



## SMITH-EMERY LABORATORIES

*An Independent Commercial Testing Laboratory, Established 1904*

781 East Washington Boulevard – 2<sup>nd</sup> Floor Los Angeles, California 90021 ♦ Phone (213) 745-5333 ♦ Fax (213) 741-8626

Project No.: 40205-1

March 6, 2012

Jeff Church  
Expanded Metal Lath Association c/o  
National Association of Architectural Metal Manufacturers  
800 Roosevelt Rd.  
Building C, Suite 312  
Glen Ellyn, IL 60137

Subject: Transverse Load Test on Stucco Panels

Dear Mr. Church:

At your request, transverse load tests were performed on 18 stucco wall assemblies with 3.4 self-furring expanded metal lath in October, 2011 in general accordance with ICC-ES AC191, *Acceptance Criteria for Metal Plaster Bases (Lath)*, effective June, 2009. The attached Report Number L-11-1869b R1 presents the description of the tests performed, the results of our testing, and our findings.

We appreciate this opportunity to be of service to you. If you have any questions regarding this report, please do not hesitate to contact us at your earliest convenience.

Respectfully submitted,  
**SMITH EMERY LABORATORIES, INC.**

Pingsheng Zhu  
Registered Civil Engineer No. C72482  
Registration Expires 6-30-12  
Staff Engineer

Attachment: Report No. L-11-1869b R1



# SMITH EMERY LABORATORIES

791 E. WASHINGTON BLVD. • LOS ANGELES, CA 90021  
PHONE (213) 745-5333 • FAX (213) 741-8626

**SUBJECT REPORT: TRANSVERSE LOAD TEST ON STUCCO PANELS**

**PREPARED FOR:** Expanded Metal Lath Association c/o  
National Association of Architectural Metal Manufacturers  
800 Roosevelt Rd.  
Building C, Suite 312  
Glen Ellyn, IL 60137

**Date:** March 6, 2012

**Project No.:** 40205-1

**Report No.:** L-11-1869b R1



# SMITH-EMERY LABORATORIES

*An Independent Commercial Testing Laboratory, Established 1904*

781 East Washington Boulevard – 2<sup>nd</sup> Floor Los Angeles, California 90021 ♦ Phone (213) 745-5333 ♦ Fax (213) 741-8626

Project No: 40205-1  
Report No: L-11-1869b R1

## TABLE OF CONTENTS

|  |          |
|--|----------|
| <b>1. INTRODUCTION .....</b>                     | <b>1</b> |
| 1.1 Purpose.....                                 | 1        |
| 1.2 Scope of Testing .....                       | 1        |
| 1.3 Sample Description.....                      | 1        |
| <b>2. TEST SETUP AND LOADING PROCEDURE .....</b> | <b>2</b> |
| <b>3. TEST RESULTS.....</b>                      | <b>3</b> |
| 3.1 Plaster Mix Compressive Strength.....        | 3        |
| 3.2 Transverse Load Test Results .....           | 3        |
| <b>4. FINDINGS AND CLOSURE .....</b>             | <b>4</b> |
| 4.1 Findings.....                                | 4        |
| 4.2 Closure .....                                | 4        |

## APPENDIX A TESTING PHOTOS

## APPENDIX B LOAD-DEFORMATION CHARTS



# SMITH-EMERY LABORATORIES

An Independent Commercial Testing Laboratory, Established 1904

781 East Washington Boulevard – 2<sup>nd</sup> Floor Los Angeles, California 90021 ♦ Phone (213) 745-5333 ♦ Fax (213) 741-8626

Project No: 40205-1  
Report No: L-11-1869b R1

## 1. INTRODUCTION

### 1.1 Purpose

The purpose of the testing was to evaluate the transverse load resisting capacity of stucco wall assemblies incorporating 3.4 self-furring expanded metal lath.

### 1.2 Scope of Testing

Our general scope of this testing program included the following:

- Perform transverse load testing on 18 wall panels (4'×4') in general accordance with ICC-ES AC191, *Acceptance Criteria for Metal Plaster Bases (Lath)*, effective June, 2009.
- Preparation of this report providing description of the testing, test results, our findings and conclusion.

### 1.3 Sample Description

Eighteen stucco wall assemblies were fabricated at Smith-Emery facility by the client's contractor. The details of the panels' construction are listed in Table 1 and were verified by Smith-Emery representatives. All samples were 4-feet long by 4-feet wide and constructed with the frames standing vertically. The scratch coat was applied on 9/21/11, the brown coat was applied on 9/23/11, and the finish coat was applied on 9/30/11.

**Table 1 – Sample Construction Details**

| ID | Lath                                  | Stucco        | Frame                                    | Fastener (Lath to frame)                | Sheathing   | Number of Panels |
|----|---------------------------------------|---------------|--|---|-------------|------------------|
| D  | 3.4 self-furring, expanded metal lath | 3-coat stucco | 3-5/8 inch, 20 gauge stud, 16" on center | #8 modified truss screw at 6" on center | 5/8" gypsum | 6                |
| E  | 3.4 self-furring, expanded metal lath | 3-coat stucco | 6 inch, 16 gauge stud, 16" on center     | #8 modified truss screw at 6" on center | 5/8" gypsum | 6                |
| F  | 3.4 self-furring, expanded metal lath | 3-coat stucco | 2×6 wood stud (#2 SPF) at 16" on center  | #8 modified truss screw at 6" on center | none        | 6                |



## 2. TEST SETUP AND LOADING PROCEDURE

Each specimen was subjected to either a positive or negative uniform pressure until failure. The sample was installed horizontally on a vacuum chamber. For a positive pressure test, the sample was placed with the stucco panel facing up and supported continuously under the two outer studs. For a negative pressure test, the sample was installed with the stucco panel facing down. To avoid direct support under the stucco, angle brackets were used to attach the two outer studs. Refer to Figure 1 for clarification.

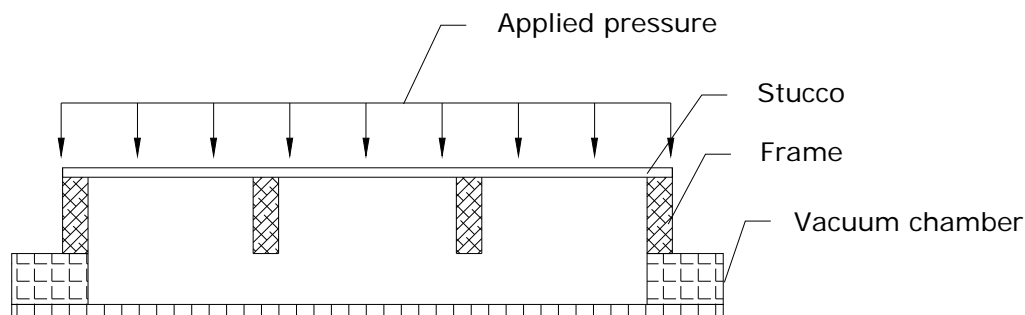
A plastic sheet (2 mils) was used to cover the top of panel and sealed the chamber. A vacuum pump was used to generate partial vacuum inside the chamber so the plastic sheet will apply a uniform pressure on the whole panel. The loading process was controlled manually.

A differential pressure transducer was used to measure the relative pressure across the chamber. The deflections of each panel were measured at the center of the stucco panel by one displacement transducer.

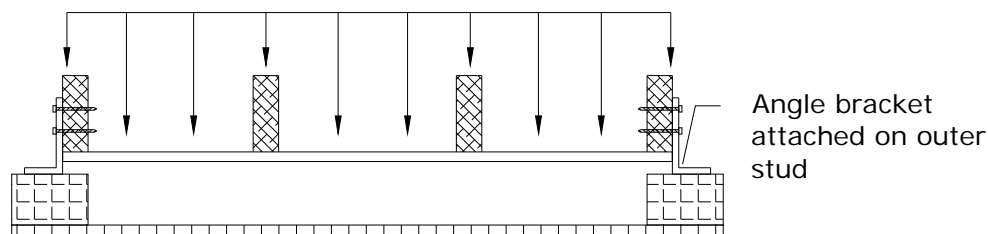
The load was applied continuously in increments. At each load increment, the load was maintained for 5 minutes.

The following instrumentations were used in the test:

- One differential pressure transducer (Omega PX654-100D5V).
- One displacement transducers (UniMeasure PA-5-DS)
- One Vishay® Scanner 5100 for data acquisition of all other instrumentation.



Positive pressure Test



Negative Pressure Test

**Figure 1 – Test Setup**

**3. TEST RESULTS****3.1 Plaster Mix Compressive Strength**

Three 2-inch cubes for each plaster mix of the scratch coat and brown coat were tested for compressive strength at the age of 28-days and the results are summarized in Table 2.

**Table 2 – Compressive Strength for Plaster**

| Specimen ID  | 28-day Compressive Strength (psi) | Average (psi) |
|--------------|-----------------------------------|---------------|
| Scratch coat | 2,830                             | 2,950         |
|              | 2,980                             |               |
|              | 3,040                             |               |
| Brown coat   | 2,240                             | 2,200         |
|              | 2,100                             |               |
|              | 2,250                             |               |

**3.2 Transverse Load Test Results**

Eighteen stucco wall panels were tested for transverse loading. The results are summarized in Table 3. The load-deformation charts are included in Appendix B.

**Table 3 – Summary of Transverse Load Test Result**

| Loading Type | Sample ID | Test Date | Maximum Load (psf) | Average Load (psf) | Failure Mode* |
|--------------|-----------|-----------|--------------------|--------------------|---------------|
| Positive     | D1        | 10/7/11   | 283                | 293                | 2             |
|              | D2        | 10/7/11   | 281                |                    | 2             |
|              | D3        | 10/10/11  | 314                |                    | 2             |
|              | E1        | 10/12/11  | 585                | 573                | 1             |
|              | E2        | 10/13/11  | 567                |                    | 1             |
|              | E3        | 10/13/11  | 568                |                    | 1             |
|              | F1        | 10/10/11  | 440                | 398                | 3, 5          |
|              | F2        | 10/11/11  | 378                |                    | 3, 5          |
|              | F3        | 10/11/11  | 376                |                    | 3, 5          |
| Negative     | D4        | 10/7/11   | 156                | 163                | 2             |
|              | D5        | 10/7/11   | 194                |                    | 2             |
|              | D6        | 10/10/11  | 139                |                    | 2             |
|              | E4        | 10/12/11  | 400                | 370                | 4, 5          |
|              | E5        | 10/13/11  | 313                |                    | 4, 5          |
|              | E6        | 10/13/11  | 398                |                    | 3             |
|              | F4        | 10/10/11  | 240                | 242                | 3, 5          |
|              | F5        | 10/11/11  | 247                |                    | 3, 5          |
|              | F6        | 10/11/11  | 238                |                    | 3, 5          |

\* Failure mode:

1. No failure;
2. Global flexural failure at the mid-span of the panel;
3. Frame members connection failure;
4. Metal lath pulling through fasteners;
5. Stucco panel crack;



# SMITH-EMERY LABORATORIES

*An Independent Commercial Testing Laboratory, Established 1904*

781 East Washington Boulevard – 2<sup>nd</sup> Floor Los Angeles, California 90021 ♦ Phone (213) 745-5333 ♦ Fax (213) 741-8626

Project No: 40205-1  
Report No: L-11-1869b R1

## 4. FINDINGS AND CLOSURE

### 4.1 Findings

Based on the information given and results presented in this report, we make no statement of compliance or noncompliance to any standard or specification for the product tested.

### 4.2 Closure

Any findings noted in this report were prepared in accordance with generally accepted material engineering and testing principles and practices. No other warranty, either expressed or implied, is made. This report has been prepared for **Expanded Metal Lath Association** to be used for product evaluation and/or design purposes only. The use of this report for any other purpose shall be at the users' own discretion, based on their own interpretation of the results contained within.





# SMITH-EMERY LABORATORIES

*An Independent Commercial Testing Laboratory, Established 1904*

781 East Washington Boulevard – 2<sup>nd</sup> Floor Los Angeles, California 90021 ♦ Phone (213) 745-5333 ♦ Fax (213) 741-8626

---

Project No: 40205-1  
Report No: L-11-1869b R1

## APPENDIX A

### TESTING PHOTOS



## SMITH-EMERY LABORATORIES

*An Independent Commercial Testing Laboratory, Established 1904*

781 East Washington Boulevard – 2<sup>nd</sup> Floor Los Angeles, California 90021 ♦ Phone (213) 745-5333 ♦ Fax (213) 741-8626

Project No: 40205-1  
Report No: L-11-1869b R1



**Photo 1 – Sample Fabrication**

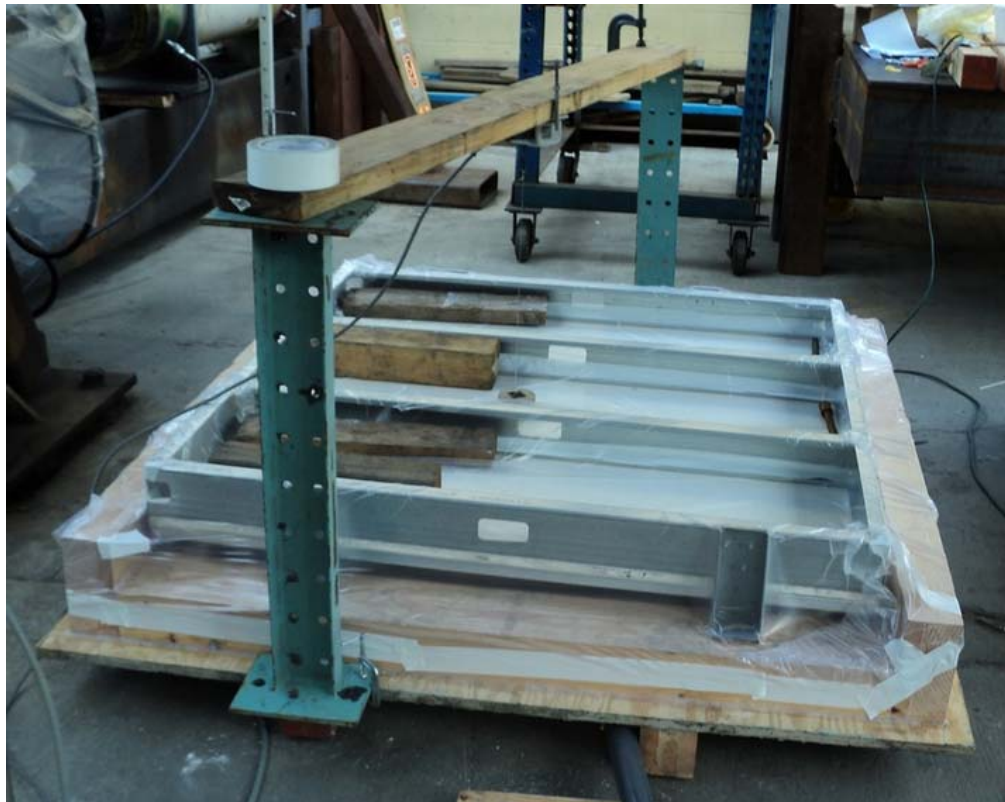


# SMITH-EMERY LABORATORIES

An Independent Commercial Testing Laboratory, Established 1904

781 East Washington Boulevard – 2<sup>nd</sup> Floor Los Angeles, California 90021 ♦ Phone (213) 745-5333 ♦ Fax (213) 741-8626

Project No: 40205-1  
Report No: L-11-1869b R1



**Photo 2 - Test Setup**

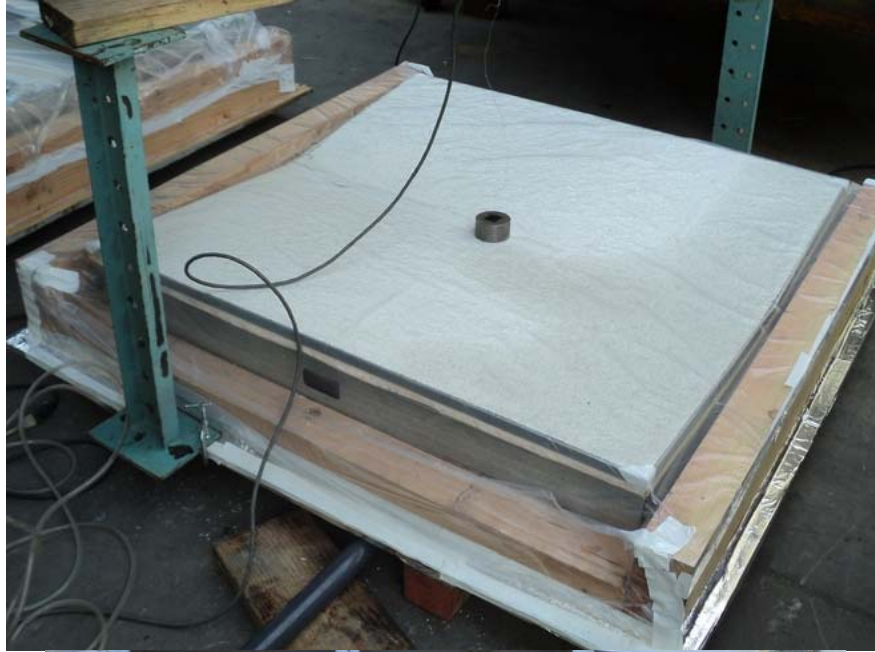


## SMITH-EMERY LABORATORIES

*An Independent Commercial Testing Laboratory, Established 1904*

781 East Washington Boulevard – 2<sup>nd</sup> Floor Los Angeles, California 90021 ♦ Phone (213) 745-5333 ♦ Fax (213) 741-8626

Project No: 40205-1  
Report No: L-11-1869b R1



**Photo 3 – Typical Failure (D3)**

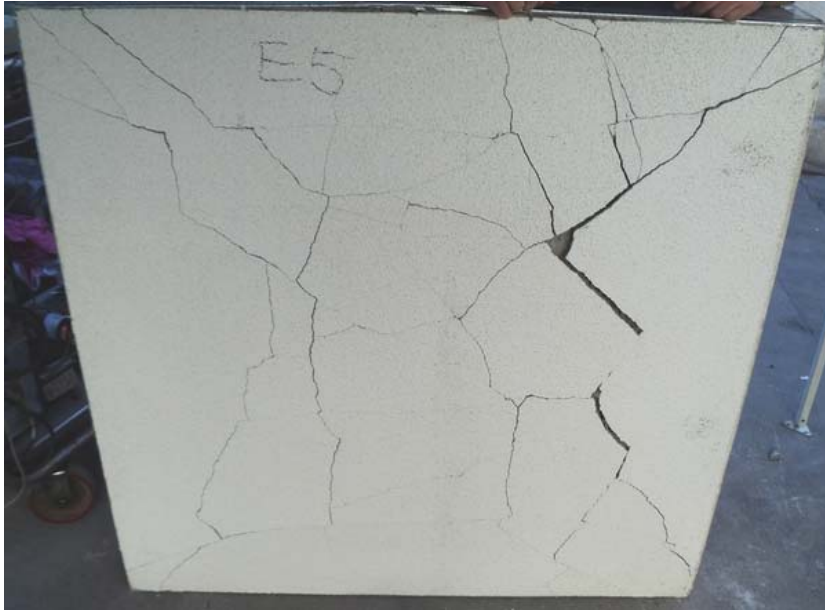


## SMITH-EMERY LABORATORIES

*An Independent Commercial Testing Laboratory, Established 1904*

781 East Washington Boulevard – 2<sup>nd</sup> Floor Los Angeles, California 90021 ♦ Phone (213) 745-5333 ♦ Fax (213) 741-8626

Project No: 40205-1  
Report No: L-11-1869b R1



**Photo 4 – Typical Failure (E5)**



## SMITH-EMERY LABORATORIES

*An Independent Commercial Testing Laboratory, Established 1904*

781 East Washington Boulevard – 2<sup>nd</sup> Floor Los Angeles, California 90021 ♦ Phone (213) 745-5333 ♦ Fax (213) 741-8626

Project No: 40205-1  
Report No: L-11-1869b R1



**Photo 5 – Typical Failure (F2)**



## SMITH-EMERY LABORATORIES

*An Independent Commercial Testing Laboratory, Established 1904*

781 East Washington Boulevard – 2<sup>nd</sup> Floor Los Angeles, California 90021 ♦ Phone (213) 745-5333 ♦ Fax (213) 741-8626

Project No: 40205-1  
Report No: L-11-1869b R1



**Photo 6 – Typical Failure (F5)**



# SMITH-EMERY LABORATORIES

*An Independent Commercial Testing Laboratory, Established 1904*

781 East Washington Boulevard – 2<sup>nd</sup> Floor Los Angeles, California 90021 ♦ Phone (213) 745-5333 ♦ Fax (213) 741-8626

Project No: 40205-1  
Report No: L-11-1869b R1

## APPENDIX B

### LOAD- DEFORMATION CHARTS

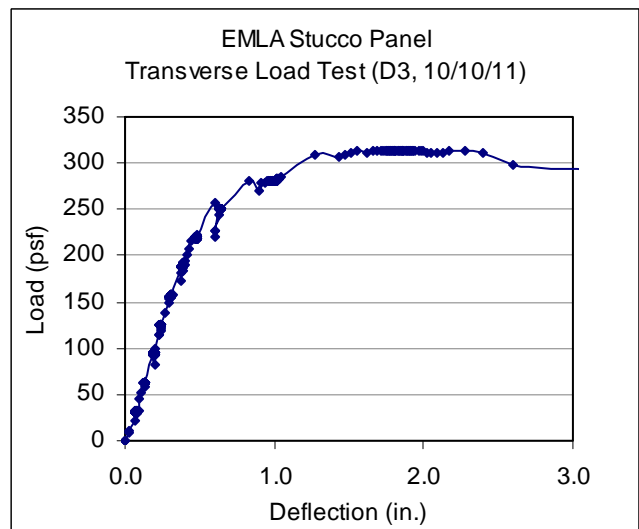
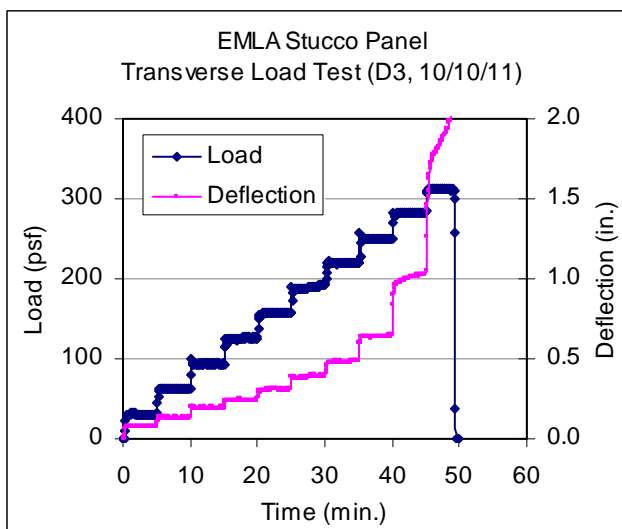
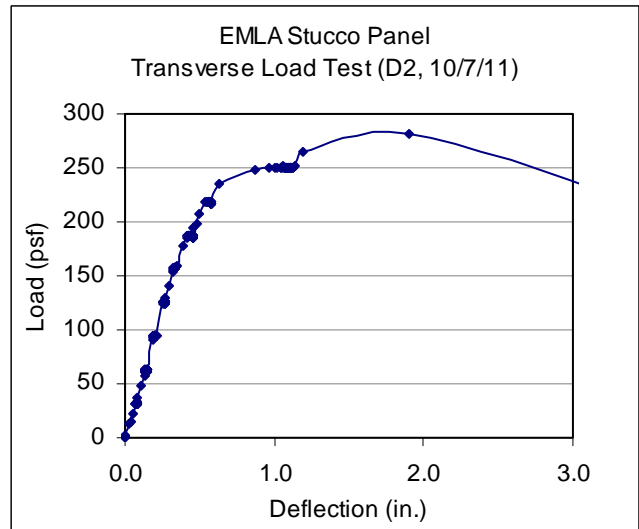
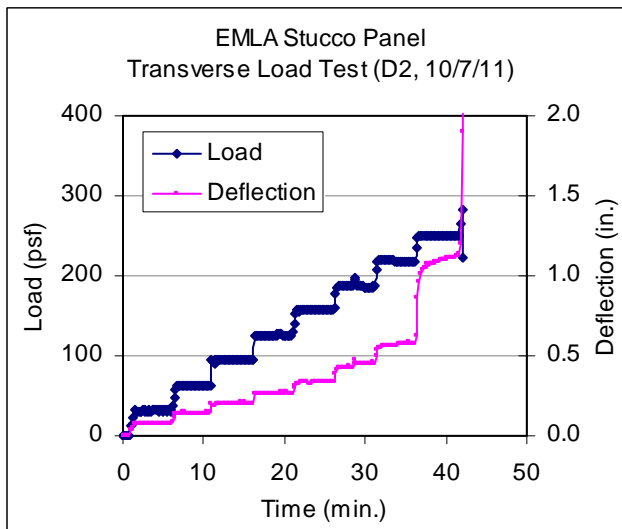
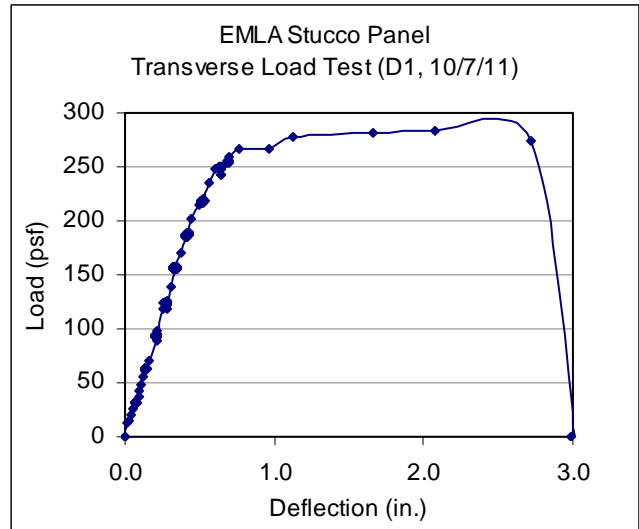
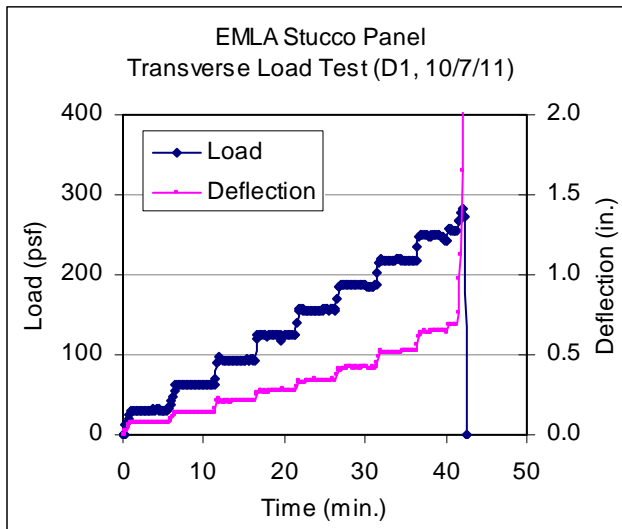


# SMITH-EMERY LABORATORIES

An Independent Commercial Testing Laboratory, Established 1904

781 East Washington Boulevard – 2<sup>nd</sup> Floor Los Angeles, California 90021 ♦ Phone (213) 745-5333 ♦ Fax (213) 741-8626

Project No: 40205-1  
Report No: L-11-1869b R1



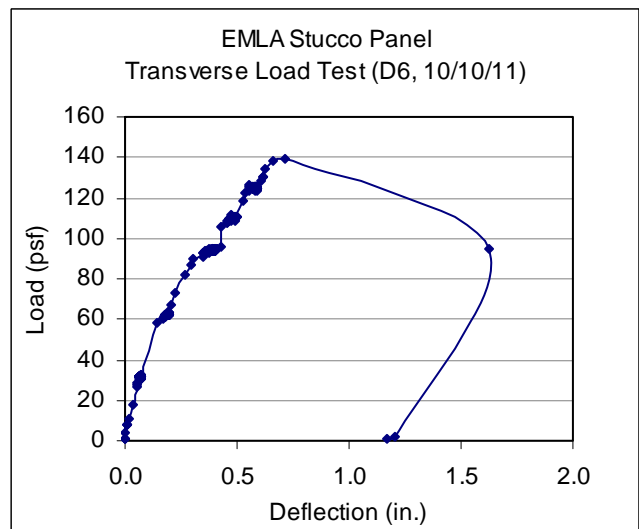
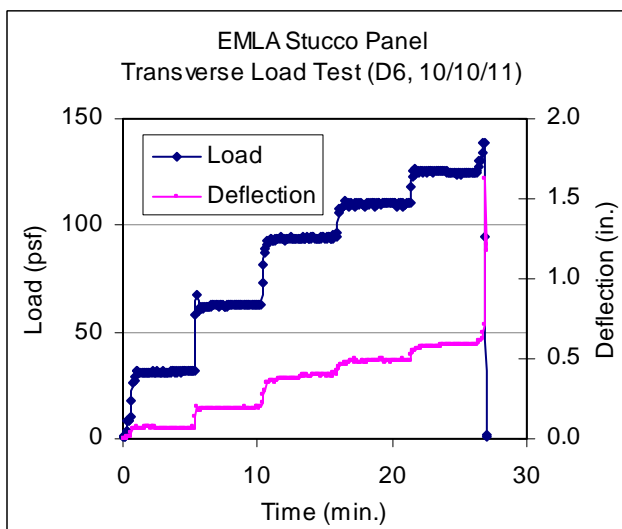
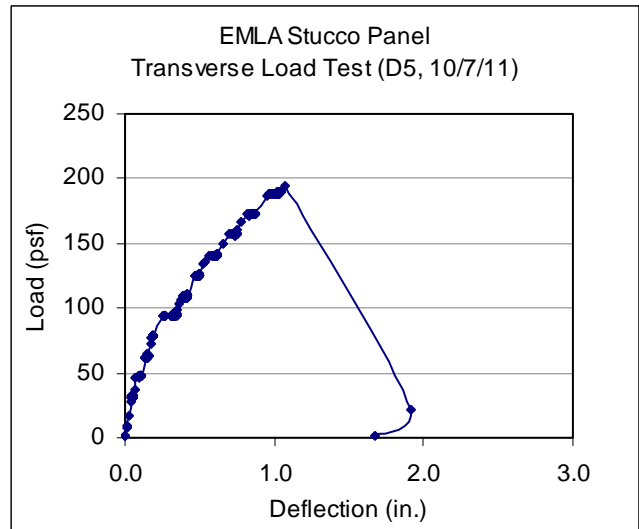
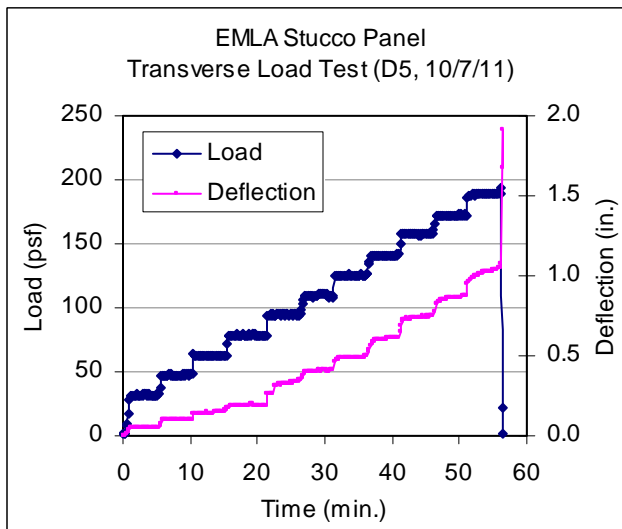
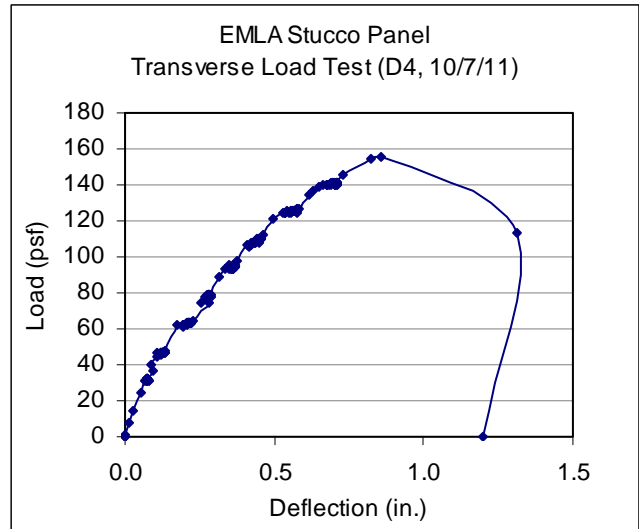
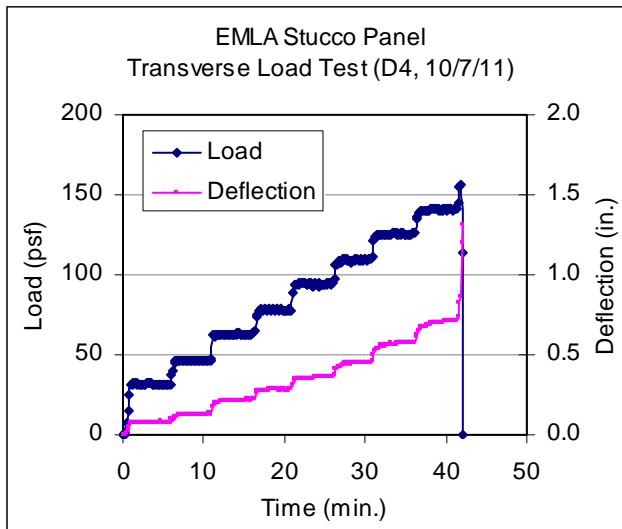


# SMITH-EMERY LABORATORIES

An Independent Commercial Testing Laboratory, Established 1904

781 East Washington Boulevard – 2<sup>nd</sup> Floor Los Angeles, California 90021 ♦ Phone (213) 745-5333 ♦ Fax (213) 741-8626

Project No: 40205-1  
Report No: L-11-1869b R1



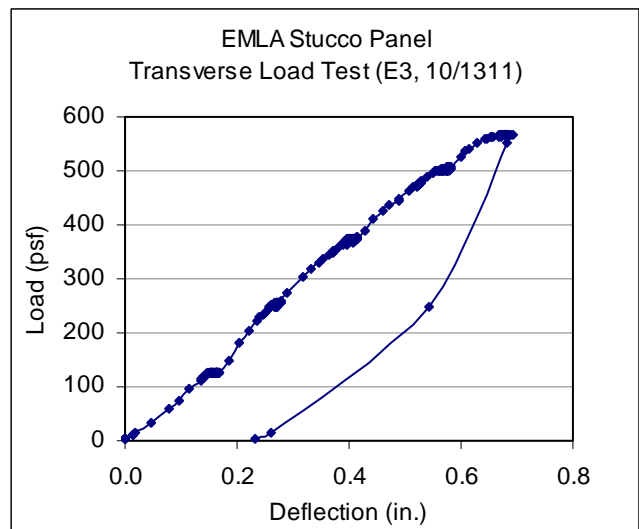
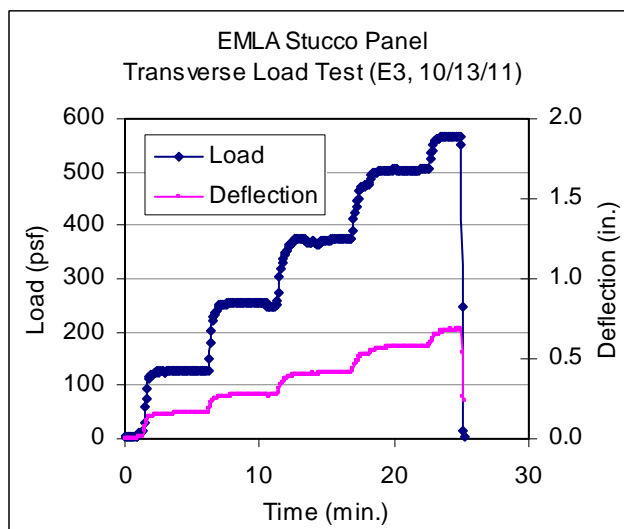
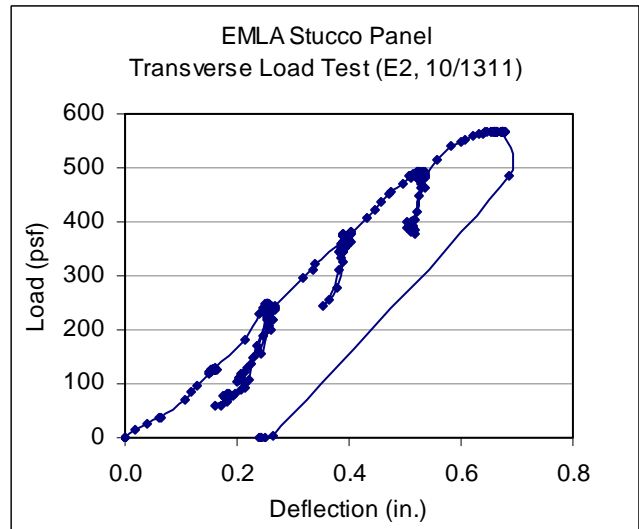
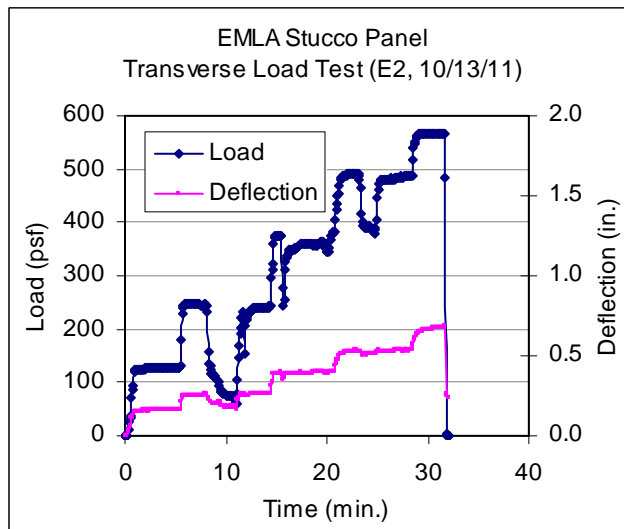
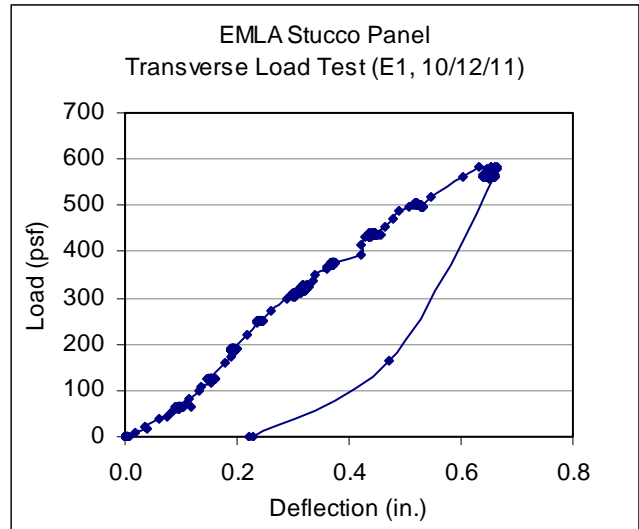
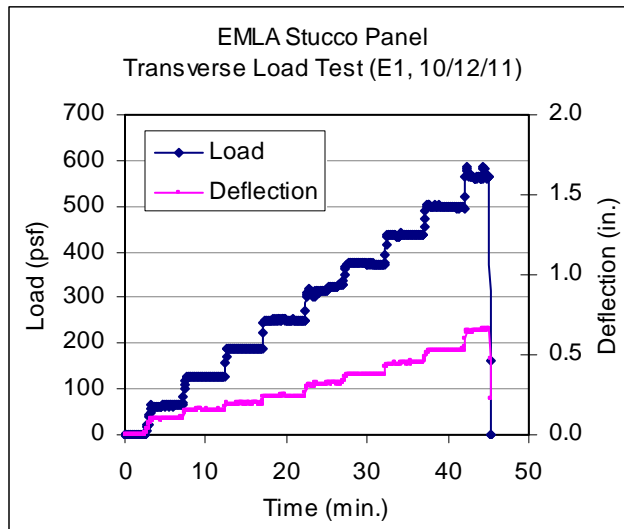


# SMITH-EMERY LABORATORIES

An Independent Commercial Testing Laboratory, Established 1904

781 East Washington Boulevard – 2<sup>nd</sup> Floor Los Angeles, California 90021 ♦ Phone (213) 745-5333 ♦ Fax (213) 741-8626

Project No: 40205-1  
Report No: L-11-1869b R1



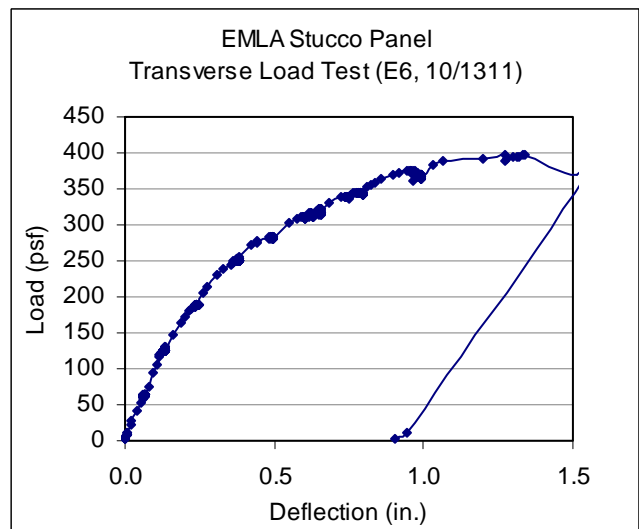
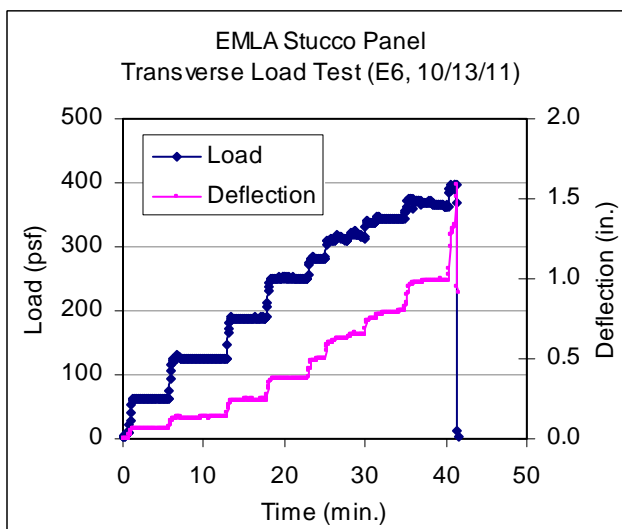
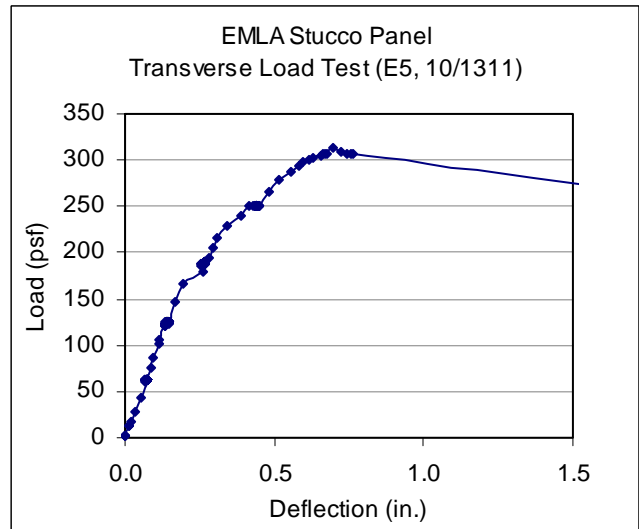
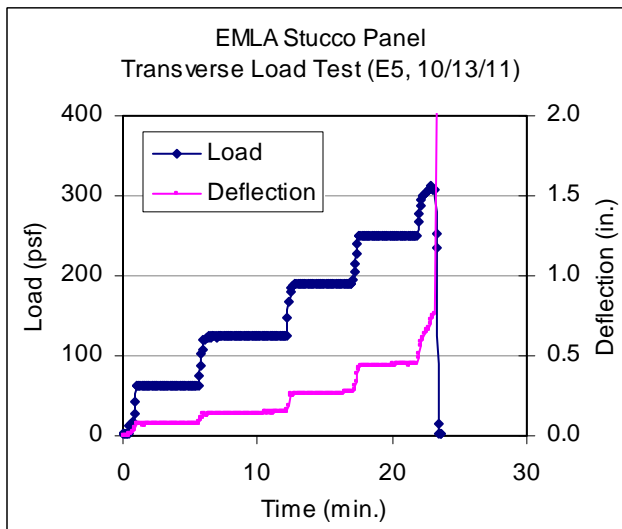
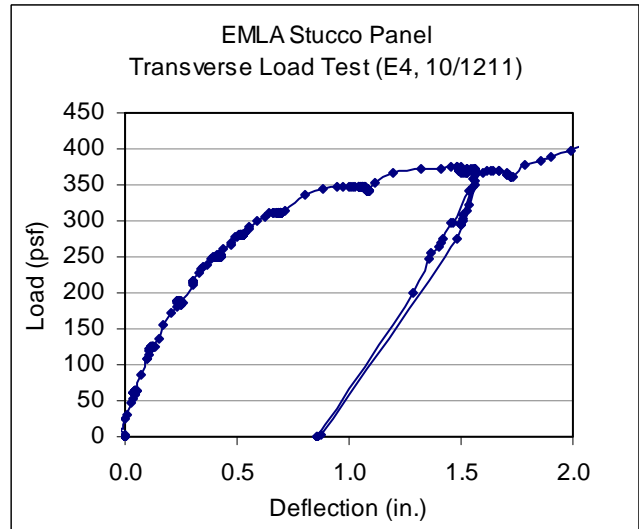
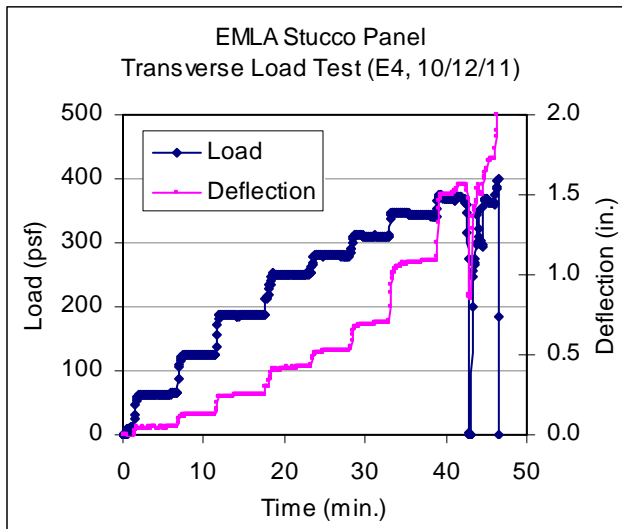


# SMITH-EMERY LABORATORIES

An Independent Commercial Testing Laboratory, Established 1904

781 East Washington Boulevard – 2<sup>nd</sup> Floor Los Angeles, California 90021 ♦ Phone (213) 745-5333 ♦ Fax (213) 741-8626

Project No: 40205-1  
Report No: L-11-1869b R1



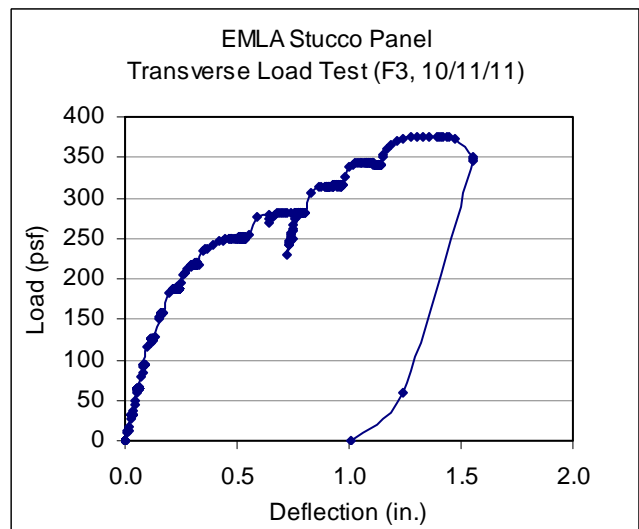
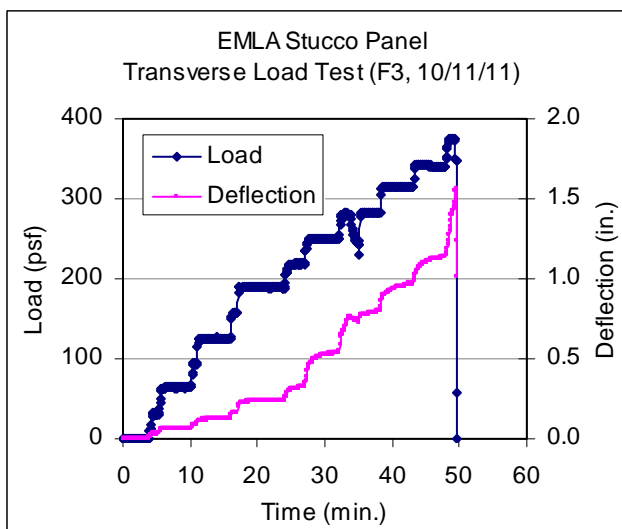
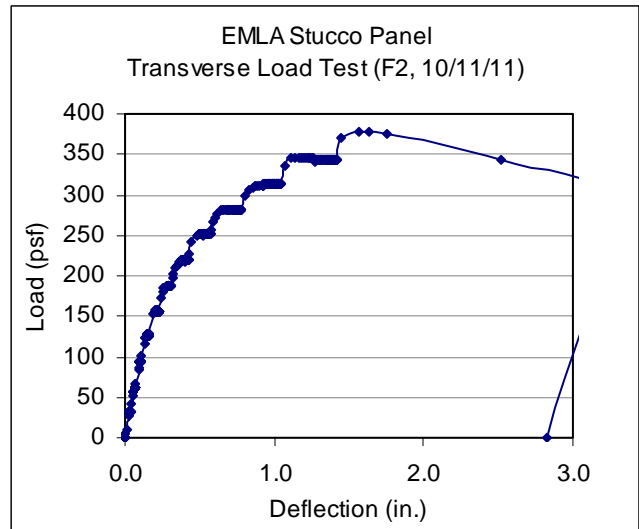
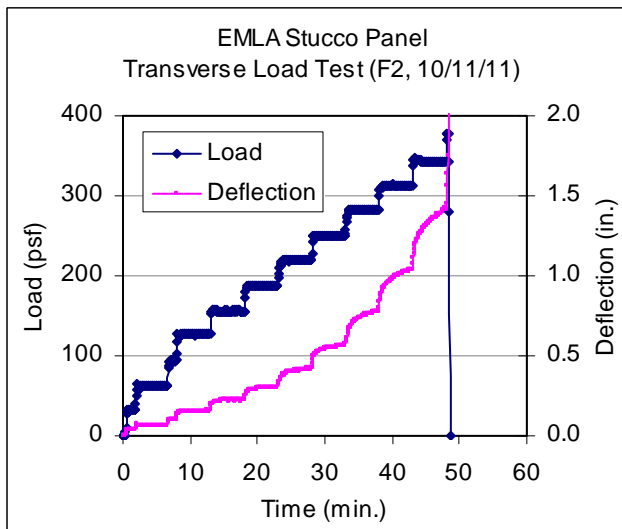
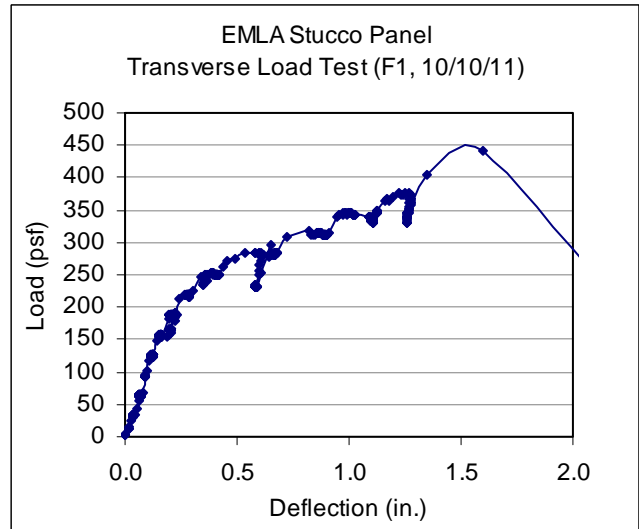
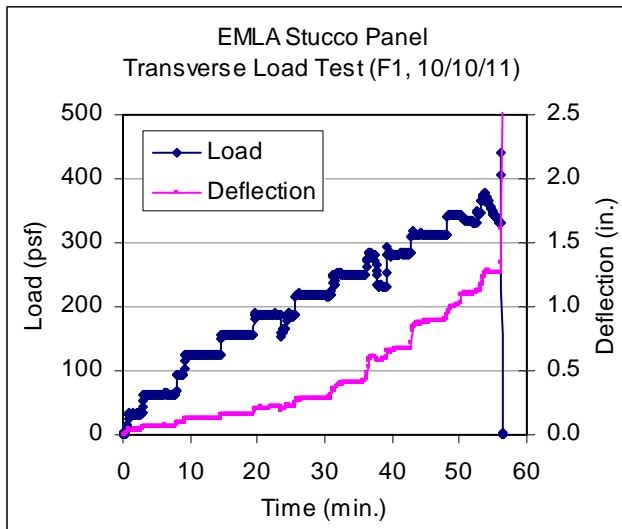


# SMITH-EMERY LABORATORIES

An Independent Commercial Testing Laboratory, Established 1904

781 East Washington Boulevard – 2<sup>nd</sup> Floor Los Angeles, California 90021 ♦ Phone (213) 745-5333 ♦ Fax (213) 741-8626

Project No: 40205-1  
Report No: L-11-1869b R1





# SMITH-EMERY LABORATORIES

An Independent Commercial Testing Laboratory, Established 1904

781 East Washington Boulevard – 2<sup>nd</sup> Floor Los Angeles, California 90021 ♦ Phone (213) 745-5333 ♦ Fax (213) 741-8626

Project No: 40205-1  
Report No: L-11-1869b R1

