minutes	-0.023	-0.069	-0.044	-0.068	-0.030	-0.030	-0.040	0.051	0.033
40	2740	685	immediate	-0.034	-0.070	-0.050	-0.068	-0.004	0.004	0.001	0.056	0.000
40	2750	688	after 5 minutes	-0.038	-0.087	-0.068	-0.081	-0.002	0.004	0.002	0.068	0.001
160	20600	5150	immediate	-0.051	-0.096	-0.093	-0.113	-0.052	-0.053	-0.067	0.088	0.057
160	20460	5115	after 5 minutes	-0.058	-0.122	-0.104	-0.130	-0.052	-0.054	-0.069	0.103	0.058
40	2710	678	immediate	-0.071	-0.122	-0.118	-0.133	-0.007	0.002	-0.001	0.111	0.002
40	2660	665	after 5 minutes	-0.096	-0.153	-0.147	-0.154	-0.005	0.004	0.001	0.137	0.000
190	25740	6435	immediate	-0.100	-0.162	-0.171	-0.187	-0.077	-0.081	-0.099	0.155	0.086
190	25290	6323	after 5 minutes	-0.124	-0.185	-0.198	-0.212	-0.077	-0.078	-0.096	0.180	0.084
40	2670	668	immediate	-0.150	-0.199	-0.210	-0.217	-0.005	0.008	0.005	0.194	0.003
40	2640	660	after 5 minutes	-0.202	-0.261	-0.278	-0.283	-0.004	0.009	0.007	0.256	0.004
230	30350	7588	immediate	-0.216	-0.286	-0.321	-0.328	-0.098	-0.098	-0.117	0.288	0.105
230	30220	7555	after 5 minutes	-0.240	-0.305	-0.344	-0.353	-0.098	-0.098	-0.117	0.310	0.104
40	2630	658	immediate	-0.248	-0.317	-0.344	-0.353	-0.003	0.013	0.013	0.315	0.008
40	2480	620	after 5 minutes	-0.282	-0.348	-0.372	-0.363	-0.001	0.015	0.015	0.341	0.010

ULTIMATE FAILURE DATA				
280	40650	10163	Hold 2 min	No change, no visible damage
355	50680	12670	Hold 2 min	Small pieces of mortar falling off from top, deflection more visible in direction of eccentric load
390	55710	13928	Hold 2 min	No change, no visible damage
420	60870	15218	Hold 2 min	Popping heard, no visible damage
455	66520	16630	Hold 2 min	No change, no visible damage
470	70250	17563	Hold 2 min	No change, no visible damage
520	75330	18833	Hold 2 min	Popping heard, mortar debris falling down from top, mortar crack visible on bottom rear of wall
550	80470	20118	Hold 2 min	No change, no visible damage
580	85600	21400	Hold 2 min	Larger pieces of mortar debris falling from top, large mortar piece broke off from bottom rear-center
630	92060	23015	Hold 2 min	No change, no visible damage
655	**95900**	**23975**	**Ultimate**	**Panel Failure** Failure occurred 1:55 seconds into holding load Horizontal shear break all along panel width, approx 37" up from the bottom. One crack visible at rear of wall, 37" from bottom. Several cracks visible on front, approx. 37" - 43" from bottom. Failure occurred in direction of eccentric load No additional visible damage present

Additional Notes: *At Load = 30350 lbs, wall deflecting more in direction of eccentric load. No visible damage present on wall
*Positive numbers indicate transducers extending **outward**; Negative numbers indicate transducers extending **inward**

	Compression		Lateral		
Load (plf)	**Deformation Mean (in.)**	**Set Mean (in.)**	**Deformation Mean (in)**	**Set Mean (in.)**	
1273	0.000	0.004	0.009	0.005	← Wall not returning to set axially, localized crushing present
2575	0.014	0.020	0.021	0.005	
3820	0.051	0.068	0.033	0.001	
5115	0.103	0.137	0.058	0.000	
6323	0.180	0.256	0.084	0.004	
7555	0.310	0.341	0.104	0.010	← Wall continued not to return to set due to localized axial crushing

Note: Transducers 1 through 4 measured axial deflections
Transducers 5 through 7 measured lateral deflections

Transducer 1: Lower front left
Transducer 2: Lower front right
Transducer 3: Lower rear left
Transducer 4: Lower rear right
Transducer 5: Midspan left
Transducer 6: Midspan center
Transducer 7: Midspan right

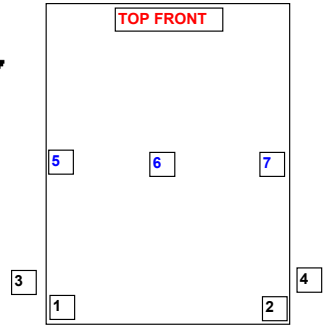
Axial Statistical Analysis	
18814.000	2377.674
3191.755	491.446
0.897	843.972
34.7458598	4
24749112.7	2849158.2

Lateral Statistical Analysis	
62191.6541	1245.0239
4787.83687	295.39027
0.97684212	399.72413
168.727366	4
26959153.3	639117.51

Intertek

Test: **Axial Compressive Load - Specimen Vertical**
Date: 11/15/2007
Client: **Emmedue S.P.A**
Product ID: **M2_4X14A3**
Product: Single Polystyrene PSM80 4' x 14' x 6" Axial 3 Structural Wall Panels
Eng/Tech(s): V. Burgos, Intertek San Antonio
Test Method(s): ICC-AC 15 - Acceptance Criteria for Concrete Floor, Roof and Wall Systems and Concrete Masonry Wall Systems Section 4.2.2.2: Wall Compression Tests in accordance with the general guidelines of ASTM E 72-05
Preload (lbs): 2500
Eccentricity (in): 1.000
Cap Plate info: 8" wide x 50" long x 1/4" EPDM rubber installed as cap and footer for even load distribution
Age of Wall: 48 days (at test date)
Wall Designation: 7.00

Project No: **3083303**
Engineer Initials:



Note: Transducers 3 and 4 located on rear side of wall

Panel		
Width (ft)	Length (ft)	Thickness (in)
4.0	14.0	6.000

Ultimate Load: 125310 lbs

				Compression Measurements				Lateral Measurements				
Hydraulic Line Pressure (psi)	Load (lbs)	Load (lbs/ft width)	Measurement Time	Trans 1 (in.)	Trans 2 (in.)	Trans 3 (in.)	Trans 4 (in.)	Trans 5 (in.)	Trans 6 (in.)	Trans 7 (in.)	Comp Mean (in.)	Lateral Mean (in.)
40	2570	643	immediate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
60	5680	1420	immediate	-0.007	-0.002	-0.011	-0.006	-0.010	-0.016	-0.015	0.007	0.014
60	5670	1418	after 5 minutes	-0.011	-0.003	-0.014	-0.009	-0.010	-0.016	-0.016	0.009	0.014
40	3070	768	immediate	-0.012	-0.003	-0.018	-0.009	-0.010	-0.016	-0.014	0.010	0.013
40	3100	775	after 5 minutes	-0.016	-0.003	-0.018	-0.010	-0.010	-0.015	-0.013	0.012	0.013
100	10440	2610	immediate	-0.017	-0.012	-0.024	-0.017	-0.021	-0.023	-0.023	0.018	0.022
100	10590	2648	after 5 minutes	-0.021	-0.014	-0.028	-0.021	-0.022	-0.022	-0.022	0.021	0.022
40	3180	795	immediate	-0.021	-0.014	-0.027	-0.021	-0.017	-0.017	-0.016	0.021	0.016
40	3030	758	after 5 minutes	-0.023	-0.014	-0.027	-0.021	-0.017	-0.016	-0.015	0.021	0.016
130	15200	3800	immediate	-0.024	-0.014	-0.039	-0.029	-0.036	-0.034	-0.032	0.027	0.034
130	15140	3785	after 5 minutes	-0.033	-0.014	-0.039	-0.030	-0.036	-0.034	-0.032	0.029	0.034
40	3020	755	immediate	-0.033	-0.015	-0.039	-0.030	-0.024	-0.022	-0.021	0.029	0.022
40	2870	718	after 5 minutes	-0.034	-0.015	-0.040	-0.030	-0.022	-0.019	-0.018	0.030	0.020
160	20380	5095	immediate	-0.034	-0.015	-0.048	-0.040	-0.057	-0.052	-0.049	0.034	0.053
160	20310	5078	after 5 minutes	-0.035	-0.015	-0.048	-0.040	-0.058	-0.053	-0.050	0.034	0.054
40	2880	720	immediate	-0.035	-0.015	-0.049	-0.040	-0.033	-0.029	-0.028	0.034	0.030
40	2750	688	after 5 minutes	-0.035	-0.015	-0.049	-0.040	-0.031	-0.027	-0.026	0.035	0.028
190	25590	6398	immediate	-0.036	-0.022	-0.059	-0.051	-0.076	-0.069	-0.065	0.042	0.070
190	25600	6400	after 5 minutes	-0.036	-0.022	-0.059	-0.051	-0.077	-0.070	-0.066	0.042	0.071
40	3000	750	immediate	-0.036	-0.022	-0.059	-0.052	-0.036	-0.031	-0.030	0.042	0.032
40	2700	675	after 5 minutes	-0.039	-0.022	-0.059	-0.052	-0.031	-0.027	-0.026	0.043	0.028
230	30450	7613	immediate	-0.039	-0.022	-0.074	-0.064	-0.093	-0.086	-0.081	0.050	0.087
230	30420	7605	after 5 minutes	-0.041	-0.022	-0.074	-0.064	-0.094	-0.090	-0.084	0.050	0.089
40	2960	740	immediate	-0.041	-0.022	-0.074	-0.063	-0.036	-0.036	-0.033	0.050	0.035
40	2630	658	after 5 minutes	-0.042	-0.022	-0.074	-0.063	-0.032	-0.032	-0.030	0.050	0.031

ULTIMATE FAILURE DATA				
280	40780	10195	Hold 2 min	No change, no visible damage
360	50360	12590	Hold 2 min	Popping and cracking 45 seconds into load, no additional visible damage
390	55550	13888	Hold 2 min	Popping heard at 23 seconds, no additional visible damage
420	60240	15060	Hold 2 min	No change, no visible damage
450	65300	16325	Hold 2 min	No change, no visible damage
470	70600	17650	Hold 2 min	Mortar breaks visible at bottom-rear, no additional visible damage present
520	75340	18835	Hold 2 min	Panel deflecting more in direction of eccentric load, no additional visual damage
550	80340	20085	Hold 2 min	No change, no visible damage
580	85500	21375	Hold 2 min	Mortar debris falling off from top, no additional visible damage
620	90670	22668	Hold 2 min	Additional mortar debris falling from top, cracking heard, no additional visible damage
650	95570	23893	Hold 2 min	No change, no visible damage
680	100470	25118	Hold 2 min	No change, no visible damage
720	105230	26308	Hold 2 min	Mortar debris falling off from top 30 seconds into load, no additional visible damage
750	110330	27583	Hold 2 min	No change, no visible damage
780	115470	28868	Hold 2 min	No change, no visible damage
820	120360	30090	Hold 2 min	No change, no visible damage
850	**125310**	**31328**	**Ultimate**	**Panel Failure** Failure occurred 15 seconds into holding load, bottom half of wall, in direction of eccentric load Horizontal shear break all along wall width approx 33" - 37" from the bottom Mortar at rear (compression) side of wall did not crack, only front (tension) side had cracks Top and bottom of wall intact, no crushing visible at these locations No additional visible damage present

Additional Notes: *Prior to testing and installing wall into test frame, two mortar cracks were present on rear of wall. The crack on the right extended the entire 14 ft length of the wall, approximately 14" from the RHS. The crack on the left extended only up to 4 ft length of the wall, located approximately 15" from the RHS
*Positive numbers indicate transducers extending **outward**; Negative numbers indicate transducers extending **inward**
*Ruben Caputo, Emmedue consultant, present during testing

	Compression		Lateral		
Load (plf)	**Deformation Mean (in.)**	**Set Mean (in.)**	**Deformation Mean (in)**	**Set Mean (in.)**	
1418	0.009	0.012	0.014	0.013	← Wall not returning to set axially, localized crushing present
2648	0.021	0.021	0.022	0.016	
3785	0.029	0.030	0.034	0.020	
5078	0.034	0.035	0.054	0.028	
6400	0.042	0.043	0.071	0.028	
7605	0.050	0.050	0.089	0.031	← Wall continued not to return to set due to localized axial crushing

Note: Transducers 1 through 4 measured axial deflections
Transducers 5 through 7 measured lateral deflections

Transducer 1: Lower front left
Transducer 2: Lower front right
Transducer 3: Lower rear left
Transducer 4: Lower rear right
Transducer 5: Midspan left
Transducer 6: Midspan center
Transducer 7: Midspan right

Axial Statistical Analysis		**Lateral Statistical Analysis**	
157388.580	-382.623	78771.8848	758.50739
10084.502	340.028	4621.07122	251.35507
0.984	330.412	0.98642108	302.9103
243.577706	4	290.574266	4
26591871.3	436688.1	26661540.8	367018.61

APPENDIX C

Test Photographs

Note: Only a small number of photos were selected for this report. A CD copy of all the project photos will be provided to the client

4X8A1 (Setup and Failure Modes)

Figure 1A: Rear view of wall

Figure 2A: Axial-compression transducer locations and EPDM rubber installation

Figure 3A: Front view of wall and instrumentation setup

Figure 4A: 4X8A1 Failure mode

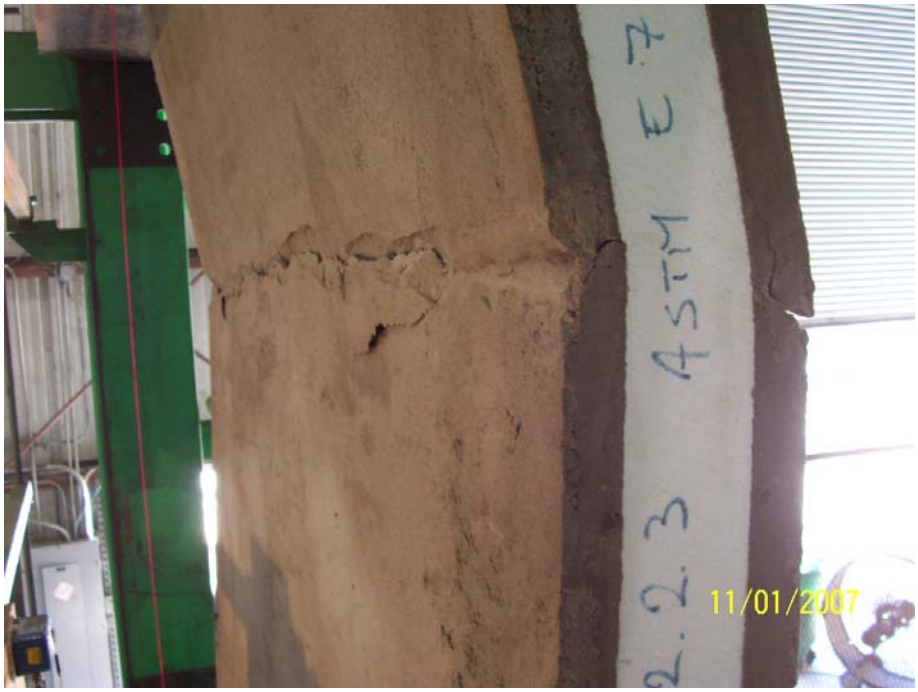
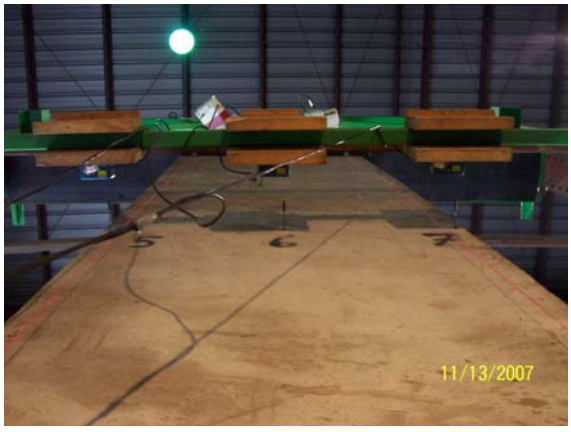


Figure 5A: 4X8A1 Failure mode (close-up)

Figure 6A: 4X8A1 Failure mode (close-up at top)

4X14A1 (Setup and Failure Modes)

Figure 7A: 4X14A1 Setup



Figures 8A and 9A: Lateral and axial transducer setup (respectively)

Figure 10A: 4X14A1 Failure mode at top of wall

Figure 11A: Rear view of failure mode

Intertek ETL SEMKO

PRE-TEST INSPECTION REPORT

Inspection Date: July 1-2, 2007 Intertek Inspector: Matt Lansdowne, EIT

Inspector's Tel: (604) 520 - 3321 Inspector's Email: matt.lansdowne@intertek.com

Product Name: Emmedue Structurally Insulated Panels

Project #: 3083303 Production Lot #: 07/01-02/07 # of Samples: See back page

General Instruction(s): Please complete ALL sections of this report. When information is not applicable, indicate "NA" and provide an explanation. Installation Instructions and MSDS sheets are required. Attach to this form, other product information, which is critical for follow-up inspections and ongoing certification. Please use the enclosed page for manufacturer's shipment.

	Owner/Distributor	Manufacturer (If Different From Owner/Distributor)
Company Name:	**Emmedue S.P.A.**	**SAME AS OWNER**
Address:	Via Toniolo 39/b Z.I. Bellocchi 61032 Fano (PU) Italy	
Tel:	(0039) 0721 855650 / 1	Fax:
Email:	(0039) 0721 854030	
Contact Person:	Omero Bassotti	

FORMULATION (attach material specification sheet(s) or "Certificate of Analysis")

Material	Approved Supplier(s)	Specification	% Content
EPS	ISOPAK Adratica Spa	15AE (It. Gov. Standard)	No Grind
EPS	Sulpol		
Steel Coil	MEttallurgica Ledrense	2.4mm diam., 3.00mm diam., 2.50mm diam.	3.0mm Yield 793 N/mm2 2.5mm Yield 712N/mm2
Adhesive	DA.FO.TEC	ABATECK D40/R	Use to join under length EPS panels

MANUFACTURING PROCESS (attach flowchart and/or details)

EPS and Steel Coil received, COA inspected to ensure quality, moved into inventory. Hotwires are set to Dimension using automated system, operator checks manually to ensure. EPS cut to size. Metal wire is Checked COA and diam. (calibrated caliper), monthly yield, ultimate, and elongation checked with calibrated tensile equipment. Steel wire loaded in to automated system. Unrolled and straightened, passed through welder that joins vertical and horizontal steel columns in preset grid pattern. Steel grid and EPS block taken To automated joiner. The EPS has steel grid laid on bottom surface and top surface. Joiner welds two grid Surfaces together. Inspector verifies welds are present . If > 3% welds missing, manual welding done.

PRODUCT DESCRIPTION: See Next Page

OTHER COMMENTS

Emmedue buys completed component parts. Uses proprietary automated equipment to cut and weld

Components together forming completed EPS Steel Grid System. This system is taken onsite, where Customers follow Emmedue installation instructions to apply shot crete exterior facings.

Intertek Testing Services NA Ltd.
Inspector: Matt Lansdowne, EIT
Email: matt.lansdowne@intertek.com

Phone: (604) 520-3321 ext. 112

EMMEDUE TEST SAMPLE SIZES
July 1-2, 2007

Type of test	Normative	Type of panel	Lengths	Height	Final thickness	Quantity of tests
Load Bearing Wall	ASMT E 119	PSM 80	10'	10'	6"	2
Floor/Roof Fire Test	ASMT E 119	PSM 80	10'	10'	6"	2
Wall Compression	AC15 4.2.2.2	PSM 80	4'	8'	6"	5
	ASTM E 72	PSM 80	4'	14'	6"	5
Wall Flexural	AC15 4.2.2.3	PSM 80	4'	8'	6"	5
	ASTM E 72	PSM 80	4'	14'	6"	4
Wall Flexural-Compression	AC15 4.2.2.4	PSM 80	4'	8'	6"	5
	ASTM E 72	PSM 80	4'	14'	6"	5
Wall Shear	AC15 4.2.2.5	PSM 80	8'	8'	6"	5
	ASTM E 72	PSM 80	8'	14'	6"	4
Floor/Roof Flexural	AC15 4.2.2.6 ASTM E 455	PSM 80	4'	8'	7"	5
		PSM 80	4'	12'	7"	6
		PSM 150	4'	8'	9.5"	6
		PSM 150	4'	12'	9.5"	6
Floor/Roof Diaphragm	AC15 4.2.2.7	PSM 80	4'	8'	6"	5
	ASTM E 455	PSM 80	4'	12'	6"	5
					Total panel	75

2/07/07.

List of Calibrated Instrumentation Used for Testing

Description	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
Load Cell	41A	1113118	3/8/07	3/8/08
Load Cell	41A	1103704	3/8/07	3/8/08
Load Cell	41A	1103702	4/17/07	4/17/08
Load Cell	41A	1103698	4/17/07	4/17/08
Load Cell	41A	1103703	4/17/07	4/17/08
Load Cell	41A	1103697	3/8/07	3/8/08
Load Cell	41A	984467	3/8/07	3/8/08
Transducer	1850-005	191408-001	2/23/07	2/23/08
Transducer	1850-005	191408-006	4/23/07	4/23/08
Transducer	1850-005	191408-007	2/23/07	2/23/08
Transducer	1850-005	191408-008	2/23/07	2/23/08
Transducer	1850-005	191408-009	4/23/07	4/23/08
Transducer	1850-005	191408-010	4/23/07	4/23/08
Transducer	1850-005	191408-013	4/23/07	4/23/08
Transducer	1850-005	191408-015	4/23/07	4/23/08
Transducer	1850-005	191408-019	2/23/07	2/23/08
Transducer	1850-005	191408-020	2/23/07	2/23/08
DAQ Cart	N/A	99LE004	5/27/07	11/27/08
Stopwatch	14-649-9	61809410	8/15/07	8/15/08
3000 psi pressure gauge	N/A	298967	5/18/07	5/18/08

REFERENCES

1) Emmedue Advanced Building Systems Operator's Manual, Rev. 02 or 3/19/2004, pp. 2-7, 15-16.
2) Acceptance Criteria for Sandwich Panels, ICC – AC 04, Effective July 1, 2007, Section 4.4.1, p. 5.
3) Acceptance Criteria for Concrete Floor, Roof and Wall Systems and Concrete Masonry Wall Systems, ICC – AC 15, Effective July 1, 2007.

REVISION SUMMARY

DATE	SUMMARY
January 5, 2009	Section 3.2 (Sample and Assembly Description); galvanized steel wire mesh diameters changed to 0.099 inches (transverse) and 0.121 inches (longitudinal)
February 20, 2008	Original Report Issue Date