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FLEXURAL TESTS OF THREE REINFORCED CONCRETE "ICE WALL" BEAMS

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FLEXURAL TESTS OF THREE REINFORCED CONCRETE "ICE WALL" BEAMS

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Report to

Ben Gerwick, Inc.
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The Principal Investigator was Associate Professor Abolhassan Astaneh-Asl. Marcial Blondet and Cheng-Chih Chen supervised the execution of the tests, processed the experimental data, and prepared the final report.

Richard Parsons and Doug Zulaica were in charge of specimen setup and control of the 4,000 kip Universal Testing Machine. Todd Merport verified all electronic components and operated the data acquisition system. William MacCracken calibrated the instruments and videotaped the tests.

1. INTRODUCTION

This report briefly presents the results of a test program on the flexural behavior of three reinforced concrete beams ("ice walls").

The tests were requested by Ben Gerwick Inc., Consulting Engineers of San Francisco, California, and were performed by the Department of Civil Engineering of the University of California at Berkeley.

The experimental work was conducted at the Structural Research Laboratory at the Richmond Field Station using the 4,000 kip Universal Testing Machine (UTM). Testing occurred between August 25 and September 2, 1992. Representatives of Ben Gerwick, Inc. witnessed the execution of each test.

2. OBJECTIVE

The main objective of the project was to study the behavior of the three ice wall specimens in flexure, under fixed-end conditions, subjected to a concentrated monotonic load. The load range of interest varied from the load corresponding to first flexural cracking level up to the load required to induce total failure.

To achieve this objective the global response of the specimens was characterized by the load-deflection relationship (stiffness and strength), distribution and level of cracking, and observed mode of failure. Local response was studied by measuring the strain in selected reinforcing elements.

It was particularly important to evaluate the impact of the amount and distribution of transverse reinforcement in the response of the specimens, since this constituted the only difference in the design of the three ice walls.

3. TEST SPECIMENS

The test specimens, labelled 2A-1, 2A-2, and 2A-3, were reinforced concrete beams. They were delivered to the Structural Research Laboratory at the Richmond Field Station on August 19, 1992. Their overall dimensions were 122.5" x 36.0" x 27.5" (longitudinal, vertical, transverse). The load was to be applied in the transverse direction, i.e. the longitudinal and "vertical" directions were in the horizontal plane.

The compressive strength of the concrete at 28 days, f'c, varied between 7,400 psi and 8,700 psi.

The longitudinal reinforcement consisted of packets of two bars spaced at 3.75". Number 7 (#7) bars were used for the bottom reinforcement, #8 bars for the top reinforcement. Vertical reinforcement consisted of two layers with 14 bars with a 1 3/8" diameter each. The continuity of these bars was simulated by tightening Dywidag nuts at each end of the bars against anchor plates loading onto the face of the specimens.

The only difference between the specimens (apart from having been built two days apart from each other) was the amount and distribution of transverse reinforcement, which consisted of T-headed stirrups. Additional rebar (#7 at the bottom, #5 at the top) was required to place the T-bars). Table 1 shows the identification code, the amount of transverse reinforcement, and the dates of construction and testing of all specimens. The test sequence was decided based on the relative early compressive strength of the concrete: the specimens were to be tested in order of decreasing early strength.

Table 1. Test Specimens

Specimen	Transverse Reinforcement	Date Built	Date Tested
2A-1	1.18%	7/27/92	9/02/92
2A-2	1.50%	7/29/92	8/28/92
2A-3	2.09%	7/31/92	8/25/92

Figures 1a, 1b, and 1c, (provided by Ben Gerwick, Inc.) show the construction details of specimens 2A-1, 2A-2, and 2A-3, respectively.

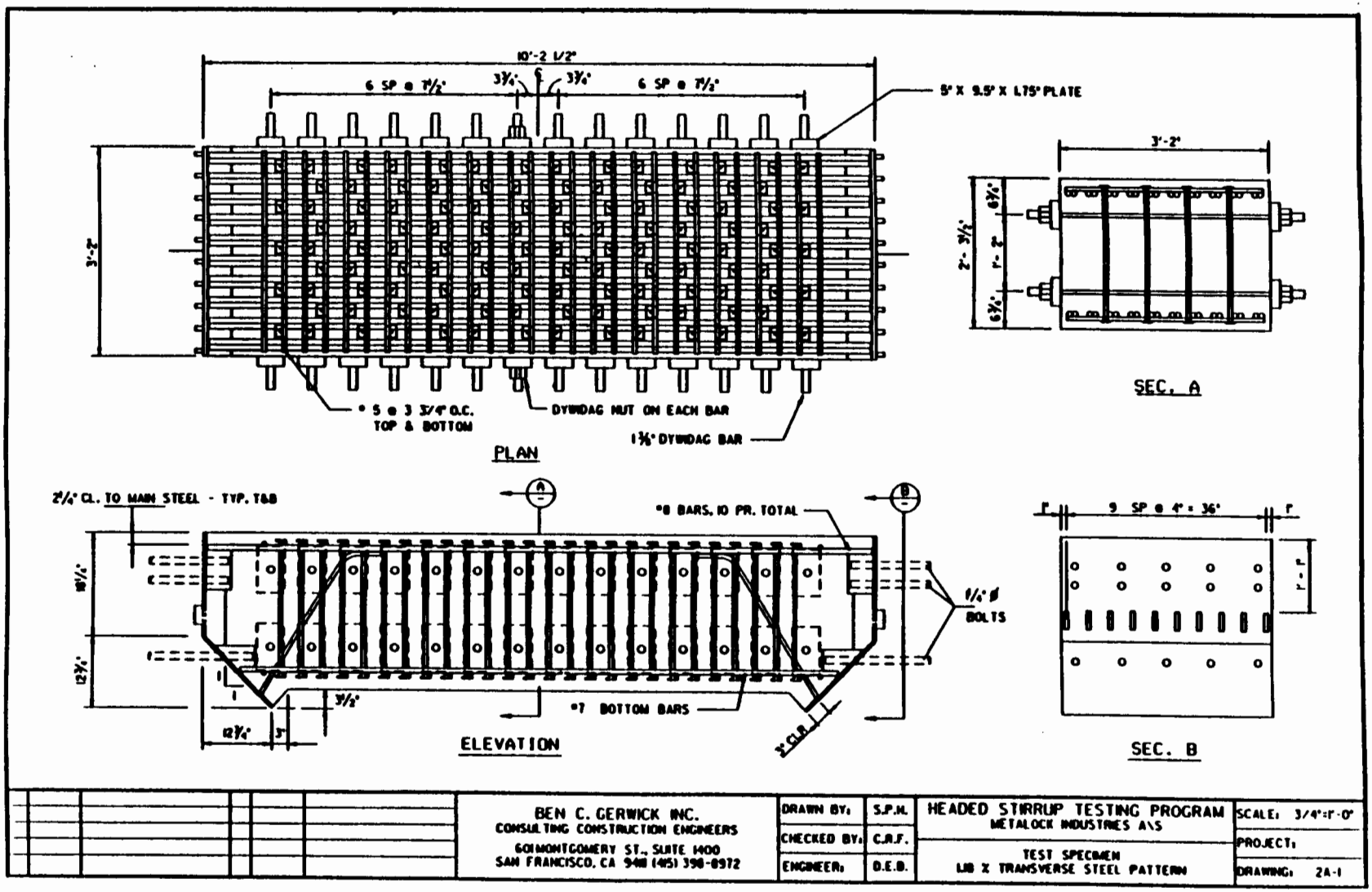


Fig.1a: Test Specimen 2A-1

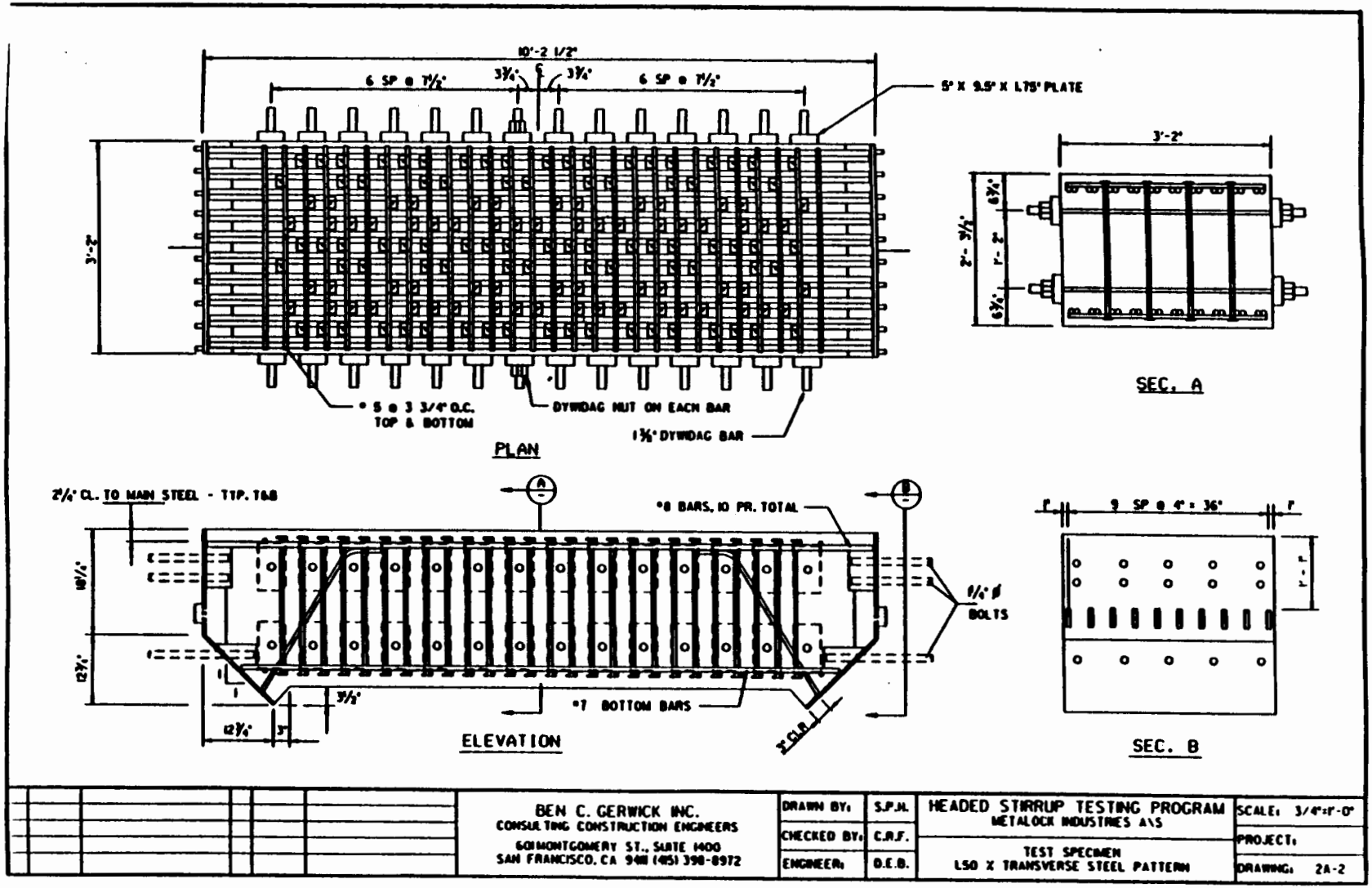


Fig.1b: Test Speciment 2A-2

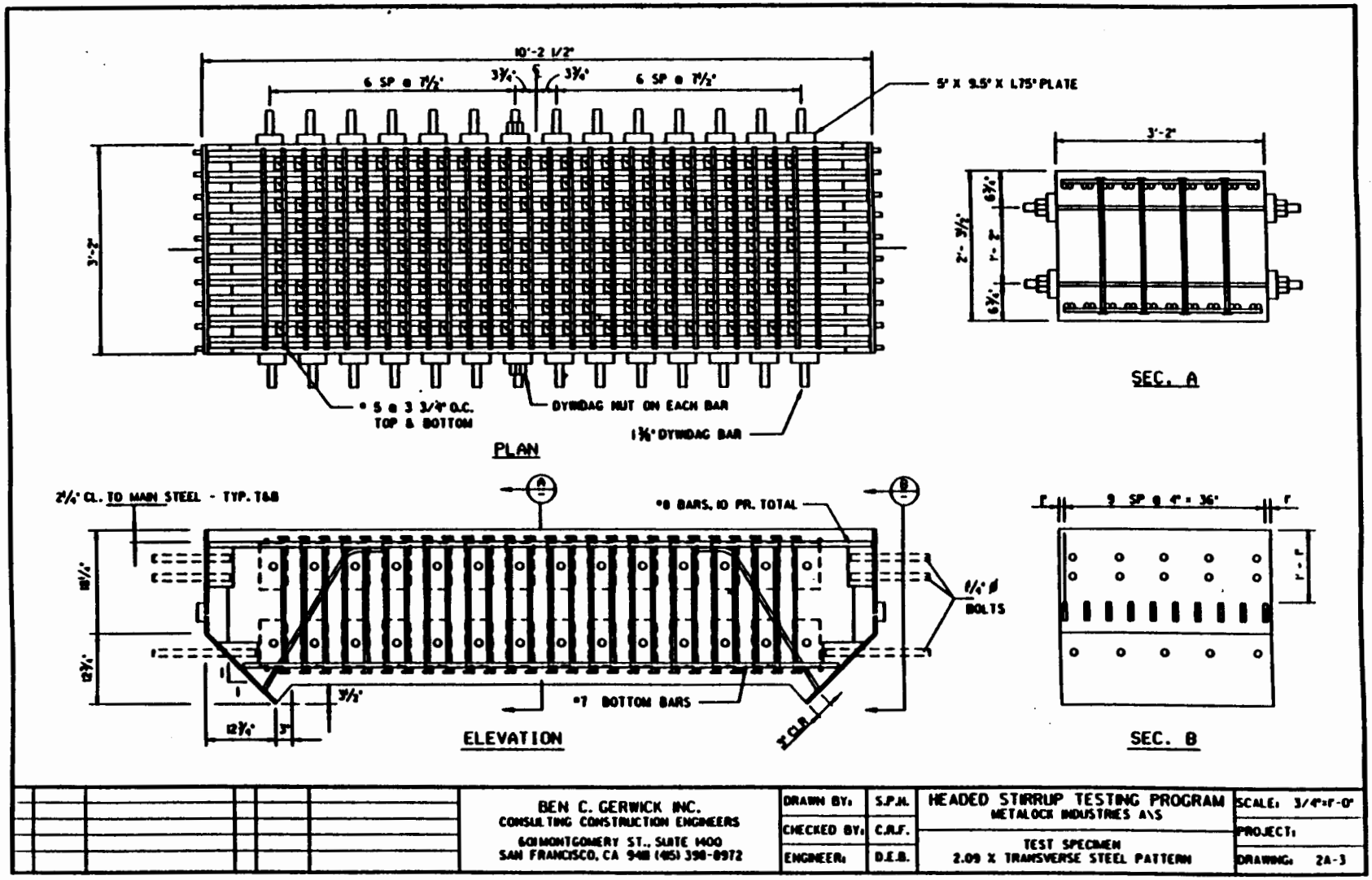


Fig.1c: Test Specimen 2A-3

4. TEST SETUP AND INSTRUMENTATION

The specimens were placed on a rigid steel frame. The supports were 45 degree planes reinforced with steel plates resting on corresponding plates of the frame. Steel plates were provided at the vertical faces at each end of the specimens. High strength bolts were used to connect the vertical ends of the beams to the frame.

To simulate a fixed-end conditions, steel keys at the vertical end plates of the specimen engaged to similar keys built into the frame. Grout was poured into the interface between frame and specimen up to above the level of these steel keys to guarantee good contact between steel frame and specimen.

The load was applied at mid-span of the beams. The head of the 4,000 kip UTM was pressed against a set of loading plates, provided to ensure uniform load distribution. Figure 2 shows the general test setup.

The instrumentation consisted of strain gauges and linear potentiometers, used to measure the strain in the reinforcement and the deflection of the beams, respectively. Figure 3 shows the distribution of internal strain gauges. The strain in the high strength connection bolts was also monitored. Figure 4 shows the placement of strain gauges on these bolts. The location of the linear potentiometers used to measure deflections is given in Figure 5. For the last two tests (specimens 2A-2 and 2A-1), a ninth potentiometer was used to measure the relative horizontal deflection between the "legs" of the steel frame. Table 2 summarizes the instrumentation used. Appendix A includes a detailed description of the instruments used for each specimen.

The experimental data were measured with a Neff 620 Data Acquisition System, connected to a 486 Personal Computer. Software developed at UCB (DAS85) was used to control the Neff, sample the instruments, and save the data in a diskfile in packed format.

The specimen behavior was monitored during each test via an XY recorder where the center displacement and the strain at a central bottom rebar were plotted continuously against the applied load.

Table 2. Summary of Instrumentation

55 INSTRUMENTS	QTY
44 STRAIN GAGES	
T-Bar	10
Longitudinal Compression	9
Longitudinal Tension	9
Haunch Bars	6
Vertical Top	3
Vertical Bottom	3
High Strength Bolts	4
9 LINEAR POTENTIOMETERS	
Transverse	8
Longitudinal	1
2 UNIVERSAL TESTING MACHINE	
Load	1
Head Displacement	1

The UTM head displacement was measured for reference purposes only. The retrieved data is not included in this report.

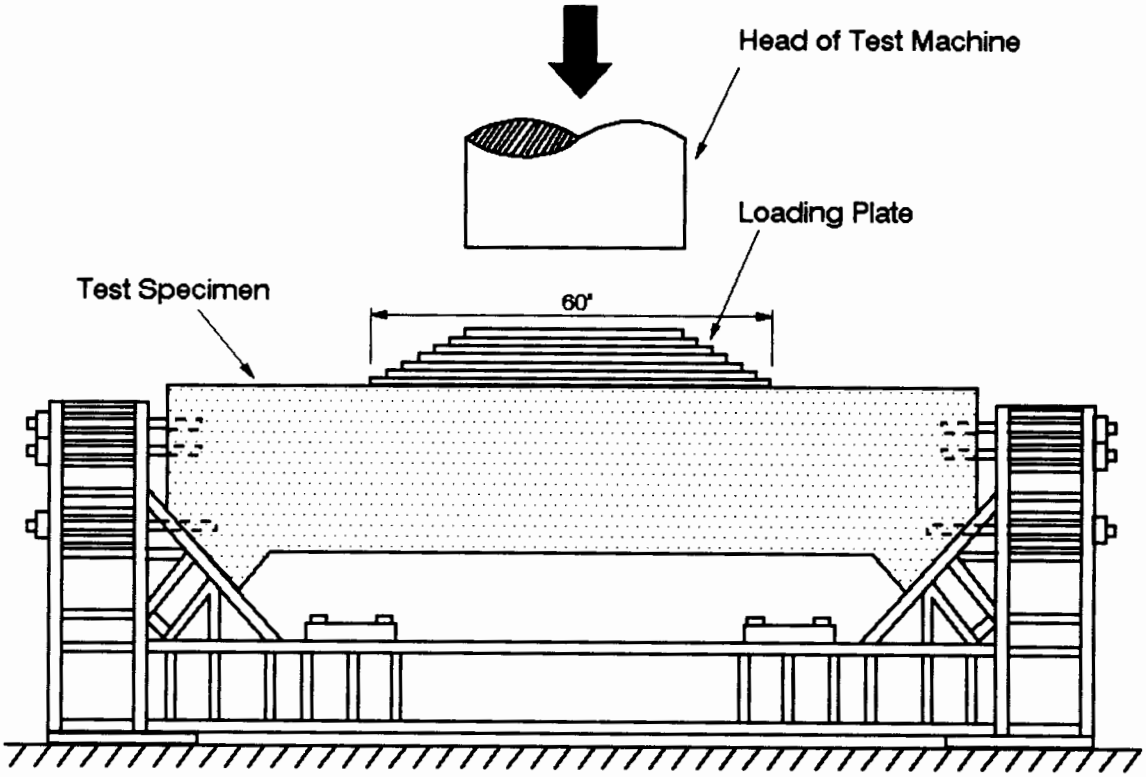


Fig. 2: Test Setup

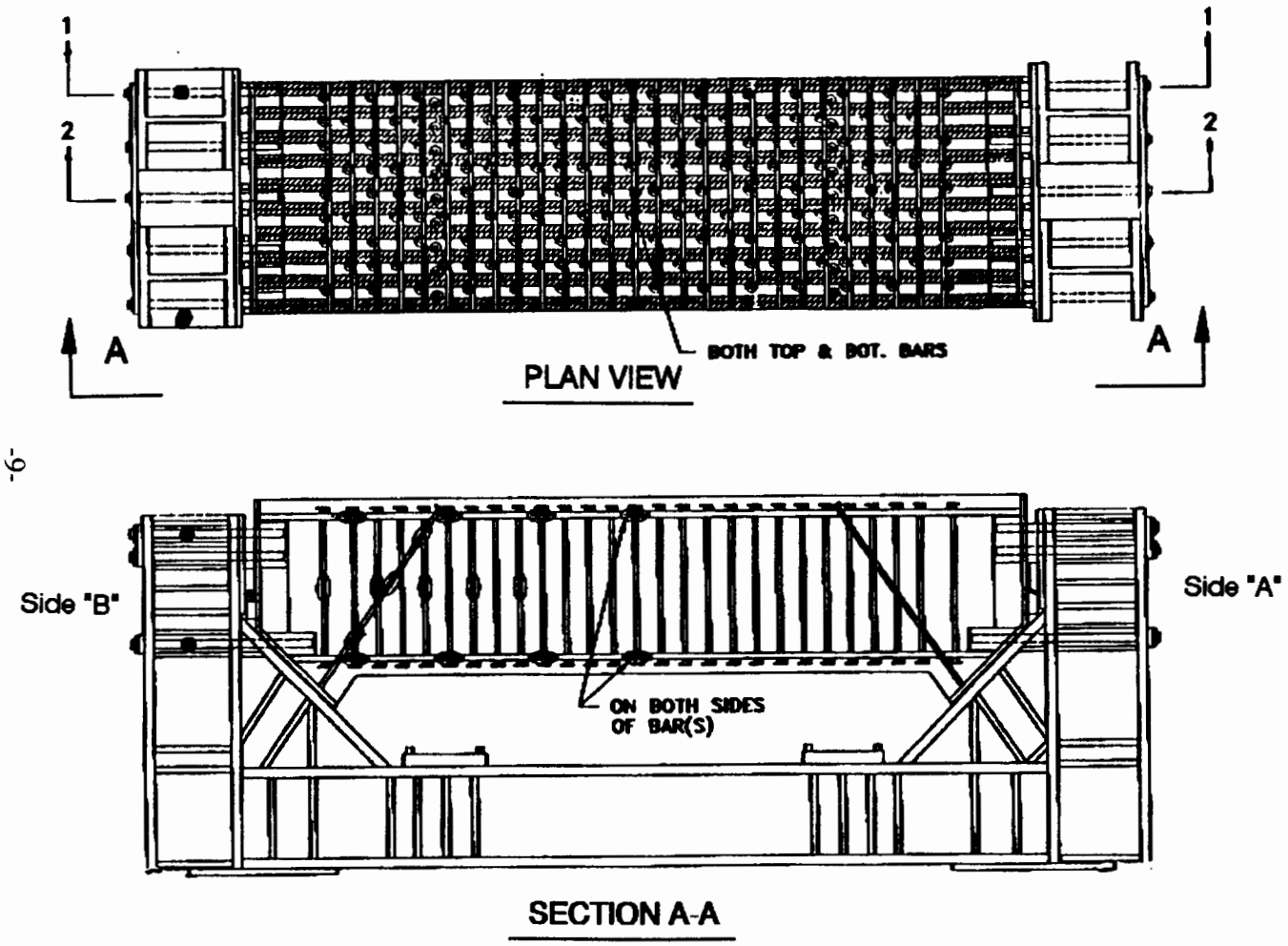
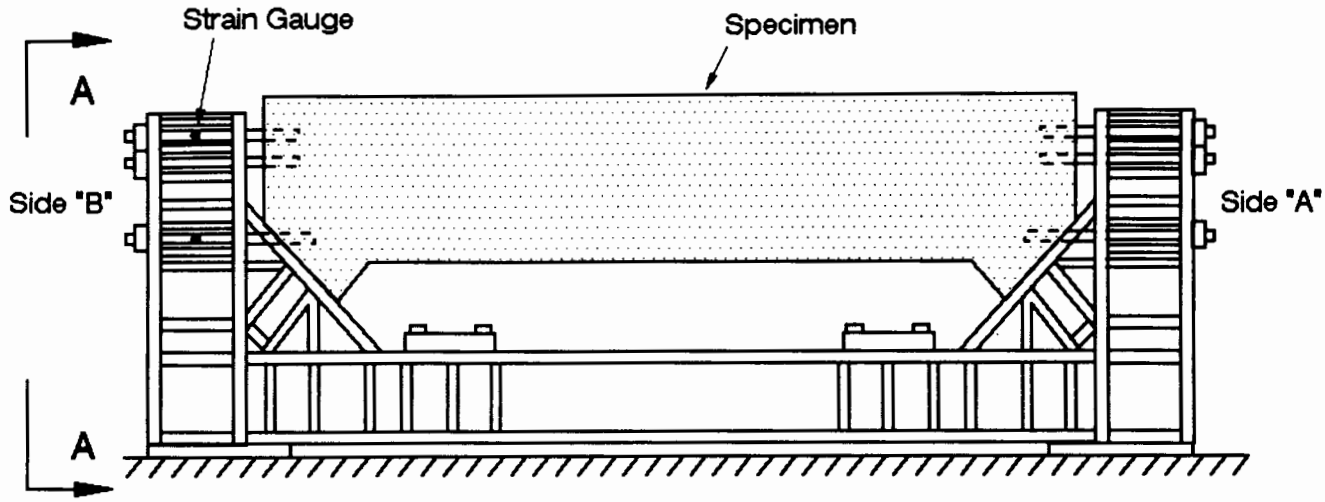
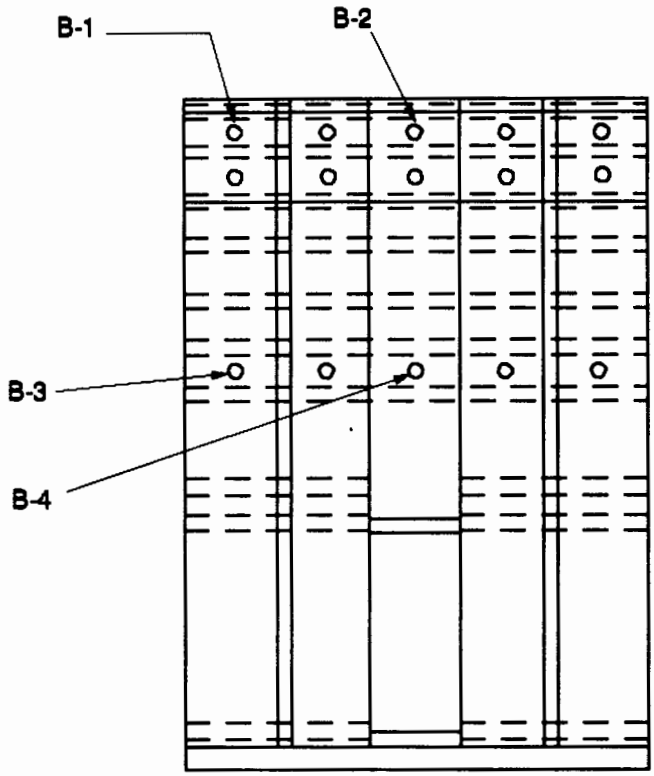


Fig.3: Distribution of Internal Strain Gauges

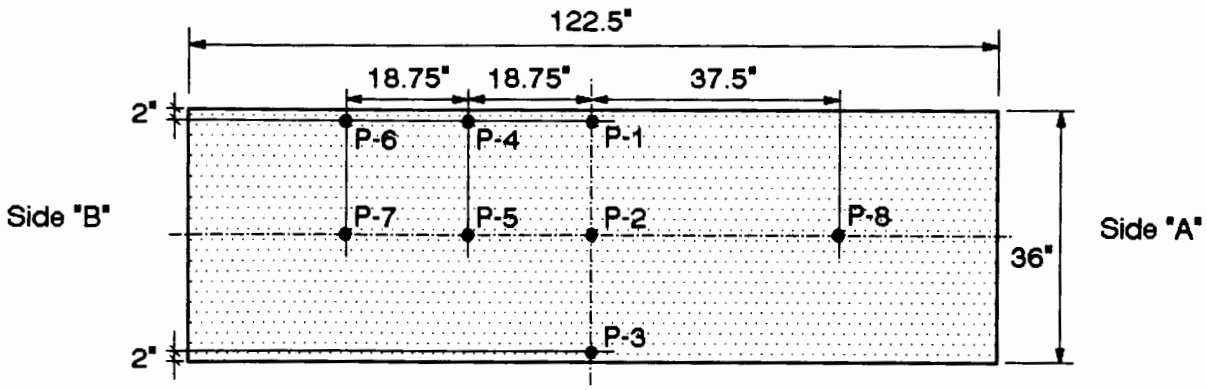


TEST SPECIMENT AND FRAME

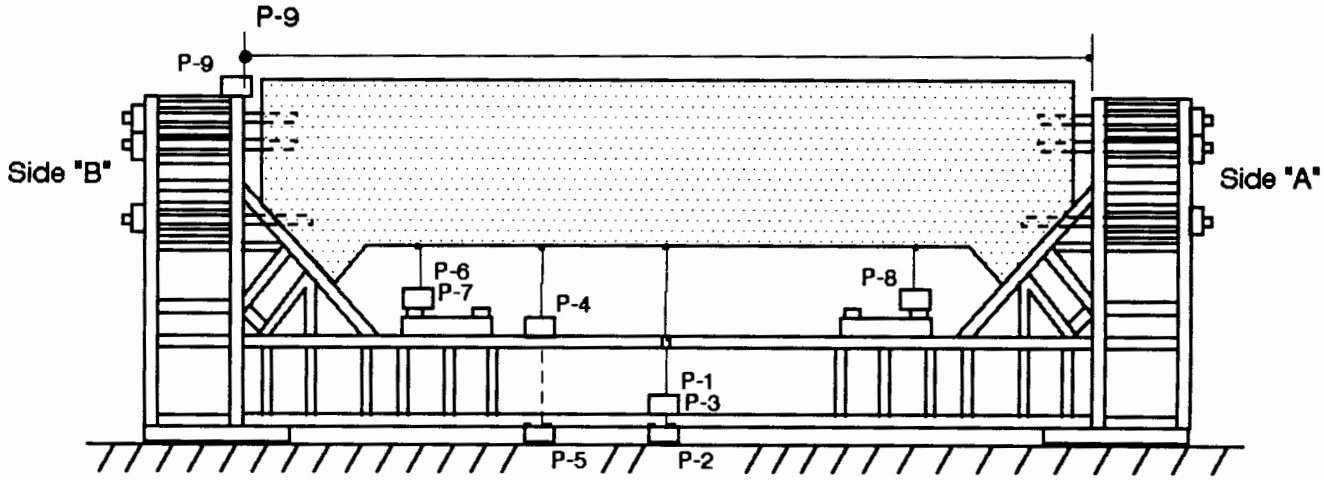


SECTION A-A

Fig.4: Location of Gauges on High Strength Bolts



PLAN VIEW OF SPECIMEN



TEST SPECIMENT AND FRAME

Pot.	Installed Location
P-1	Bottom Flange
P-2	Ground
P-3	Bottome Flange
P-4	Top Flange
P-5	Ground
P-6	Roller Bearing Plate
P-7	Roller Bearing Plate
P-8	Roller Bearing Plate
P-9	Column of Frame

Fig.5: Location of Potentiometers

5. SPECIMEN TESTING

5.1 Testing Procedure

The following testing procedure was used for the three beams:

1. Mount specimen on steel frame. Place anchor plates on vertical reinforcement and hand tight Dywidag nuts. Attach loading plates, grouting the first plate to the top of the beam. Move frame and specimen under UTM using the 10 ton overhead crane and the head of the UTM. Place grout under the frame support plates. Grout interfaces between beam and frame up to above steel keys. Let grout harden for at least 24 hours.

2. Connect instrumentation. Mount linear potentiometers. Attach strain gauges to high strength bolts. Connect all instrumentation cables to Data Acquisition System. Shunt calibrate the strain gauges. Calibrate the potentiometers.

3. Tighten high strength bolts. Measure the strain due to tightening the high strength bolts. This state corresponds to zero reading for the internal strain gauges and the linear potentiometers.

4. Preload specimen. Slowly load the specimen up to 250 kips, wait a few minutes, and unload to 50 kips. Take readings every 50 kips. Verify the acquired data.

5. Apply load. First increase load to 100 kips, and then apply load in 100 kip intervals. After reaching 3,000 kips or when ultimate capacity seems to be near, use a smaller load step. Record data at each load step. Mark cracks every 500 kips. After ultimate load is attained, keep deforming the specimen until displacements become excessive. Unload and disengage UTM head.

6. Remove specimen. Remove high tension bolts. Impose very large deformation with UTM, until steel keys at each end of the specimen disengage from the frame. Move frame outside the loading area with UTM head and 10 ton crane. Remove specimen with crane.

5.2 Specimen 2A-1

This beam, with 1.18% of transverse reinforcement, was tested on September 2. A linear potentiometer (P-9) was added to measure the relative horizontal deformation between frame columns. The average strain due to prestress of the high strength bolts was about 500 microstrain. Channel B-3, recording the strain gauge on one of the bolts, was not functional.

The following observations were made during the test:

Preload to 250 kips: Some flexural cracks appeared at the bottom of the beam.

50 to 500 kips: More flexural cracks appeared. Diagonal shear cracks developed.

1,000 to 1,500 kips: Noises could be heard due to specimen sliding on its supports and cracking of the specimen. More shear cracks developed.

1,500 to 2,000 kips: More noises occurred. Existing cracks widened to a maximum width of about 0.04 inches (1.0 mm). No new cracks were formed. Vertical cracks developed at the top of specimen.

2,000 kips to ultimate load: Deformation was mainly due to widening of existing diagonal shear cracks. The ultimate load was 3,200 kips, the corresponding center deflection was 0.58 inches.

Failure: A punching shear mechanism developed after the concrete fractured along two diagonal planes spanning from the end of the top loading plates, across the beam height, to the bottom of the beam. The central region was therefore connected to the two end portions by the longitudinal reinforcement and the T-bars only. The applied load dropped to about 1,400 kips at a deflection of about 3.5 inches, and then started to slowly increase. The specimen was able to sustain load due to tension in the T-bars and dowel action of the longitudinal reinforcement across the cracks, and overall catenary effects. Concrete spalled near the supports, and many T-bars fractured during this process. The test was terminated by unloading the specimen when the deflection was about 6.3 inches.

5.3 Specimen 2A-2

This specimen, with 1.5% of transverse reinforcement, was tested on August 28. A linear potentiometer (P-9) was added to measure horizontal deformation of the frame. The strain on the high strength bolts was measured at about 500 microstrain.

The following observations were made during the test:

Preload to 250 kips: Several flexural cracks appeared. One shear crack occurred at 200 kips on the right side (looking from side B to side A).

50 to 500 kips: Many flexural and diagonal shear cracks developed, mostly on the right side.

500 to 1,000 kips: Flexural and diagonal shear cracks developed on both sides. Noises were heard due to specimen sliding on its supports and cracking of the specimen. Maximum shear crack width was 0.02 inches (0.5 mm).

1,000 to 1,500 kips: More cracking developed. Maximum crack width was 0.03 inches (0.8 mm). Noises occurred.

1,500 to 2,000 kips: Few new cracks appeared. Some previous cracks widened up to about 0.04 inches (1.0 mm). Noises sounded continuously.

2,000 to ultimate load: Deflection mainly due to widening of existing cracks. The vertical deformation of the beam was visible at the 3,000 kips load level. The ultimate load was 3,500 kips, with a corresponding deflection at the center of 0.69 inches.

Failure: The mode of failure was similar to that of specimen 2A-1, i.e, punching shear of the central region of the beam. Several T-headed stirrups fractured. The test was terminated when the center deflection was about 5.9 inches. The support frame developed a permanent horizontal deformation (measured with potentiometer P-9) of about 0.5 inches due to the catenary pull of the beam. After the test, it was necessary to turn the frame upside down and load it with the UTM to eliminate the permanent deformation.

5.4 Specimen 2A-3

This specimen was tested on August 25. It had 2.09% of transverse reinforcement. The initial strain in the high strength bolts was not measured. Channels H-13 (strain gauge at top haunch) and B-4 (strain gauge at high strength bolt) were not functional.

The following observations were made during the test:

Preload to 300 kips: Some flexural cracking occurred.

50 to 1,000 kips: More flexural cracks and some shear cracks appeared.

1,000 to 2,500 kips. Significant shear cracking developed.

2,500 kips to ultimate load: Existing cracks widened. The concrete cover in the lower corner spalled at about 2,500 kips. Ultimate load was 3,700 kips, with a center displacement of 0.95 inches.

Failure: Punching shear failure occurred, as in the case of specimens 2A-1 and 2A-2. After the ultimate condition was reached, the load decreased, and stabilized at 2,200 kips due to catenary action. Several T-headed stirrups in the area of shear cracking fractured. The test was concluded when the center deflection was about 6.8 inches. After removing the specimen, the loading frame needed straightening (about 1 inch). During the straightening, the panel zone yielding in the testing frame was clearly evident.

6. DATA PROCESSING

Data files with instrument readings were unpacked from DAS85 binary format to standard text (ASCII) files. For each specimen, offset corrections were made such that the baseline (zero level) for all channels corresponded to the state after stressing the high strength bolts, before the preload with the UTM (except for the strain gauges at the high strength bolts, which had the strain due to prestress).

All data were then loaded from the text file to a flat database (Borland's Reflex 2.0 for DOS) for initial processing and graphing, and then translated to a spreadsheet (Microsoft's Excel 4.0 for Windows) for generation of final tables and figures.

All processed test data are presented in Appendix A, which also include photos taken during the tests, and XY records of load versus center deflection and load versus strain in a longitudinal tension strain gauge.

Appendix B contains all the figures requested by Ben Gerwick, Inc. by letter of September 4, 1992.

APPENDIX A

EXPERIMENTAL DATA

APPENDIX A

CONTENTS

Table A.1.1: Instrumentation Description for Speciment 2A-1

Gauge Wire Location	Gauge Wire Mark	Gauge Wire Description
1	C-41	Outside Longitudinal Compression
2	T-31	Outside Longitudinal Tension
3	T-6A	Inside Longitudinal Tension
4	D-51	Center Vertical Top
5	D-52	Outside Vertical Top
6	D-43	Outside Vertical Bottom
7	D-42	Center Vertical Bottom
8	T-5A	T-Bar
9	C-6	Inside Longitudinal Compression
10	C-42	Outside Longitudinal Compression
11	T-32	Outside Longitudinal Tension
12	T-10	T-Bar
13	T-29	T-Bar
14	C-43	Outside Longitudinal Compression
15	T-33	Outside Longitudinal Tension
16	T-12	T-Bar
17	T-13	T-Bar
18	H-33	Top Haunch
19	H-32	Center Haunch
20	H-31	Bottom Haunch
21	C-44	Outside Longitudinal Compression
22	T-34	Outside Longitudinal Tension
23	C-5	Inside Longitudinal Compression
24	C-11	Outside Longitudinal Compression
25	T-21	Outside Longitudinal Tension
26	T-5B	Inside Longitudinal Tension
27	T-3	T-Bar
28	C-12	Outside Longitudinal Compression
29	T-22	Outside Longitudinal Tension
30	T-6B	T-Bar
31	T-26	T-Bar
32	C-13	Outside Longitudinal Compression
33	T-23	Outside Longitudinal Tension
34	T-7	T-Bar
35	S-2	Center Vertical Top
36	T-4	T-Bar
37	S-3	Center Vertical Bottom
38	H-63	Top Haunch
39	H-62	Center Haunch
40	H-61	Bottom Haunch
41	C-14	Outside Longitudinal Compression
42	T-24	Outside Longitudinal Tension
	B-1	Outside Top Bolt
	B-2	Center Top Bolt

Table A.1.1: Instrumentation Description for Speciment 2A-1(Cont'd)

Gauge Wire Location	Gauge Wire Mark	Gauge Wire Description
	B-3	Outside Bottom Bolt
	B-4	Center Bottom Bolt
	P-1	Potentiometer P-1
	P-2	Potentiometer P-2
	P-3	Potentiometer P-3
	P-4	Potentiometer P-4
	P-5	Potentiometer P-5
	P-6	Potentiometer P-6
	P-7	Potentiometer P-7
	P-8	Potentiometer P-8
	P-9	Potentiometer P-9

Table A.1.2: Test Data for Speciment 2A-1

No.	LOAD (Kips)	C-41 (ustrain)	T-31 (ustrain)	T-6A (ustrain)	D-51 (ustrain)	D-52 (ustrain)	D-43 (ustrain)	D-42 (ustrain)	T-5A (ustrain)
1	0	0	0	-6	0	6	-6	0	6
2	52	-37	147	-6	-24	0	0	-37	31
3	101	-49	177	-31	-12	0	12	-49	12
4	201	-122	250	-31	-6	18	6	-43	0
5	299	-147	372	-31	-24	18	0	-37	12
6	400	-208	482	18	-43	6	6	-37	6
7	501	-232	641	98	-24	24	0	-37	0
8	501	-244	635	92	-18	6	-6	-61	18
9	603	-299	726	134	-24	24	-6	-73	12
10	702	-299	824	171	-31	31	0	-147	12
11	804	-336	891	140	-24	31	0	-195	18
12	905	-372	983	128	-31	31	24	-189	12
13	999	-385	1068	116	-24	43	6	-128	6
14	1005	-403	1074	79	-43	37	12	-6	24
15	1108	-433	1135	73	-31	49	12	18	12
16	1200	-446	1184	61	-37	43	0	24	6
17	1307	-476	1264	61	-18	49	24	31	6
18	1403	-494	1337	55	-43	67	24	43	6
19	1502	-531	1404	49	-37	43	18	37	6
20	1508	-531	1471	37	-49	67	6	6	0
21	1609	-568	1514	31	-43	67	18	37	12
22	1700	-586	1575	12	-61	67	12	43	6
23	1805	-610	1648	0	-55	98	12	49	6
24	1909	-629	1727	-37	-73	116	18	37	12
25	2006	-665	1813	-61	-55	140	6	49	-6
26	2014	-702	1868	-55	-67	171	0	49	6
27	2108	-702	1929	-67	-73	201	6	49	6
28	2200	-714	1978	-79	-67	214	6	37	0
29	2303	-751	2063	-49	-61	226	18	31	12
30	2400	-781	2130	-43	-55	250	6	31	6
31	2506	-806	2234	-43	-79	287	0	18	6
32	2515	-830	2289	-37	-79	287	12	0	0
33	2509	-842	2313	-18	-79	299	-18	0	6
34	2603	-842	2362	-24	-79	311	6	6	12
35	2708	-891	2442	-24	-79	311	0	0	-6
36	2799	-897	2503	0	-85	317	0	-37	18
37	2903	-934	2515	24	-85	311	-24	-31	18
38	3000	-983	2557	43	-98	330	6	-6	12
39	3011	-989	2619	55	-104	336	-6	-12	37
40	3014	-995	2600	61	-110	342	0	-18	31
41	3048	-1013	2625	55	-98	342	-18	-24	24
42	3101	-1007	2655	24	-116	348	-6	-24	24
43	3148	-1019	2631	43	-104	354	0	-24	37
44	3197	-1025	2619	61	-104	354	-6	-18	18
45	3104	-1062	2606	-116	-116	354	0	-37	37
46	2891	-989	2612	-171	-110	354	6	-37	31
47	2691	-971	2619	-293	-104	336	-6	-31	31
48	2546	-946	2643	-293	-104	330	0	6	24

Table A.1.2: Test Data for Speciment 2A-1 (Cont'd)

No.	LOAD (Kips)	C-41 (ustrain)	T-31 (ustrain)	T-6A (ustrain)	D-51 (ustrain)	D-52 (ustrain)	D-43 (ustrain)	D-42 (ustrain)	T-5A (ustrain)
49	2391	-903	2673	-293	-110	324	-6	-24	43
50	2320	-885	2655	-275	-104	311	-6	6	37
51	2168	-806	2637	-220	-122	317	6	-24	24
52	1851	-690	2649	-55	-73	263	-12	-12	37
53	1612	-610	2673	49	-92	208	0	-31	-12
54	1525	-543	2704	214	-73	153	0	-24	0
55	1466	-421	2777	299	-73	116	0	6	-49
56	1464	-311	2771	336	-67	140	0	67	-61
57	1402	-171	2747	427	-43	214	-37	-55	-67
58	1441	-37	2136	421	-43	177	-6	140	-49
59	1506	104	2271	189	-31	183	24	165	-61
60	1572	305	2155	269	6	183	12	153	-67
61	1599	354	2350	409	18	171	12	140	-92
62	1650	409	2472	586	24	177	0	159	-85
63	1278	409	2173	739	24	165	18	171	-98
64	342	678	1697	317	61	208	18	177	-67
65	263	732	1660	287	61	195	37	177	-61
66	215	757	1611	287	49	201	43	165	-73
67	194	763	1605	287	55	195	49	171	-79
68	108	751	1581	171	43	189	49	159	-61
69	77	751	1550	177	37	177	73	165	-55
70	65	751	1544	177	55	171	49	159	-55
71	55	751	1532	201	43	177	67	159	-67
72	3	739	1502	140	37	171	73	153	-55
73	3	739	1489	177	49	165	73	153	-49

Table A.1.2: Test Data for Speciment 2A-1 (Cont'd)

No.	LOAD (Kips)	C-6 (ustrain)	C-42 (ustrain)	T-32 (ustrain)	T-10 (ustrain)	T-29 (ustrain)	C-43 (ustrain)	T-33 (ustrain)	T-12 (ustrain)
1	0	6	-6	-6	0	6	0	-6	-6
2	52	-61	-55	165	0	12	-12	37	0
3	101	-67	-73	183	-12	24	-43	61	-12
4	201	-110	-140	226	-6	12	-55	92	-6
5	299	-165	-183	275	6	18	-104	128	-6
6	400	-214	-232	342	6	24	-110	324	-6
7	501	-226	-250	336	18	31	-79	415	0
8	501	-220	-250	342	37	37	-73	409	-6
9	603	-250	-269	336	43	24	-73	507	-6
10	702	-269	-281	372	55	31	-73	586	-24
11	804	-275	-293	427	85	55	-67	641	-43
12	905	-287	-305	476	98	55	-55	708	-73
13	999	-305	-299	531	92	67	-43	775	-122
14	1005	-317	-299	537	79	43	-73	800	-140
15	1108	-317	-324	574	79	49	-55	836	-159
16	1200	-311	-311	641	85	49	-43	879	-195
17	1307	-324	-305	739	104	61	-43	940	-183
18	1403	-330	-293	812	104	73	-37	995	-208
19	1502	-330	-293	885	116	73	-18	1074	-250
20	1508	-305	-269	922	110	73	-24	1105	-299
21	1609	-311	-244	971	110	79	-18	1154	-403
22	1700	-324	-232	1068	110	85	-18	1178	-494
23	1805	-299	-232	1184	134	104	-24	1233	-586
24	1909	-324	-177	1294	134	110	-6	1294	-671
25	2006	-324	-183	378	147	128	-12	1349	-732
26	2014	-342	-171	324	128	122	-12	1398	-696
27	2108	-360	-147	336	134	134	-18	1428	-769
28	2200	-348	-153	330	153	147	-6	1465	-879
29	2303	-366	-134	348	183	134	0	1526	-1001
30	2400	-385	-134	348	189	159	18	1593	-1148
31	2506	-385	-98	360	214	171	55	1654	-1361
32	2515	-403	-110	354	214	171	49	1703	-1368
33	2509	-421	-116	360	195	177	49	1709	-1331
34	2603	-427	-104	366	201	183	61	1752	-1477
35	2708	-415	-85	348	214	183	67	1807	-1722
36	2799	-427	-55	311	256	177	116	1831	-1825
37	2903	-415	-6	293	281	201	165	1819	-1923
38	3000	-391	43	201	299	201	214	1843	-1783
39	3011	-385	79	476	293	195	232	1825	-1679
40	3014	-360	92	165	287	177	232	1831	-1636
41	3048	-372	85	153	281	177	232	1831	-1612
42	3101	-342	128	171	299	183	256	1849	-1624
43	3148	-324	134	177	324	177	293	1843	-1612
44	3197	-287	208	177	403	177	299	1813	-1654
45	3104	-232	-6	183	604	189	244	1782	-3589
46	2891	-232	-85	171	549	159	281	1721	-1716
47	2691	-165	-110	189	519	195	397	1758	427
48	2546	-110	-85	263	470	183	757	1831	958

Table A.1.2: Test Data for Speciment 2A-1 (Cont'd)

No.	LOAD (Kips)	C-6 (ustrain)	C-42 (ustrain)	T-32 (ustrain)	T-10 (ustrain)	T-29 (ustrain)	C-43 (ustrain)	T-33 (ustrain)	T-12 (ustrain)
49	2391	31	-24	403	159	195	1288	1935	37
50	2320	189	110	458	195	195	1978	1990	-275
51	2168	348	263	507	128	183	2728	2094	-238
52	1851	427	336	476	73	214	3491	2435	-37
53	1612	476	415	531	-49	189	5243	2515	519
54	1525	519	415	513	-37	201	3675	2594	671
55	1466	562	397	507	-92	208	4175	2722	684
56	1464	604	403	531	-140	208	4297	2747	665
57	1402	751	555	555	-134	464	4254	2710	641
58	1441	891	629	519	-128	812	4303	3564	671
59	1506	1025	763	549	-110	897	4840	3979	769
60	1572	1154	855	568	-98	897	5646	3210	903
61	1599	1257	946	562	-55	946		3748	1049
62	1650	1373	1050	568	6	1288		4218	1184
63	1278	1355	977	531	55	1080		3931	1245
64	342	1080	830	366	-12	586		2686	793
65	263	1038	800	360	6	562		2515	775
66	215	1032	794	348	-67	525		2374	751
67	194	1001	781	348	-31	543		2295	751
68	108	855	696	330	-49	488		2332	708
69	77	794	659	330	37	476		2271	665
70	65	794	647	336	85	464		2258	665
71	55	751	653	348	177	476		2258	653
72	3	641	647	324	378	427		2216	568
73	3	647	653	324	366	427		2203	562

Table A.1.2: Test Data for Speciment 2A-1 (Cont'd)

No.	LOAD (Kips)	T-13 (ustrain)	H-33 (ustrain)	H-32 (ustrain)	H-31 (ustrain)	C-44 (ustrain)	T-34 (ustrain)	C-5 (ustrain)	C-11 (ustrain)
1	0	0	6	0	6	0	0	0	0
2	52	-12	-6	-18	-24	49	-12	-24	6
3	101	-12	-18	-12	-18	49	-24	-37	-6
4	201	-6	-24	-12	-37	67	-12	-85	-24
5	299	-12	-24	-24	-37	61	0	-110	-43
6	400	-6	-43	-37	-43	73	-12	-153	-55
7	501	0	-61	-43	-61	92	18	-171	-49
8	501	-6	-61	-49	-73	61	-12	-165	-55
9	603	6	-73	-61	-67	116	37	-159	-55
10	702	6	-73	-85	-79	159	55	-171	-73
11	804	-12	-79	-85	-85	171	67	-201	-98
12	905	6	-116	-122	-92	195	55	-250	-85
13	999	6	-153	-134	-110	226	37	-256	-116
14	1005	0	-159	-134	-116	244	37	-299	-116
15	1108	24	-183	-153	-122	275	24	-311	-110
16	1200	37	-201	-171	-134	287	-12	-330	-116
17	1307	37	-220	-214	-134	324	-43	-354	-134
18	1403	55	-244	-330	-140	336	-55	-378	-147
19	1502	67	-256	-482	-171	372	-67	-403	-140
20	1508	43	-281	-501	-177	385	-37	-433	-165
21	1609	37	-287	-549	-177	415	-18	-458	-159
22	1700	24	-311	-580	-189	440	-12	-476	-171
23	1805	12	-336	-610	-220	446	12	-507	-177
24	1909	-12	-366	-665	-226	507	18	-531	-189
25	2006	-12	-403	-708	-226	531	43	-555	-189
26	2014	-6	-403	-720	-238	537	55	-586	-201
27	2108	0	-433	-745	-244	549	73	-604	-208
28	2200	-18	-452	-800	-262	574	85	-617	-214
29	2303	-18	-470	-855	-281	610	116	-653	-232
30	2400	-24	-501	-897	-299	629	122	-659	-238
31	2506	-24	-531	-971	-299	690	128	-696	-244
32	2515	-12	-525	-1001	-293	714	122	-720	-250
33	2509	-31	-531	-983	-287	702	128	-751	-256
34	2603	-12	-549	-1007	-299	739	134	-751	-244
35	2708	-31	-568	-1050	-311	787	140	-751	-250
36	2799	-43	-580	-1117	-336	818	110	-781	-263
37	2903	-85	-562	-1184	-360	867	61	-812	-263
38	3000	-110	-537	-1239	-372	916	24	-830	-275
39	3011	-128	-464	-1257	-372	934	-31	-867	-287
40	3014	-116	-427	-1288	-360	928	-43	-867	-275
41	3048	-134	-421	-1294	-366	946	-55	-891	-269
42	3101	-140	-385	-1306	-385	977	-55	-891	-275
43	3148	-140	-378	-1355	-409	977	-61	-891	-281
44	3197	-147	-378	-1385	-433	983	12	-922	-293
45	3104	-269	-403	-1532	-464	812	226	-909	-287
46	2891	-391	-415	-1520	-482	800	275	-916	-281
47	2691	-269	-446	-1648	-464	824	324	-885	-263
48	2546	-543	-403	-1685	-452	842	433	-873	-244

Table A.1.2: Test Data for Speciment 2A-1 (Cont'd)

No.	LOAD (Kips)	T-13 (ustrain)	H-33 (ustrain)	H-32 (ustrain)	H-31 (ustrain)	C-44 (ustrain)	T-34 (ustrain)	C-5 (ustrain)	C-11 (ustrain)
49	2391	-464	-653	-842	-439	922	501	-836	-263
50	2320	-287	-781	-18	-427	1050	446	-824	-232
51	2168	-171	-745	800	-433	1178	470	-751	-214
52	1851	-165	-226	549	-378	1007	604	-665	-189
53	1612	-244	226	-391	-409	983	812	-507	-92
54	1525	12	592	-635	-336	763	232	-446	-67
55	1466	49	555	-238	-287	769	165	-354	-37
56	1464	79	525	24	-293	794	293	-263	0
57	1402	49	592	458	-226	818	342	-177	24
58	1441	24	574	604	-238	934	256	-73	61
59	1506	12	537	928	-226	1007	177	92	116
60	1572	31	488	1135	-275	1111	147	354	220
61	1599	61	409	1196	-238	1203	128	458	244
62	1650	-6	372	1251	-250	1264	189	519	275
63	1278	-153	488	1746	61	1221	653	531	275
64	342	-531	739	2527	189	928	415	775	372
65	263	-531	708	2576	171	934	324	806	366
66	215	-555	684	2637	183	885	299	818	354
67	194	-549	671	2600	183	861	299	824	348
68	108	-586	635	2692	177	769	342	806	330
69	77	-580	653	2631	171	714	336	787	330
70	65	-549	653	2411	159	696	336	781	299
71	55	-543	653	1196	177	635	317	769	311
72	3	-555	690	1172	195	555	317	751	287
73	3	-537	684	1154	189	537	305	757	287

Table A.1.2: Test Data for Speciment 2A-1 (Cont'd)

No.	LOAD (Kips)	T-21 (ustrain)	T-5B (ustrain)	T-3 (ustrain)	C-12 (ustrain)	T-22 (ustrain)	T-6B (ustrain)	T-26 (ustrain)	C-13 (ustrain)
1	0	12	0	0	0	-12	0	0	0
2	52	-43	43	12	49	18	-61	73	-6
3	101	12	43	18	37	18	-37	73	-24
4	201	110	79	-31	49	43	-61	73	-43
5	299	134	122	-49	49	49	-37	116	-61
6	400	159	159	-61	85	61	12	128	18
7	501	159	147	-92	171	55	-18	580	134
8	501	159	159	-73	189	49	-24	537	153
9	603	177	140	-104	208	61	-43	757	177
10	702	183	171	-134	226	49	-61	934	201
11	804	201	189	-140	208	55	-79	1050	220
12	905	195	226	-159	214	79	-85	1190	226
13	999	177	244	-177	208	61	-104	1331	232
14	1005	177	208	-171	201	85	-98	1178	232
15	1108	177	232	-177	208	73	-116	1312	220
16	1200	177	244	-189	189	85	-110	1385	238
17	1307	195	263	-177	195	98	-116	1453	238
18	1403	208	263	-189	177	92	-110	1477	232
19	1502	214	287	-214	189	98	-116	1489	244
20	1508	183	269	-208	189	116	-116	1331	244
21	1609	214	287	-220	183	110	-122	1379	232
22	1700	232	305	-232	177	122	-128	1477	232
23	1805	226	311	-232	177	134	-116	1532	238
24	1909	256	330	-256	183	147	-128	1630	250
25	2006	269	360	-250	165	171	-159	1654	305
26	2014	244	342	-238	134	177	-159	1453	366
27	2108	250	348	-244	140	189	-153	1514	403
28	2200	275	348	-256	134	201	-159	1593	488
29	2303	275	378	-269	122	208	-153	1648	653
30	2400	287	391	-269	140	201	-153	1672	2045
31	2506	305	415	-281	165	208	-159	1758	3040
32	2515	269	415	-263	177	208	-159	1636	2991
33	2509	275	409	-256	183	208	-165	1569	2875
34	2603	275	421	-256	165	214	-171	1617	2899
35	2708	281	427	-281	214	250	-171	1666	2863
36	2799	275	415	-269	256	281	-165	1678	2850
37	2903	269	397	-214	263	275	-153	1758	2838
38	3000	263	403	-177	317	269	-134	1855	2972
39	3011	275	385	-153	324	256	-140	891	3101
40	3014	263	372	-153	330	262	-159	867	3113
41	3048	275	372	-134	348	275	-153	903	3149
42	3101	256	385	-122	348	262	-159	964	3210
43	3148	250	372	-128	378	269	-147	1025	3259
44	3197	263	372	-128	433	275	-122	1196	3516
45	3104	244	354	-98	171	250	-122		
46	2891	244	360	-85	61	250	-116		
47	2691	269	366	-73	-55	287	-98		
48	2546	275	391	-79	-98	305	-92		

Table A.1.2: Test Data for Speciment 2A-1 (Cont'd)

No.	LOAD (Kips)	T-21 (ustrain)	T-5B (ustrain)	T-3 (ustrain)	C-12 (ustrain)	T-22 (ustrain)	T-6B (ustrain)	T-26 (ustrain)	C-13 (ustrain)
49	2391	256	378	-43	-31	299	-55		
50	2320	275	391	-24	122	366	-55		
51	2168	263	415	-43	299	470	-55		
52	1851	275	409	0	391	549	-122		
53	1612	263	427	12	610	678	-140		
54	1525	263	415	12	714	684	-61		
55	1466	250	427	0	751	708	6		
56	1464	256	458	18	800	745	18		
57	1402	269	1068	24	897	781	0		
58	1441	366	1147	31	989	830	-85		
59	1506	720	1190	24	1239	879	-122		
60	1572	1611	1306	12	1392	983	-232		
61	1599	1795	1324	-6	1544	1300	37		
62	1650	1929	1349	-12	1709	1575	-110		
63	1278	1630	1160	-18	1624	1459	-116		
64	342	848	690	6	1306	1098	-147		
65	263	806	635	24	1300	1062	-250		
66	215	775	635	18	1343	1043	-397		
67	194	739	623	31	1544	1025	-79		
68	108	665	598	0	1550	946	324		
69	77	653	592	31	1532	916	250		
70	65	641	568	31	1526	897	208		
71	55	623	568	6	1495	861	256		
72	3	574	537	6	1416	690	342		
73	3	568	531	6	1410	690	330		

Table A.1.2: Test Data for Speciment 2A-1 (Cont'd)

No.	LOAD (Kips)	T-23 (ustrain)	T-7 (ustrain)	S-2 (ustrain)	T-4 (ustrain)	S-3 (ustrain)	H-63 (ustrain)	H-62 (ustrain)	H-61 (ustrain)
1	0	6	-6	0	-6	-6	-6	0	0
2	52	98	6	-18	0	-116	0	-24	-55
3	101	140	6	-6	-6	-122	12	-55	-85
4	201	171	-6	24	-6	-110	0	-85	-134
5	299	250	-12	37	0	-122	6	-110	-195
6	400	287	12	18	73	-116	-6	-195	-244
7	501	330	55	18	79	-79	-37	-201	-348
8	501	293	31	0	55	-92	-12	-214	-372
9	603	311	37	43	73	-73	-18	-238	-439
10	702	275	55	67	92	-85	-31	-226	-507
11	804	201	67	43	110	-85	-37	-287	-549
12	905	171	55	18	116	-85	-55	-293	-598
13	999	183	43	73	116	-79	-61	-311	-647
14	1005	171	49	37	85	-85	-73	-311	-647
15	1108	189	61	24	104	-92	-92	-336	-678
16	1200	214	67	31	110	-67	-85	-354	-726
17	1307	220	73	43	110	-61	-92	-354	-763
18	1403	208	214	43	98	-37	-104	-366	-793
19	1502	244	1019	37	31	-31	-122	-403	-836
20	1508	201	818	24	79	-37	-122	-421	-842
21	1609	220	903	43	67	-18	-110	-440	-885
22	1700	214	971	55	85	-24	-128	-476	-928
23	1805	214	1062	37	67	0	-147	-519	-977
24	1909	226	1147	61	49	18	-159	-562	-1025
25	2006	220	1202	61	37	43	-153	-598	-1086
26	2014	220	787	43	116	49	-171	-617	-1098
27	2108	220	848	55	98	37	-177	-629	-1129
28	2200	208	897	55	104	79	-165	-665	-1172
29	2303	208	995	31	104	92	-195	-684	-1214
30	2400	195	1208	37	110	122	-189	-732	-1288
31	2506	214	1355	43	37	140	-177	-800	-1367
32	2515	189	1221	18	110	159	-189	-812	-1428
33	2509	189	1318	43	128	165	-183	-824	-1434
34	2603	214	1495	31	85	171	-195	-867	-1471
35	2708	201	1642	24	73	189	-189	-903	-1568
36	2799	189	1703	12	55	195	-171	-964	-1642
37	2903	183	1880	18	67	202	-201	-1013	-1733
38	3000	195	1721	18	104	214	-189	-1062	-1837
39	3011	189	1202	0	147	214	-201	-1111	-1892
40	3014	183	1233	6	214	202	-195	-1099	-1922
41	3048	189	1312	31	208	220	-208	-1111	-1953
42	3101	189	1520	18	195	232	-195	-1141	-1990
43	3148	189	1813	12	208	226	-214	-1160	-2032
44	3197	183	2386	0	220	269	-208	-1178	-2069
45	3104	208		55	201		-128	-891	-1886
46	2891	238		61	305		-263	-934	-1782
47	2691	250		55	391		-238	-1129	-1629
48	2546	342		31	159		-37	-1178	-1556

Table A.1.2: Test Data for Speciment 2A-1 (Cont'd)

No.	LOAD (Kips)	T-23 (ustrain)	T-7 (ustrain)	S-2 (ustrain)	T-4 (ustrain)	S-3 (ustrain)	H-63 (ustrain)	H-62 (ustrain)	H-61 (ustrain)
49	2391	403		98	24		104	-1227	-1507
50	2320	433		122	-104		183	-1300	-1581
51	2168	452		147	-317		183	-1355	-1611
52	1851	519		165	-641		165	-1068	-1355
53	1612	531		159	-409		562	-934	-1166
54	1525	604		153	147		739	-769	-916
55	1466	586		140	177		806	-757	-818
56	1464	580		134	140		818	-763	-781
57	1402	671		140	92		830	-745	-732
58	1441	671		140	67		867	-867	-739
59	1506	818		134	49		806	-836	-775
60	1572	1196		140	31		739	-830	-763
61	1599	1764		116	31		720	-830	-745
62	1650	2216		147	49		678	-946	-781
63	1278	1971		98	61		739	-739	-537
64	342	1416		67	-92		708	-494	-482
65	263	1355		73	-98		714	-501	-470
66	215	1318		61	-92		720	-470	-452
67	194	1294		67	-98		732	-452	-439
68	108	1147		55	-67		739	-354	-330
69	77	1184		55	-61		775	-311	-281
70	65	1215		43	-61		781	-287	-262
71	55	1221		49	-61		775	-232	-244
72	3	1208		55	-55		812	-147	-159
73	3	1172		49	-55		830	-140	-147

Table A.1.2: Test Data for Speciment 2A-1 (Cont'd)

No.	LOAD (Kips)	C-14 (ustrain)	T-24 (ustrain)	B-1 (ustrain)	B-2 (ustrain)	B-3 (ustrain)	B-4 (ustrain)	P-1 (Inches)	P-2 (Inches)
1	0	0	-6	405	364		652	-0.085	-0.006
2	52	-6	-18	440	405		599	0.015	0.018
3	101	0	-18	440	417		599	0.013	0.016
4	201	12	-18	487	446		569	0.019	0.025
5	299	6	-24	516	499		546	0.032	0.037
6	400	55	110	552	534		517	0.037	0.051
7	501	67	177	599	581		493	0.056	0.067
8	501	73	159	581	569		476	0.052	0.072
9	603	85	201	622	622		464	0.058	0.082
10	702	110	232	663	651		481	0.069	0.100
11	804	122	250	692	687		464	0.086	0.110
12	905	128	263	698	728		434	0.093	0.121
13	999	153	250	739	757		423	0.099	0.141
14	1005	159	238	751	769		417	0.102	0.141
15	1108	177	238	757	792		399	0.108	0.153
16	1200	208	214	781	816		411	0.119	0.168
17	1307	214	189	798	869		399	0.136	0.178
18	1403	244	171	833	880		399	0.139	0.194
19	1502	275	147	863	916		370	0.164	0.213
20	1508	287	116	869	939		370	0.177	0.225
21	1609	305	134	898	957		352	0.182	0.231
22	1700	336	147	910	986		358	0.197	0.247
23	1805	354	140	939	1009		358	0.214	0.258
24	1909	397	104	974	1051		335	0.223	0.278
25	2006	415	116	1004	1068		335	0.240	0.286
26	2014	427	116	1021	1104		311	0.256	0.299
27	2108	452	128	1033	1127		305	0.266	0.311
28	2200	452	122	1051	1156		323	0.277	0.319
29	2303	494	147	1074	1174		305	0.292	0.329
30	2400	519	165	1121	1203		294	0.301	0.350
31	2506	543	244	1145	1239		299	0.323	0.370
32	2515	537	250	1168	1244		294	0.331	0.385
33	2509	537	244	1150	1274		288	0.334	0.387
34	2603	555	250	1162	1280		299	0.338	0.401
35	2708	586	250	1203	1303		282	0.359	0.411
36	2799	617	232	1233	1344		270	0.383	0.438
37	2903	647	189	1256	1379		270	0.394	0.456
38	3000	665	140	1309	1432		264	0.427	0.483
39	3011	696	116	1326	1444		264	0.446	0.503
40	3014	696	134	1332	1450		241	0.457	0.513
41	3048	708	122	1332	1467		258	0.470	0.528
42	3101	726	116	1356	1479		264	0.485	0.542
43	3148	726	104	1368	1497		258	0.500	0.558
44	3197	739	140	1356	1503		253	0.526	0.581
45	3104	623	263	1215	1368		258	0.680	0.736
46	2891	610	165	1203	1332		247	0.849	0.918
47	2691	562	43	1186	1332		253	1.051	1.133
48	2546	598	-18	1203	1338		264	1.248	1.339

Table A.1.2: Test Data for Speciment 2A-1 (Cont'd)

No.	LOAD (Kips)	C-14 (ustrain)	T-24 (ustrain)	B-1 (ustrain)	B-2 (ustrain)	B-3 (ustrain)	B-4 (ustrain)	P-1 (Inches)	P-2 (Inches)
49	2391	690	-79	1250	1421		264	1.480	1.585
50	2320	842	-73	1362	1550		276	1.744	1.867
51	2168	971	-24	1497	1696		294	2.017	2.149
52	1851	861	360	1379	1585		329	2.348	2.487
53	1612	836	659	1391	1632		352	2.671	2.843
54	1525	720	385	1268	1532		393	2.892	3.092
55	1466	720	134	1256	1550		429	3.152	3.377
56	1464	763	85	1309	1591		476	3.360	3.624
57	1402	812	171	1420	1690		634	3.635	3.951
58	1441	873	214	1514	1784		699	3.901	4.285
59	1506	934	397	1649	1919		804	4.349	4.812
60	1572	1025	360	1714	1984		857	4.677	5.215
61	1599	1068	690	1790	2043		945	5.025	5.635
62	1650	1135	726	1825	2107		980	5.303	5.982
63	1278	1117	1965	1737	2007		1009	5.450	6.181
64	342	946	1495	1285	1573		822	4.980	5.604
65	263	916	1294	1191	1497		722	4.882	5.500
66	215	879	1184	1103	1415		640	4.817	5.420
67	194	861	1111	1057	1391		599	4.783	5.373
68	108	726	977	851	1174		470	4.547	5.095
69	77	665	946	775	1092		423	4.445	4.980
70	65	647	940	751	1057		429	4.415	4.941
71	55	623	903	739	1021		423	4.373	4.890
72	3	531	842	616	857		405	4.178	4.653
73	3	537	830	616	845		393	4.170	4.647

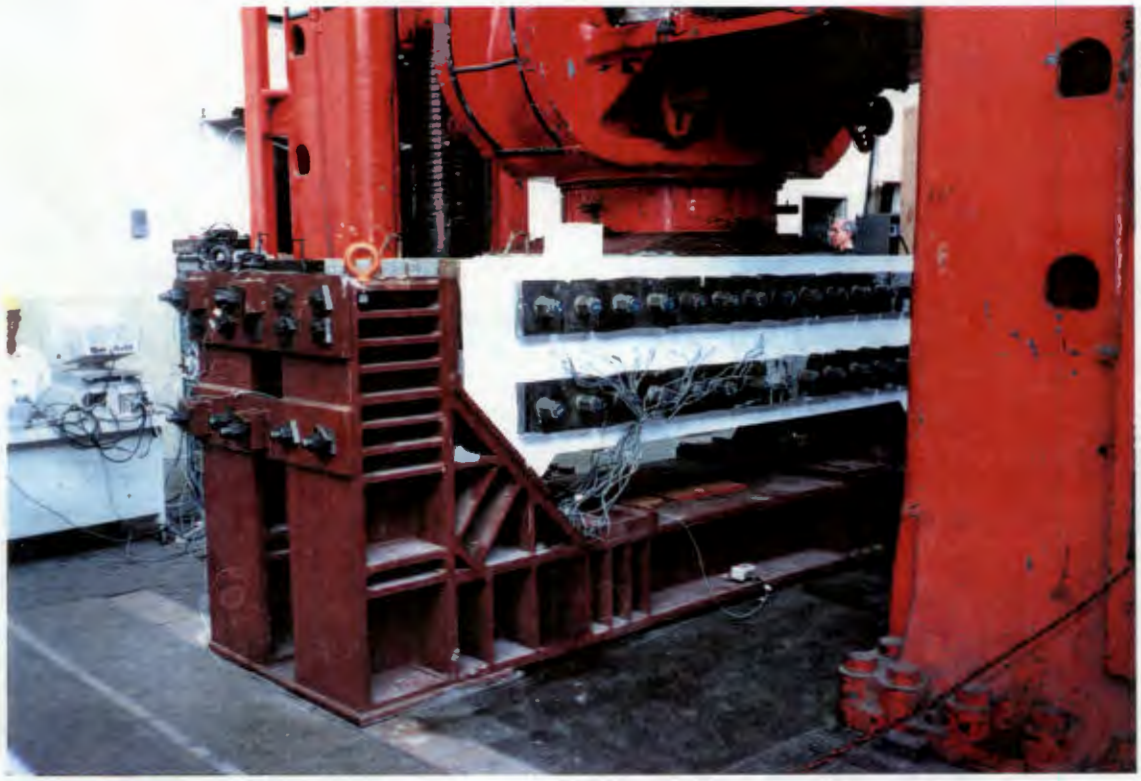
Table A.1.2: Test Data for Speciment 2A-1 (Cont'd)

No.	LOAD (Kips)	P-3 (Inches)	P-4 (Inches)	P-5 (Inches)	P-6 (Inches)	P-7 (Inches)	P-8 (Inches)	P-9 (Inches)
1	0	-0.088	-0.028	-0.086	-0.016	-0.018	-0.018	-0.042
2	52	0.021	0.002	0.013	0.007	0.010	0.009	-0.001
3	101	0.024	0.004	0.021	0.007	0.009	0.008	0.003
4	201	0.039	0.008	0.033	0.006	0.014	0.010	0.001
5	299	0.050	0.015	0.040	0.013	0.022	0.017	0.001
6	400	0.075	0.025	0.063	0.015	0.030	0.024	0.000
7	501	0.099	0.037	0.077	0.020	0.039	0.032	-0.001
8	501	0.104	0.039	0.084	0.020	0.038	0.033	0.002
9	603	0.119	0.046	0.096	0.026	0.044	0.037	0.000
10	702	0.134	0.054	0.107	0.028	0.054	0.044	-0.004
11	804	0.151	0.067	0.121	0.032	0.057	0.048	-0.006
12	905	0.164	0.077	0.134	0.035	0.064	0.053	-0.009
13	999	0.181	0.087	0.144	0.041	0.068	0.057	-0.012
14	1005	0.188	0.093	0.149	0.047	0.071	0.062	-0.016
15	1108	0.198	0.099	0.161	0.047	0.075	0.066	-0.021
16	1200	0.211	0.109	0.172	0.051	0.083	0.072	-0.019
17	1307	0.231	0.122	0.184	0.061	0.087	0.081	-0.024
18	1403	0.240	0.131	0.191	0.064	0.092	0.083	-0.025
19	1502	0.259	0.145	0.213	0.067	0.104	0.092	-0.031
20	1508	0.270	0.154	0.224	0.075	0.108	0.097	-0.031
21	1609	0.285	0.164	0.239	0.086	0.111	0.103	-0.036
22	1700	0.296	0.172	0.253	0.089	0.118	0.108	-0.035
23	1805	0.311	0.184	0.264	0.093	0.124	0.115	-0.039
24	1909	0.330	0.197	0.276	0.101	0.132	0.123	-0.043
25	2006	0.350	0.208	0.293	0.106	0.139	0.129	-0.044
26	2014	0.367	0.221	0.310	0.113	0.144	0.136	-0.044
27	2108	0.371	0.229	0.326	0.120	0.147	0.140	-0.044
28	2200	0.384	0.239	0.329	0.122	0.154	0.146	-0.050
29	2303	0.406	0.250	0.345	0.129	0.163	0.154	-0.051
30	2400	0.417	0.263	0.360	0.139	0.169	0.158	-0.057
31	2506	0.436	0.280	0.371	0.144	0.179	0.169	-0.060
32	2515	0.451	0.290	0.389	0.151	0.184	0.175	-0.064
33	2509	0.447	0.295	0.391	0.152	0.188	0.174	-0.061
34	2603	0.462	0.299	0.404	0.157	0.194	0.178	-0.064
35	2708	0.486	0.312	0.425	0.164	0.202	0.187	-0.068
36	2799	0.498	0.329	0.438	0.174	0.210	0.193	-0.075
37	2903	0.524	0.350	0.460	0.184	0.228	0.203	-0.080
38	3000	0.552	0.377	0.492	0.205	0.249	0.222	-0.087
39	3011	0.585	0.393	0.511	0.213	0.262	0.232	-0.090
40	3014	0.589	0.400	0.523	0.216	0.267	0.234	-0.090
41	3048	0.602	0.409	0.534	0.224	0.275	0.239	-0.092
42	3101	0.624	0.422	0.551	0.231	0.287	0.247	-0.090
43	3148	0.641	0.435	0.563	0.246	0.296	0.255	-0.094
44	3197	0.669	0.464	0.595	0.270	0.319	0.269	-0.100
45	3104	0.842	0.642	0.793	0.488	0.535	0.359	-0.103
46	2891	1.016	0.813	0.969	0.666	0.709	0.528	-0.092
47	2691	1.224	1.016	1.183	0.874	0.917	0.726	-0.063
48	2546	1.427	1.215	1.402	1.073	1.107	0.918	-0.033

Table A.1.2: Test Data for Speciment 2A-1 (Cont'd)

No.	LOAD (Kips)	P-3 (Inches)	P-4 (Inches)	P-5 (Inches)	P-6 (Inches)	P-7 (Inches)	P-8 (Inches)	P-9 (Inches)
49	2391	1.653	1.433	1.631	1.271	1.300	1.150	0.007
50	2320	1.923	1.679	1.911	1.476	1.497	1.370	0.055
51	2168	2.187	1.929	2.181	1.665	1.690	1.589	0.111
52	1851	2.513	2.262	2.522	1.958	1.995	1.830	0.201
53	1612	2.847	2.580	2.862	2.234	2.256	2.115	0.310
54	1525	3.065	2.821	3.125	2.474	2.482	2.262	0.403
55	1466	3.322	3.083	3.423	2.687	2.676	2.462	0.512
56	1464	3.537	3.295	3.674	2.720	2.689	2.553	0.609
57	1402	3.805	3.572	4.000	2.724	2.697	2.577	0.755
58	1441	4.073	3.844	4.327	2.728	2.697	2.587	0.894
59	1506	4.517	4.273	4.854	2.734	2.707	2.598	1.131
60	1572	4.856	4.592	5.233	2.738	2.708	2.600	1.318
61	1599	5.189	4.928	5.627	2.739	2.710	2.602	1.540
62	1650	5.476	5.203	5.962	2.739	2.713	2.666	1.739
63	1278	5.627	5.354	6.156	2.739	2.813	2.667	1.890
64	342	5.141	4.906	5.604	2.738	2.753	2.664	1.560
65	263	5.057	4.823	5.495	2.740	2.752	2.671	1.502
66	215	4.996	4.760	5.418	2.741	2.751	2.671	1.455
67	194	4.953	4.720	5.380	2.737	2.750	2.672	1.431
68	108	4.720	4.477	5.097	2.739	2.751	2.691	1.302
69	77	4.614	4.375	4.982	2.741	2.753	2.692	1.250
70	65	4.586	4.343	4.946	2.738	2.750	2.694	1.229
71	55	4.543	4.300	4.898	2.741	2.752	2.696	1.215
72	3	4.342	4.101	4.676	2.741	2.751	2.702	1.121
73	3	4.334	4.094	4.668	2.744	2.751	2.702	1.118

(a) Load = 500 kips



(b) Load = 3,000 kips

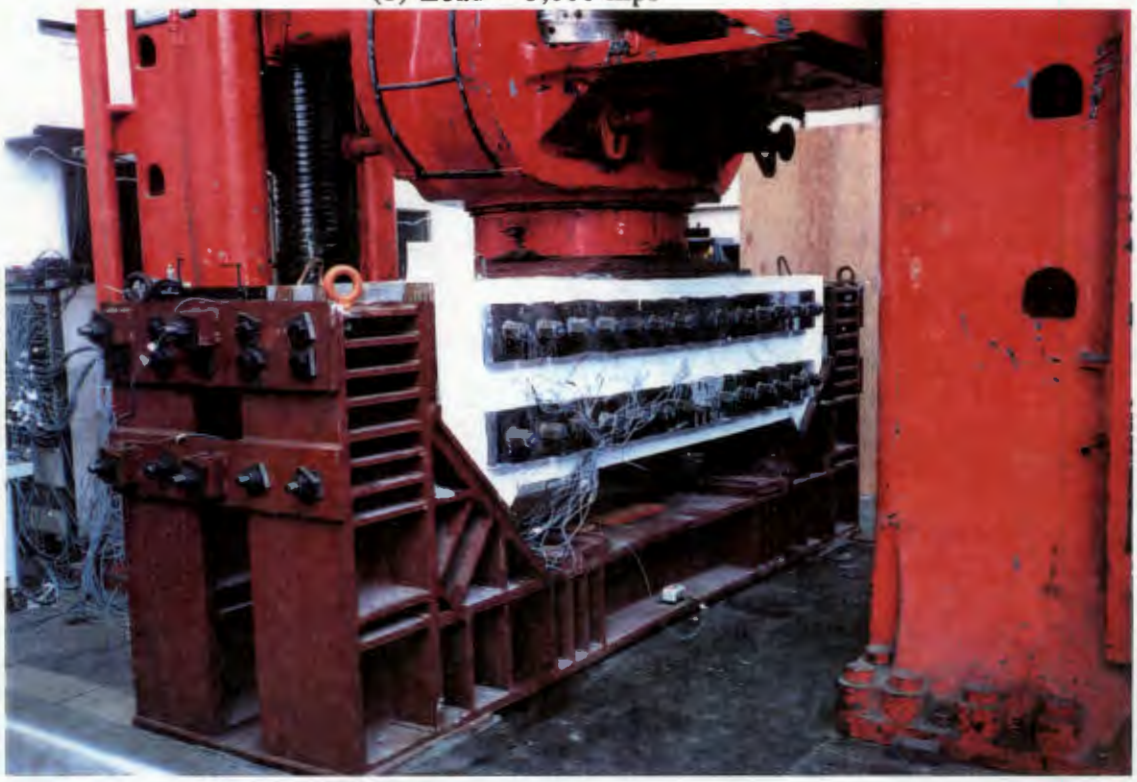
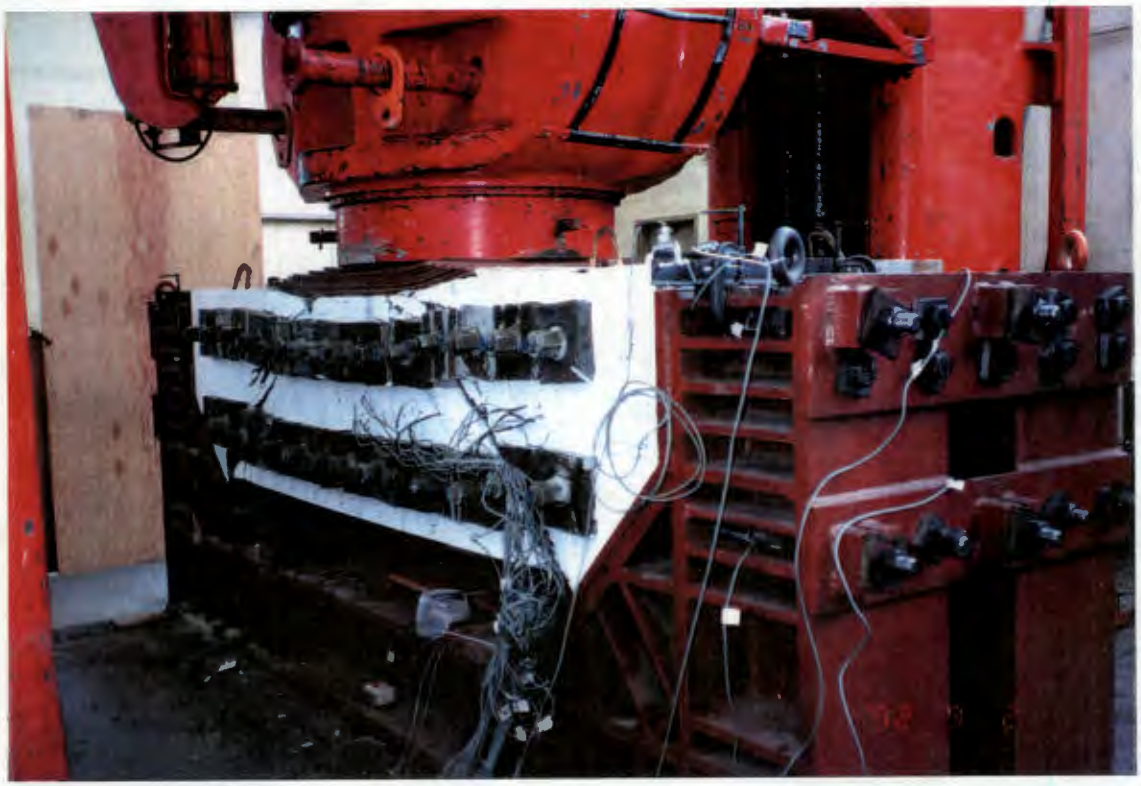


Fig. A.1.1 Specimen 2A-1 Photos

(c) After Ultimate Load



(d) After Ultimate Load

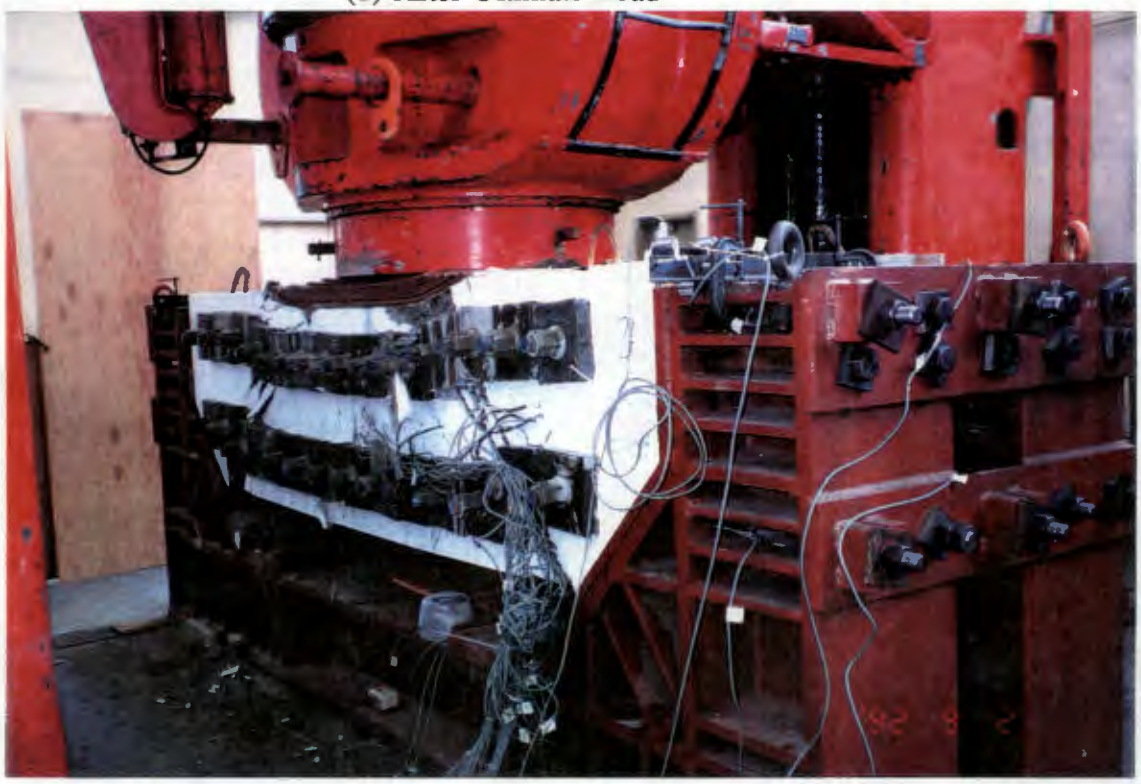


Fig. A.1.1 Specimen 2A-1 Photos (Cont'd)

(e) End of the Test

(f) End of the Test

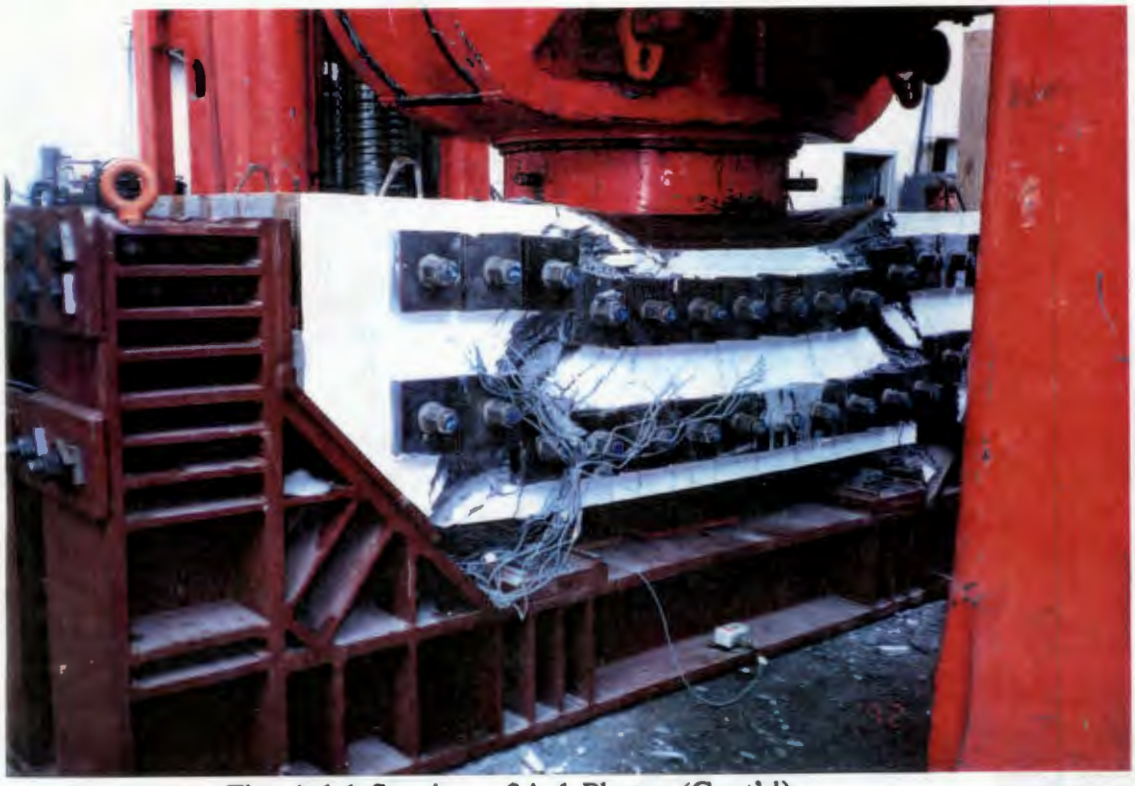


Fig. A.1.1 Specimen 2A-1 Photos (Cont'd)

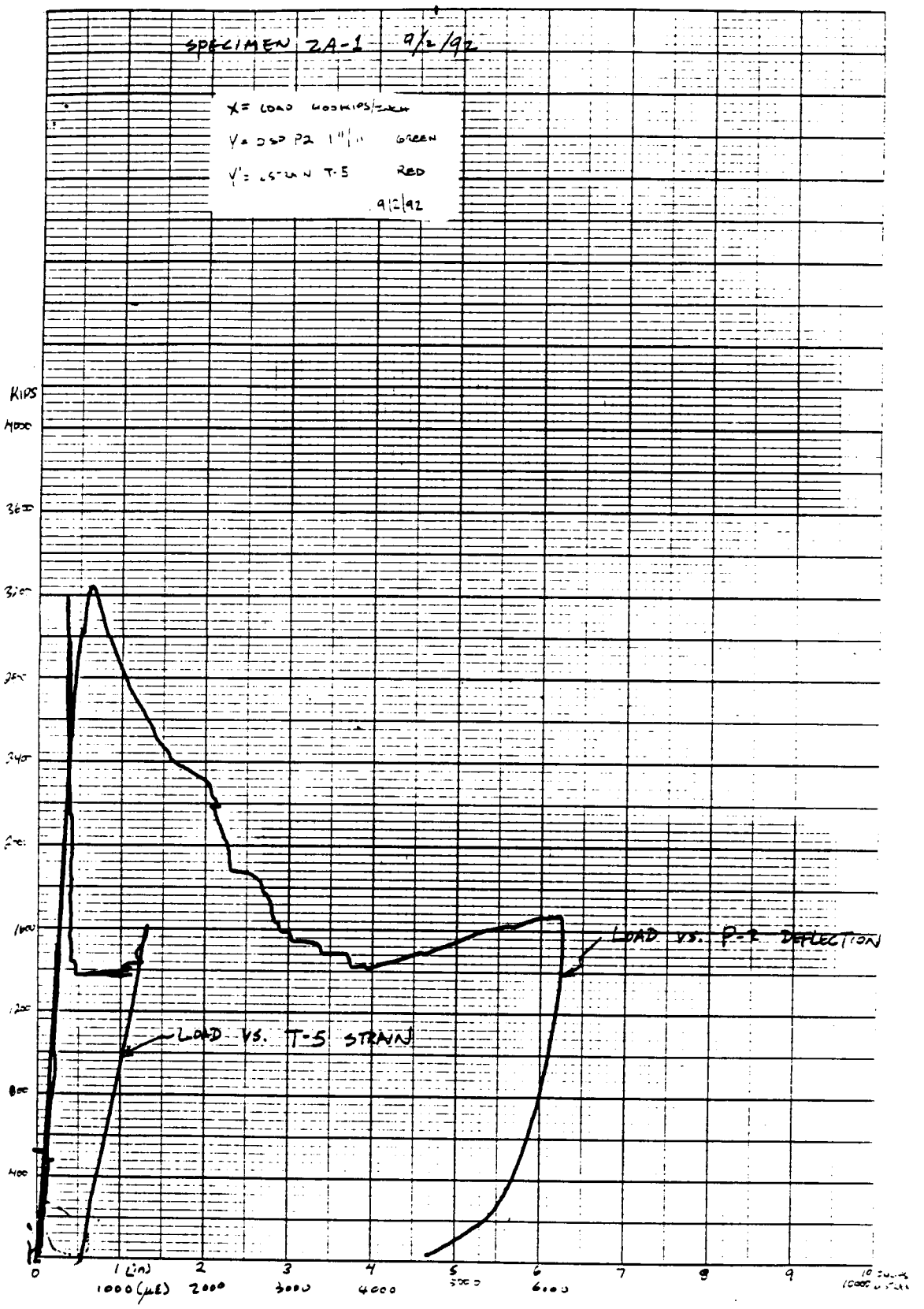


Fig. A.1.2 Specimen 2A-1 XY Plots

Table A.2.1: Instrumentation Description for Speciment 2A-2

Gauge Wire Location	Gauge Wire Mark	Gauge Wire Description
1	C-31	Outside Longitudinal Compression
2	T-41	Outside Longitudinal Tension
3	T-4	Inside Longitudinal Tension
4	D-21	Center Vertical Top
5	D-22	Outside Vertical Top
6	D-12	Outside Vertical Bottom
7	D-11	Center Vertical Bottom
8	T-11A	T-Bar
9	C-3	Inside Longitudinal Compression
10	C-32	Outside Longitudinal Compression
11	T-42	Outside Longitudinal Tension
12	T-14A	T-Bar
13	T-17	T-Bar
14	C-33	Outside Longitudinal Compression
15	T-43	Outside Longitudinal Tension
16	T-22	T-Bar
17	T-1	T-Bar
18	H-23	Top Haunch
19	H-22	Center Haunch
20	H-21	Bottom Haunch
21	C-34	Outside Longitudinal Compression
22	T-44	Outside Longitudinal Tension
23	C-1	Inside Longitudinal Compression
24	C-21	Outside Longitudinal Compression
25	T-11B	Outside Longitudinal Tension
26	T-3	Inside Longitudinal Tension
27	T-18	T-Bar
28	C-22	Outside Longitudinal Compression
29	T-12	Outside Longitudinal Tension
30	T-16	T-Bar
31	T-25	T-Bar
32	C-23	Outside Longitudinal Compression
33	T-13	Outside Longitudinal Tension
34	T-15	T-Bar
35	S-4	Center Vertical Top
36	T-30	T-Bar
37	S-5	Center Vertical Bottom
38	H-53	Top Haunch
39	H-52	Center Haunch
40	H-51	Bottom Haunch
41	C-24	Outside Longitudinal Compression
42	T-14B	Outside Longitudinal Tension
	B-1	Outside Top Bolt
	B-2	Center Top Bolt

Table A.2.1: Instrumentation Description for Speciment 2A-2(Cont'd)

Gauge Wire Location	Gauge Wire Mark	Gauge Wire Description
	B-3	Outside Bottom Bolt
	B-4	Center Bottom Bolt
	P-1	Potentiometer P-1
	P-2	Potentiometer P-2
	P-3	Potentiometer P-3
	P-4	Potentiometer P-4
	P-5	Potentiometer P-5
	P-6	Potentiometer P-6
	P-7	Potentiometer P-7
	P-8	Potentiometer P-8
	P-9	Potentiometer P-9

Table A.2.2: Test Data for Speciment 2A-2

No.	LOAD (Kips)	C-31 (ustrain)	T-41 (ustrain)	T-4 (ustrain)	D-21 (ustrain)	D-22 (ustrain)	D-12 (ustrain)	D-11 (ustrain)	T-11A (ustrain)
1	0	6	0	6	-6	0	0	0	-6
2	50	-31	31	12	0	18	-12	6	-6
3	100	-73	67	-6	0	31	-12	-6	12
4	200	-128	67	6	24	43	-18	-6	12
5	300	-183	98	0	37	61	-12	0	49
6	399	-226	116	0	43	73	-24	-12	79
7	501	-269	98	18	43	92	0	-12	98
8	599	-317	92	85	49	92	0	0	85
9	701	-342	104	171	43	104	12	0	98
10	800	-385	104	195	49	110	-6	18	104
11	900	-427	110	171	49	110	-24	12	92
12	1000	-458	122	110	55	116	-6	6	92
13	1099	-488	116	104	55	110	-37	0	98
14	1199	-513	128	79	49	134	-37	-18	79
15	1299	-562	134	67	79	134	-43	-6	104
16	1400	-586	140	49	55	153	-31	0	110
17	1500	-629	140	24	73	140	-31	0	104
18	1602	-665	159	12	79	147	-61	-6	116
19	1702	-678	171	-24	73	147	-55	-18	128
20	1803	-720	165	-31	79	147	-49	-6	122
21	1901	-745	147	-24	98	165	-43	0	140
22	1999	-787	177	-55	92	147	-31	-18	134
23	2100	-824	165	-43	110	165	-37	-18	153
24	2199	-855	189	-67	98	177	-31	-24	140
25	2298	-885	183	-49	104	183	-49	-6	147
26	2404	-909	177	-49	98	195	-37	-18	140
27	2506	-940	208	-79	122	201	-43	-6	171
28	2499	-989	171	-43	122	220	-37	-12	153
29	2502	-1001	177	-43	104	220	-61	-24	153
30	2607	-1019	171	-43	134	238	-55	-31	147
31	2703	-1025	159	-49	110	232	-61	-31	140
32	2801	-1050	165	-67	122	256	-61	-31	153
33	2902	-1099	165	-67	140	262	-61	-18	153
34	3009	-1123	177	-61	153	269	-73	-37	153
35	3003	-1178	183	-79	147	293	-140	-43	140
36	3052	-1184	165	-85	159	317	-128	-43	134
37	3099	-1197	159	-92	159	317	-159	-49	134
38	3154	-1184	171	-98	153	330	-153	-49	147
39	3206	-1215	153	-110	159	311	-177	-55	134
40	3257	-1221	122	-110	153	330	-201	-55	140
41	3302	-1245	128	-116	165	317	-220	-67	134
42	3345	-1258	208	-134	177	348	-153	-85	140
43	3400	-1276	250	-147	171	348	-73	-98	122
44	3493	-1307	287	-775	165	378	85	-92	134
45	3503	-1319	293	-824	171	360	147	-79	153
46	3496	-1337	305	-830	183	366	208	-67	134
47	3490	-1319	293	-647	177	372	220	-85	128
48	3408	-1319	317	482	177	360	226	-85	116

Table A.2.2: Test Data for Speciment 2A-2 (Cont'd)

No.	LOAD (Kips)	C-31 (ustrain)	T-41 (ustrain)	T-4 (ustrain)	D-21 (ustrain)	D-22 (ustrain)	D-12 (ustrain)	D-11 (ustrain)	T-11A (ustrain)
49	3232	-1300	269	1257	183	360	263	-73	116
50	2894	-1288	262	2301	153	342	263	-67	110
51	2659	-1252	275		140	336	250	-73	104
52	2596	-1233	330		128	324	214	-73	104
53	2440	-1191	354		134	330	92	-79	116
54	2275	-1166	348		110	293	43	-79	110
55	2153	-1099	330		98	281	67	-61	128
56	2070	-1044	360		104	256	104	-55	122
57	1926	-946	421		67	195	159	0	122
58	1740	-909	452		67	165	159	24	128
59	1741	-867	488		73	128	165	31	128
60	1729	-781	598		73	116	226	31	153
61	1764	-714	629		55	61	244	43	147
62	1724	-604	726		31	55	275	37	153
63	1686	-482	720		37	55	299	55	159
64	1738	-336	732		6	49	305	49	153
65	1791	-159	732		0	73	311	55	140
66	1611	-134	708		0	55	293	37	134
67	1111	-12	592		12	79	287	31	116
68	839	134	519		31	67	293	55	110
69	464	336	391		37	49	281	37	122
70	310	440	348		37	43	275	18	98
71	247	482	336		43	24	256	24	104
72	177	525	311		37	37	256	31	104
73	77	574	287		43	37	244	12	122
74	58	586	275		43	43	244	18	104
75	52	586	293		31	37	244	12	110
76	55	586	293		24	37	232	12	122
77	49	592	281		43	31	244	18	104
78	28	604	281		24	24	226	12	104
79	3	604	275		31	24	232	12	110
80	2	604	262		37	24	226	6	104
81	2	610	262		31	24	226	12	104

Table A.2.2: Test Data for Speciment 2A-2 (Cont'd)

No.	LOAD (Kips)	C-3 (ustrain)	C-32 (ustrain)	T-42 (ustrain)	T-14A (ustrain)	T-17 (ustrain)	C-33 (ustrain)	T-43 (ustrain)	T-22 (ustrain)
1	0	0	-6	-18	0	6	0	0	6
2	50	-37	0	0	6	12	-12	12	12
3	100	-61	-6	6	0	18	-31	18	6
4	200	-122	-18	12	-6	31	-43	18	12
5	300	-171	-24	37	-6	49	-49	24	12
6	399	-226	-37	79	-6	67	-49	31	18
7	501	-256	-43	116	31	85	-55	43	0
8	599	-299	-49	110	18	92	-67	134	12
9	701	-336	-43	140	31	98	-55	183	43
10	800	-372	-55	147	37	104	-55	214	92
11	900	-391	-61	140	18	104	-43	256	177
12	1000	-433	-61	183	24	116	-43	275	256
13	1099	-464	-55	177	24	104	-49	256	232
14	1199	-501	-79	177	18	128	-24	269	256
15	1299	-531	-79	201	24	128	-31	275	275
16	1400	-562	-73	214	24	134	-31	269	293
17	1500	-586	-85	226	31	140	-24	269	324
18	1602	-629	-85	208	31	140	-18	183	342
19	1702	-653	-85	220	12	140	-37	195	354
20	1803	-690	-79	232	12	147	-12	189	378
21	1901	-702	-92	250	18	165	-12	214	415
22	1999	-732	-98	262	12	147	-6	214	427
23	2100	-787	-122	256	24	147	-18	220	452
24	2199	-800	-110	275	6	140	0	226	488
25	2298	-836	-92	269	37	147	-6	238	537
26	2404	-873	-92	281	12	171	6	238	549
27	2506	-903	-73	287	18	165	24	275	592
28	2499	-928	-85	250	24	171	31	256	543
29	2502	-952	-67	256	18	165	43	232	555
30	2607	-958	-73	269	0	165	24	250	598
31	2703	-970	-79	250	0	171	49	256	586
32	2801	-983	-73	262	6	189	67	232	635
33	2902	-1007	-55	256	-24	195	79	256	623
34	3009	-1056	-61	281	-12	232	110	263	629
35	3003	-1099	-37	244	-12	262	128	263	543
36	3052	-1099	-31	238	-24	262	134	244	580
37	3099	-1111	-43	256	-24	262	134	256	562
38	3154	-1123	-24	287	-24	299	147	250	586
39	3206	-1136	-6	281	-18	311	177	263	574
40	3257	-1136	-6	275	-18	336	183	287	623
41	3302	-1160	37	293	-18	366	201	256	635
42	3345	-1166	92	305	-31	397	226	250	671
43	3400	-1197	134	287	-31	409	269	263	714
44	3493	-1239	372	305	-49	433	415	305	1288
45	3503	-1233	494	299	-37	458	476	299	1672
46	3496	-1245	525	287	-24	464	525	299	2136
47	3490	-1239	525	275	-49	446	519	324	3040
48	3408	-1233	513	275	-37	446	403	891	

Table A.2.2: Test Data for Speciment 2A-2 (Cont'd)

No.	LOAD (Kips)	C-3 (ustrain)	C-32 (ustrain)	T-42 (ustrain)	T-14A (ustrain)	T-17 (ustrain)	C-33 (ustrain)	T-43 (ustrain)	T-22 (ustrain)
49	3232	-1221	525	244	0	421	263	1709	
50	2894	-1203	562	232	-12	421	653		
51	2659	-1160	555	256	-31	433	1434		
52	2596	-1154	525	269	-12	482	1947		
53	2440	-1099	494	293	-6	519	3058		
54	2275	-1075	482	269	18	519	3943		
55	2153	-1001	513	256	18	494	2844		
56	2070	-964	482	275	12	519	1208		
57	1926	-861	494	372	49	635	-2100		
58	1740	-824	501	751	61	684	-2039		
59	1741	-769	525	1672	73	787	-1215		
60	1729	-690	519	2002	79	891	-1904		
61	1764	-629	549	1697	195	885	-1355		
62	1724	-537	549	1575	281	897	-330		
63	1686	-360	537	1538	269	922	1447		
64	1738	-244	513	1581	275	922	3076		
65	1791	-6	543	1672	238	940	5029		
66	1611	43	501	1611	232	873			
67	1111	134	488	1288	208	708			
68	839	250	482	1111	208	616			
69	464	446	488	757	220	476			
70	310	549	501	665	177	415			
71	247	610	476	635	177	403			
72	177	653	464	598	153	385			
73	77	702	452	568	110	342			
74	58	708	427	555	104	354			
75	52	720	452	568	73	348			
76	55	714	433	580	110	330			
77	49	708	415	580	104	342			
78	28	720	440	586	98	336			
79	3	732	476	555	85	317			
80	2	726	482	580	79	324			
81	2	732	482	568	79	317			

Table A.2.2: Test Data for Speciment 2A-2 (Cont'd)

No.	LOAD (Kips)	T-1 (ustrain)	H-23 (ustrain)	H-22 (ustrain)	H-21 (ustrain)	C-34 (ustrain)	T-44 (ustrain)	C-1 (ustrain)	C-21 (ustrain)
1	0	18	0	0	6	6	6	0	0
2	50	24	6	12	-6	43	18	18	0
3	100	31	-18	12	-18	37	24	-6	-12
4	200	24	-24	-6	-37	24	31	-49	-49
5	300	18	-6	-18	-61	43	12	-67	-73
6	399	24	-37	-24	-67	79	-6	-92	-85
7	501	43	-24	-24	-104	116	-6	-140	-116
8	599	49	-37	-31	-140	128	6	-165	-147
9	701	24	-37	-85	-171	177	12	-195	-189
10	800	37	-61	-110	-220	195	43	-232	-220
11	900	-31	-61	-140	-287	214	67	-287	-263
12	1000	-24	-73	-153	-342	226	73	-299	-293
13	1099	-37	-98	-189	-397	250	104	-348	-336
14	1199	-43	-104	-195	-458	287	110	-385	-372
15	1299	-31	-128	-208	-501	317	122	-421	-403
16	1400	-43	-140	-208	-555	342	116	-464	-440
17	1500	-37	-171	-208	-604	348	140	-494	-488
18	1602	-12	-183	-208	-659	378	147	-537	-513
19	1702	-12	-208	-189	-720	415	165	-549	-537
20	1803	-12	-220	-195	-775	433	165	-592	-580
21	1901	12	-226	-171	-848	470	177	-617	-623
22	1999	43	-244	-189	-909	494	171	-653	-647
23	2100	116	-269	-195	-989	549	195	-714	-690
24	2199	134	-281	-195	-1050	562	208	-714	-726
25	2298	134	-281	-189	-1135	586	195	-769	-763
26	2404	122	-311	-226	-1221	616	220	-794	-781
27	2506	128	-324	-244	-1306	665	238	-836	-824
28	2499	116	-336	-250	-1367	671	250	-879	-873
29	2502	122	-336	-269	-1385	684	250	-873	-873
30	2607	159	-354	-287	-1422	726	244	-891	-879
31	2703	147	-354	-287	-1477	732	244	-891	-891
32	2801	140	-372	-324	-1556	775	226	-916	-916
33	2902	128	-378	-348	-1648	824	244	-934	-964
34	3009	73	-403	-409	-1739	897	232	-983	-977
35	3003	-6	-427	-464	-1849	964	220	-1044	-1025
36	3052	-6	-440	-482	-1892	977	226	-1038	-1038
37	3099	-85	-446	-501	-1916	970	208	-1050	-1032
38	3154	-116	-464	-525	-1959	1013	195	-1044	-1038
39	3206	-153	-440	-543	-2008	1038	238	-1074	-1056
40	3257	-183	-464	-568	-2051	1044	214	-1080	-1062
41	3302	-208	-458	-617	-2124	1111	220	-1074	-1074
42	3345	-232	-482	-678	-2222	1148	189	-1087	-1074
43	3400	-232	-494	-745	-2289	1178	177	-1087	-1087
44	3493	-263	-501	-873	-2490	1301	79	-1123	-1099
45	3503	-171	-519	-952	-2490	1313	104	-1129	-1117
46	3496	-92	-537	-1062	-2472	1301	122	-1135	-1111
47	3490	-79	-549	-1099	-2447	1264	104	-1129	-1111
48	3408	-122	-598	-1123	-2362	1136	79	-1148	-1117

Table A.2.2: Test Data for Speciment 2A-2 (Cont'd)

No.	LOAD (Kips)	T-1 (ustrain)	H-23 (ustrain)	H-22 (ustrain)	H-21 (ustrain)	C-34 (ustrain)	T-44 (ustrain)	C-1 (ustrain)	C-21 (ustrain)
49	3232	-366	-629	-1141	-2289	1069	-49	-1111	-1117
50	2894	-781	-690	-1343	-2173	1087	-171	-1093	-1080
51	2659	-610	-647	-1587	-2063	1124	-189	-1050	-1044
52	2596	-238	-562	-1611	-2038	1124	-171	-1019	-1007
53	2440	464	-275	-1562	-1947	1056	-122	-940	-952
54	2275	586	-67	-1459	-1794	970	-128	-867	-873
55	2153	580	79	-1343	-1691	934	-61	-824	-836
56	2070	519	214	-1373	-1672	1007	-6	-769	-781
57	1926	458	604	-1288	-1605	1038	110	-647	-684
58	1740	427	726	-1288	-1550	1056	134	-513	-531
59	1741	348	830	-1306	-1575	1124	85	-440	-458
60	1729	244	928	-1312	-1556	1178	-55	-336	-378
61	1764	201	1056	-1337	-1611	1270	55	-263	-305
62	1724	159	1154	-1379	-1672	1392	49	-165	-238
63	1686	189	1208	-1355	-1642	1459	55	12	-73
64	1738	171	1178	-1361	-1660	1520	562	134	37
65	1791	122	1086	-1392	-1660	1612	537	317	214
66	1611	116	1062	-1318	-1526	1551	543	354	226
67	1111	391	1172	-1007	-1099	1343	519	397	281
68	839	439	1245	-824	-879	1239	507	446	336
69	464	586	1184	-568	-580	1050	482	568	482
70	310	604	1105	-458	-452	952	452	641	555
71	247	586	1056	-415	-397	909	433	671	592
72	177	574	995	-360	-342	842	385	720	623
73	77	549	867	-244	-201	720	293	720	623
74	58	513	848	-226	-159	714	299	714	641
75	52	513	836	-220	-134	678	287	720	641
76	55	507	824	-214	-140	690	287	726	623
77	49	488	830	-195	-122	665	281	726	641
78	28	482	806	-183	-110	671	269	726	647
79	3	464	769	-159	-73	629	281	702	647
80	2	470	757	-159	-67	598	269	702	629
81	2	464	751	-153	-67	604	275	702	635

Table A.2.2: Test Data for Speciment 2A-2 (Cont'd)

No.	LOAD (Kips)	T-11B (ustrain)	T-3 (ustrain)	T-18 (ustrain)	C-22 (ustrain)	T-12 (ustrain)	T-16 (ustrain)	T-25 (ustrain)	C-23 (ustrain)
1	0	12	-6	0	0	0	-6	-6	12
2	50	37	140	-67	-18	134	31	-12	49
3	100	49	177	-73	-43	159	24	-12	37
4	200	98	238	-98	-79	202	12	-6	31
5	300	128	311	-85	-122	281	37	6	37
6	399	140	372	-55	-116	342	122	18	55
7	501	153	427	-61	-104	354	214	-61	92
8	599	177	482	-49	-92	391	226	-98	134
9	701	189	507	-43	-98	409	220	-67	147
10	800	226	574	-49	-43	452	238	-43	153
11	900	256	623	-37	-43	476	262	-24	153
12	1000	281	684	-43	-55	488	269	-18	171
13	1099	275	708	-31	-67	482	281	0	177
14	1199	293	757	-43	-73	519	275	6	171
15	1299	342	812	-37	-98	543	281	0	171
16	1400	360	848	-49	-104	568	281	0	159
17	1500	378	873	-49	-134	592	299	12	165
18	1602	391	903	-43	-159	592	305	18	140
19	1702	415	940	-43	-165	641	281	18	140
20	1803	446	946	-49	-165	647	311	12	122
21	1901	464	995	-37	-177	671	299	31	128
22	1999	488	1019	-37	-214	775	311	24	116
23	2100	507	1025	-24	-238	836	293	49	98
24	2199	531	1050	-37	-256	848	293	43	92
25	2298	543	1044	-24	-256	867	305	55	85
26	2404	586	1019	-37	-281	910	311	67	79
27	2506	629	226	-43	-287	336	305	73	55
28	2499	604	177	-43	-293	269	293	73	49
29	2502	580	159	-43	-299	256	305	43	49
30	2607	598	189	-49	-305	269	275	67	49
31	2703	592	171	-43	-305	263	262	73	67
32	2801	604	177	-43	-305	263	244	79	73
33	2902	598	208	-18	-311	269	226	92	92
34	3009	482	208	12	-281	281	226	110	98
35	3003	421	189	73	-287	263	238	104	116
36	3052	409	201	61	-281	256	226	104	128
37	3099	439	183	85	-269	256	232	104	128
38	3154	439	189	79	-244	256	232	110	128
39	3206	452	183	85	-250	238	244	122	159
40	3257	464	208	104	-220	250	250	147	189
41	3302	501	183	134	-177	256	250	159	201
42	3345	543	195	134	-122	256	250	171	238
43	3400	574	177	134	-85	256	244	195	269
44	3493	641	189	134	-12	250	299	201	336
45	3503	665	195	122	-6	250	317	195	391
46	3496	659	195	128	-31	256	348	147	464
47	3490	671	195	140	-43	250	366	116	501
48	3408	684	208	134	-183	250	488	31	446

Table A.2.2: Test Data for Speciment 2A-2 (Cont'd)

No.	LOAD (Kips)	T-11B (ustrain)	T-3 (ustrain)	T-18 (ustrain)	C-22 (ustrain)	T-12 (ustrain)	T-16 (ustrain)	T-25 (ustrain)	C-23 (ustrain)
49	3232	678	195	116	-501	220	635	85	
50	2894	690	195	98	-684	244	653	134	
51	2659	1001	360	128	-653	256	531	140	
52	2596	1203	476	122	-635	263	513	147	
53	2440	1392	555	110	-531	263	525	104	
54	2275	1300	519	128	-403	220	610	134	
55	2153	1258	519	110	-336	244	592	128	
56	2070	848	574	98	-244	263	574	92	
57	1926	1081	568	92	-92	305	531	73	
58	1740	1068	543	104	73	946	519	31	
59	1741	1294	555	98	189	1862	464	12	
60	1729	1331	580	122	317	1605	348	-12	
61	1764	1367	586	98	458	1575	232	0	
62	1724	1465	684	98	574	1733	153	31	
63	1686	1428	885	104	714	1819	147	73	
64	1738	1526	1013	128	830	1941	134	85	
65	1791	1532	1068	110	1007	2112	73	110	
66	1611	1428	1007	104	977	1965	85	98	
67	1111	1197	873	110	873	1605	153	104	
68	839	1056	800	98	806	1495	177	104	
69	464	781	635	43	696	1245	275	85	
70	310	659	562	31	623	1160	311	55	
71	247	610	543	24	604	1117	324	73	
72	177	562	501	18	580	1062	360	37	
73	77	519	470	31	482	983	330	-31	
74	58	494	452	24	446	977	305	-6	
75	52	507	464	18	458	983	299	18	
76	55	513	458	31	452	989	305	24	
77	49	507	440	12	458	971	311	24	
78	28	494	446	18	440	952	324	-6	
79	3	476	427	37	415	922	348	-31	
80	2	482	421	24	409	928	378	0	
81	2	476	427	24	409	922	378	0	

Table A.2.2: Test Data for Speciment 2A-2 (Cont'd)

No.	LOAD (Kips)	T-13 (ustrain)	T-15 (ustrain)	S-4 (ustrain)	T-30 (ustrain)	S-5 (ustrain)	H-53 (ustrain)	H-52 (ustrain)	H-51 (ustrain)
1	0	0	-6	-12	0	0	-6	6	6
2	50	12	-12	0	92	-18	-134	-214	-24
3	100	18	-12	-18	73	-6	-336	-208	-37
4	200	24	0	-12	79	-18	-366	-189	-85
5	300	31	-6	-18	140	-12	-342	-177	-140
6	399	104	0	-12	195	-18	-433	-244	-214
7	501	128	6	-18	269	-24	-513	-275	-275
8	599	134	6	-37	293	-12	-519	-299	-348
9	701	189	-18	-24	354	-12	-543	-324	-397
10	800	220	-43	-31	391	12	-568	-354	-439
11	900	226	-92	-18	433	24	-610	-372	-476
12	1000	244	-122	-18	488	37	-641	-378	-525
13	1099	226	-122	-12	537	31	-482	-415	-562
14	1199	250	-159	12	580	24	-537	-415	-598
15	1299	232	-159	-6	635	31	-702	-433	-641
16	1400	214	-165	12	714	18	-745	-470	-665
17	1500	171	-159	6	787	37	-757	-470	-684
18	1602	104	-134	24	854	31	-934	-494	-708
19	1702	67	-128	31	916	31	-958	-537	-708
20	1803	67	0	43	1440	61	-1013	-586	-739
21	1901	37	37	43	1623	85	-1025	-629	-787
22	1999	12	61	49	1788	104	-1056	-653	-812
23	2100	-147	67	61	1965	110	-1117	-696	-848
24	2199	-177	98	85	2105	104	-1104	-708	-885
25	2298	-201	116	85	2228	122	-1111	-757	-928
26	2404	-250	110	85	2368	134	-1159	-806	-964
27	2506	348	92	104	2539	140	-1196	-842	-1019
28	2499	250	31	116	2606	128	-1196	-867	-1055
29	2502	238	24	128	2618	116	-1245	-867	-1049
30	2607	226	37	134	2685	116	-1269	-909	-1092
31	2703	244	37	134	2783	128	-1281	-922	-1129
32	2801	250	31	140	2856	134	-1294	-964	-1184
33	2902	244	73	165	3351	153	-1330	-995	-1263
34	3009	244	122	147	4345	159	-1367	-1080	-1367
35	3003	220	324	189	513	140	-1458	-1160	-1464
36	3052	208	324	183	494	116	-1440	-1160	-1489
37	3099	238	324	183	415	140	-1458	-1178	-1501
38	3154	220	494	171	458	165	-1446	-1196	-1550
39	3206	232	757	189	537	147	-1465	-1221	-1580
40	3257	238	1050	189	214	183	-1495	-1264	-1623
41	3302	244	769	189	208	165	-1495	-1294	-1672
42	3345	250	1123	195	49	171	-1507	-1343	-1782
43	3400	238	1263	201	67	165	-1513	-1380	-1849
44	3493	226	1630	208	104	153	-1556	-1459	-1995
45	3503	238	1971	208	281	116	-1562	-1496	-2026
46	3496	238	2423	201	726	134	-1562	-1496	-2050
47	3490	220	2594	189	525	128	-1550	-1502	-2050
48	3408	238	3040	201	-275		-1483	-1435	-1971

Table A.2.2: Test Data for Speciment 2A-2 (Cont'd)

No.	LOAD (Kips)	T-13 (ustrain)	T-15 (ustrain)	S-4 (ustrain)	T-30 (ustrain)	S-5 (ustrain)	H-53 (ustrain)	H-52 (ustrain)	H-51 (ustrain)
49	3232	232		232	-2509		-1281	-1313	-1873
50	2894	281		256	-3772		-1135	-1215	-1745
51	2659	311		299	-3815		-1007	-1141	-1696
52	2596	311		299	-4499		-946	-1135	-1666
53	2440	348		299	-5005		-854	-1038	-1544
54	2275	372		324	-3119		-592	-793	-1275
55	2153	513		311	-2179		-488	-775	-1226
56	2070	763		305	-2039		-391	-775	-1220
57	1926	1221		311	-1715		-189	-769	-1202
58	1740	1153		360	-2564		0	-653	-1080
59	1741	1074		360	-2210		122	-678	-1104
60	1729	1019		372	-1764		214	-684	-1141
61	1764	1013		366	-1557		348	-665	-1196
62	1724	1025		366	-1374		440	-665	-1245
63	1686	1025		348	-452		549	-519	-1068
64	1738	1105		354	-690		556	-537	-1086
65	1791	1276		360	-757		556	-574	-1123
66	1611	1251		360	-720		617	-470	-1043
67	1111	1111		397	-684		726	-293	-824
68	839	1013		360	-720		757	-189	-696
69	464	867		317	-763		610	-31	-488
70	310	800		305	-806		501	12	-397
71	247	794		293	-806		446	6	-360
72	177	745		293	-824		391	12	-287
73	77	1398		269	-848		195	-6	-183
74	58	1501		250	-867		171	0	-134
75	52	1489		250	-873		159	0	-122
76	55	1446		238	-867		159	0	-122
77	49	1422		250	-867		159	6	-98
78	28	1544		250	-885		128	6	-85
79	3	1764		244	-897		37	24	-43
80	2	1709		244	-897		43	37	-24
81	2	1660		238	-903		43	37	-18

Table A.2.2: Test Data for Speciment 2A-2 (Cont'd)

No.	LOAD (Kips)	C-24 (ustrain)	T-14B (ustrain)	B-1 (ustrain)	B-2 (ustrain)	B-3 (ustrain)	B-4 (ustrain)	P-1 (Inches)	P-2 (Inches)
1	0	0	-6	411	458	786	434	0.000	0.000
2	50	37	110	446	493	734	405	0.015	0.027
3	100	24	104	475	534	745	393	0.013	0.020
4	200	31	116	475	540	710	387	0.020	0.025
5	300	37	183	528	581	693	340	0.028	0.049
6	399	49	708	557	616	646	305	0.043	0.065
7	501	73	1215	581	663	616	282	0.054	0.082
8	599	110	1160	616	693	587	264	0.065	0.096
9	701	122	800	651	740	546	235	0.072	0.121
10	800	134	751	663	769	534	206	0.093	0.137
11	900	153	910	692	822	505	188	0.102	0.149
12	1000	171	1074	728	851	487	206	0.115	0.166
13	1099	189	922	757	886	458	188	0.136	0.184
14	1199	208	910	786	916	446	164	0.139	0.194
15	1299	232	763	810	957	428	159	0.154	0.209
16	1400	250	1184	833	986	399	141	0.167	0.223
17	1500	281	3717	851	1039	376	117	0.182	0.231
18	1602	305	1374	898	1068	364	123	0.197	0.249
19	1702	317	977	921	1109	335	106	0.208	0.264
20	1803	354	-195	951	1139	329	94	0.221	0.284
21	1901	372	-275	992	1174	317	106	0.238	0.297
22	1999	397	-342	1004	1203	299	70	0.247	0.311
23	2100	409	98	1045	1238	270	65	0.268	0.329
24	2199	458	183	1056	1274	264	59	0.279	0.342
25	2298	494	-49	1080	1303	258	70	0.295	0.358
26	2404	507	-177	1127	1344	235	59	0.301	0.374
27	2506	543	-238	1162	1373	241	59	0.316	0.389
28	2499	549	18	1209	1426	188	41	0.338	0.407
29	2502	574	-6	1191	1426	188	47	0.338	0.413
30	2607	580	-110	1215	1438	188	29	0.351	0.425
31	2703	592	-92	1244	1456	170	53	0.357	0.431
32	2801	629	-104	1279	1503	182	47	0.375	0.440
33	2902	671	-110	1309	1550	176	41	0.385	0.462
34	3009	696	293	1362	1585	141	70	0.405	0.481
35	3003	732	610	1426	1661	123	94	0.446	0.513
36	3052	739	543	1432	1661	117	88	0.450	0.521
37	3099	757	543	1461	1673	112	65	0.453	0.521
38	3154	763	415	1456	1690	117	76	0.455	0.536
39	3206	787	354	1485	1714	106	100	0.459	0.538
40	3257	812	134	1508	1737	106	82	0.474	0.554
41	3302	836	-128	1538	1773	100	82	0.489	0.564
42	3345	885	2588	1567	1814	82	106	0.509	0.587
43	3400	922	7550	1591	1831	65	94	0.526	0.607
44	3493	952		1655	1878	47	82	0.576	0.659
45	3503	964		1649	1884	35	100	0.600	0.687
46	3496	946		1626	1866	35	100	0.630	0.726
47	3490	958		1620	1861	35	117	0.639	0.740
48	3408	842		1514	1755	41	82	0.717	0.808

Table A.2.2: Test Data for Speciment 2A-2 (Cont'd)

No.	LOAD (Kips)	C-24 (ustrain)	T-14B (ustrain)	B-1 (ustrain)	B-2 (ustrain)	B-3 (ustrain)	B-4 (ustrain)	P-1 (Inches)	P-2 (Inches)
49	3232	769		1461	1702	35	94	0.877	0.976
50	2894	769		1456	1714	41	76	1.228	1.334
51	2659	855		1467	1726	29	94	1.614	1.745
52	2596	903		1461	1755	47	82	1.750	1.884
53	2440	958		1438	1737	53	106	1.971	2.138
54	2275	800		1362	1655	59	76	2.120	2.295
55	2153	824		1344	1649	59	88	2.313	2.479
56	2070	903		1391	1731	76	106	2.521	2.707
57	1926	995		1456	1802	94	100	2.844	3.064
58	1740	1055		1473	1855	94	100	3.085	3.355
59	1741	1153		1579	1972	117	112	3.323	3.631
60	1729	1251		1649	2054	129	135	3.572	3.940
61	1764	1361		1743	2183	141	164	3.827	4.241
62	1724	1477		1866	2312	159	164	4.066	4.551
63	1686	1538		1890	2324	147	182	4.336	4.883
64	1738	1593		1943	2395	170	206	4.616	5.237
65	1791	1709		1995	2465	194	217	4.978	5.689
66	1611	1660		1937	2424	205	241	5.071	5.834
67	1111	1458		1778	2224	223	229	4.973	5.701
68	839	1348		1626	2060	229	211	4.885	5.590
69	464	1110		1391	1784	200	159	4.674	5.331
70	310	1007		1273	1632	188	147	4.547	5.175
71	247	964		1215	1579	176	147	4.482	5.096
72	177	885		1144	1485	182	129	4.395	4.979
73	77	671		968	1285	217	141	4.178	4.705
74	58	647		933	1227	217	141	4.131	4.652
75	52	629		921	1209	200	159	4.113	4.625
76	55	623		927	1209	205	147	4.109	4.625
77	49	623		915	1197	217	141	4.103	4.611
78	28	598		880	1162	229	147	4.063	4.570
79	3	531		822	1098	241	176	3.998	4.468
80	2	531		822	1074	247	170	3.985	4.457
81	2	525		816	1080	241	159	3.975	4.451

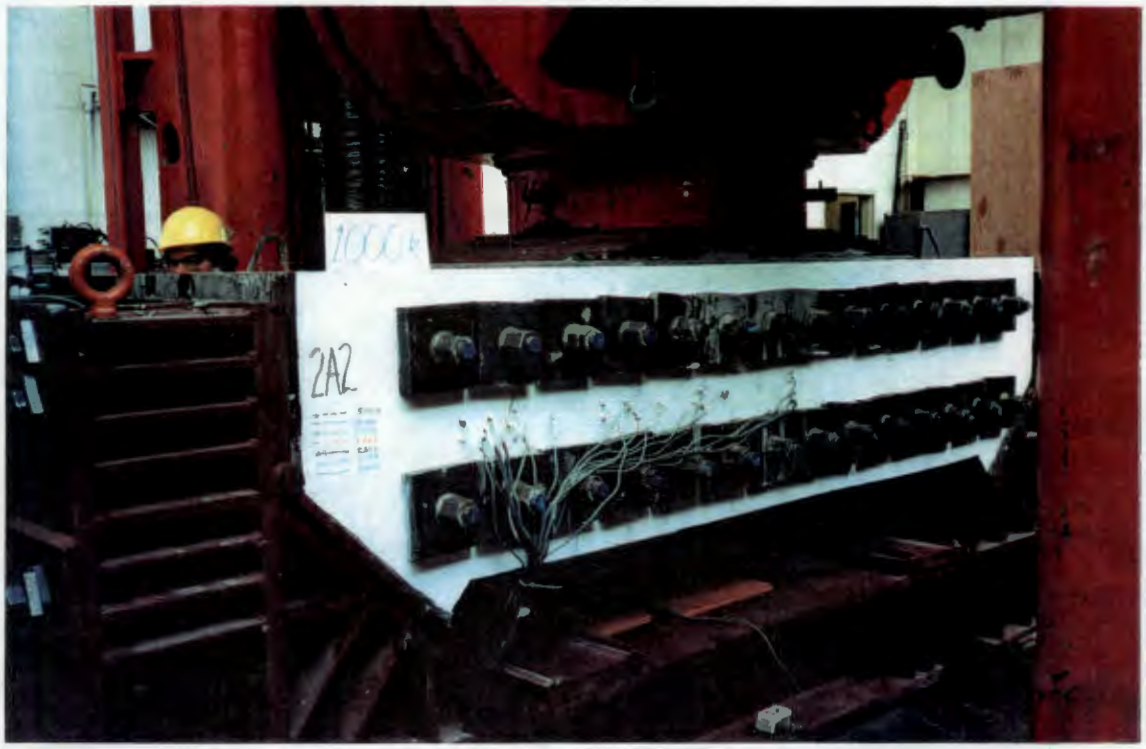
Table A.2.2: Test Data for Speciment 2A-2 (Cont'd)

No.	LOAD (Kips)	P-3 (Inches)	P-4 (Inches)	P-5 (Inches)	P-6 (Inches)	P-7 (Inches)	P-8 (Inches)	P-9 (Inches)
1	0	0.000	0.001	0.002	-0.001	-0.001	-0.001	0.002
2	50	0.028	0.011	0.011	0.008	0.009	0.014	0.003
3	100	0.026	0.010	0.013	0.006	0.011	0.015	0.004
4	200	0.045	0.013	0.021	0.007	0.010	0.015	0.001
5	300	0.060	0.020	0.036	0.012	0.016	0.019	0.003
6	399	0.082	0.033	0.054	0.019	0.028	0.027	0.002
7	501	0.110	0.044	0.069	0.026	0.034	0.038	0.000
8	599	0.134	0.056	0.086	0.030	0.042	0.047	0.003
9	701	0.153	0.066	0.100	0.037	0.049	0.054	0.000
10	800	0.173	0.076	0.117	0.039	0.057	0.061	-0.005
11	900	0.192	0.088	0.128	0.044	0.060	0.065	-0.007
12	1000	0.205	0.100	0.147	0.051	0.070	0.072	-0.010
13	1099	0.220	0.113	0.153	0.059	0.078	0.080	-0.014
14	1199	0.239	0.124	0.170	0.064	0.081	0.083	-0.015
15	1299	0.252	0.136	0.182	0.070	0.088	0.091	-0.018
16	1400	0.270	0.149	0.195	0.077	0.098	0.098	-0.024
17	1500	0.291	0.164	0.214	0.087	0.103	0.102	-0.026
18	1602	0.306	0.177	0.230	0.096	0.108	0.112	-0.028
19	1702	0.313	0.190	0.241	0.100	0.118	0.115	-0.032
20	1803	0.334	0.198	0.253	0.105	0.125	0.123	-0.035
21	1901	0.350	0.212	0.268	0.108	0.130	0.129	-0.039
22	1999	0.363	0.225	0.283	0.115	0.137	0.140	-0.044
23	2100	0.386	0.243	0.297	0.127	0.149	0.147	-0.047
24	2199	0.399	0.254	0.312	0.129	0.155	0.154	-0.050
25	2298	0.414	0.263	0.326	0.137	0.160	0.160	-0.052
26	2404	0.432	0.276	0.339	0.142	0.169	0.167	-0.057
27	2506	0.447	0.292	0.356	0.149	0.177	0.172	-0.059
28	2499	0.462	0.303	0.371	0.161	0.185	0.179	-0.065
29	2502	0.468	0.308	0.377	0.160	0.188	0.183	-0.064
30	2607	0.477	0.315	0.379	0.166	0.193	0.185	-0.066
31	2703	0.492	0.326	0.394	0.168	0.195	0.191	-0.066
32	2801	0.503	0.335	0.404	0.175	0.200	0.197	-0.065
33	2902	0.518	0.350	0.423	0.180	0.210	0.205	-0.072
34	3009	0.544	0.368	0.444	0.190	0.218	0.214	-0.079
35	3003	0.581	0.392	0.469	0.206	0.235	0.234	-0.086
36	3052	0.589	0.398	0.475	0.205	0.238	0.234	-0.089
37	3099	0.596	0.403	0.483	0.210	0.242	0.238	-0.089
38	3154	0.598	0.410	0.490	0.213	0.243	0.240	-0.091
39	3206	0.613	0.417	0.496	0.216	0.247	0.247	-0.092
40	3257	0.621	0.425	0.513	0.220	0.251	0.251	-0.097
41	3302	0.636	0.439	0.523	0.227	0.259	0.261	-0.099
42	3345	0.660	0.456	0.542	0.237	0.265	0.274	-0.108
43	3400	0.675	0.468	0.553	0.242	0.272	0.281	-0.111
44	3493	0.738	0.523	0.615	0.275	0.309	0.313	-0.125
45	3503	0.760	0.546	0.643	0.292	0.324	0.324	-0.128
46	3496	0.796	0.578	0.674	0.318	0.353	0.342	-0.131
47	3490	0.807	0.589	0.684	0.332	0.362	0.346	-0.131
48	3408	0.885	0.684	0.775	0.433	0.466	0.377	-0.131

Table A.2.2: Test Data for Speciment 2A-2 (Cont'd)

No.	LOAD (Kips)	P-3 (Inches)	P-4 (Inches)	P-5 (Inches)	P-6 (Inches)	P-7 (Inches)	P-8 (Inches)	P-9 (Inches)
49	3232	1.057	0.853	0.955	0.561	0.599	0.502	-0.129
50	2894	1.403	1.193	1.311	0.853	0.906	0.797	-0.093
51	2659	1.789	1.581	1.721	1.299	1.433	1.102	-0.034
52	2596	1.925	1.712	1.853	1.426	1.665	1.194	-0.013
53	2440	2.150	1.945	2.100	1.771	2.820	1.366	0.043
54	2275	2.301	2.098	2.259	1.917	2.825	1.458	0.079
55	2153	2.486	2.282	2.445	2.097	2.823	1.616	0.133
56	2070	2.698	2.488	2.663	2.265	2.825	1.815	0.198
57	1926	3.021	2.806	3.015	2.606	2.825	2.100	0.321
58	1740	3.278	3.041	3.299	2.622	2.825	2.756	0.444
59	1741	3.513	3.277	3.580	2.625	2.824	2.756	0.570
60	1729	3.766	3.539	3.875	2.649	2.822	2.758	0.709
61	1764	4.019	3.788	4.177	2.654	2.826	2.759	0.849
62	1724	4.258	4.022	4.474	2.670	2.823	2.762	1.005
63	1686	4.530	4.284	4.803	2.809	2.824	2.772	1.180
64	1738	4.813	4.557	5.137	2.792	2.835	2.773	1.370
65	1791	5.171	4.893	5.560	2.786	2.881	2.781	1.616
66	1611	5.266	4.994	5.680	2.784	2.882	2.783	1.706
67	1111	5.160	4.903	5.567	2.784	2.884	2.782	1.674
68	839	5.067	4.816	5.466	2.784	2.885	2.782	1.614
69	464	4.862	4.623	5.227	2.783	2.884	2.781	1.474
70	310	4.733	4.503	5.079	2.784	2.885	2.781	1.384
71	247	4.668	4.442	5.004	2.783	2.888	2.780	1.340
72	177	4.575	4.353	4.892	2.786	2.888	2.779	1.274
73	77	4.346	4.139	4.639	2.785	2.889	2.779	1.144
74	58	4.284	4.095	4.585	2.788	2.888	2.780	1.122
75	52	4.271	4.082	4.568	2.788	2.891	2.780	1.111
76	55	4.265	4.078	4.568	2.791	2.891	2.780	1.111
77	49	4.260	4.069	4.555	2.789	2.888	2.781	1.107
78	28	4.211	4.030	4.507	2.791	2.890	2.779	1.080
79	3	4.126	3.966	4.419	2.793	2.891	2.780	1.042
80	2	4.113	3.957	4.409	2.793	2.892	2.780	1.040
81	2	4.103	3.954	4.403	2.793	2.893	2.779	1.038

(a) Load = 1,000 kips



(b) Load = 3,000 kips

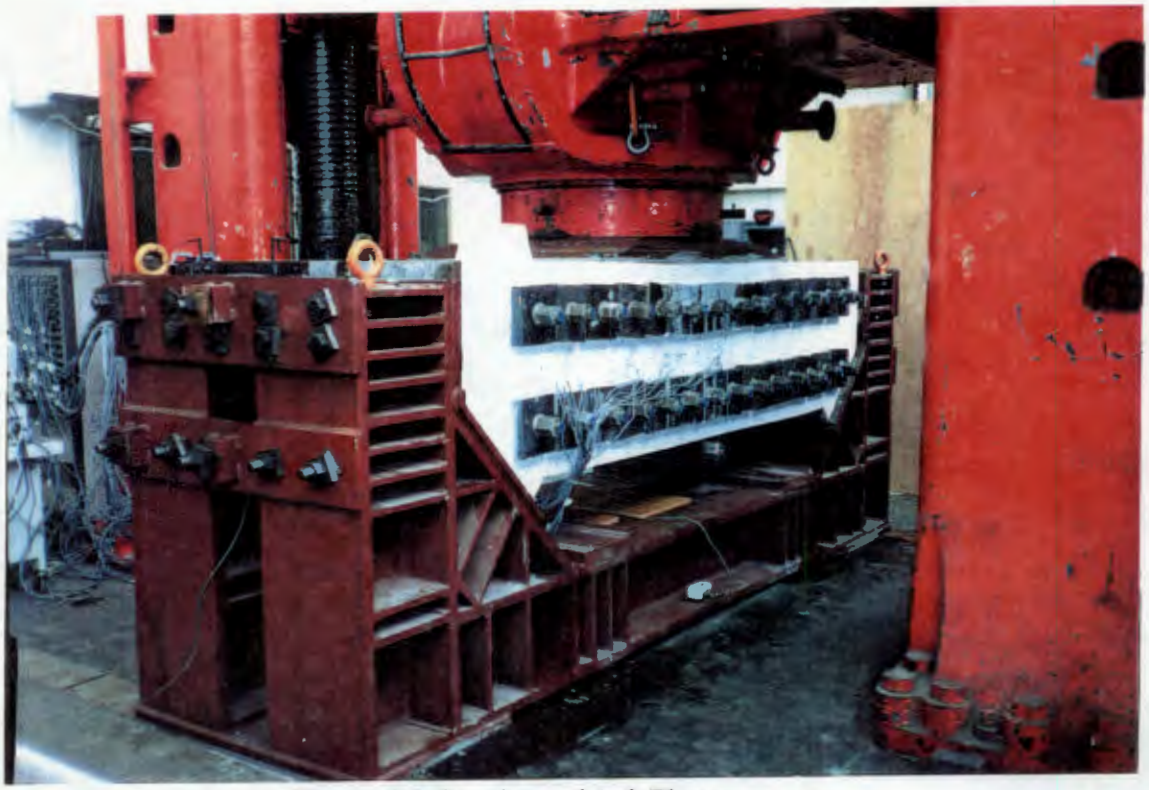
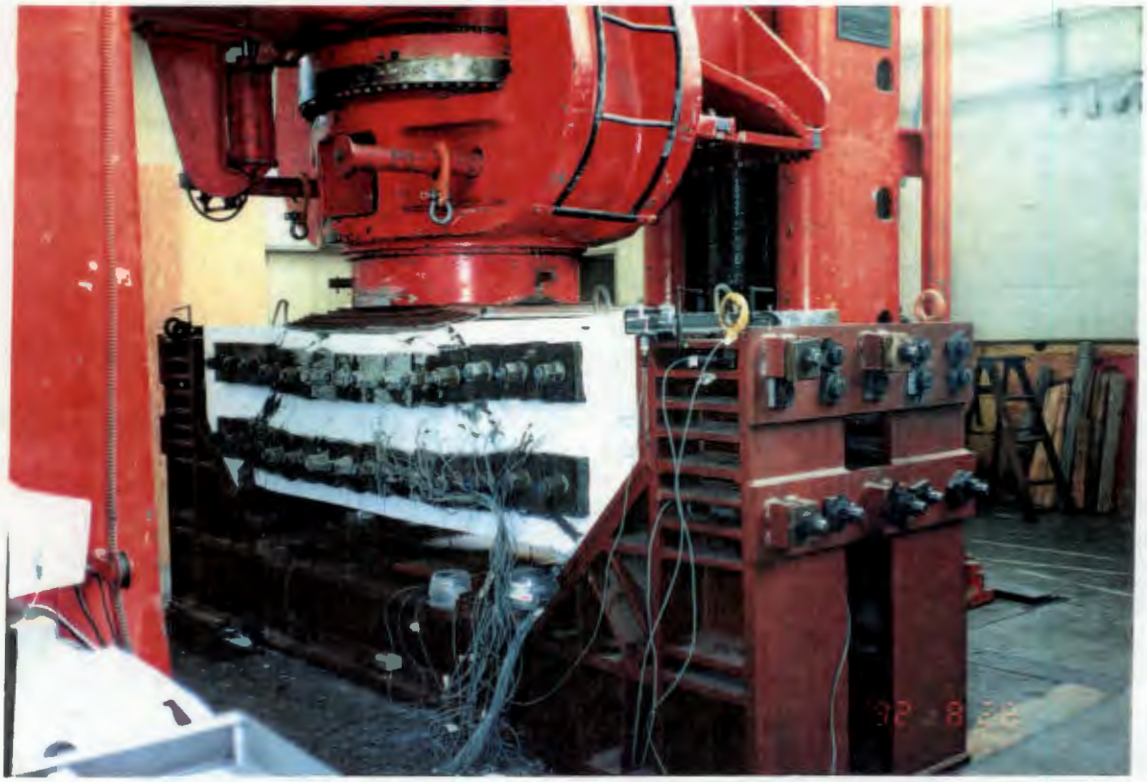


Fig. A.2.1 Specimen 2A-2 Photos

(c) After Ultimate Load



(d) After Ultimate Load

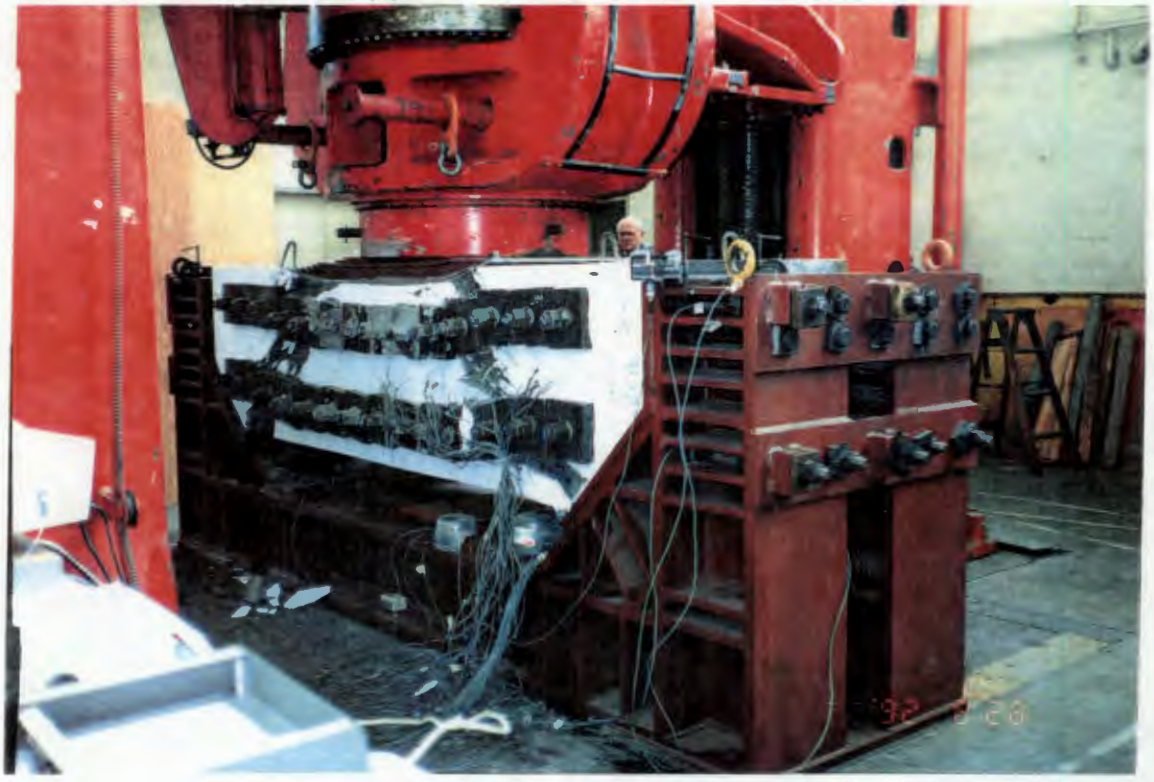


Fig. A.2.1 Specimen 2A-2 Photos (Cont'd)

(e) End of the Test

(f) End of the Test

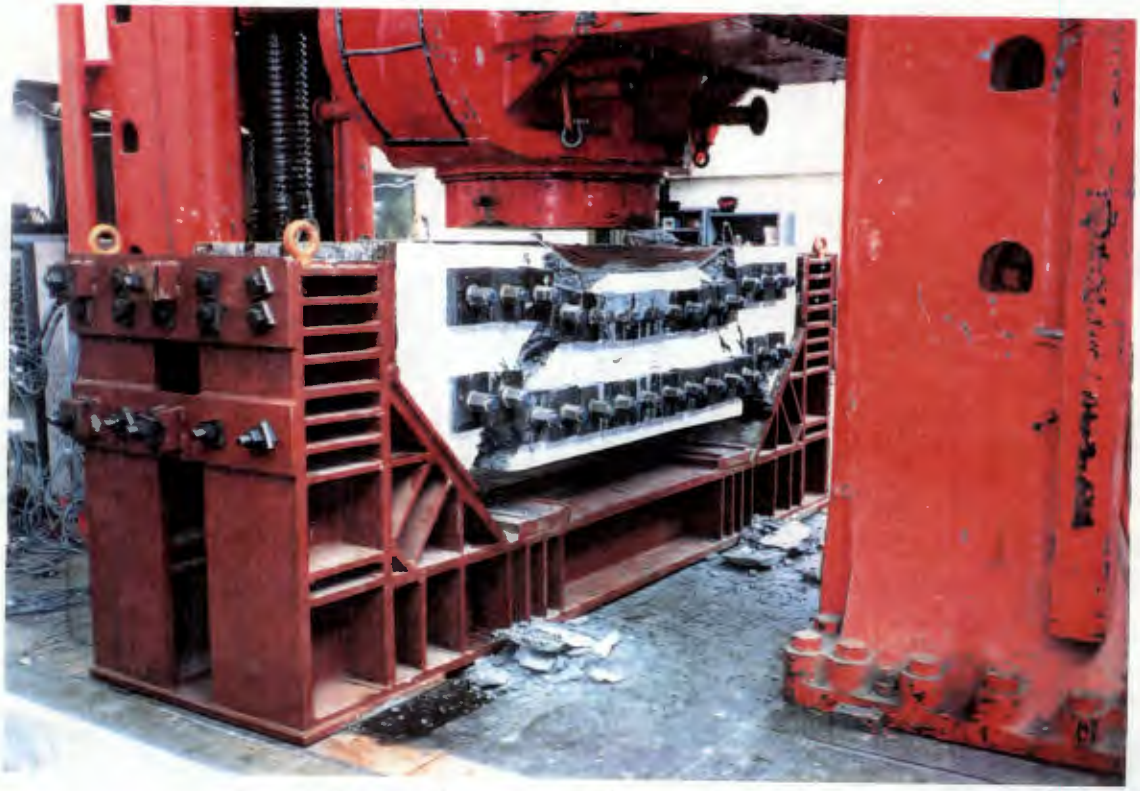


Fig. A.2.1 Specimen 2A-2 Photos (Cont'd)

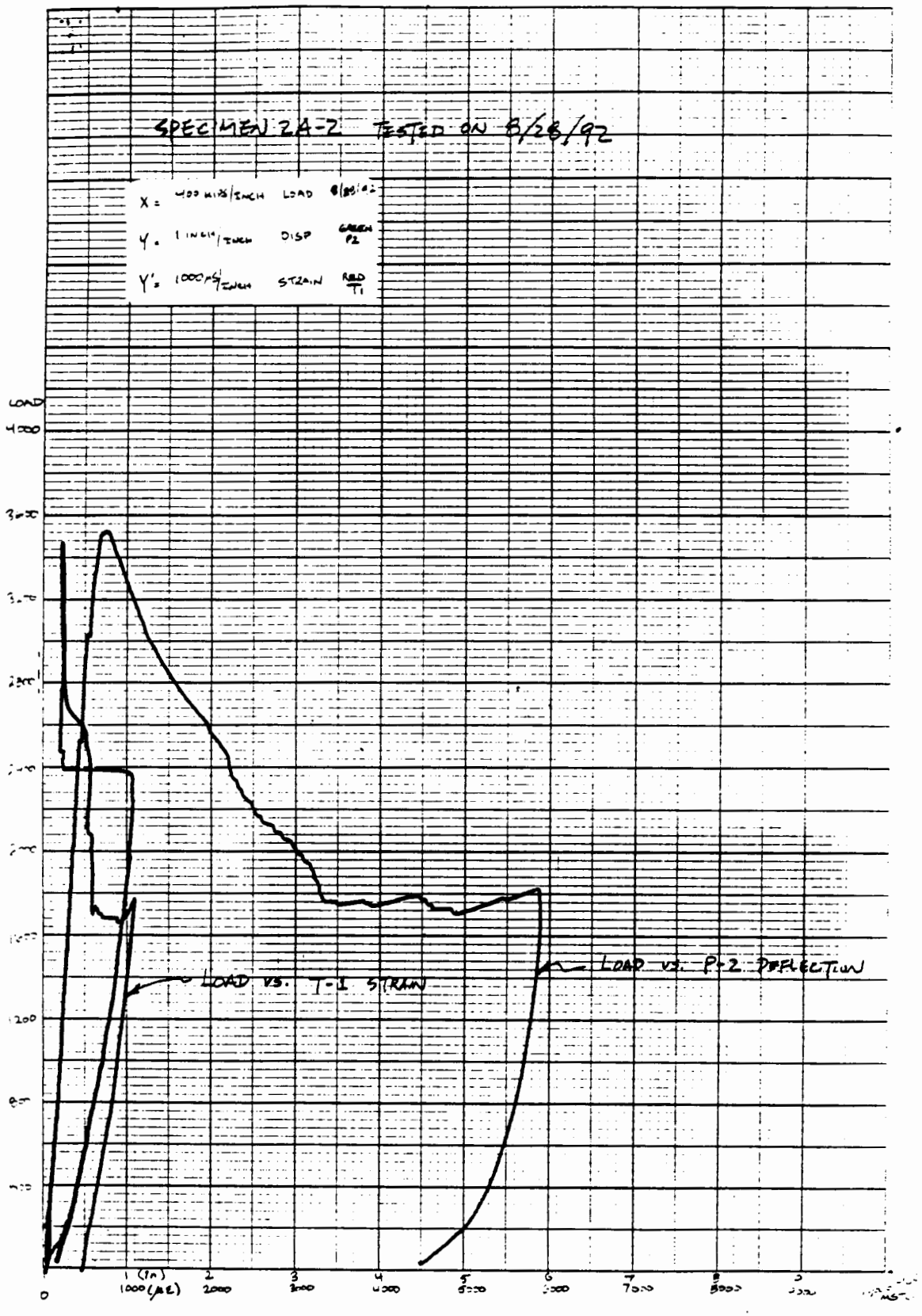


Fig. A.2.2 Specimen 2A-2 XY Plots

Table A.3.1: Instrumentation Description for Speciment 2A-3

Gauge Wire Location	Gauge Wire Mark	Gauge Wire Description
1	C-51	Outside Longitudinal Compression
2	T-61	Outside Longitudinal Tension
3	T-2A	Inside Longitudinal Tension
4	D-61	Center Vertical Top
5	D-62	Outside Vertical Top
6	D-32	Outside Vertical Bottom
7	D-31	Center Vertical Bottom
8	T-8	T-Bar
9	C-4	Inside Longitudinal Compression
10	C-52	Outside Longitudinal Compression
11	T-62	Outside Longitudinal Tension
12	T-20	T-Bar
13	T-2B	T-Bar
14	C-53	Outside Longitudinal Compression
15	T-63	Outside Longitudinal Tension
16	T-24	T-Bar
17	T-27	T-Bar
18	H-43	Top Haunch
19	H-42	Center Haunch
20	H-41	Bottom Haunch
21	C-54	Outside Longitudinal Compression
22	T-64	Outside Longitudinal Tension
23	C-2	Inside Longitudinal Compression
24	C-61	Outside Longitudinal Compression
25	T-51	Outside Longitudinal Tension
26	T-1	Inside Longitudinal Tension
27	T-19	T-Bar
28	C-62	Outside Longitudinal Compression
29	T-52	Outside Longitudinal Tension
30	T-9	T-Bar
31	T-28	T-Bar
32	C-63	Outside Longitudinal Compression
33	T-53	Outside Longitudinal Tension
34	T-21	T-Bar
35	S-6	Center Vertical Top
36	T-23	T-Bar
37	S-1	Center Vertical Bottom
38	H-13	Top Haunch
39	H-12	Center Haunch
40	H-11	Bottom Haunch
41	C-64	Outside Longitudinal Compression
42	T-54	Outside Longitudinal Tension
43	H-14	Top Haunch Extra on Tail End
44	H-44	Top Haunch Extra on Tail End

Table A.3.1: Instrumentation Description for Speciment 2A-3(Cont'd)

Gauge Wire Location	Gauge Wire Mark	Gauge Wire Description
	B-1	Outside Top Bolt
	B-2	Center Top Bolt
	B-3	Outside Bottom Bolt
	B-4	Center Bottom Bolt
	P-1	Potentiometer P-1
	P-2	Potentiometer P-2
	P-3	Potentiometer P-3
	P-4	Potentiometer P-4
	P-5	Potentiometer P-5
	P-6	Potentiometer P-6
	P-7	Potentiometer P-7
	P-8	Potentiometer P-8

Table A.3.2: Test Data for Speciment 2A-3

No.	LOAD (Kips)	C-51 (ustrain)	T-61 (ustrain)	T-2A (ustrain)	D-61 (ustrain)	D-62 (ustrain)	D-32 (ustrain)	D-31 (ustrain)	T-8 (ustrain)
1	0	12	0	-6	0	31	43	0	6
2	55	-18	6	-440	-79	-18	-43	-85	67
3	103	-55	0	-421	-55	6	-31	-73	31
4	205	-104	43	-452	-31	-18	-37	-73	0
5	302	-153	79	-452	-55	-31	-55	-67	43
6	404	-226	92	-446	-31	-43	-24	-73	85
7	504	-226	147	-433	-43	-18	43	-73	49
8	600	-275	177	-415	-31	-55	0	-79	61
9	703	-311	165	-372	-49	-31	73	-232	31
10	702	-324	171	-391	24	-18	31	-214	49
11	803	-366	171	-739	-67	-37	43	-195	55
12	902	-378	226	-366	-18	-43	49	-214	55
13	1001	-427	250	-342	-43	-55	67	-171	43
14	1101	-446	275	-324	-24	-73	49	-220	92
15	1198	-494	305	-324	24	-49	55	-220	18
16	1301	-494	330	-324	12	-79	49	-226	73
17	1399	-531	354	-324	6	-31	73	-208	18
18	1500	-549	409	-330	-18	-49	85	-232	85
19	1501	-598	354	-311	6	-31	79	-275	55
20	1600	-574	391	-415	31	-37	98	-281	61
21	1699	-635	391	-330	-6	-24	98	-324	55
22	1799	-635	427	-403	24	-55	147	-293	43
23	1898	-714	409	-385	37	0	171	-299	55
24	1999	-671	476	-360	6	-24	134	-293	24
25	2099	-751	482	-360	49	24	140	-324	37
26	2199	-800	501	-372	-6	6	85	-317	73
27	2298	-812	537	-372	73	12	85	-324	31
28	2398	-873	598	-348	55	43	85	-317	49
29	2499	-922	610	-354	37	49	73	-305	73
30	2504	-964	623	-354	31	61	55	-342	55
31	2502	-928	604	-372	31	73	49	-317	37
32	2496	-922	555	-360	55	61	55	-299	49
33	2501	-934	580	-391	31	98	43	-311	55
34	2496	-909	568	-366	43	55	49	-256	43
35	2499	-922	574	-360	37	49	67	-324	31
36	2497	-977	562	-372	79	92	43	-330	43
37	2497	-940	568	-372	61	49	49	-348	67
38	2494	-903	568	-385	55	73	104	-311	55
39	2494	-934	543	-372	55	24	104	-324	79
40	2598	-922	574	-360	55	79	79	-354	49
41	2695	-952	555	-379	49	67	85	-293	85
42	2796	-995	531	-342	61	85	61	-342	18
43	2895	-1001	562	-366	79	43	61	-317	61
44	2999	-1087	537	-379	98	98	79	-342	49
45	2994	-1019	519	-366	104	98	85	-330	49
46	2989	-1093	513	-330	31	110	67	-330	55
47	2991	-1099	531	-391	140	122	79	-330	43
48	2991	-1087	519	-391	134	128	79	-330	18

Table A.3.2: Test Data for Speciment 2A-3 (Cont'd)

No.	LOAD (Kips)	C-51 (ustrain)	T-61 (ustrain)	T-2A (ustrain)	D-61 (ustrain)	D-62 (ustrain)	D-32 (ustrain)	D-31 (ustrain)	T-8 (ustrain)
49	2996	-1081	531	-360	24	55	73	-305	49
50	2990	-1111	513	-348	73	128	61	-348	43
51	3047	-1105	531	-415	79	122	79	-305	-6
52	3095	-1117	555	-330	85	153	79	-330	43
53	3146	-1124	513	-354	92	128	61	-324	104
54	3194	-1136	513	-336	79	147	61	-354	61
55	3248	-1191	519	-317	98	140	61	-336	18
56	3296	-1197	537	-317	49	147	73	-305	55
57	3346	-1197	543	-275	140	171	79	-299	31
58	3398	-1252	470	-281	110	195	85	-348	49
59	3446	-1239	513	-336	104	128	61	-324	73
60	3494	-1288	488	-275	134	238	92	-324	43
61	3499	-1294	531	-281	98	256	61	-287	55
62	3497	-1313	513	-336	128	269	61	-287	85
63	3499	-1319	525	-317	73	226	55	-336	67
64	3497	-1301	531	-403	140	269	79	-305	55
65	3544	-1349	494	-336	110	263	79	-305	55
66	3598	-1349	507	-293	147	244	55	-324	61
67	3649	-1392	458	-256	147	281	49	-311	55
68	3695	-1423	507	537	189	232	73	-281	92
69	3695	-1441	488	4675	153	317	18	-269	55
70	3688	-1441	452	5664	171	311	49	-324	61
71	3654	-1441	507	6512	177	330	55	-336	98
72	3573	-1478	476	1623	165	317	55	-324	6
73	3420	-1435	427	708	153	330	6	-305	49
74	3287	-1410	494	769	140	324	55	-317	43
75	3198	-1429	482	1165	134	324	73	-311	43
76	3084	-1410	513	3289	128	330	61	-330	79
77	2864	-1307	519	5181	61	311	98	-269	85
78	2694	-1246	476	6060	110	275	79	-287	67
79	2499	-1075	409		92	275	49	-287	49
80	2456	-1013	452		85	269	-18	-269	12
81	2393	-970	507		85	256	24	-555	-6
82	2361	-916	1752		37	214	201	-153	-37
83	2283	-855	2448		73	226	281	67	-31
84	2258	-726	2600		49	189	287	189	-49
85	2273	-671	2722		-12	165	324	238	-55
86	2248	-568	2722		12	201	336	287	-104
87	1661	-67			6	116	427	555	37
88	742	269			24	98	336	458	18
89	351	574			92	6	305	403	24
90	258	641			79	-61	299	348	0
91	81	751			37	-31	281	317	6
92	75	726			24	-55	317	317	6
93	56	769			73	-18	269	336	24
94	55	763			67	-12	269	324	12
95	63	726			43	-37	250	293	0

Table A.3.2: Test Data for Speciment 2A-3 (Cont'd)

No.	LOAD (Kips)	C-4 (ustrain)	C-52 (ustrain)	T-62 (ustrain)	T-20 (ustrain)	T-2B (ustrain)	C-53 (ustrain)	T-63 (ustrain)	T-24 (ustrain)
1	0	0	0	0	0	-37	-12	-18	12
2	55	43	-79	0	-73	-49	-24	-79	24
3	103	6	-116	12	-31	-67	-6	-55	31
4	205	-79	-147	49	-73	-12	-61	-67	12
5	302	-128	-189	43	-43	-37	-73	-98	-18
6	404	-189	-220	79	-18	-31	-67	0	12
7	504	-220	-226	98	128	-24	-122	49	12
8	600	-220	-305	122	189	18	-85	378	6
9	703	-281	-244	171	201	-6	-61	592	18
10	702	-275	-262	79	195	-12	-67	525	0
11	803	-372	-287	104	201	-18	-116	568	-18
12	902	-336	-330	140	208	24	-92	708	-18
13	1001	-385	-323	128	269	24	-92	836	-24
14	1101	-409	-323	171	269	43	-61	970	-12
15	1198	-421	-323	195	262	37	-31	1202	-12
16	1301	-439	-330	208	244	43	0	1385	-128
17	1399	-488	-360	238	281	67	-43	1501	-305
18	1500	-555	-366	226	287	0	-98	1690	-726
19	1501	-549	-366	220	281	55	-43	1727	-940
20	1600	-568	-378	195	275	73	-37	1776	-1153
21	1699	-604	-366	262	293	24	-37	1904	-1691
22	1799	-592	-421	281	269	92	-6	2075	-287
23	1898	-635	-348	269	269	116	-31	2154	-287
24	1999	-647	-378	287	305	128	-24	2282	-281
25	2099	-787	-403	281	287	140	-98	2386	-330
26	2199	-824	-397	299	250	104	-73	2459	-354
27	2298	-806	-427	324	244	110	-12	2526	-342
28	2398	-818	-433	372	238	147	18	940	-391
29	2499	-812	-433	385	287	299	37	818	-421
30	2504	-861	-415	330	189	256	-6	855	-439
31	2502	-867	-433	391	256	232	6	812	-433
32	2496	-867	-403	403	281	269	24	818	-421
33	2501	-879	-433	391	275	263	6	794	-433
34	2496	-848	-409	342	256	226	24	775	-409
35	2499	-897	-409	397	262	177	0	757	-421
36	2497	-861	-366	378	232	226	-12	763	-409
37	2497	-879	-397	385	232	220	18	751	-403
38	2494	-903	-421	397	232	232	6	720	-397
39	2494	-873	-421	372	226	220	0	726	-439
40	2598	-916	-433	366	208	195	37	769	-427
41	2695	-946	-427	403	226	195	12	732	-476
42	2796	-952	-415	415	159	208	43	678	-598
43	2895	-970	-433	525	128	226	12	745	-580
44	2999	-964	-427	482	-104	177	79	671	-696
45	2994	-1001	-409	452	-415	165	49	671	-690
46	2989	-1056	-415	452	-482	208	43	647	-751
47	2991	-1007	-421	476	-494	208	43	659	-739
48	2991	-1049	-427	470	-610	195	67	671	-678

Table A.3.2: Test Data for Speciment 2A-3 (Cont'd)

No.	LOAD (Kips)	C-4 (ustrain)	C-52 (ustrain)	T-62 (ustrain)	T-20 (ustrain)	T-2B (ustrain)	C-53 (ustrain)	T-63 (ustrain)	T-24 (ustrain)
49	2996	-1056	-433	452	-574	214	49	641	-714
50	2990	-1043	-415	433	-690	232	61	635	-714
51	3047	-1098	-415	476	-751	226	43	647	-745
52	3095	-1074	-433	439	-879	189	92	635	-763
53	3146	-1080	-427	452	-1026	201	61	623	-861
54	3194	-1104	-452	458	-1135	208	73	623	-836
55	3248	-1056	-427	525	-1306	232	79	629	-885
56	3296	-1129	-403	580	-1465	195	79	635	-916
57	3346	-1172	-439	610	-1660	208	110	617	-946
58	3398	-1196	-427	726	-1874	201	73	665	-995
59	3446	-1220	-415	763	-2118	195	140	647	-1068
60	3494	-1239	-403	830	-2283	189	153	598	-1202
61	3499	-1245	-403	861	-2344	183	153	623	-1269
62	3497	-1269	-403	928	-2478	183	183	610	-1404
63	3499	-1269	-403	940	-610	201	189	568	-1489
64	3497	-1275	-427	970	-507	220	159	580	-1526
65	3544	-1269	-397	1032	-458	214	262	598	-1715
66	3598	-1312	-360	1142	-476	189	256	617	-2118
67	3649	-1324	-311	1331	-488	201	317	635	-2130
68	3695	-1318	-269	1453	-501	183	433	934	-2203
69	3695	-1367	-214	1313	-623	183	610	1831	-1935
70	3688	-1367	-189	1343	-629	201	714	2185	-1794
71	3654	-1373	-189	1404	-659	195	732	2630	-1593
72	3573	-1330	-250	1380	-690	195	739	3180	-153
73	3420	-1397	-378	1422	-684	171	891	3436	-378
74	3287	-1336	-458	1593	-690	147	1202		281
75	3198	-1397	-500	1697	-690	220	1214		1373
76	3084	-1330	-488	1734	-641	195			3034
77	2864	-1257	-354	1905	-244	201			
78	2694	-1178	-195	1990	-189	189			
79	2499	-1043	98	2069	-61	134			
80	2456	-958	269	2344	85	140			
81	2393	-897	397	2497	214	159			
82	2361	-836	379	2692	275	549			
83	2283	-793	342	2558	262	763			
84	2258	-678	494	2405	275	812			
85	2273	-610	537	2655	287	922			
86	2248	-507	598	2643	305	1025			
87	1661	-43	1007	2466	195	1092			
88	742	385	922	2033	18	867			
89	351	702	946	1746	-37	684			
90	258	769	958	1697	-37	635			
91	81	836	983	1587	-6	574			
92	75	861	1032	1551	0	617			
93	56	873	1044	1612	31	598			
94	55	855	995	1593	24	629			
95	63	830	995	1593	37	562			

Table A.3.2: Test Data for Speciment 2A-3 (Cont'd)

No.	LOAD (Kips)	T-27 (ustrain)	H-43 (ustrain)	H-42 (ustrain)	H-41 (ustrain)	C-54 (ustrain)	T-64 (ustrain)	C-2 (ustrain)	C-61 (ustrain)
1	0	-24	0	-24	-12	31	-6	18	-6
2	55	-31	18	-55	-12	360	-85	-6	-18
3	103	-37	-12	-55	-37	385	-92	-24	-55
4	205	-49	-18	-55	-24	403	-98	-61	-79
5	302	-24	6	-31	-67	366	-110	-85	-104
6	404	-37	-31	-104	-134	409	-122	-116	-110
7	504	-55	-18	-110	-201	433	-85	-140	-140
8	600	-55	-61	-140	-238	446	-134	-171	-189
9	703	-43	-79	-171	-311	452	-128	-208	-195
10	702	-55	-85	-153	-311	458	-122	-226	-226
11	803	-79	-147	-201	-366	769	-183	-269	-262
12	902	-49	-92	-177	-415	494	-159	-299	-232
13	1001	-61	-128	-226	-482	519	-116	-287	-311
14	1101	-61	-195	-281	-555	555	-61	-317	-415
15	1198	-85	-244	-214	-604	568	-24	-360	-372
16	1301	-43	-256	-220	-684	562	37	-403	-403
17	1399	-24	-269	-226	-793	635	43	-403	-446
18	1500	-6	-293	-238	-824	671	31	-464	-488
19	1501	-18	-324	-195	-867	647	43	-519	-488
20	1600	6	-336	-244	-934	708	67	-488	-501
21	1699	-49	-354	-232	-934	696	73	-525	-513
22	1799	18	-317	-250	-1031	684	116	-549	-586
23	1898	18	-409	-281	-1080	751	134	-537	-623
24	1999	6	-439	-293	-1141	775	122	-641	-653
25	2099	43	-470	-281	-1239	787	116	-665	-702
26	2199	147	-494	-293	-1312	830	183	-696	-732
27	2298	134	-482	-311	-1397	818	189	-720	-745
28	2398	183	-525	-372	-1452	885	189	-757	-781
29	2499	232	-580	-330	-1562	928	177	-812	-836
30	2504	201	-592	-317	-1556	928	183	-867	-812
31	2502	195	-592	-311	-1562	964	232	-818	-842
32	2496	208	-562	-324	-1648	928	214	-787	-812
33	2501	250	-598	-336	-1580	952	208	-812	-812
34	2496	195	-592	-336	-1574	909	202	-830	-812
35	2499	208	-659	-324	-1599	916	202	-818	-855
36	2497	208	-580	-324	-1605	940	250	-824	-836
37	2497	238	-598	-330	-1587	934	165	-842	-848
38	2494	244	-616	-336	-1599	964	208	-836	-824
39	2494	238	-586	-311	-1574	922	232	-848	-873
40	2598	263	-647	-299	-1672	970	177	-861	-861
41	2695	256	-635	-281	-1745	1007	195	-897	-861
42	2796	311	-678	-238	-1873	1056	208	-885	-909
43	2895	372	-684	-262	-1996	1111	214	-1025	-952
44	2999	378	-739	-256	-2124	1202	140	-977	-971
45	2994	440	-745	-250	-2203	1172	110	-1007	-1031
46	2989	452	-751	-232	-2221	1233	177	-1025	-1074
47	2991	372	-757	-238	-2246	1160	153	-1013	-1007
48	2991	342	-751	-220	-2203	1215	147	-1019	-1031

Table A.3.2: Test Data for Speciment 2A-3 (Cont'd)

No.	LOAD (Kips)	T-27 (ustrain)	H-43 (ustrain)	H-42 (ustrain)	H-41 (ustrain)	C-54 (ustrain)	T-64 (ustrain)	C-2 (ustrain)	C-61 (ustrain)
49	2996	421	-763	-250	-2240	1178	153	-1050	-1068
50	2990	440	-763	-220	-2252	1190	134	-1031	-1025
51	3047	421	-775	-256	-2313	1160	128	-1062	-1068
52	3095	403	-806	-195	-2356	1215	110	-1019	-1062
53	3146	427	-793	-238	-2502	1202	122	-1050	-1050
54	3194	433	-830	-250	-2557	1270	128	-1099	-1141
55	3248	470	-806	-183	-2685	1306	43	-1123	-1135
56	3296	464	-861	-104	-2801	1337	73	-1105	-1129
57	3346	421	-885	0	-2960	1349	6	-1160	-1147
58	3398	488	-922	-31	-3265	1409	6	-1233	-1196
59	3446	513	-928	-134	-3747	1428	-79	-1190	-1214
60	3494	531	-946	-208	-4217	1458	-183	-1233	-1220
61	3499	525	-922	-201	-4553	1501	-202	-1251	-1214
62	3497	543	-952	-244	-4834	1452	-293	-1245	-1227
63	3499	549	-940	-287	-5114	1562	-305	-1276	-1263
64	3497	568	-952	-299	-5182	1556	-336	-1257	-1269
65	3544	586	-964	-293	-5462	1532	-354	-1276	-1275
66	3598	635	-995	-317	-6146	1605	-397	-1263	-1300
67	3649	586	-586	-391	-6799	1702	-440	-1270	-1275
68	3695	555	-446	-220	-7873	1794	-525	-1331	-1349
69	3695	635	-439	-311	-8716	1965	-440	-1318	-1349
70	3688	653	-476	-403	-8807	1983	-385	-1337	-1343
71	3654	732	-501	-354	-8905	1995	-293	-1318	-1306
72	3573	848	-616	-397	-8966	2044	-92	-1337	-1367
73	3420	1397	-793	-549	-8905	2020	598	-1337	-1330
74	3287	1635	-757	-635	-8825	1983	1068	-1312	-1330
75	3198	1745	-549	-745	-8770	2093	1092	-1270	-1306
76	3084	1745	-525	-806	-8703	2008	824	-1257	-1282
77	2864	1562	-519	-818	-8764	2221	659	-1160	-1159
78	2694	1550	-476	-995	-8734	2343	684	-1111	-1098
79	2499	1446	-439	-1160	-8819	2606	745	-983	-983
80	2456	1397	-391	-1264	-8862	2710	763	-916	-922
81	2393	1379	-360	-1429	-8838	2795	726	-787	-830
82	2361	1354	-385	-1545	-8783	2826	757	-720	-775
83	2283	1373	-446	-1478	-8685	2734	818	-604	-647
84	2258	1379	-189	-1307	-8502	2563	1178	-470	-537
85	2273	1379	-140	-1276	-8502	2587	1355	-348	-415
86	2248	1422	-92	-1160	-8459	2520	1922	-232	-354
87	1661	1873	409	-452	-7568	2215	4516	354	226
88	742	1525	433	208	-6628	1672	4113	647	476
89	351	1263	281	531	-6225	1483	3454	928	751
90	258	1208	79	635	-6018	1422	3192	1013	830
91	81	1202	128	848	-5621	1227	2954	977	812
92	75	1171	67	830	-5566	1215	2990	964	873
93	56	1177	110	879	-5548	879	2966	1031	885
94	55	1171	98	897	-5499	867	2990	1038	861
95	63	1190	92	891	-5529	1221	2935	989	879

Table A.3.2: Test Data for Speciment 2A-3 (Cont'd)

No.	LOAD (Kips)	T-51 (ustrain)	T-1 (ustrain)	T-19 (ustrain)	C-62 (ustrain)	T-52 (ustrain)	T-9 (ustrain)	T-28 (ustrain)	C-63 (ustrain)
1	0	12	18	6	6	37	12	6	6
2	55	92	-6	-67	-73	6	-470	6	-73
3	103	79	61	-85	-79	67	-470	-18	-43
4	205	122	134	-85	-134	92	-488	0	-49
5	302	159	171	-116	-153	116	-507	-55	-67
6	404	171	159	-67	-134	305	-379	-55	-85
7	504	214	177	-104	-55	336	-324	458	-79
8	600	263	153	-116	-55	366	-305	555	-134
9	703	208	244	-122	-98	427	-281	617	-104
10	702	226	256	-79	-85	366	-275	598	-79
11	803	183	238	-122	-92	354	-494	665	-92
12	902	189	250	-159	-98	446	-269	702	-73
13	1001	214	293	-134	-147	458	-202	787	-24
14	1101	226	311	-153	-201	421	-208	800	-31
15	1198	299	330	-159	-189	507	-147	812	12
16	1301	293	372	-177	-165	415	-153	855	-37
17	1399	256	366	-159	-275	421	-86	879	-31
18	1500	269	397	-226	-201	439	-104	958	-12
19	1501	275	415	-238	-214	385	-116	964	-12
20	1600	220	360	-244	-281	397	-86	977	-61
21	1699	293	385	-226	-244	409	-61	1074	-43
22	1799	311	397	-214	-244	427	-49	1093	-24
23	1898	317	403	-208	-244	452	-25	1135	-31
24	1999	391	446	-244	-275	470	6	1203	6
25	2099	324	452	-214	-287	433	49	1251	-18
26	2199	336	482	-201	-287	470	31	1306	-12
27	2298	391	494	-201	-324	415	79	1367	-31
28	2398	452	610	-165	-311	482	79	1422	-73
29	2499	586	940	-208	-317	446	146	1489	6
30	2504	635	1013	-189	-305	494	104	1489	-6
31	2502	635	1038	-208	-293	494	49	1483	-12
32	2496	617	1074	-214	-293	476	98	1453	18
33	2501	665	1160	-208	-305	501	116	1502	12
34	2496	653	1160	-226	-317	470	104	1508	-18
35	2499	610	1184	-201	-275	446	104	1502	18
36	2497	592	1123	-220	-311	507	110	1502	-12
37	2497	592	1111	-275	-293	494	134	1520	-12
38	2494	592	1087	-183	-311	446	98	1453	12
39	2494	549	1038	-195	-269	482	98	1496	-12
40	2598	586	519	-195	-348	458	98	1550	31
41	2695	604	555	-201	-293	427	92	1575	37
42	2796	610	549	-226	-244	623	104	1654	-6
43	2895	592	555	-262	-281	598	61	1697	18
44	2999	647	586	-305	-311	732	0	1752	61
45	2994	592	525	-324	-281	702	31	1801	31
46	2989	635	623	-311	-275	696	61	1764	31
47	2991	555	647	-324	-250	745	104	1746	37
48	2991	501	641	-317	-293	708	61	1776	43

Table A.3.2: Test Data for Speciment 2A-3 (Cont'd)

No.	LOAD (Kips)	T-51 (ustrain)	T-1 (ustrain)	T-19 (ustrain)	C-62 (ustrain)	T-52 (ustrain)	T-9 (ustrain)	T-28 (ustrain)	C-63 (ustrain)
49	2996	604	635	-244	-324	702	61	1770	0
50	2990	617	610	-220	-262	684	79	1752	12
51	3047	586	623	-232	-293	708	43	1752	-6
52	3095	586	604	-256	-287	745	73	1752	18
53	3146	507	641	-256	-250	757	43	1770	31
54	3194	598	653	-262	-269	763	24	1770	-6
55	3248	598	690	-269	-299	739	43	1770	24
56	3296	617	696	-250	-256	836	18	1709	31
57	3346	574	745	-250	-256	812	37	1660	0
58	3398	580	781	43	-275	836	43	1636	31
59	3446	586	775	92	-214	848	6	1526	49
60	3494	592	824	98	-214	842	12	1380	67
61	3499	574	812	214	-189	781	12	1276	37
62	3497	604	836	250	-189	861	12	1166	73
63	3499	574	824	250	-201	830	12	1154	0
64	3497	562	824	293	-208	806	24	1160	61
65	3544	574	824	269	-201	842	6	1117	61
66	3598	494	830	342	-159	787	12	1068	122
67	3649	555	836	378	-153	897	18	971	171
68	3695	555	861	433	-153	922	49	1221	226
69	3695	568	848	543	-128	879	128	1410	391
70	3688	562	848	592	-220	867	128	1453	354
71	3654	580	830	586	-134	824	134	1508	427
72	3573	543	879	617	-226	775	189	1673	421
73	3420	525	842	629	-256	787	177	2179	513
74	3287	519	800	696	-287	800	195	2271	433
75	3198	555	879	855	-311	732	171	2332	403
76	3084	610	891	726	-250	678	177		
77	2864	617	958	214	-85	592	165		
78	2694	617	995	116	-43	549	159		
79	2499	610	995	128	317	574	214		
80	2456	671	1142	470	476	610	244		
81	2393	800	1380	610	732	653	415		
82	2361	946	1416	568	836	787	464		
83	2283	995	1630	446	922	757	482		
84	2258	952	1416	360	1019	726	519		
85	2273	964	1404	403	1062	775	561		
86	2248	891	1422	397	1141	745	573		
87	1661	1123	1538	488	1434	702	720		
88	742	1031	1331	324	1385	433	726		
89	351	830	1105	476	1379	250	470		
90	258	830	1050	537	1312	220	378		
91	81	751	995	458	1153	147	452		
92	75	751	977	525	1172	159	439		
93	56	775	983	482	1129	122	817		
94	55	769	983	531	1153	171	836		
95	63	726	940	464	1123	128	446		

Table A.3.2: Test Data for Speciment 2A-3 (Cont'd)

No.	LOAD (Kips)	T-53 (ustrain)	T-21 (ustrain)	S-6 (ustrain)	T-23 (ustrain)	S-1 (ustrain)	H-13 (ustrain)	H-12 (ustrain)	H-11 (ustrain)
1	0	43	67	6	18	-6		0	0
2	55	-6	67	-61	12	-18		6	-439
3	103	98	37	-43	-6	12		6	-397
4	205	6	43	-43	37	-61		-43	-488
5	302	55	49	-6	12	-43		-67	-525
6	404	73	12	-55	49	-24		-55	-586
7	504	488	12	-43	18	-43		-85	-629
8	600	525	0	-67	0	-6		-98	-653
9	703	610	43	-43	-6	6		-128	-678
10	702	598	24	-67	0	6		-159	-726
11	803	623	61	-73	-18	31		-165	-891
12	902	671	110	-24	-24	0		-153	-812
13	1001	751	330	-24	6	12		-110	-836
14	1101	812	464	-55	-37	-37		-104	-855
15	1198	873	555	-31	18	43		-134	-940
16	1301	482	525	-31	-31	12		-153	-1001
17	1399	488	555	-85	-73	24		-195	-1031
18	1500	519	525	-49	-24	12		-269	-1105
19	1501	488	501	-79	-37	12		-195	-1172
20	1600	488	501	-18	-31	12		-232	-1172
21	1699	494	501	-24	-31	31		-226	-1196
22	1799	525	464	-61	-24	49		-287	-1270
23	1898	507	549	12	-31	24		-311	-1379
24	1999	446	549	-12	-55	-24		-397	-1441
25	2099	537	543	37	-61	55		-458	-1502
26	2199	531	562	37	-49	61		-501	-1575
27	2298	525	678	18	-61	31		-507	-1642
28	2398	494	903	49	-24	43		-507	-1795
29	2499	476	1270	55	-85	31		-464	-1819
30	2504	470	1337	37	-73	31		-464	-1850
31	2502	501	1355	43	-85	24		-446	-1813
32	2496	482	1380	-12	-104	31		-488	-1892
33	2501	482	1428	31	-79	31		-446	-1831
34	2496	452	1447	55	-61	61		-427	-1837
35	2499	409	1465	49	-116	31		-433	-1904
36	2497	519	1483	79	-134	49		-421	-1880
37	2497	482	1538	31	-67	43		-354	-1862
38	2494	470	1551	24	-116	43		-433	-1843
39	2494	427	1575	61	-92	73		-385	-1868
40	2598	458	1911	98	-92	43		-342	-1874
41	2695	464	2332	92	-67	49		-324	-1990
42	2796	446	2307	49	-110	24		-250	-2112
43	2895	421	2429	104	-116	67		-208	-2228
44	2999	446	2545	128	-116	31		-171	-2368
45	2994	403	2564	92	-147	43		-201	-2405
46	2989	391	2576	122	-134	37		-147	-2381
47	2991	403	2564	116	-134	61		-140	-2405
48	2991	397	2594	128	-104	0		-110	-2417

Table A.3.2: Test Data for Speciment 2A-3 (Cont'd)

No.	LOAD (Kips)	T-53 (ustrain)	T-21 (ustrain)	S-6 (ustrain)	T-23 (ustrain)	S-1 (ustrain)	H-13 (ustrain)	H-12 (ustrain)	H-11 (ustrain)
49	2996	378	2619	116	-159	24		-104	-2405
50	2990	378	2582	134	-128	61		-110	-2417
51	3047	452	2619	140	-128	79		-104	-2460
52	3095	385	2637	171	-147	61		-110	-2503
53	3146	366	2661	116	-201	37		-116	-2558
54	3194	397	2686	140	-134	31		-140	-2588
55	3248	360	2777	147	-171	67		-128	-2637
56	3296	317	2759	122	-226	37		-153	-2698
57	3346	354	2820	147	-232	92		-134	-2759
58	3398	330	2918	128	-201	79		-153	-2753
59	3446	378	2936	147	-195	-6		-183	-3351
60	3494	360	3022	140	-189	67		-214	-3851
61	3499	378	3070	159	-201	85		-201	-4187
62	3497	354	3174	140	-250	37		-214	-4602
63	3499	360	3284	177	-232	85		-244	-4968
64	3497	342	3308	189	-238	92		-244	-5133
65	3544	354	3449	189	-256	116		-262	-5512
66	3598	378	3479	165	-287	110		-262	-6720
67	3649	348	3705	153	-275	104		-214	-8405
68	3695	421	3907	171	-317	183		-311	-10090
69	3695	507	4035	195	-324	189		-324	-11790
70	3688	494	7386	250	-299	269		-324	-12090
71	3654	494	9638	263	-378	330		-287	-12380
72	3573	531	2973	397	-330	128		-153	-12360
73	3420	775	3943	1794	-354	18		-43	-12170
74	3287	714	7282		-378			256	-12090
75	3198	800	2655		-354			336	-12060
76	3084	1025	1520		-348			354	-12020
77	2864	1025	4608		-336			366	-12170
78	2694	1124	6812		-305			311	-12210
79	2499	1294			-293			250	-12790
80	2456	1862			-287			214	-13190
81	2393	2961			-244			238	-13290
82	2361	3418			-263			214	-13160
83	2283	4065			-238			183	-12970
84	2258				-256			226	-12870
85	2273				-244			189	-12810
86	2248				-293			153	-12770
87	1661				-195			275	-11870
88	742				-104			397	-10510
89	351				18			421	-9924
90	258				43			433	-9693
91	81				61			440	-9241
92	75				61			452	-9168
93	56				98			446	-8814
94	55				122			470	-8777
95	63				116			440	-9058

Table A.3.2: Test Data for Speciment 2A-3 (Cont'd)

No.	LOAD (Kips)	C-64 (ustrain)	T-54 (ustrain)	H-14 (ustrain)	H-44 (ustrain)	B-1 (ustrain)	B-2 (ustrain)	B-3 (ustrain)	B-4 (ustrain)
1	0	-6	12	12	0	6	-35	0	
2	55	18	-79	24	-6	47	18	-6	
3	103	-55	-73	-12	-37	117	70	29	
4	205	31	-85	-12	-37	106	88	-6	
5	302	24	-67	-24	-31	135	94	-6	
6	404	12	-134	24	-18	223	182	-94	
7	504	24	-116	0	-49	282	211	-59	
8	600	55	-116	-6	-49	352	205	-112	
9	703	79	-73	6	-37	440	311	-88	
10	702	92	-67	6	-37	428	323	-76	
11	803	92	-67	24	-49	393	364	-147	
12	902	104	-49	43	-24	493	405	-70	
13	1001	140	104	55	-49	552	411	-135	
14	1101	159	128	85	-6	563	452	-158	
15	1198	214	165	128	67	622	493	-135	
16	1301	195	208	98	43	646	534	-170	
17	1399	226	153	128	104	704	558	-164	
18	1500	269	220	104	55	728	640	-188	
19	1501	262	189	98	31	757	610	-194	
20	1600	281	220	92	73	751	646	-170	
21	1699	317	208	92	92	816	675	-147	
22	1799	348	250	85	24	863	698	-182	
23	1898	366	214	92	12	904	757	-141	
24	1999	427	226	85	24	945	757	-164	
25	2099	446	238	31	-18	986	833	-164	
26	2199	446	263	98	-18	1021	804	-106	
27	2298	470	256	104	-18	1062	822	-223	
28	2398	531	269	134	-37	1097	921	-217	
29	2499	562	201	104	-61	1138	945	-158	
30	2504	549	201	104	-61	1132	921	-229	
31	2502	549	250	98	-49	1144	933	-153	
32	2496	562	208	116	-73	1150	939	-164	
33	2501	592	263	98	-67	1115	904	-147	
34	2496	580	226	79	-67	1168	968	-158	
35	2499	562	220	122	-85	1173	951	-135	
36	2497	537	208	79	-49	1173	957	-158	
37	2497	555	226	79	-79	1162	974	-123	
38	2494	568	208	116	-85	1179	957	-164	
39	2494	568	195	73	-79	1150	974	-170	
40	2598	617	195	110	-85	1220	1004	-147	
41	2695	641	208	98	-98	1256	1027	-123	
42	2796	678	165	116	-134	1326	1044	-170	
43	2895	714	92	43	-122	1344	1144	-170	
44	2999	726	110	104	-92	1420	1168	-153	
45	2994	818	134	140	-122	1449	1173	-106	
46	2989	787	98	134	-122	1461	1185	-153	
47	2991	848	98	116	-153	1449	1250	-135	
48	2991	824	73	116	-122	1443	1185	-164	

Table A.3.2: Test Data for Speciment 2A-3 (Cont'd)

No.	LOAD (Kips)	C-64 (ustrain)	T-54 (ustrain)	H-14 (ustrain)	H-44 (ustrain)	B-1 (ustrain)	B-2 (ustrain)	B-3 (ustrain)	B-4 (ustrain)
49	2996	757	37	67	-165	1420	1150	-170	
50	2990	806	85	92	-165	1526	1203	-135	
51	3047	824	79	98	-128	1526	1220	-147	
52	3095	855	67	61	-85	1514	1244	-135	
53	3146	800	79	92	-171	1514	1273	-176	
54	3194	909	73	92	-159	1561	1214	-153	
55	3248	916	49	98	-165	1602	1314	-188	
56	3296	964	43	79	-183	1619	1349	-158	
57	3346	934	18	104	-128	1637	1338	-135	
58	3398	964	-18	67	-183	1684	1385	-170	
59	3446	995	-18	92	-153	1749	1414	-141	
60	3494	1044	-55	37	-153	1754	1420	-188	
61	3499	1062	-43	73	-189	1784	1455	-129	
62	3497	1050	-73	73	-214	1807	1479	-135	
63	3499	1056	-79	98	-201	1819	1490	-129	
64	3497	1074	-92	116	-201	1825	1496	-158	
65	3544	1092	-73	122	-195	1872	1479	-94	
66	3598	1123	-92	79	-195	1925	1549	-129	
67	3649	1196	-73	140	-208	1977	1596	-129	
68	3695	1221	-110	171	-6	2007	1596	-170	
69	3695	1434	-43	470	317	2224	1743	-153	
70	3688	1459	-43	537	354	2224	1766	-147	
71	3654	1453	-6	696	494	2224	1778	-129	
72	3573	1471	-6	861	867	2236	1766	-129	
73	3420	1404	85	1099	1886	2189	1772	-129	
74	3287	1367	92	1080	3168	2154	1749	-141	
75	3198	1404	12	1453	3461	2212	1766	-123	
76	3084	1507	-43	1270	2789	2259	1837	-141	
77	2864	1678	-18	116		2388	1960	-164	
78	2694	1855	12			2629	2089	-176	
79	2499	2112	61			2934	2212	-141	
80	2456	2246	110			3046	2359	-117	
81	2393	2270	232			3116	2359	-112	
82	2361	2301	317			3145	2394	-176	
83	2283	2258	458			3098	2365	-158	
84	2258	2301	421			3098	2359	-194	
85	2273	2350	378			3151	2406	-141	
86	2248	2380	366			3163	2400	-147	
87	1661	2075	751			2799	2124	-129	
88	742	1483	488			2253	1602	-129	
89	351	1245	177			1813	1220	-158	
90	258	1141	67			1655	1121	-135	
91	81	903	-67			1291	775	-147	
92	75	873	-92			1244	751	-200	
93	56	873	-61			1215	745	-135	
94	55	861	-49			1203	728	-141	
95	63	855	-67			1191	775	-153	

Table A.3.2: Test Data for Speciment 2A-3 (Cont'd)

No.	LOAD (Kips)	P-1 (Inches)	P-2 (Inches)	P-3 (Inches)	P-4 (Inches)	P-5 (Inches)	P-6 (Inches)	P-7 (Inches)	P-8 (Inches)
1	0	0.004	0.006	0.019	0.000	0.004	-0.003	0.000	-0.001
2	55	0.011	0.029	0.032	0.012	0.036	0.008	0.010	0.006
3	103	0.007	0.023	0.034	0.013	0.042	0.008	0.008	0.010
4	205	0.024	0.037	0.050	0.020	0.044	0.016	0.015	0.016
5	302	0.028	0.041	0.047	0.025	0.048	0.012	0.024	0.019
6	404	0.039	0.053	0.078	0.036	0.071	0.022	0.020	0.027
7	504	0.050	0.074	0.104	0.044	0.071	0.018	0.032	0.032
8	600	0.076	0.084	0.121	0.060	0.109	0.023	0.041	0.046
9	703	0.082	0.106	0.138	0.073	0.111	0.035	0.044	0.052
10	702	0.078	0.127	0.140	0.077	0.121	0.038	0.045	0.055
11	803	0.093	0.117	0.153	0.084	0.125	0.044	0.054	0.069
12	902	0.106	0.125	0.168	0.096	0.142	0.048	0.057	0.069
13	1001	0.126	0.147	0.184	0.105	0.144	0.046	0.069	0.075
14	1101	0.117	0.166	0.209	0.128	0.165	0.059	0.073	0.085
15	1198	0.145	0.174	0.218	0.128	0.172	0.061	0.083	0.090
16	1301	0.154	0.184	0.225	0.149	0.205	0.071	0.101	0.099
17	1399	0.175	0.209	0.250	0.159	0.218	0.084	0.107	0.105
18	1500	0.193	0.241	0.259	0.171	0.224	0.083	0.103	0.116
19	1501	0.195	0.229	0.280	0.175	0.234	0.089	0.103	0.123
20	1600	0.201	0.262	0.289	0.186	0.234	0.093	0.114	0.127
21	1699	0.206	0.258	0.298	0.195	0.258	0.101	0.118	0.133
22	1799	0.227	0.288	0.319	0.207	0.266	0.107	0.128	0.138
23	1898	0.241	0.294	0.335	0.216	0.280	0.112	0.128	0.141
24	1999	0.267	0.307	0.347	0.232	0.297	0.110	0.137	0.152
25	2099	0.284	0.317	0.354	0.250	0.322	0.135	0.145	0.162
26	2199	0.290	0.333	0.373	0.263	0.327	0.132	0.159	0.171
27	2298	0.292	0.341	0.389	0.275	0.337	0.139	0.159	0.176
28	2398	0.323	0.368	0.412	0.288	0.360	0.148	0.163	0.185
29	2499	0.351	0.391	0.445	0.308	0.375	0.153	0.176	0.194
30	2504	0.344	0.389	0.460	0.306	0.379	0.156	0.172	0.196
31	2502	0.342	0.380	0.444	0.309	0.372	0.155	0.177	0.197
32	2496	0.346	0.393	0.458	0.308	0.377	0.158	0.175	0.207
33	2501	0.338	0.397	0.453	0.310	0.381	0.167	0.178	0.197
34	2496	0.349	0.405	0.451	0.314	0.394	0.159	0.179	0.199
35	2499	0.353	0.397	0.440	0.308	0.383	0.159	0.181	0.203
36	2497	0.344	0.399	0.453	0.322	0.385	0.160	0.180	0.200
37	2497	0.357	0.405	0.460	0.317	0.385	0.160	0.181	0.204
38	2494	0.355	0.403	0.458	0.317	0.385	0.160	0.178	0.209
39	2494	0.357	0.425	0.455	0.317	0.383	0.162	0.177	0.203
40	2598	0.375	0.409	0.462	0.331	0.404	0.165	0.182	0.206
41	2695	0.386	0.432	0.481	0.344	0.412	0.173	0.193	0.214
42	2796	0.390	0.456	0.514	0.357	0.427	0.183	0.203	0.229
43	2895	0.427	0.485	0.539	0.377	0.452	0.197	0.216	0.234
44	2999	0.459	0.509	0.557	0.399	0.460	0.202	0.218	0.247
45	2994	0.466	0.511	0.561	0.408	0.479	0.203	0.231	0.255
46	2989	0.463	0.524	0.572	0.409	0.483	0.210	0.218	0.251
47	2991	0.474	0.542	0.580	0.411	0.479	0.206	0.224	0.256
48	2991	0.463	0.528	0.587	0.408	0.484	0.211	0.229	0.259

Table A.3.2: Test Data for Speciment 2A-3 (Cont'd)

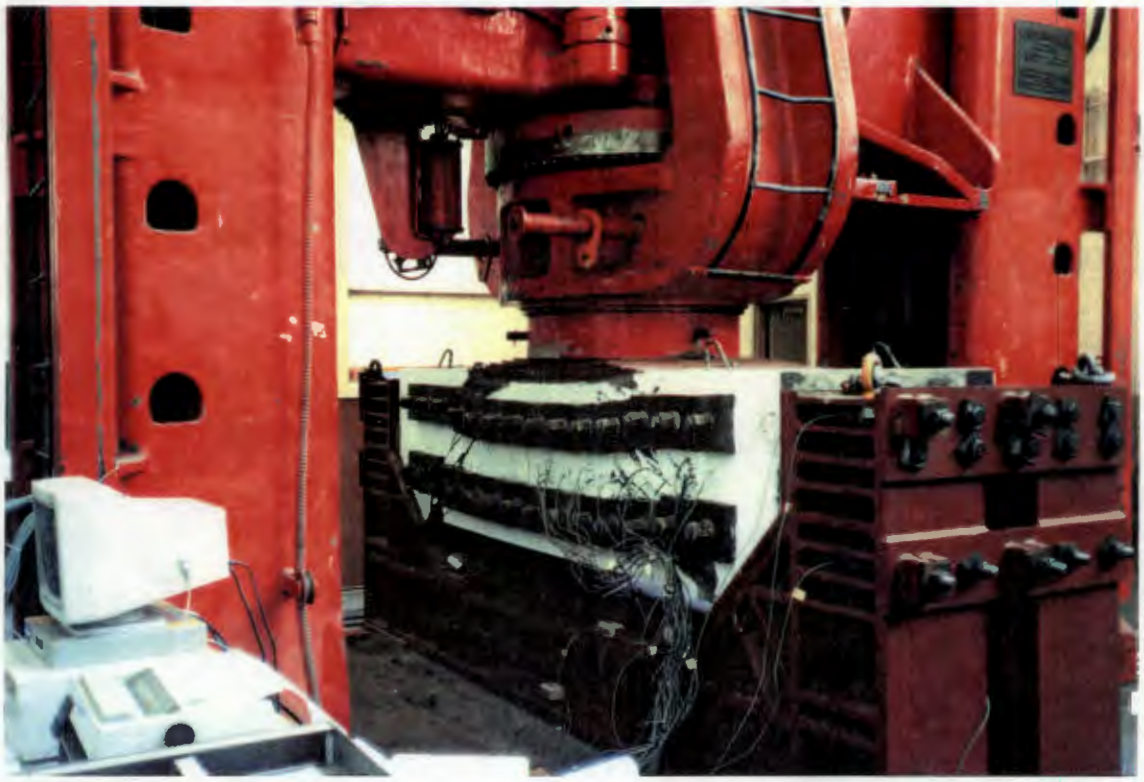
No.	LOAD (Kips)	P-1 (Inches)	P-2 (Inches)	P-3 (Inches)	P-4 (Inches)	P-5 (Inches)	P-6 (Inches)	P-7 (Inches)	P-8 (Inches)
49	2996	0.468	0.530	0.583	0.416	0.504	0.210	0.227	0.257
50	2990	0.451	0.521	0.583	0.417	0.494	0.214	0.229	0.258
51	3047	0.472	0.528	0.596	0.426	0.490	0.208	0.231	0.263
52	3095	0.490	0.548	0.602	0.426	0.506	0.219	0.236	0.263
53	3146	0.498	0.552	0.611	0.438	0.504	0.221	0.237	0.265
54	3194	0.507	0.567	0.619	0.443	0.538	0.232	0.243	0.272
55	3248	0.526	0.583	0.647	0.456	0.536	0.233	0.255	0.281
56	3296	0.548	0.589	0.643	0.465	0.542	0.241	0.249	0.282
57	3346	0.539	0.601	0.658	0.479	0.538	0.245	0.256	0.294
58	3398	0.555	0.605	0.669	0.493	0.574	0.250	0.273	0.302
59	3446	0.578	0.636	0.691	0.506	0.594	0.252	0.271	0.308
60	3494	0.596	0.656	0.710	0.515	0.601	0.268	0.279	0.316
61	3499	0.602	0.661	0.721	0.531	0.605	0.274	0.281	0.325
62	3497	0.621	0.671	0.740	0.540	0.622	0.283	0.287	0.330
63	3499	0.621	0.681	0.751	0.549	0.628	0.286	0.291	0.330
64	3497	0.637	0.681	0.742	0.553	0.638	0.289	0.291	0.332
65	3544	0.650	0.706	0.766	0.563	0.641	0.290	0.307	0.346
66	3598	0.673	0.718	0.794	0.585	0.676	0.305	0.309	0.359
67	3649	0.704	0.761	0.814	0.606	0.718	0.319	0.322	0.379
68	3695	0.767	0.822	0.896	0.674	0.766	0.365	0.360	0.429
69	3695	0.881	0.949	1.029	0.787	0.860	0.436	0.434	0.514
70	3688	0.929	0.982	1.061	0.821	0.910	0.463	0.454	0.545
71	3654	0.986	1.041	1.113	0.877	0.969	0.506	0.504	0.570
72	3573	1.075	1.141	1.219	0.978	1.069	0.586	0.590	0.643
73	3420	1.278	1.350	1.409	1.176	1.264	0.797	0.785	0.813
74	3287	1.486	1.563	1.635	1.389	1.467	1.026	0.995	0.948
75	3198	1.677	1.763	1.834	1.576	1.676	1.201	1.164	1.088
76	3084	1.921	2.019	2.073	1.835	1.917	1.403	1.380	1.311
77	2864	2.428	2.545	2.561	2.315	2.466	1.817	1.872	1.749
78	2694	2.731	2.866	2.868	2.614	2.788	2.324	4.410	2.054
79	2499	3.160	3.344	3.293	3.028	3.242	2.335	4.416	2.546
80	2456	3.416	3.610	3.543	3.291	3.548	2.328	4.421	2.852
81	2393	3.724	3.970	3.852	3.607	3.914	2.324	4.418	4.576
82	2361	3.944	4.226	4.076	3.829	4.174	2.332	4.427	4.571
83	2283	4.133	4.451	4.253	4.028	4.400	2.332	4.422	4.568
84	2258	4.480	4.852	4.613	4.381	4.787	2.312	4.424	4.574
85	2273	4.688	5.136	4.831	4.594	5.038	2.324	4.429	4.574
86	2248	4.967	5.443	5.103	4.861	5.373	2.313	4.426	4.575
87	1661	6.039	6.768	6.197	5.906	6.688	2.314	4.351	4.575
88	742	5.760	6.437	5.913	5.652	6.365	2.314	4.361	4.575
89	351	5.530	6.134	5.677	5.418	6.058	2.315	4.349	4.569
90	258	5.443	6.018	5.591	5.328	5.938	2.314	4.352	4.566
91	81	5.153	5.654	5.278	5.069	5.591	2.314	4.346	4.569
92	75	5.134	5.637	5.261	5.047	5.559	2.315	4.346	4.572
93	56	5.103	5.613	5.239	5.029	5.539	2.314	4.351	4.578
94	55	5.093	5.600	5.231	5.023	5.534	2.315	4.349	4.569
95	63	5.093	5.586	5.235	5.023	5.536	2.320	4.350	4.572

(a) Load = about 1,000 kips

(b) Load = 3,000 kips

Fig. A.3.1 Specimen 2A-3 Photos

(c) After Ultimate Load



(d) After Ultimate Load

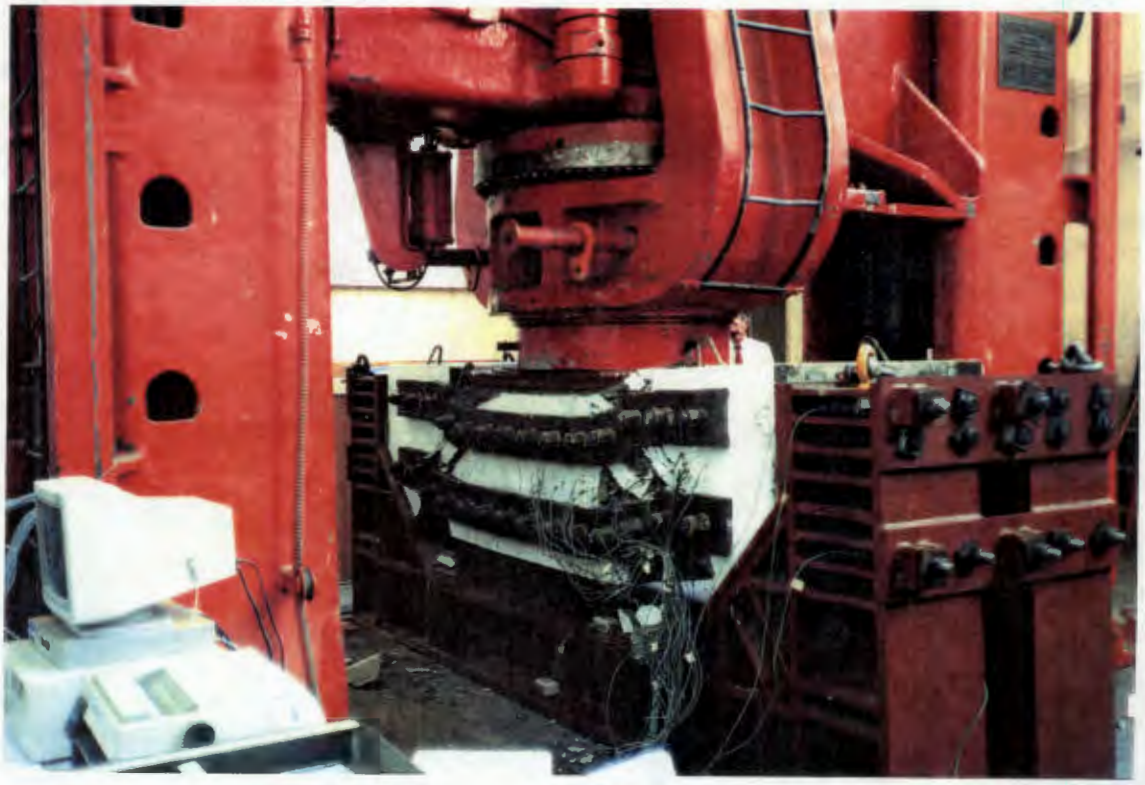
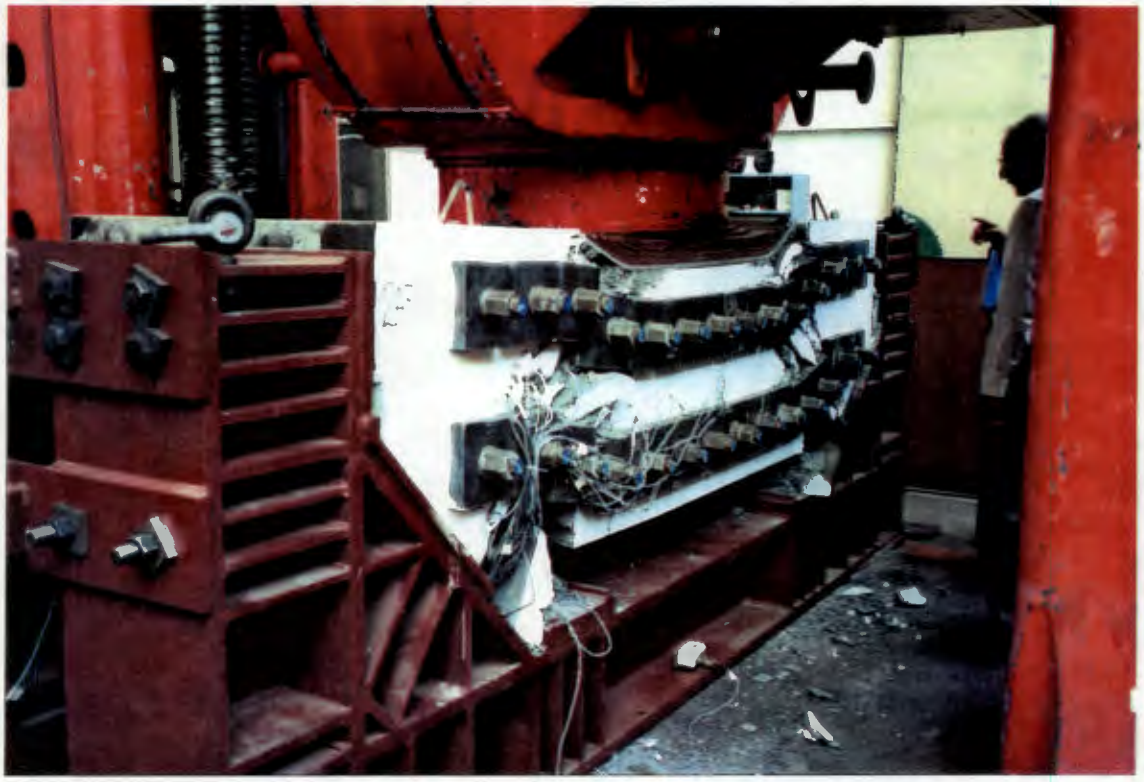


Fig. A.3.1 Specimen 2A-3 Photos (Cont'd)

(e) End of the Test



(f) Fracture of the T-Headed Stirrups

Fig. A.3.1 Specimen 2A-3 Photos (Cont'd)

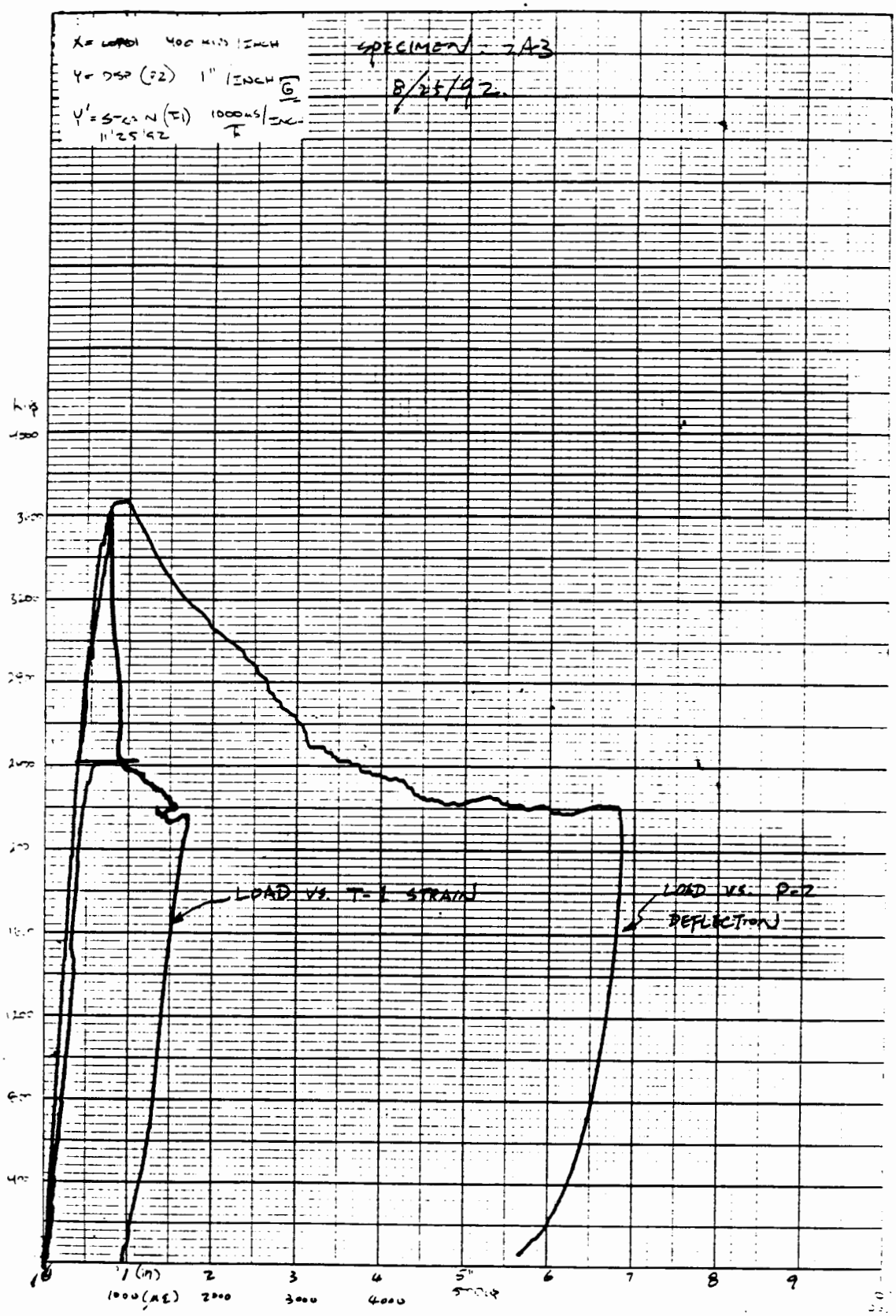


Fig. A.3.2 Specimen 2A-3 XY Plots

APPENDIX B

FIGURES WITH PROCESSED DATA

APPENDIX B

LIST OF FIGURES

APPENDIX B

LIST OF FIGURES (cont'd)

Fig. 1: Load vs. Deflection for Specimens: 2A-1, 2A-2 and 2A-3

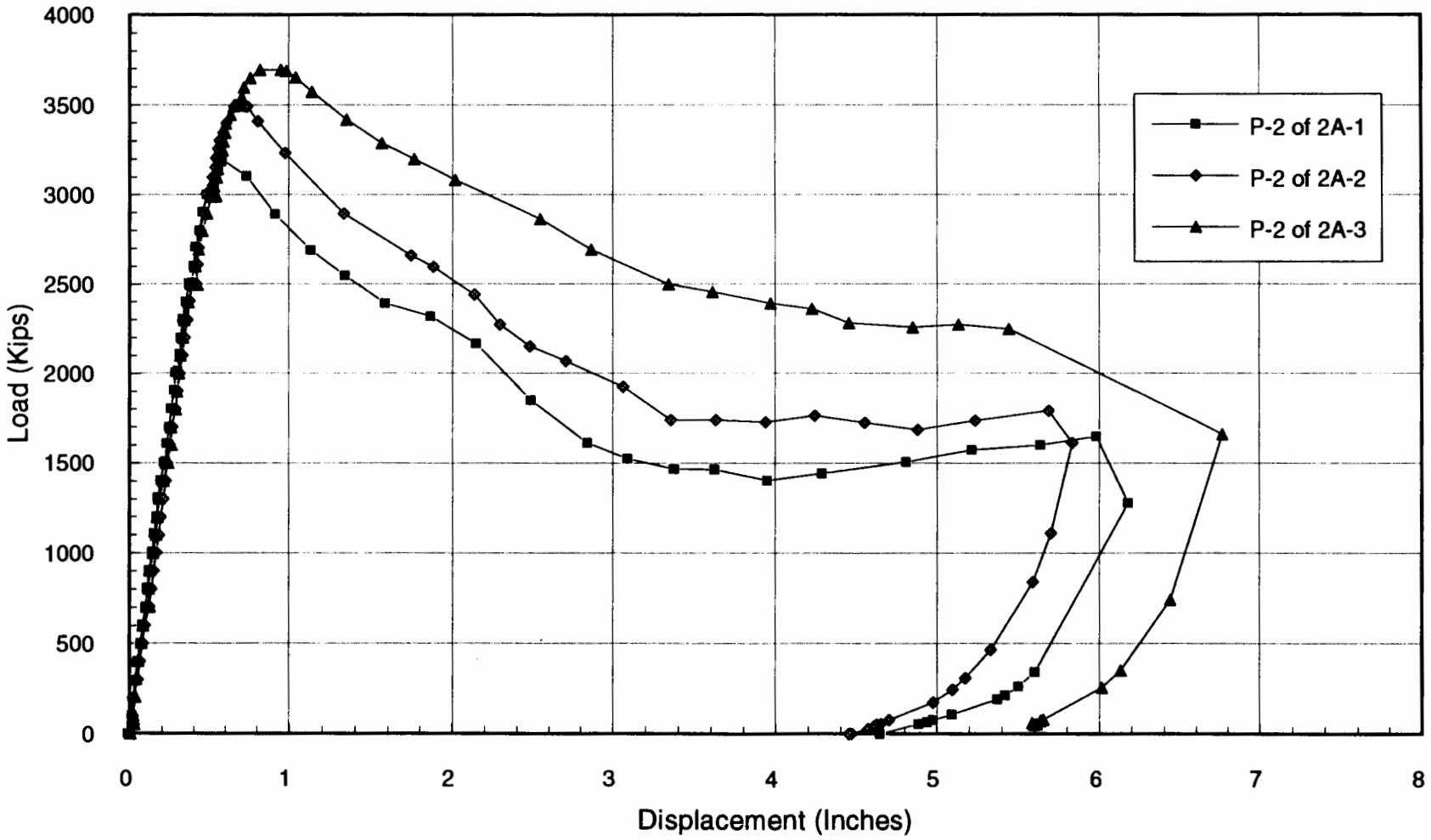


Fig. 2: Load vs. Deflection along Long. Center-line for Spec. 2A-1

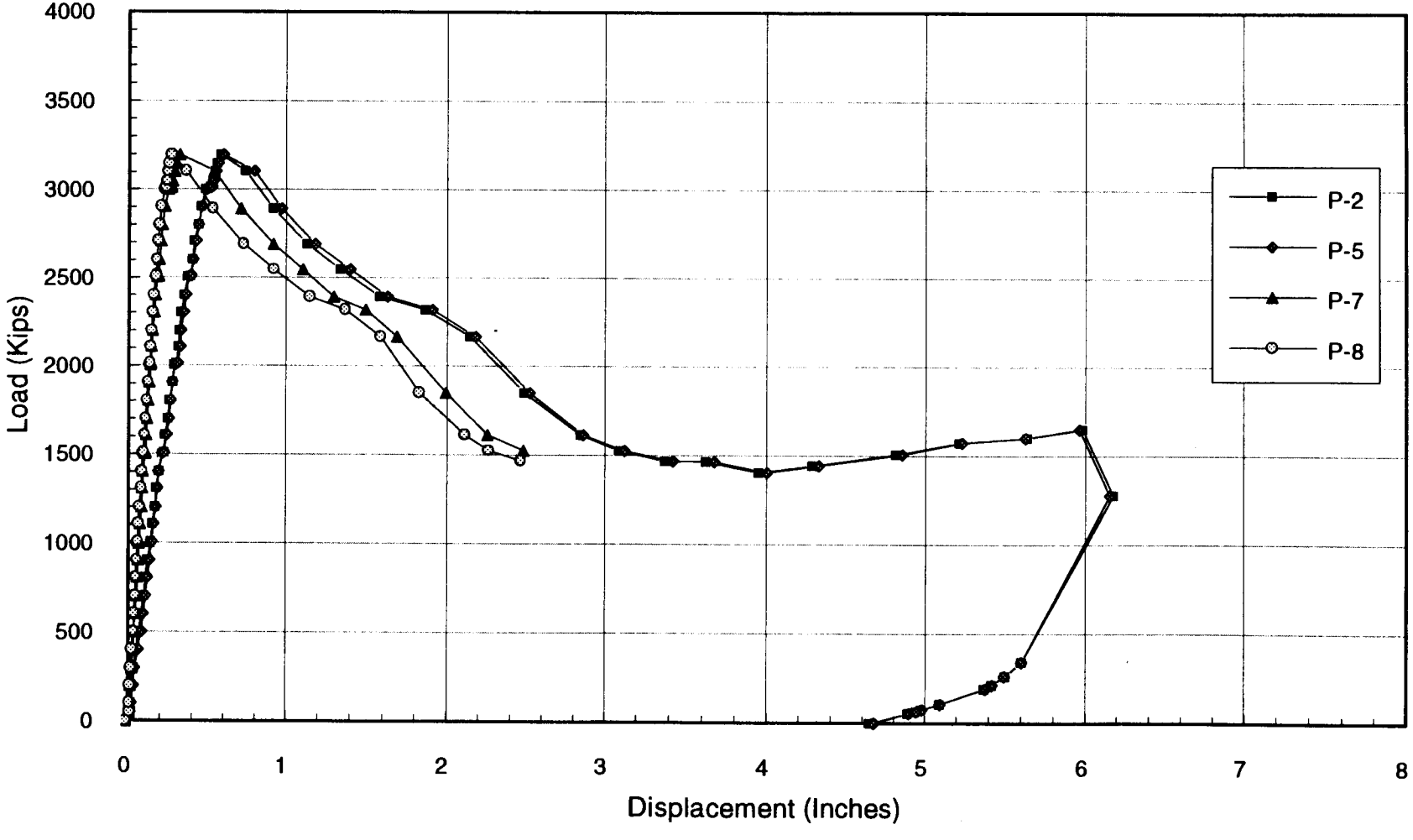


Fig. 3: Load vs. Deflection along Long. Center-line for Spec. 2A-2

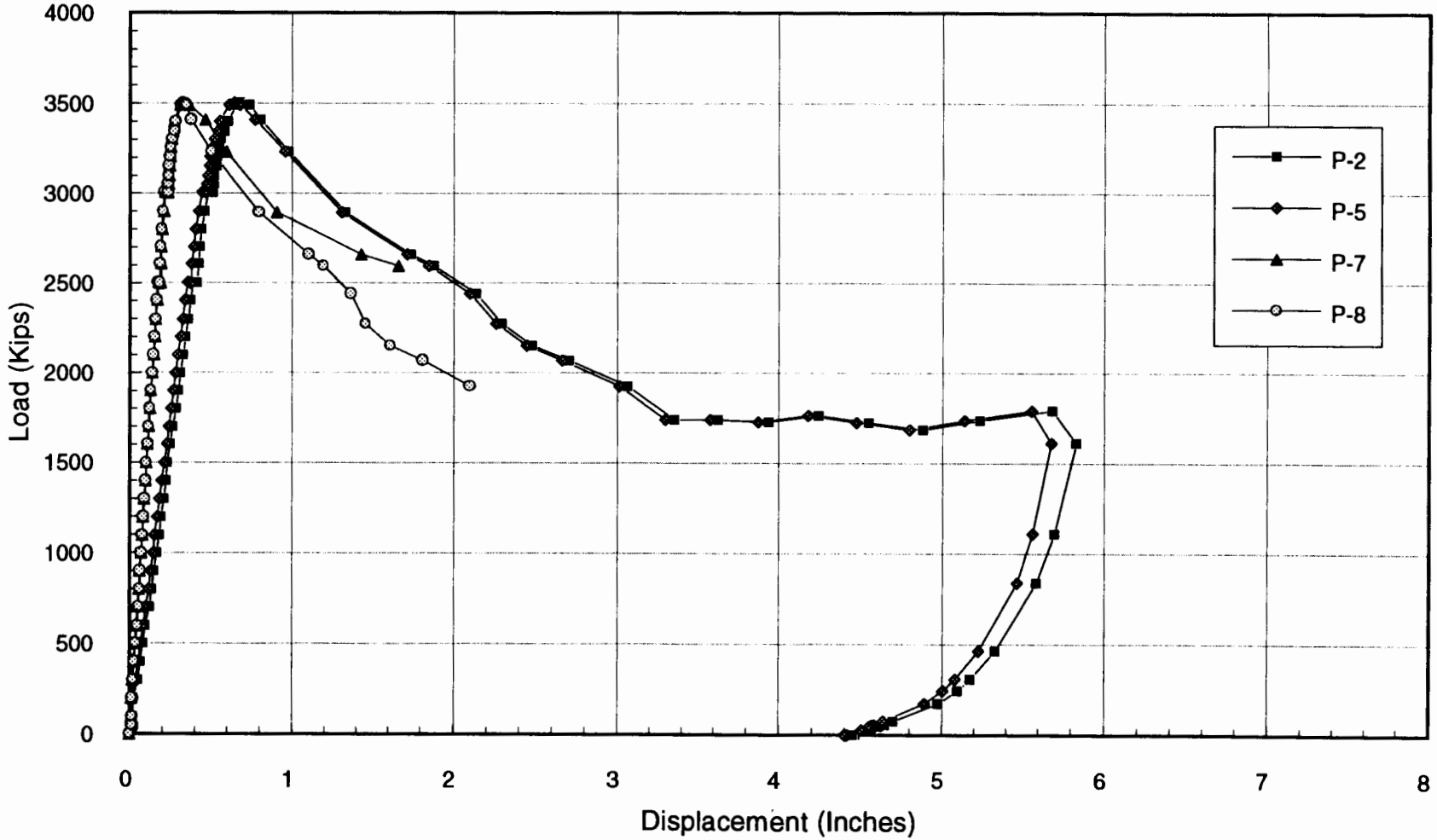


Fig. 4: Load vs. Deflection along Long. Center-line for Spec. 2A-3

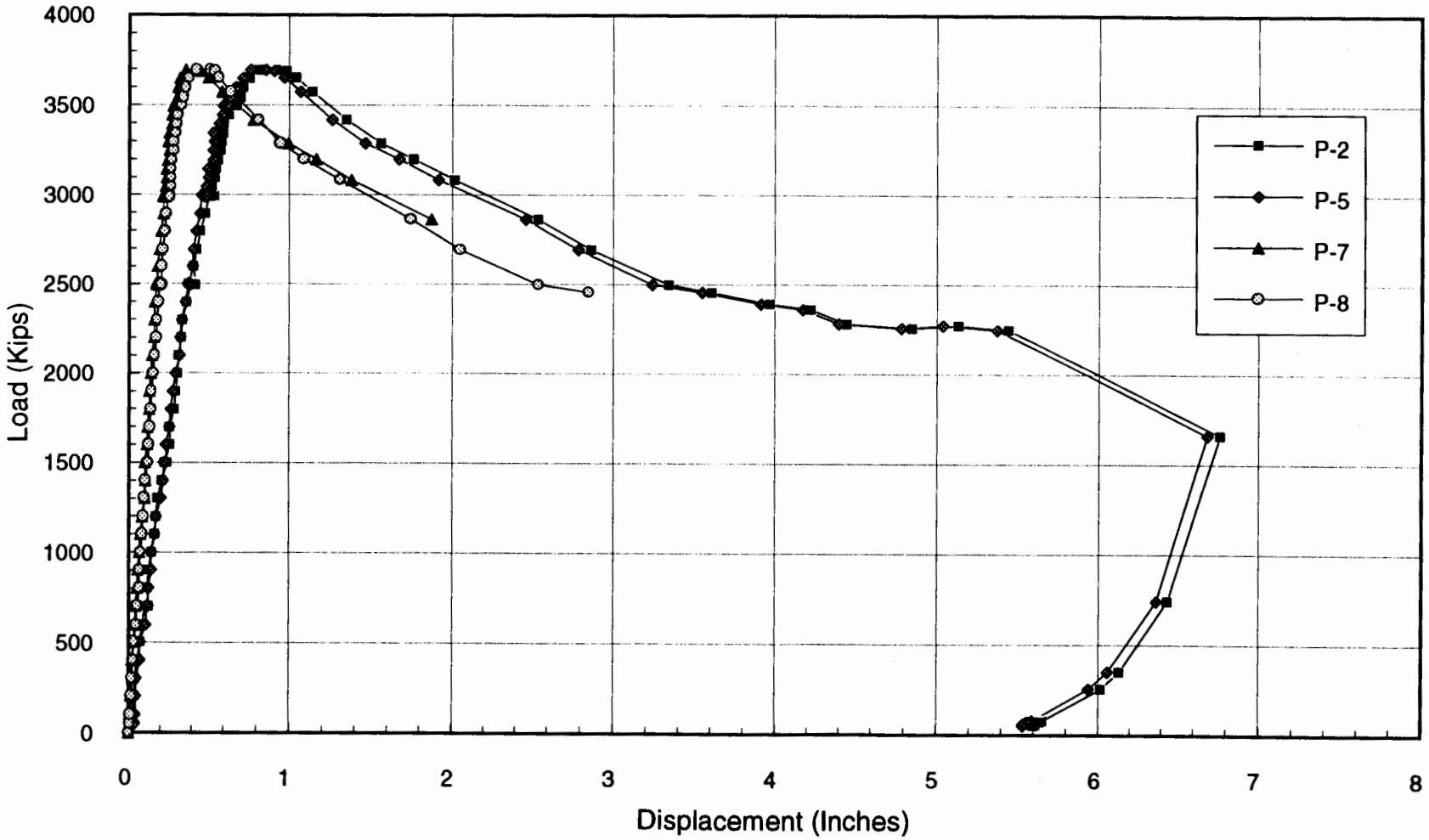


Fig. 5: Load vs. Deflection along Long. Side A for Spec. 2A-1

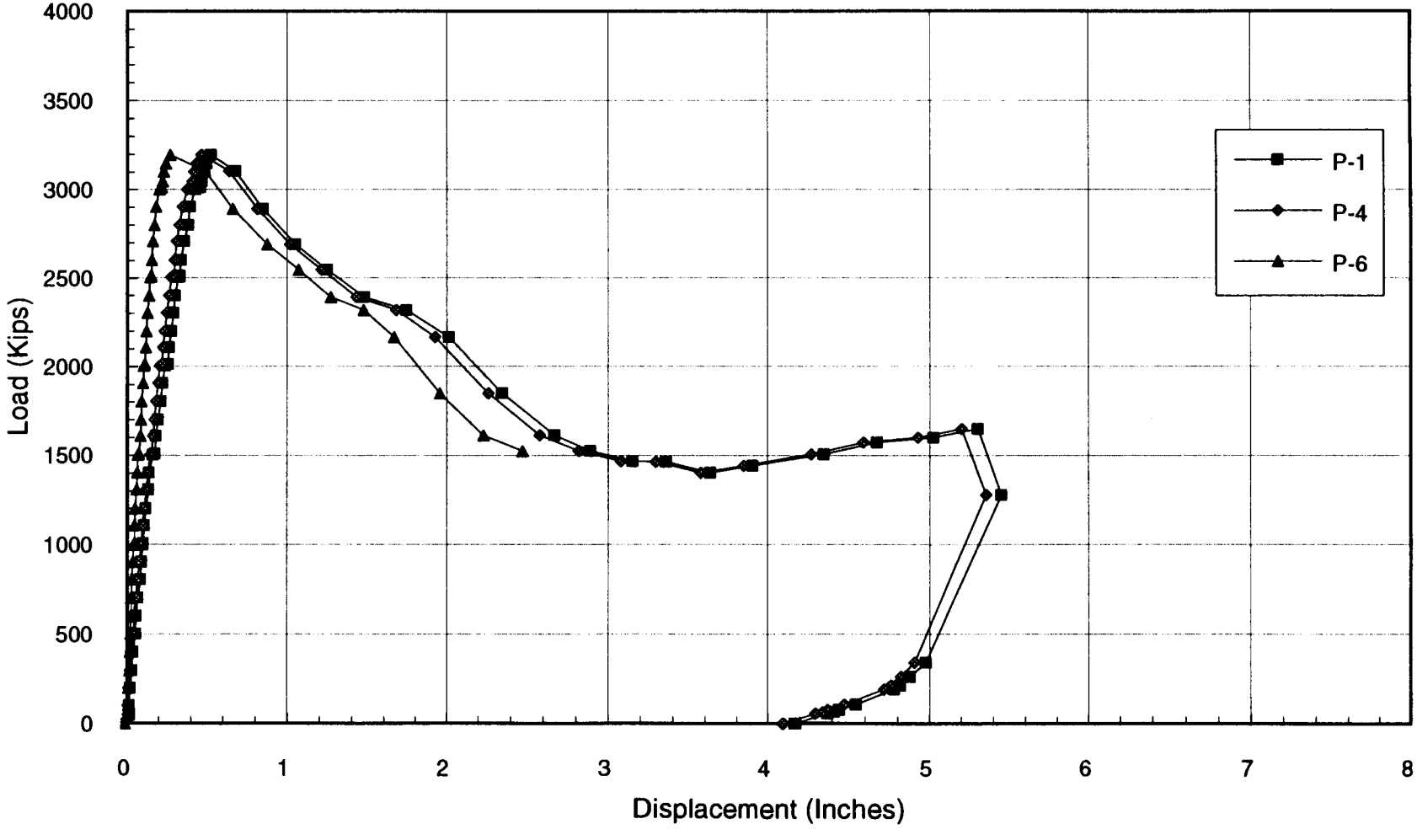


Fig. 6: Load vs. Deflection along Long. Side A for Spec. 2A-2

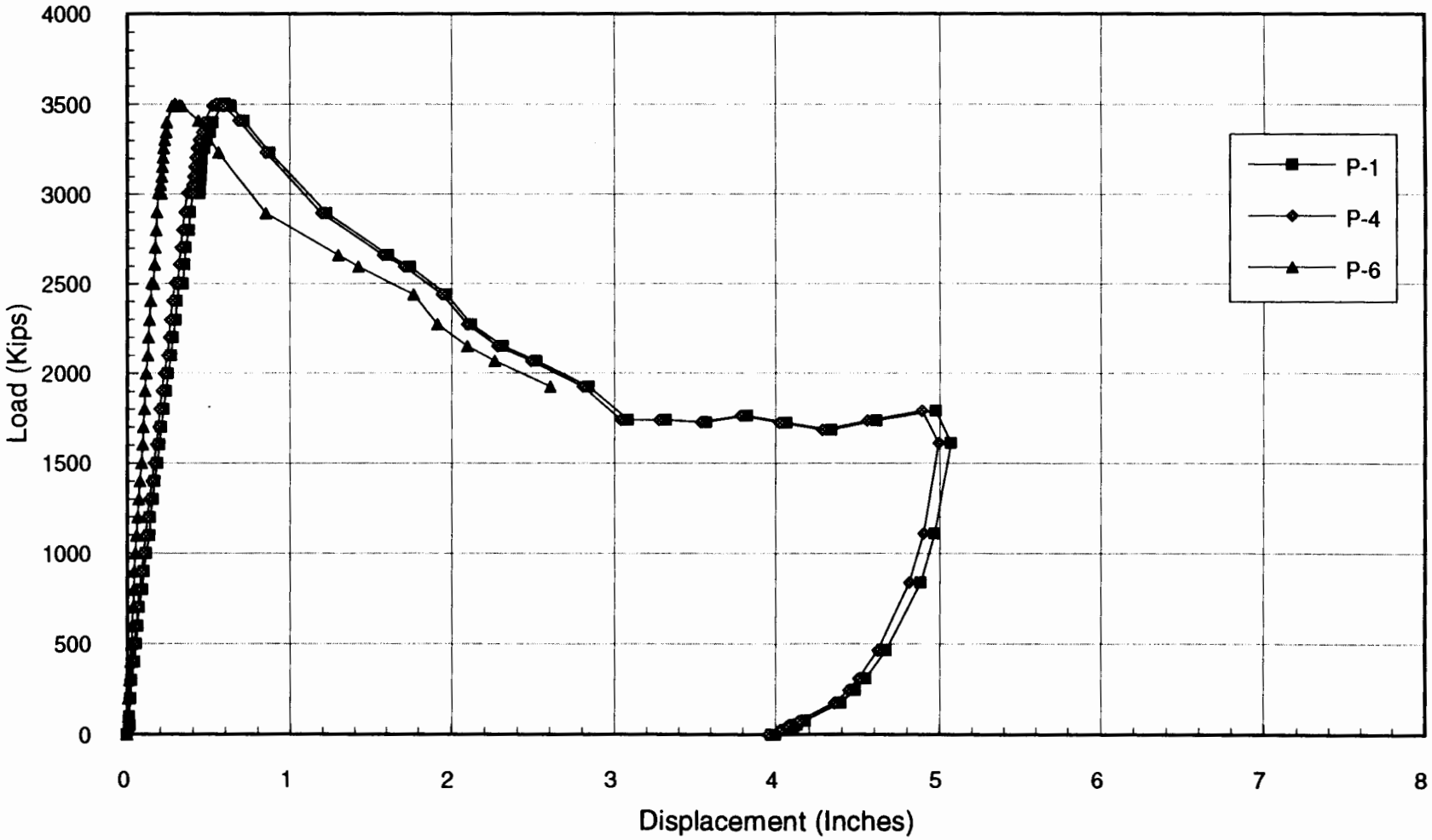


Fig. 7: Load vs. Deflection along Long. Side A for Spec. 2A-3

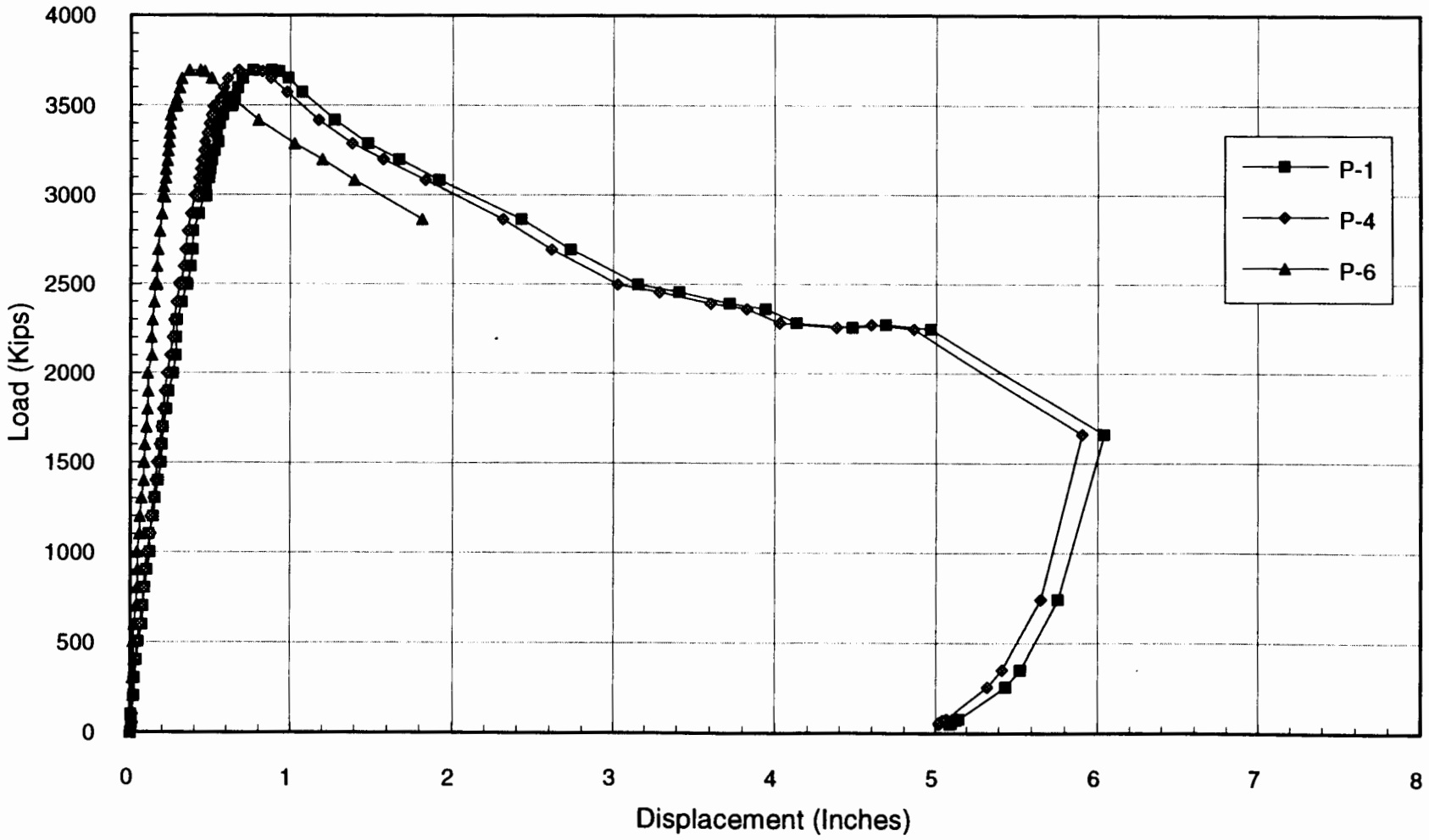


Fig. 8: Load vs. Deflection along Vertical Center-line for Spec. 2A-1

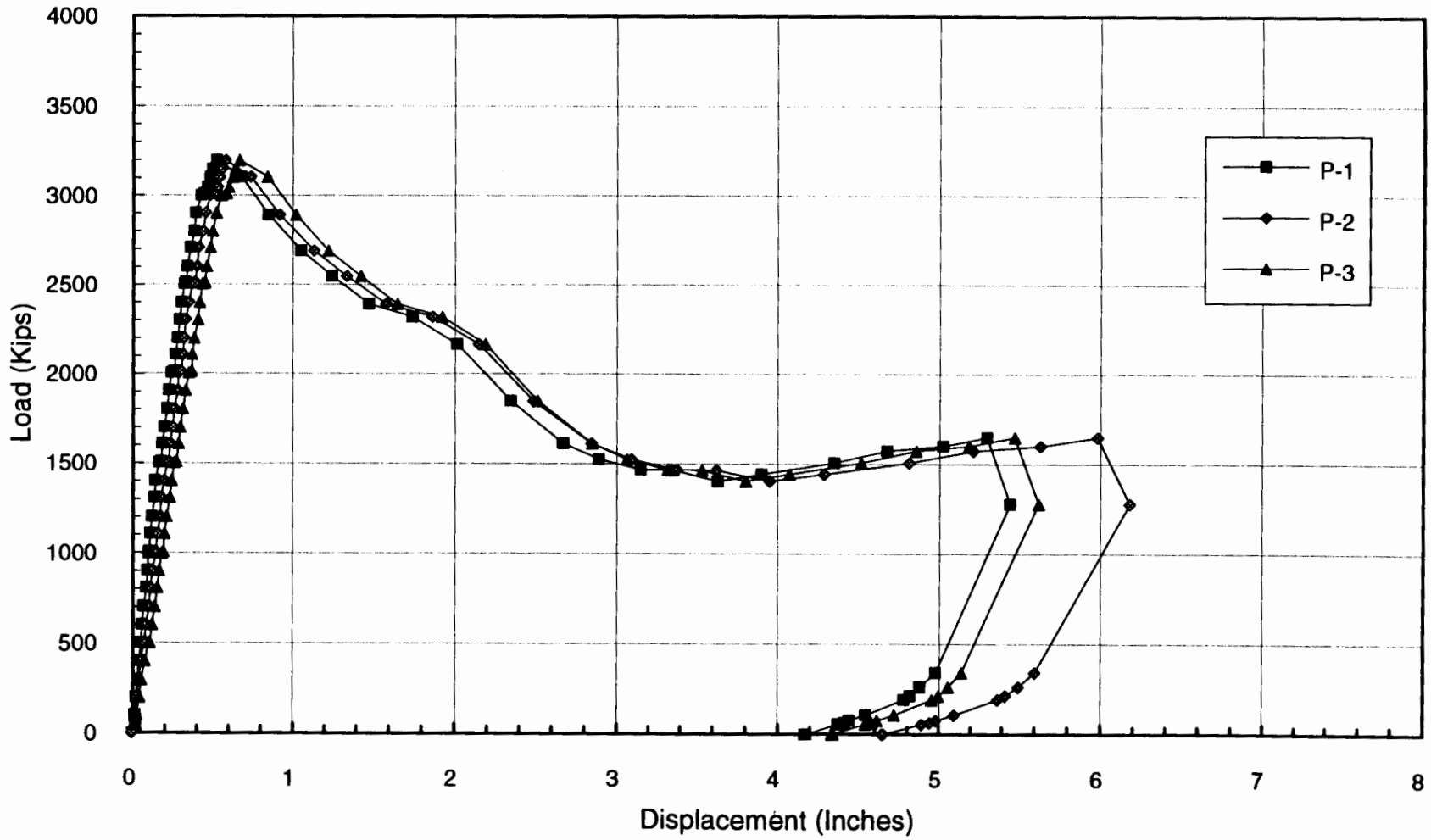


Fig. 9: Load vs. Deflection along Vertical Center-line for Spec. 2A-2

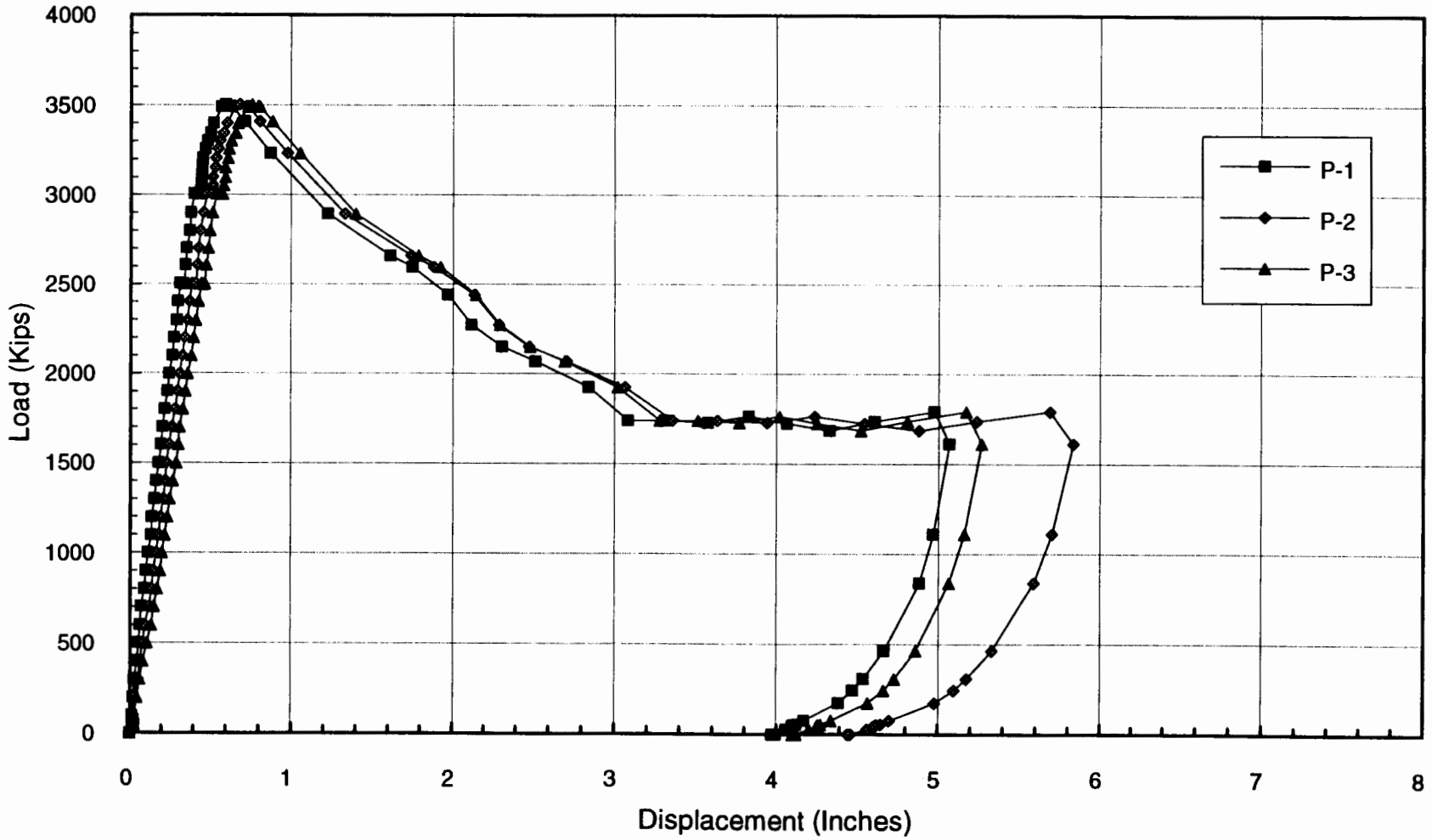


Fig. 10: Load vs. Deflection along Vertical Center-line for Spec. 2A-3

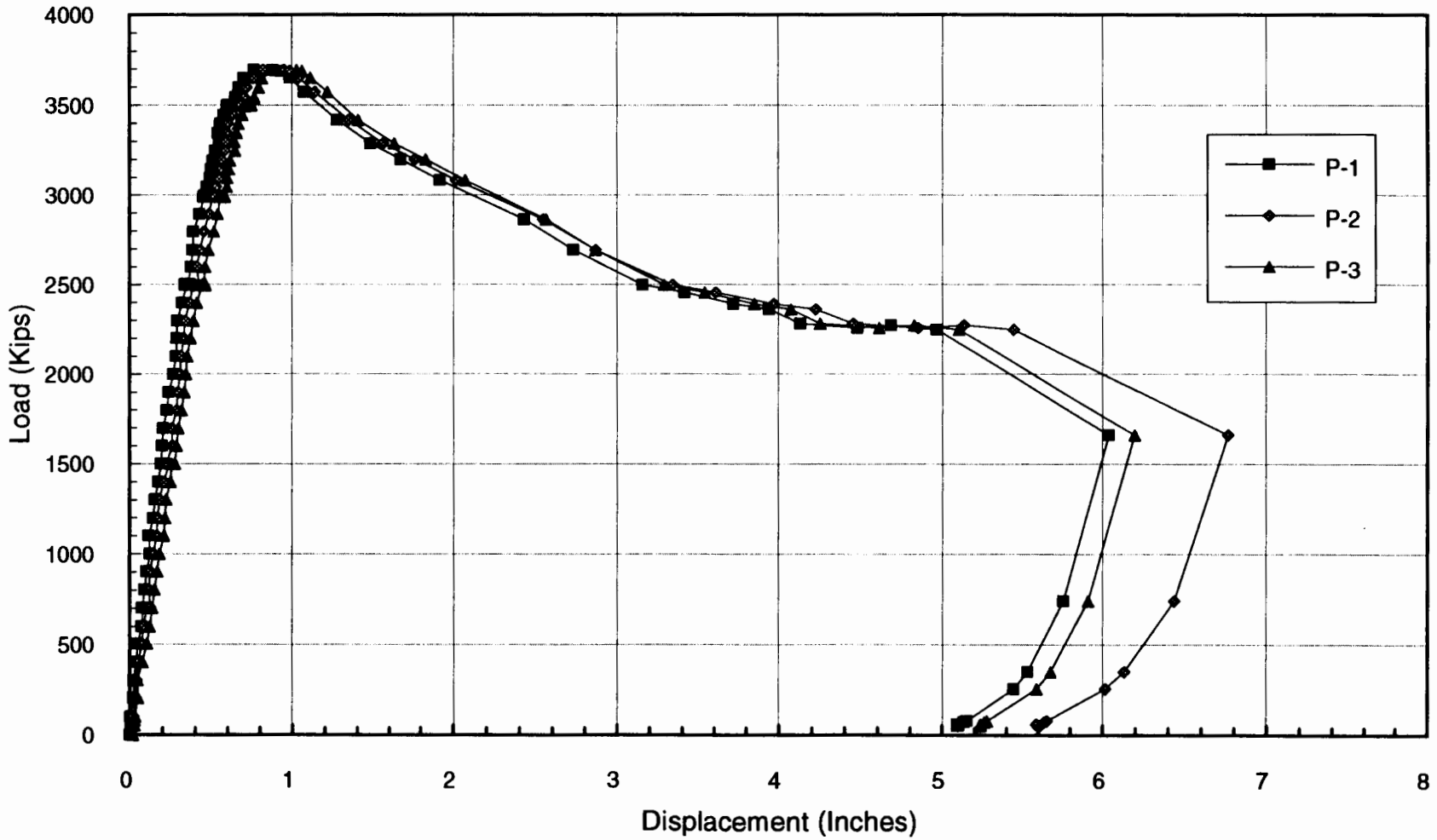


Fig. 11: Load vs. Strain for Exterior Bolts on Frame for Spec. 2A-1

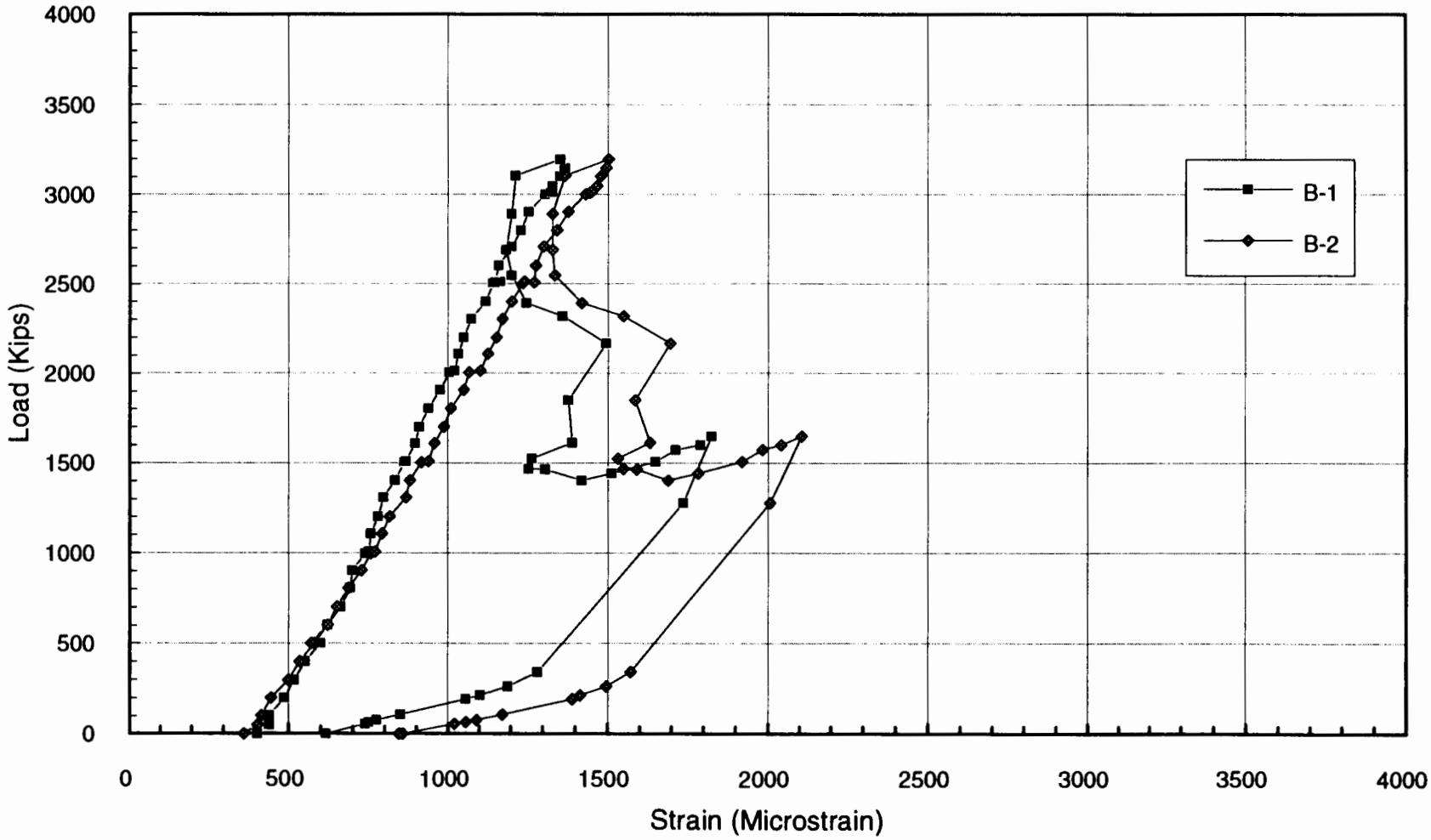


Fig. 12: Load vs. Strain for Exterior Bolts on Frame for Spec. 2A-2

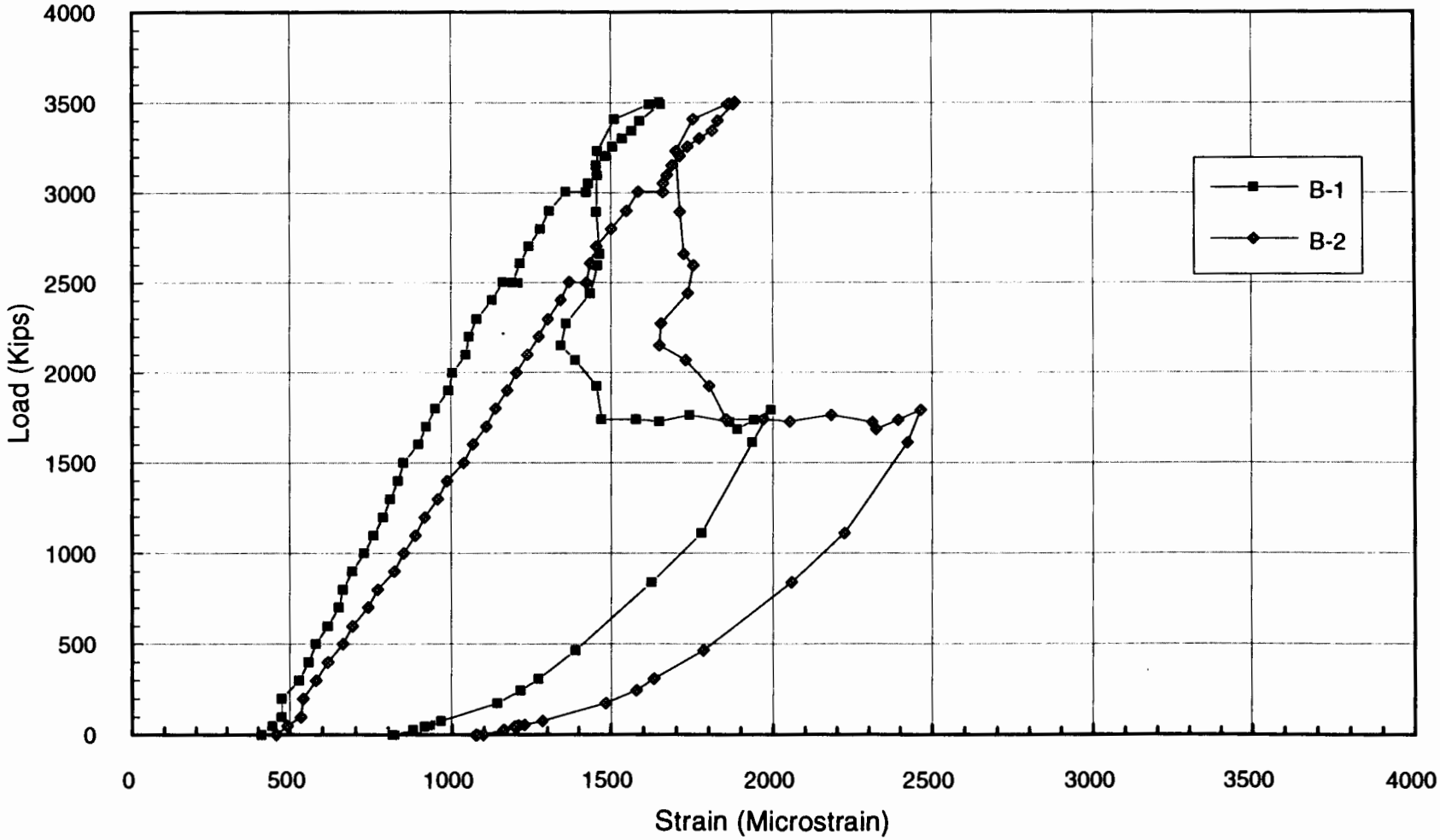


Fig. 13: Load vs. Strain for Exterior Bolts on Frame for Spec. 2A-3

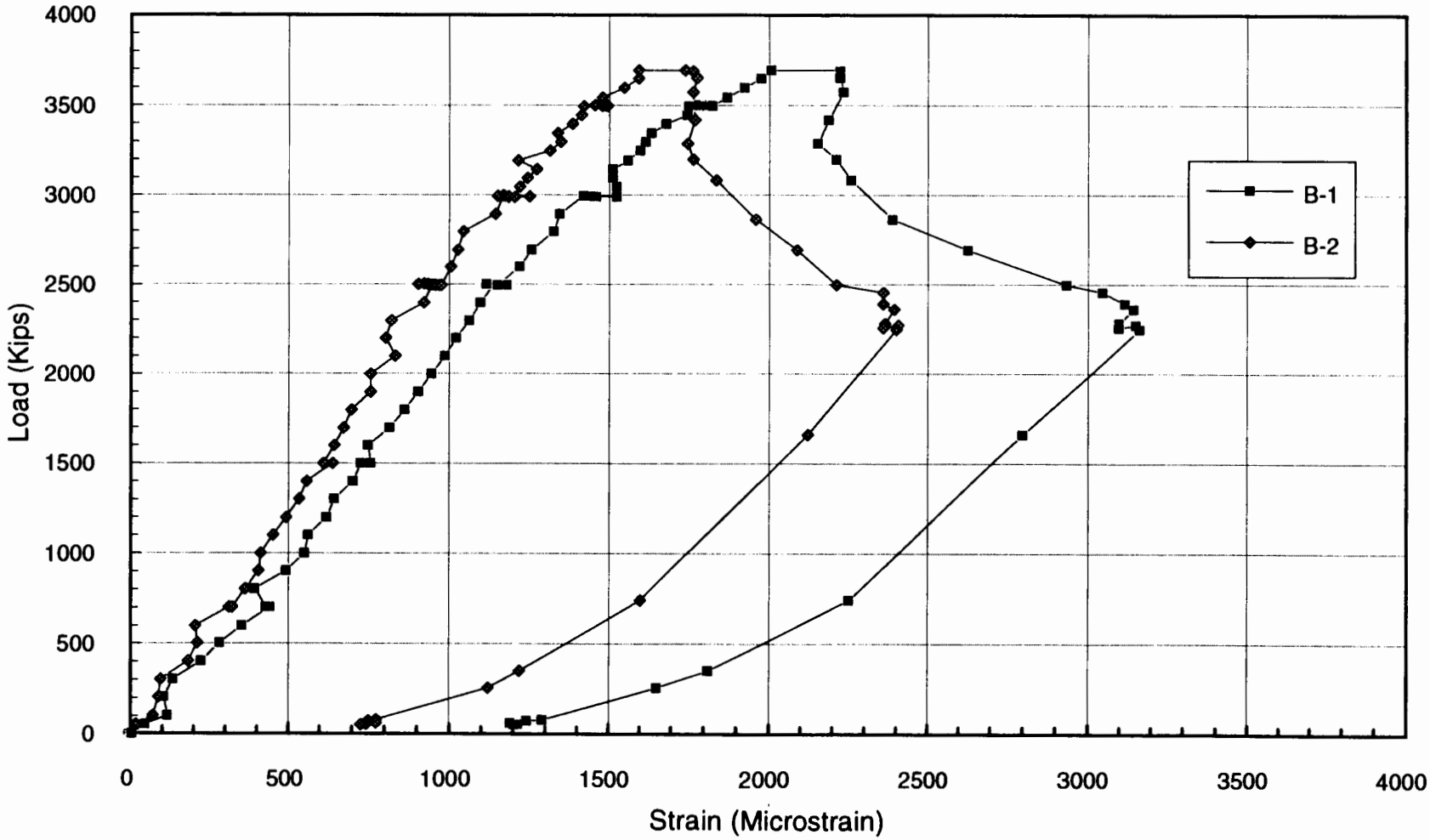


Fig. 14: Load vs. Strain for Interior Bolts on Frame for Spec. 2A-1

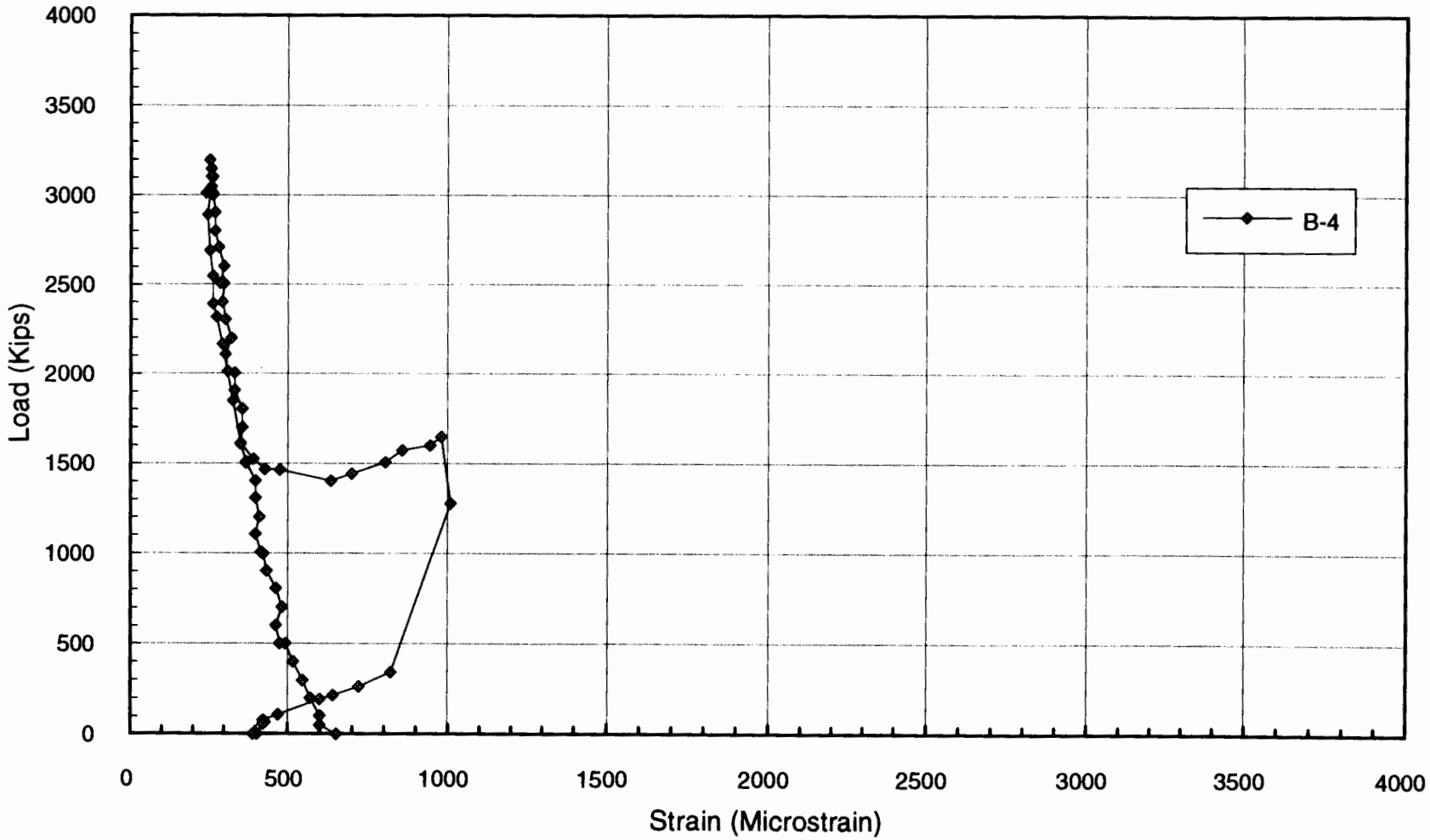


Fig. 15: Load vs. Strain for Interior Bolts on Frame for Spec. 2A-2

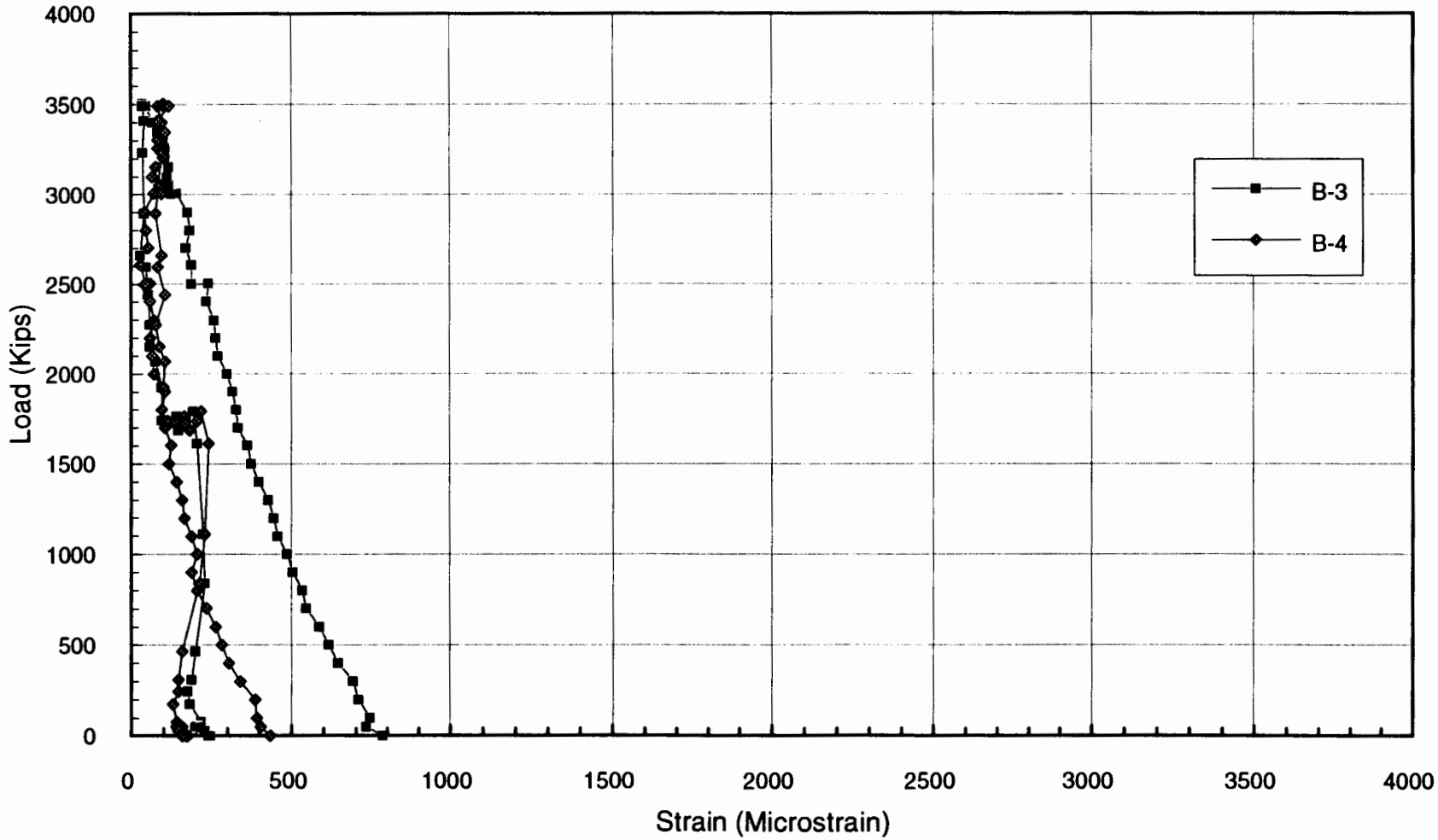


Fig. 16: Load vs. Strain for Interior Bolts on Frame for Spec. 2A-3

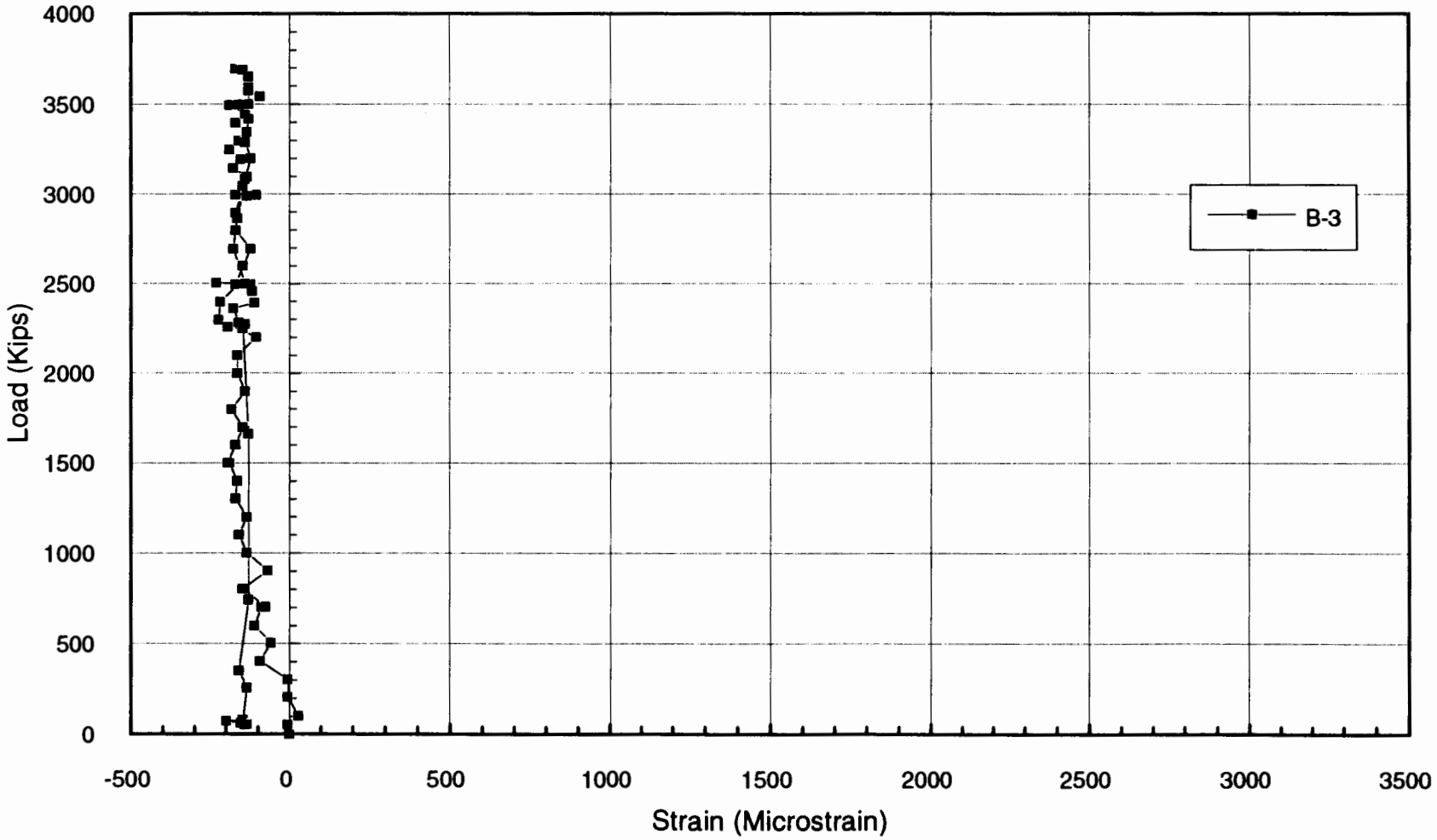


Fig. 17: Load vs. Longitudinal Movement of Spec. 2A-1 and 2A-2

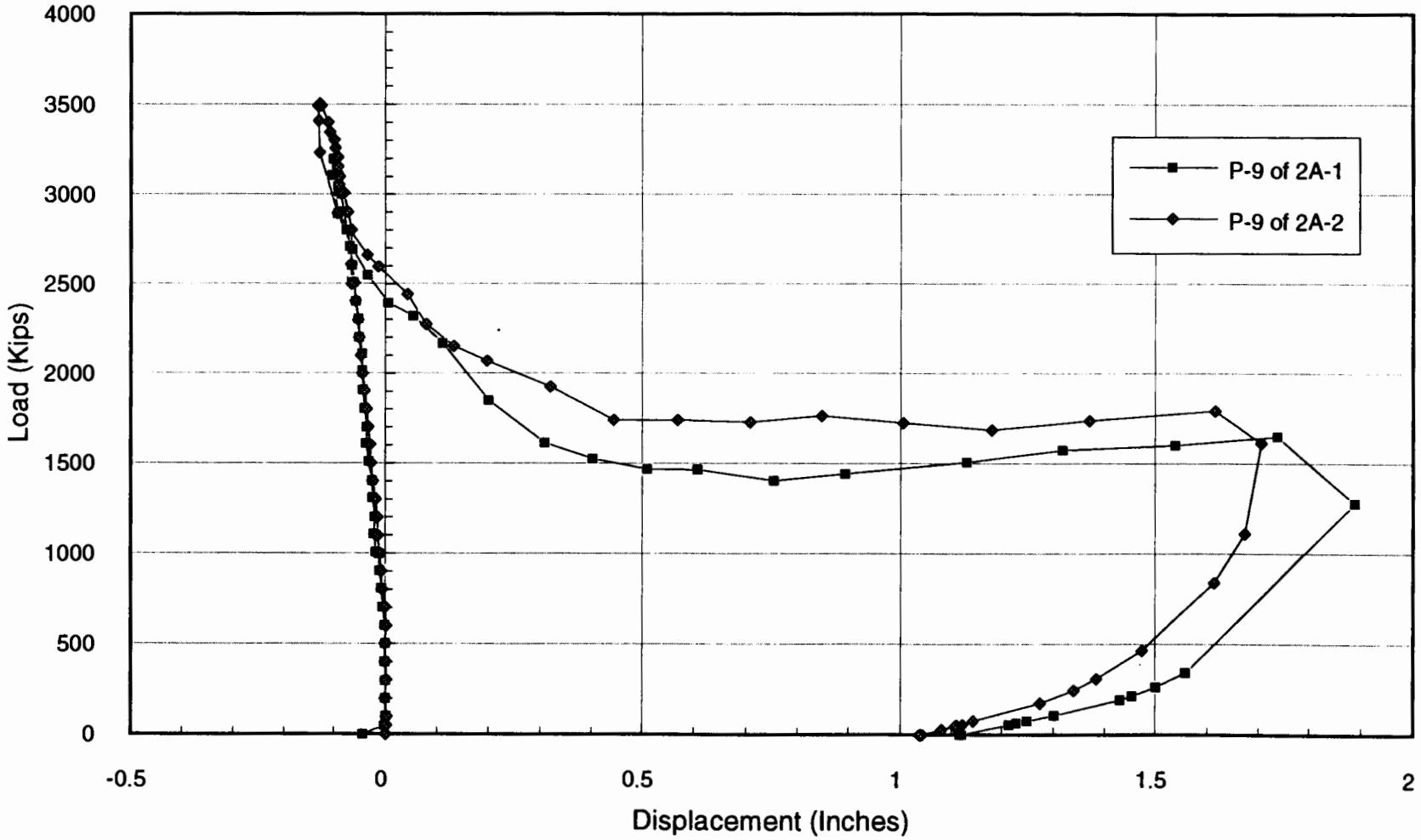


Fig. 18: Load vs. Strain along Exterior (top) Long. Bars Side A for Spec. 2A-1

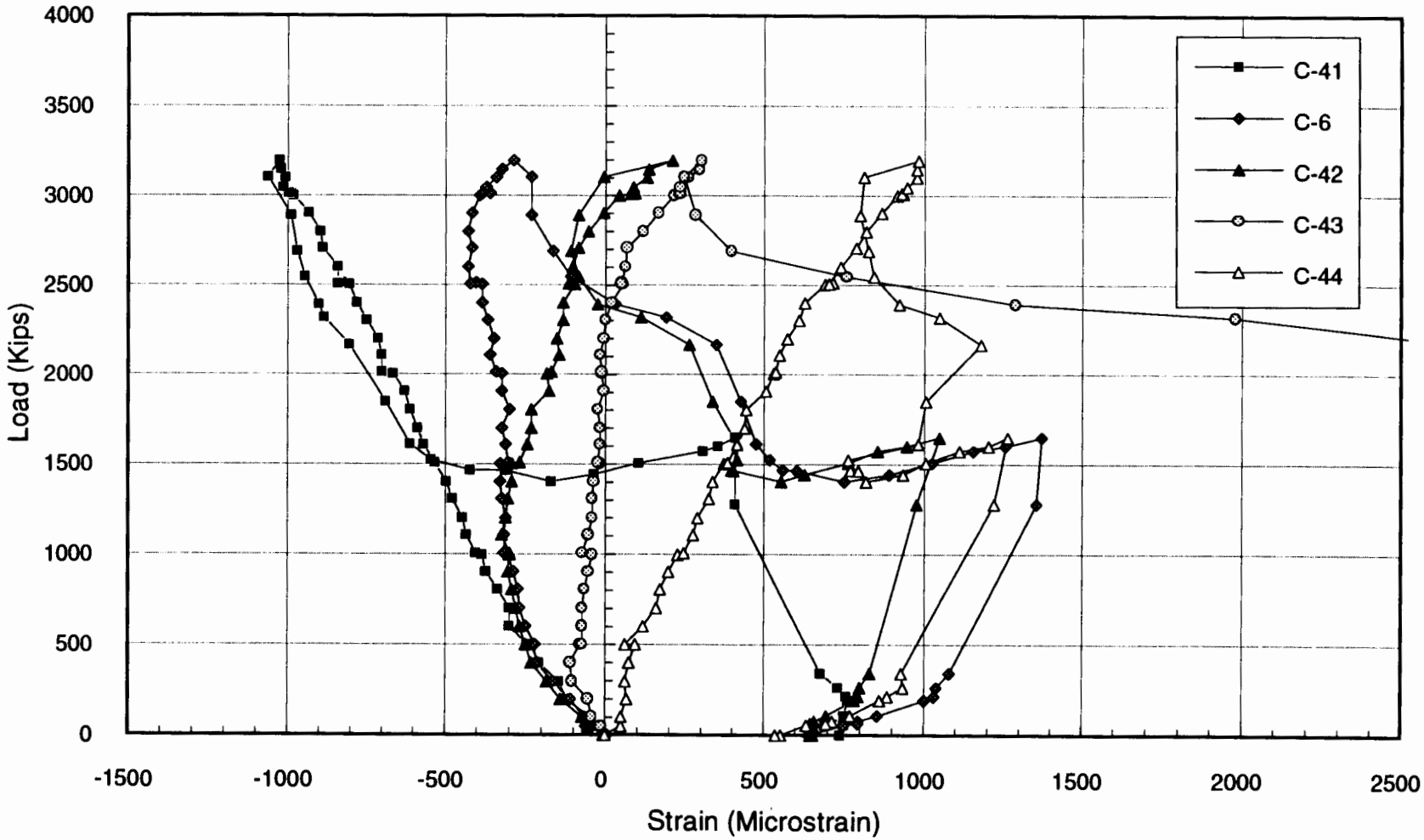


Fig. 19: Load vs. Strain along Exterior (top) Long. Bars Side B for Spec. 2A-1

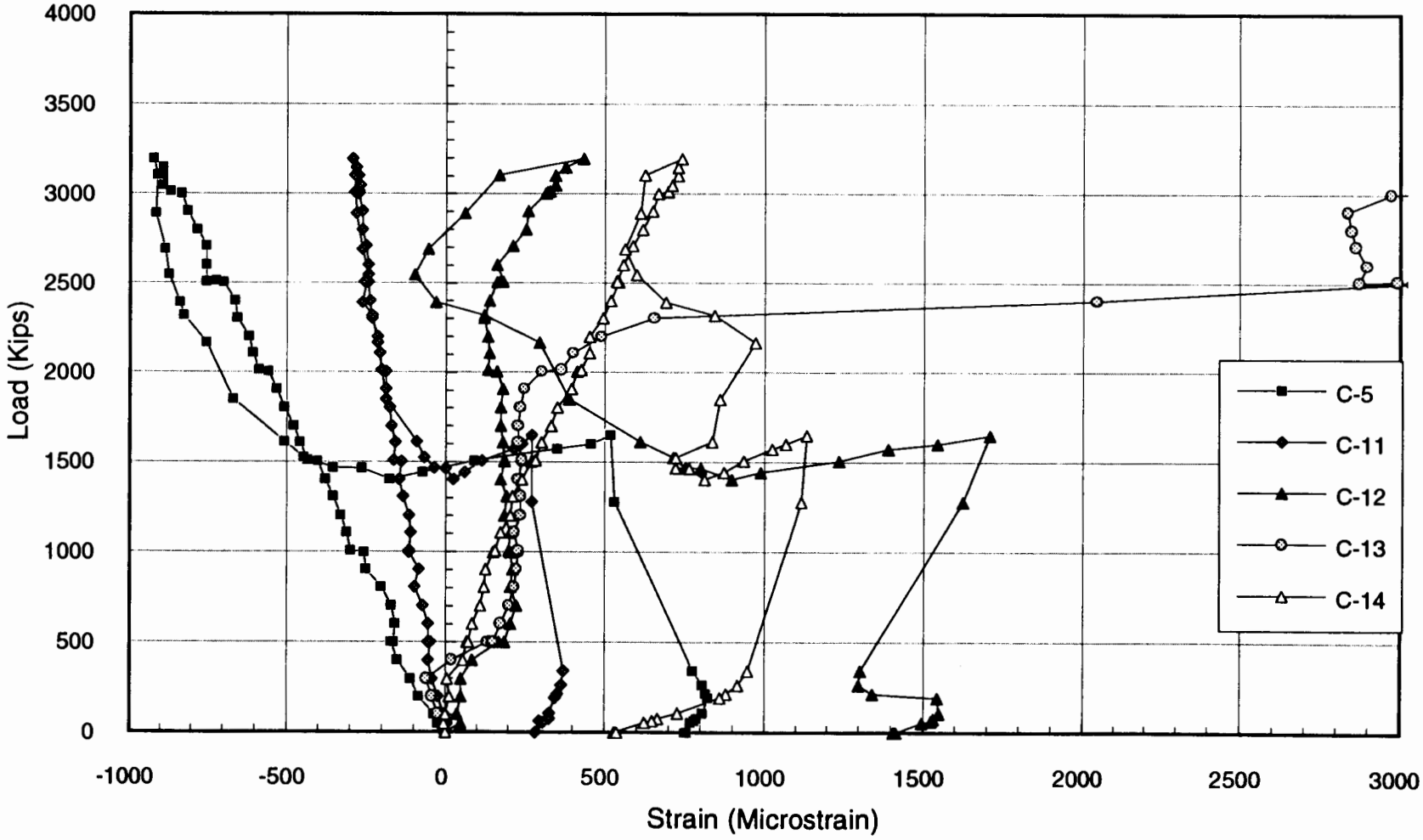


Fig. 20: Load vs. Strain along Interior (bottom) Long. Bars Side A for Spec. 2A-1

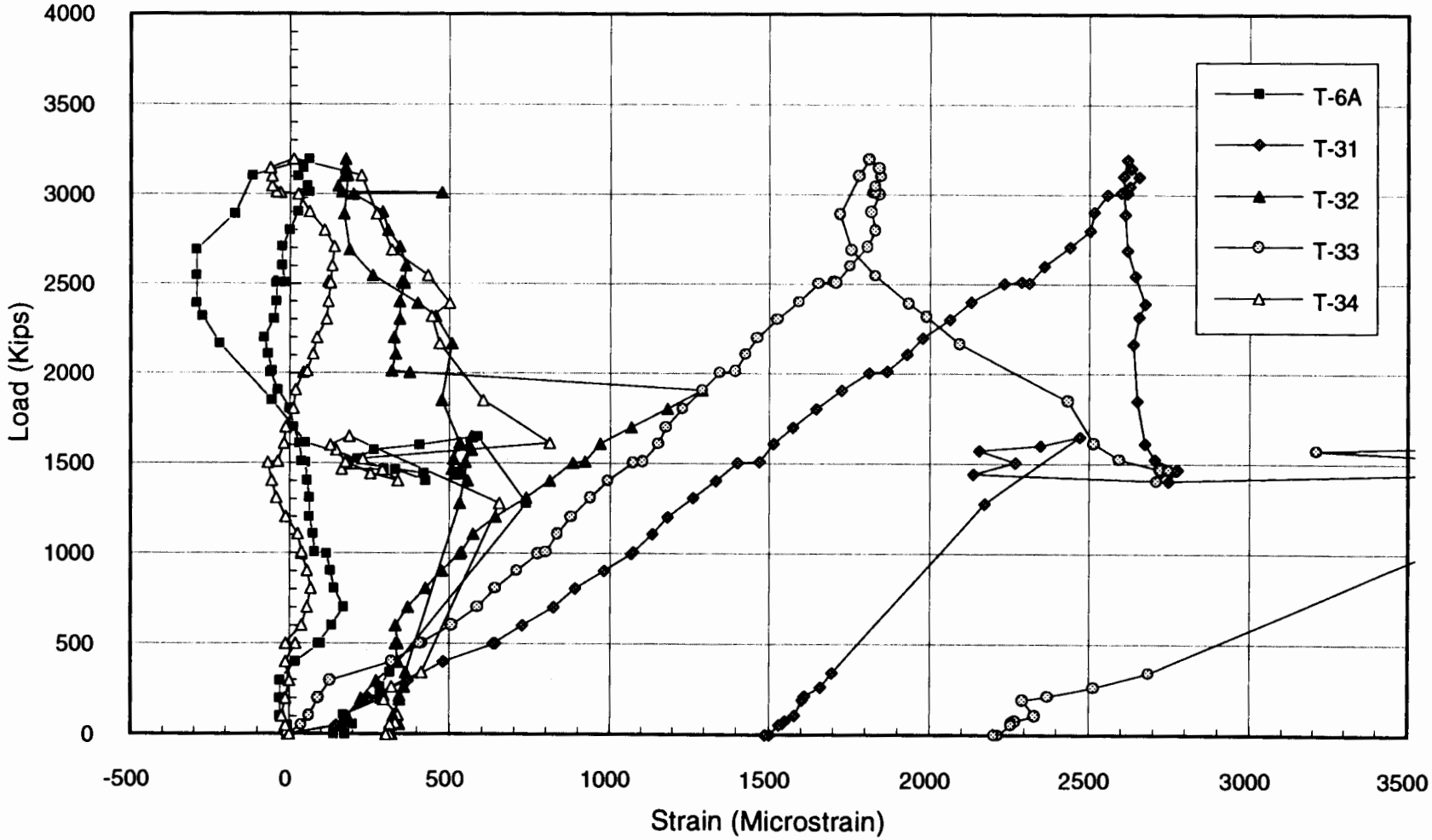


Fig. 21: Load vs. Strain along Interior (bottom) Long. Bars Side B for Spec. 2A-1

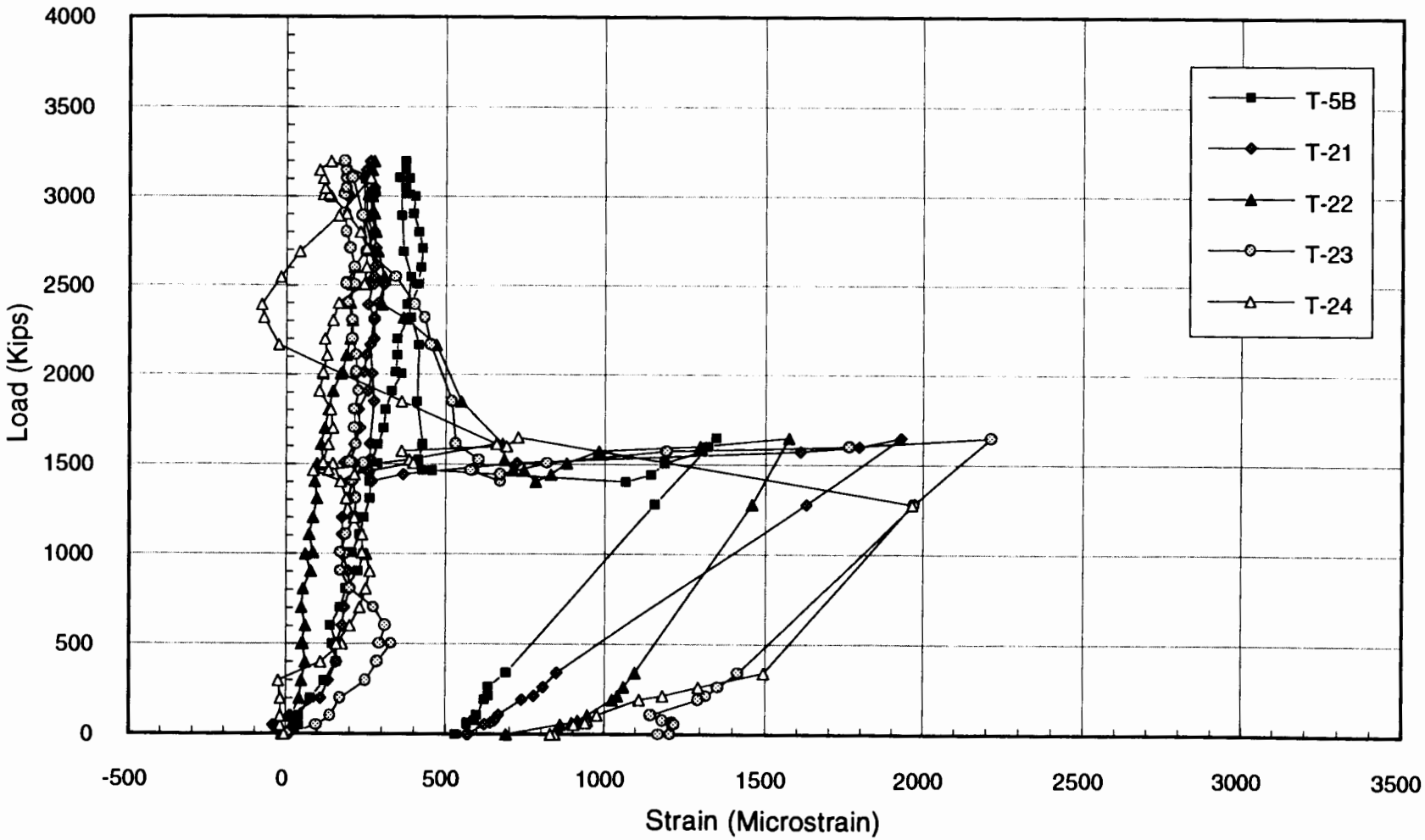


Fig. 22: Load vs. Strain for Two Exterior (top) Vertical (trans.) Bars for Spec. 2A-1

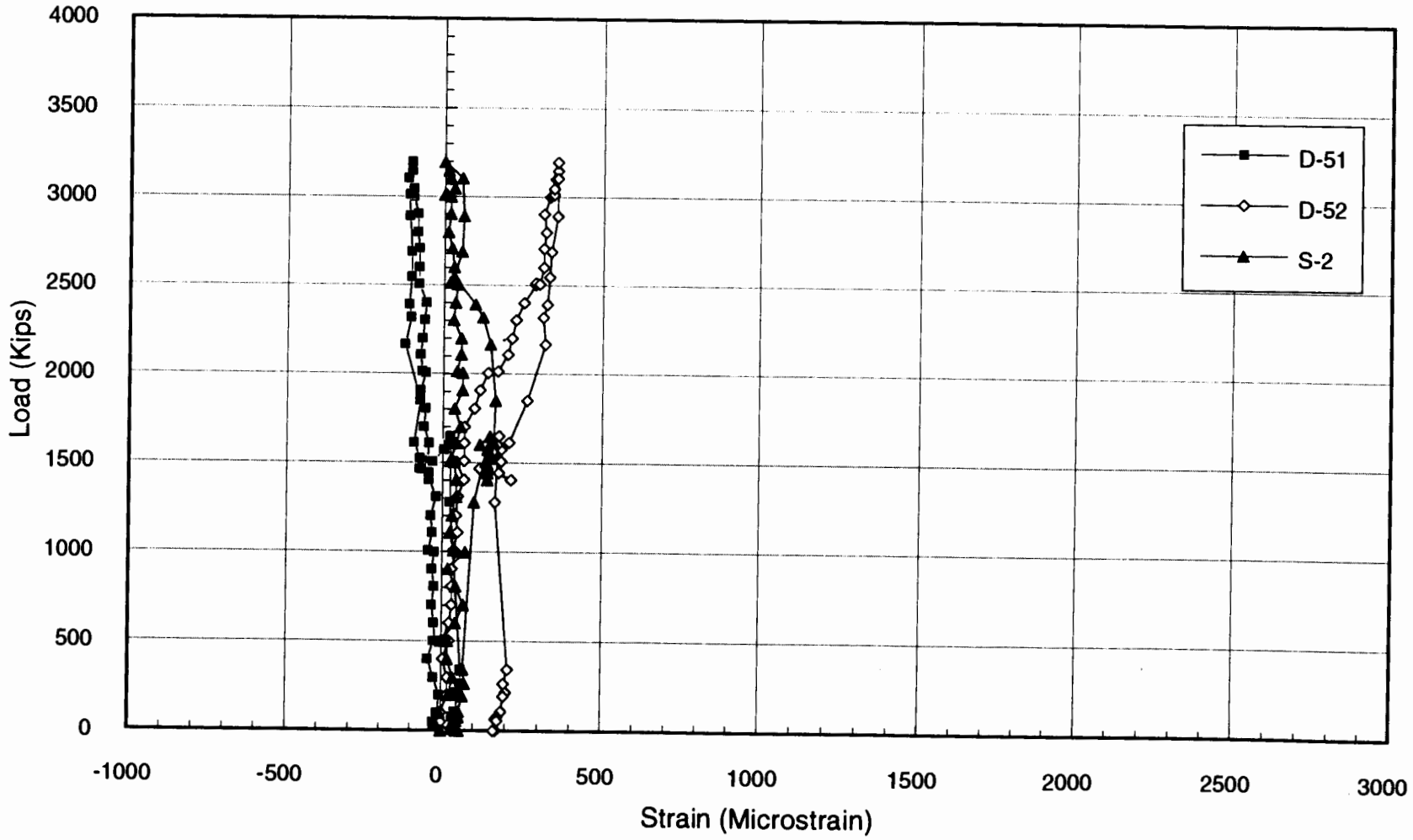


Fig. 23: Load vs. Strain for Two Interior (btm) Vertical (trans.) Bars for Spec. 2A-1

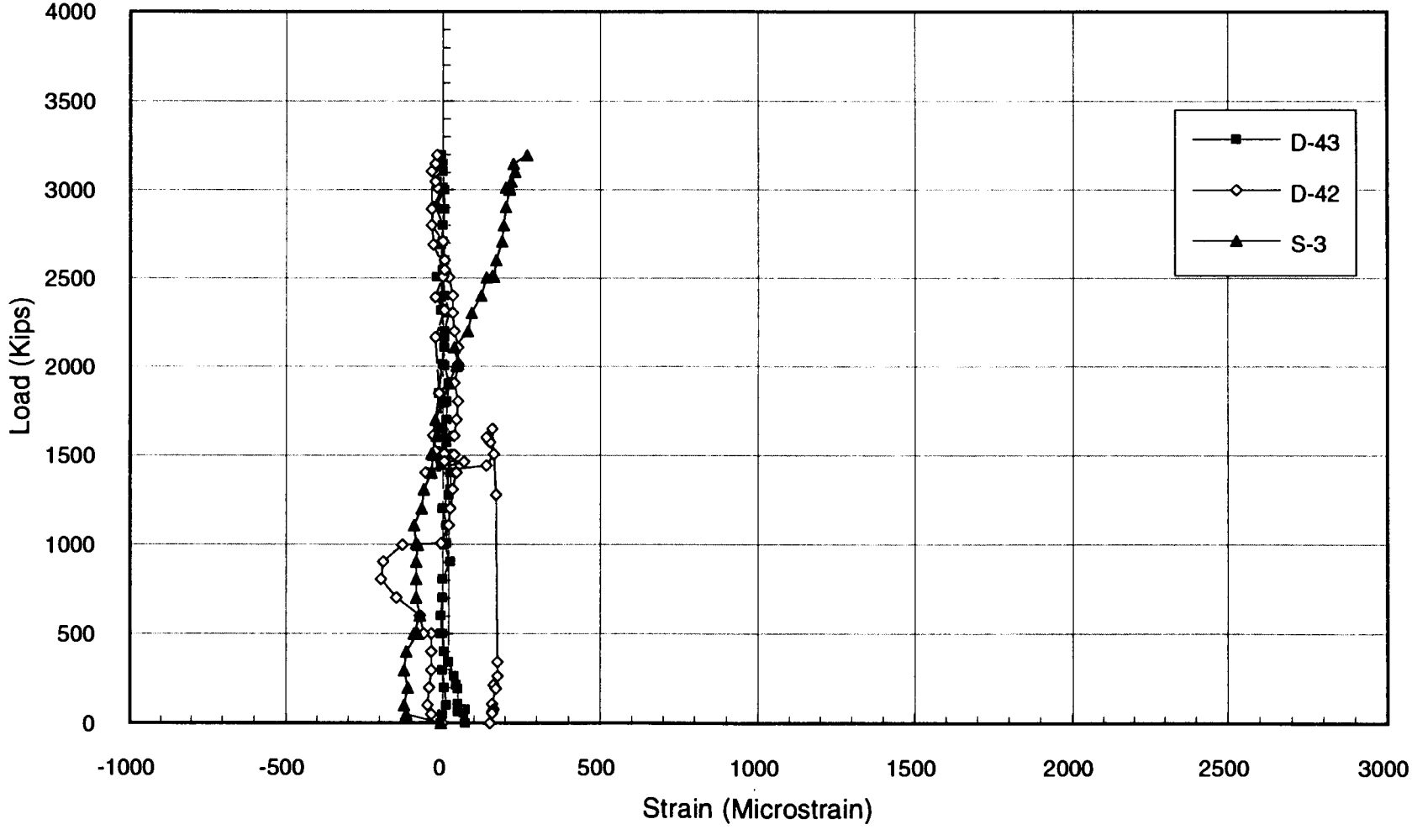


Fig. 24: Load vs. Strain for T-Headed Stirrups along Long. Line Side A, Spec. 2A-1

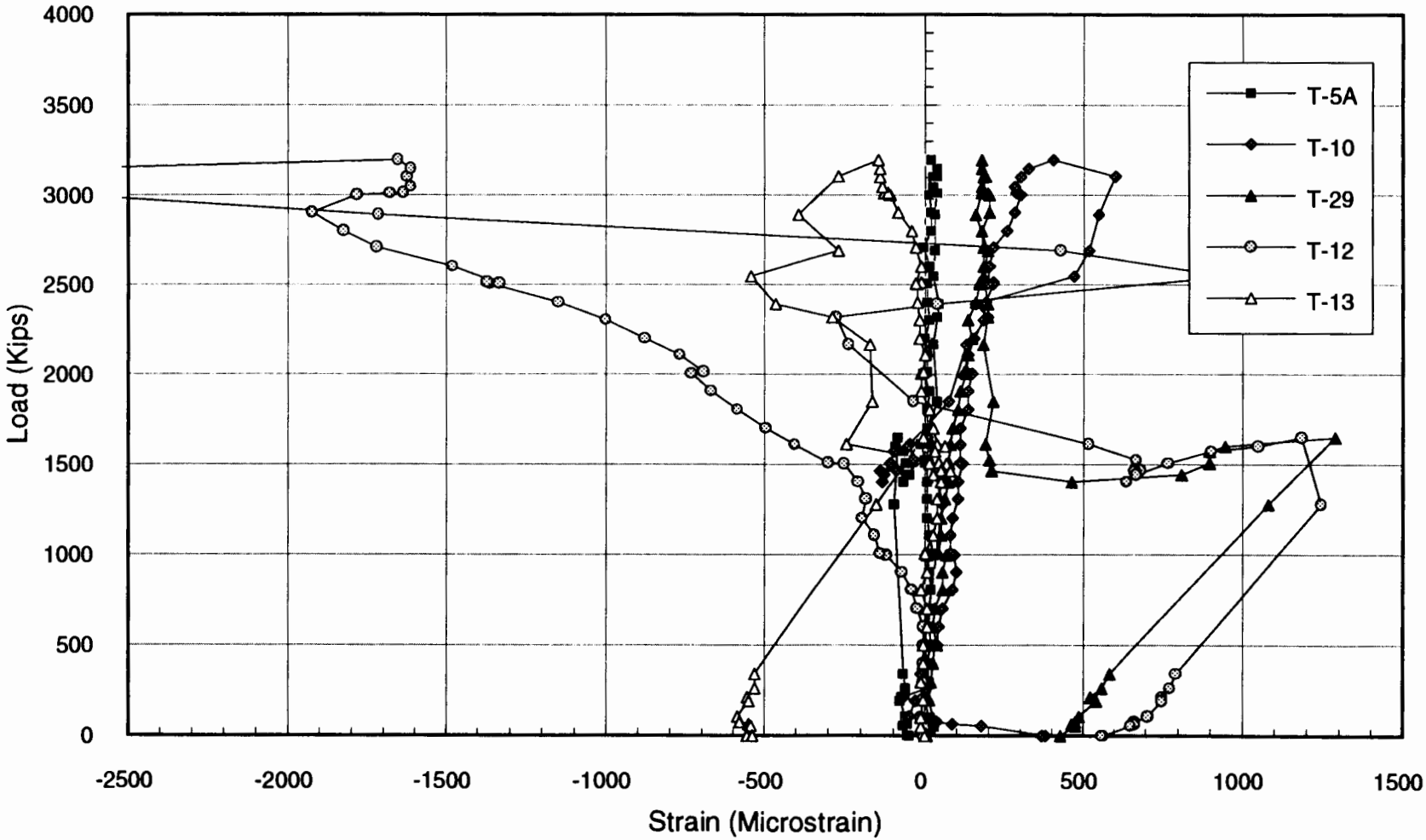


Fig. 25: Load vs. Strain for T-Headed Stirrups along Long. Line Side B, Spec. 2A-1

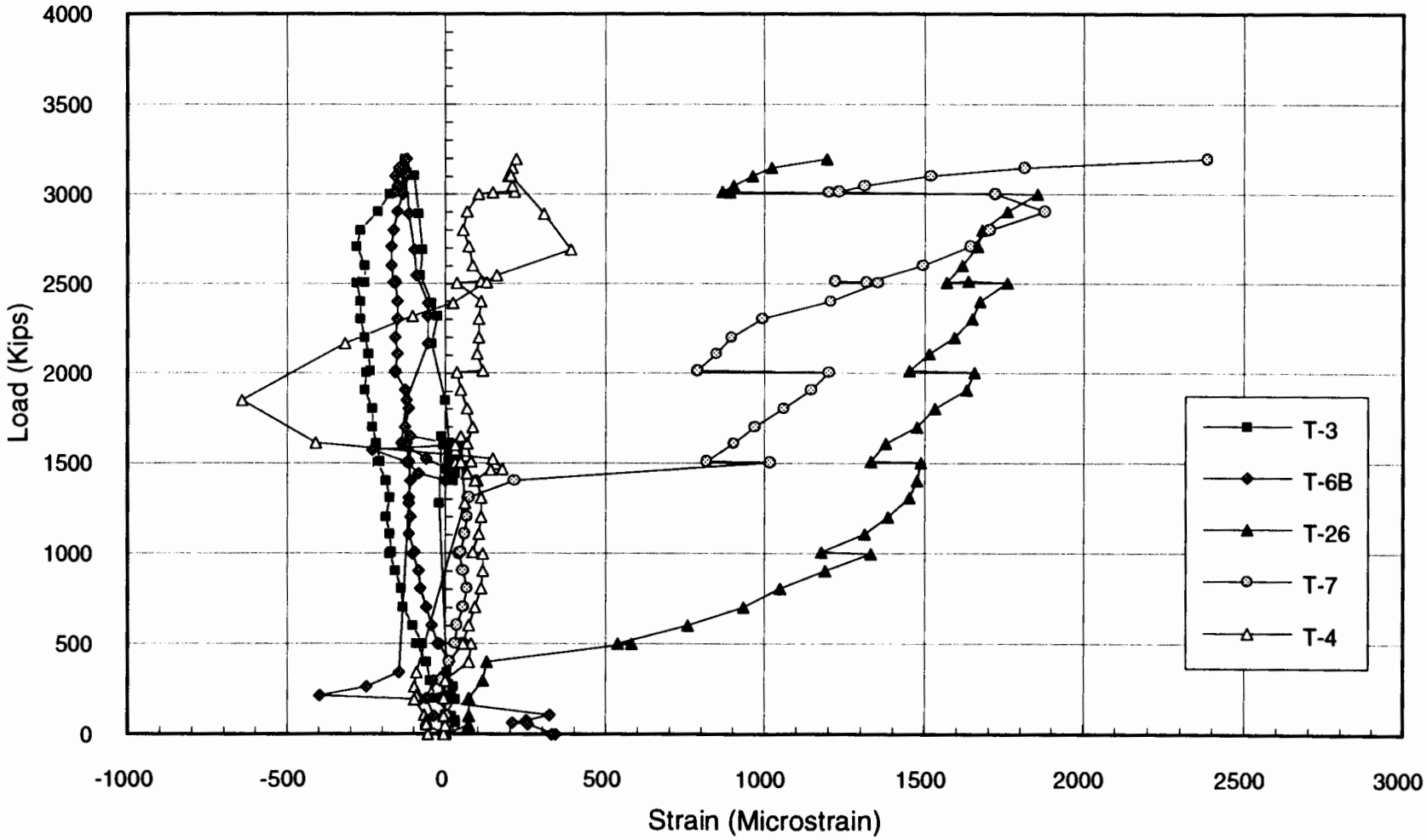


Fig. 26: Load vs. Strain along One Haunch Bar Side A for Spec. 2A-1

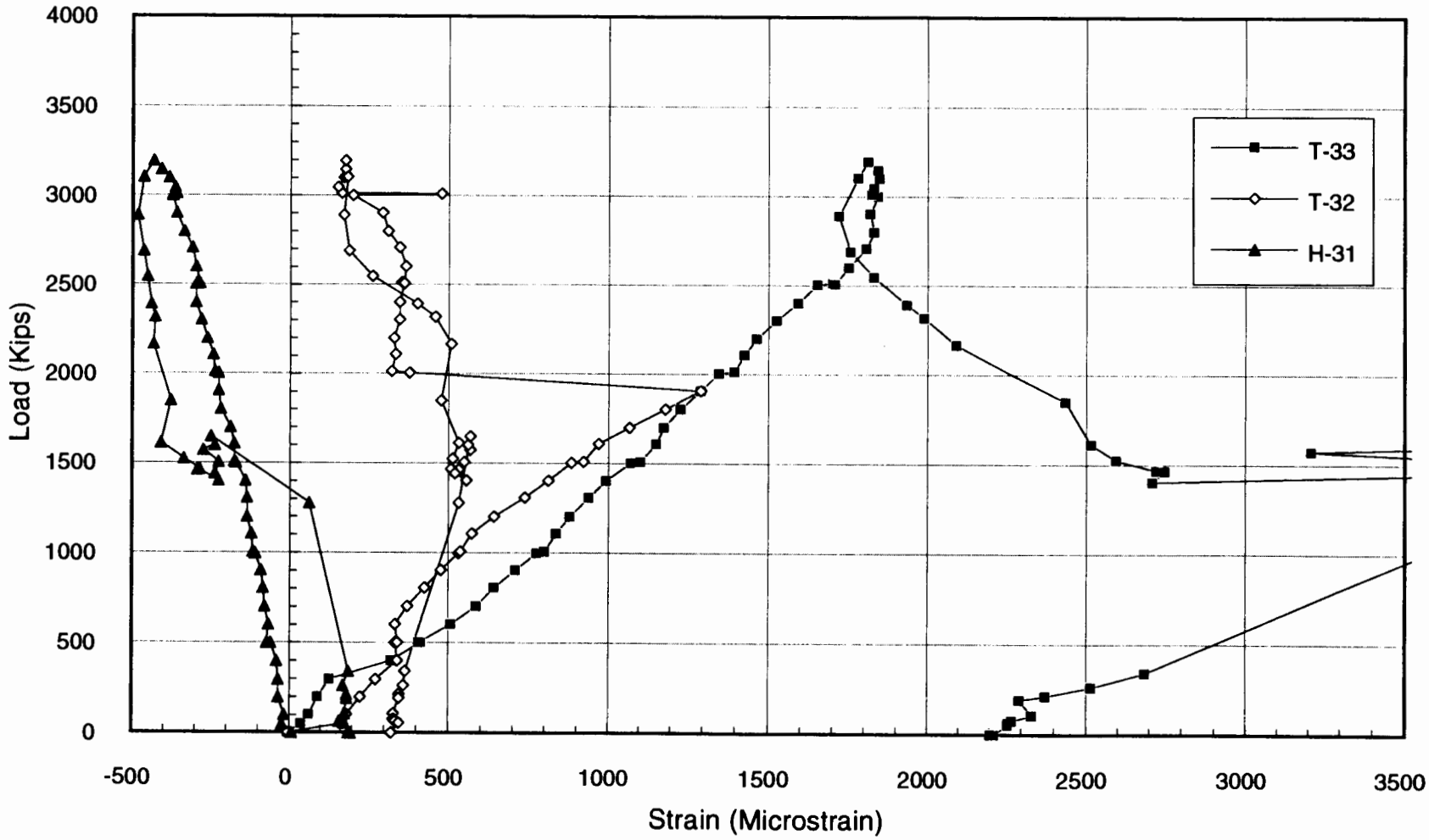


Fig. 27: Load vs. Strain along One Haunch Bar Side B for Spec. 2A-1

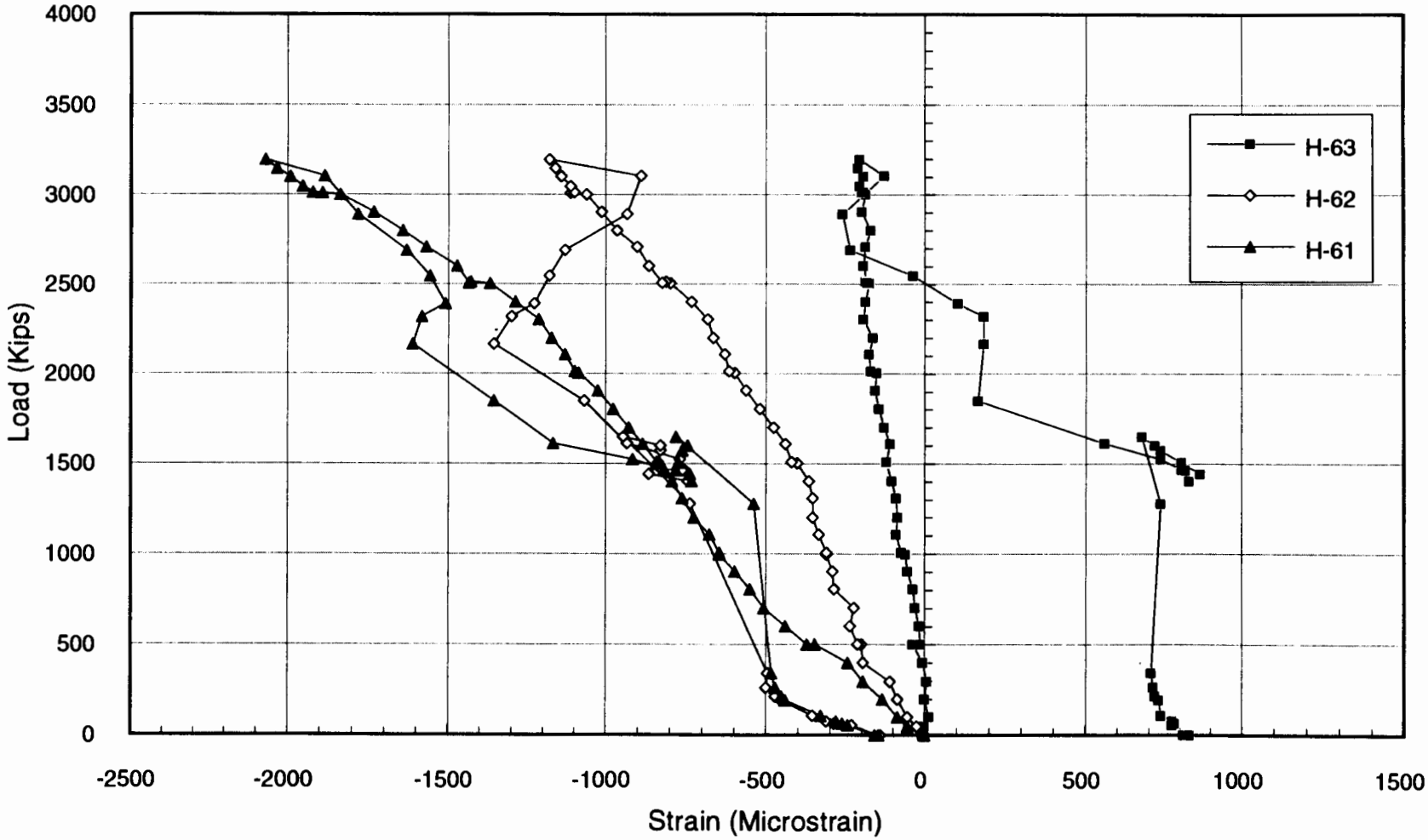


Fig. 28: Load vs. Strain along Exterior (top) Long. Bars Side A for Spec. 2A-2

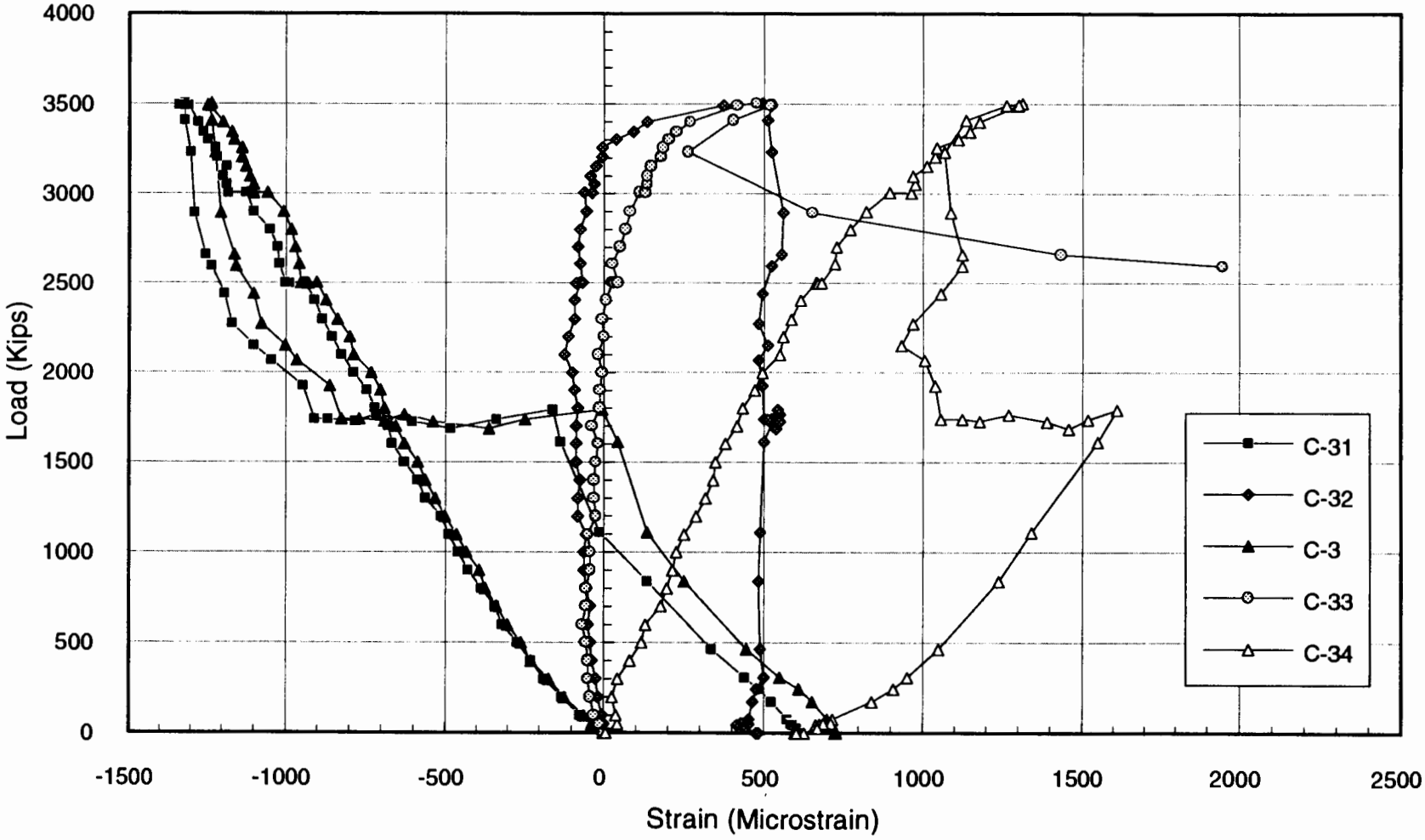


Fig. 29: Load vs. Strain along Exterior (top) Long. Bars Side B for Spec. 2A-2

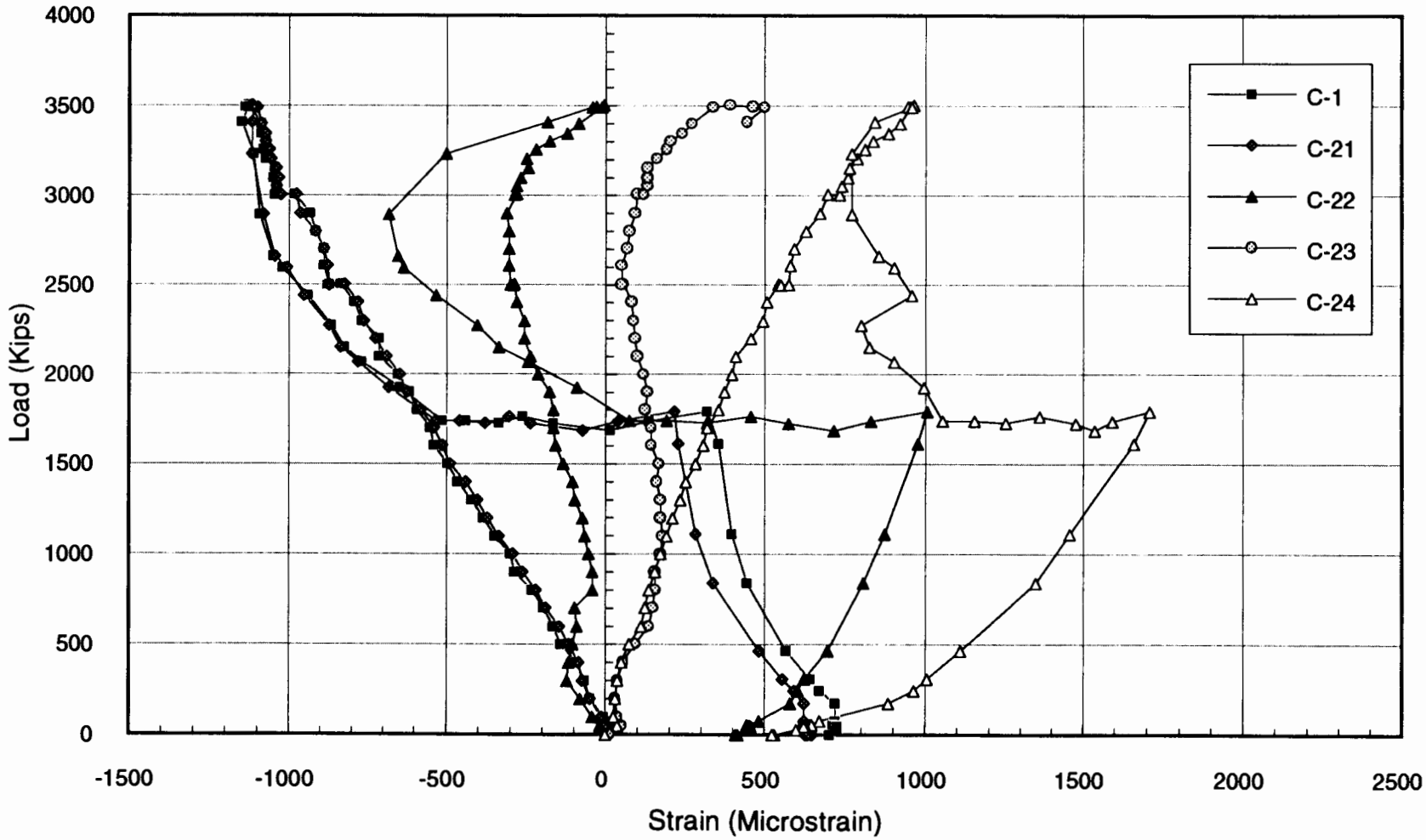


Fig. 30: Load vs. Strain along Interior (btm) Long. Bars Side A for Spec. 2A-2

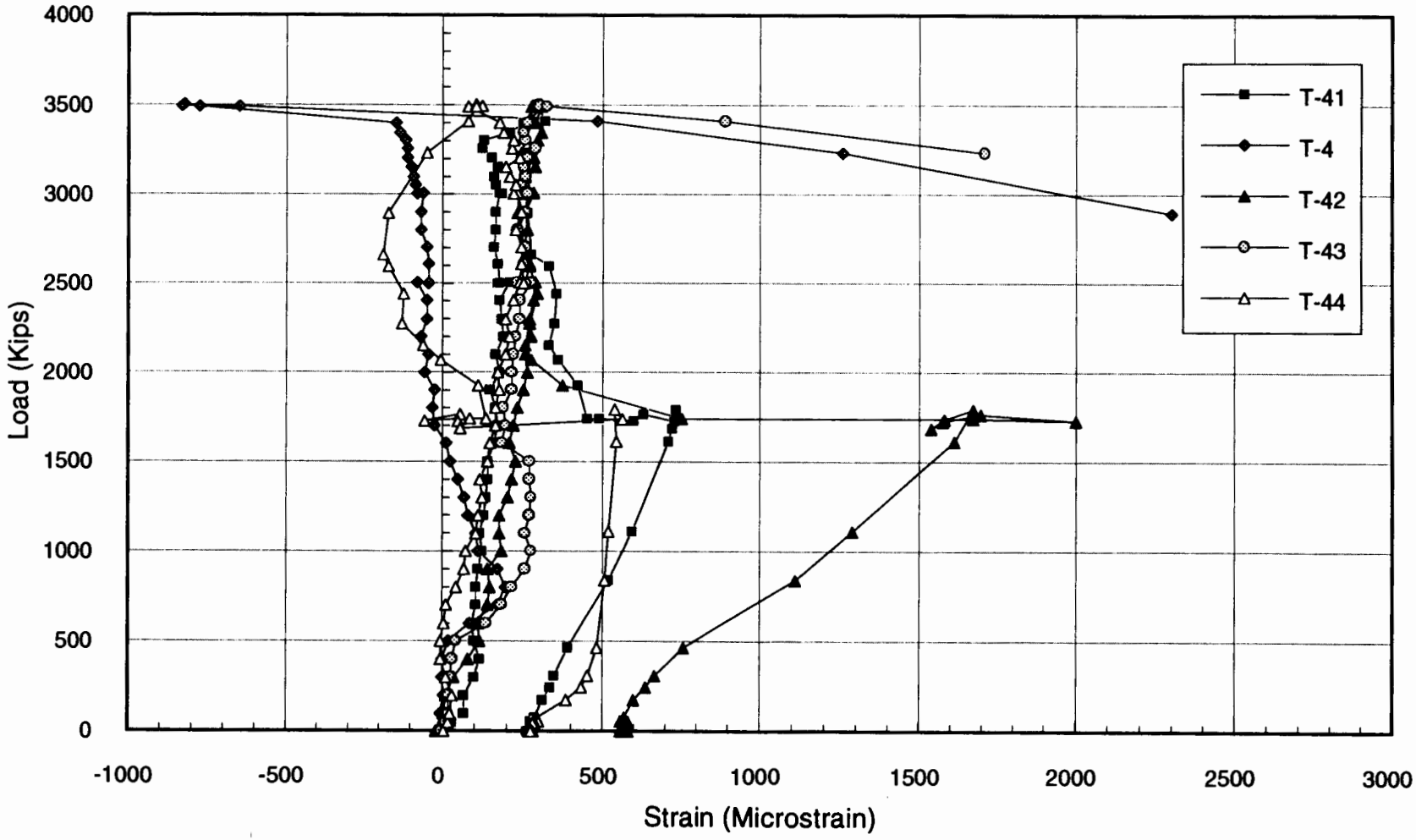


Fig. 31: Load vs. Strain along Interior (btm) Long. Bars Side B for Spec. 2A-2

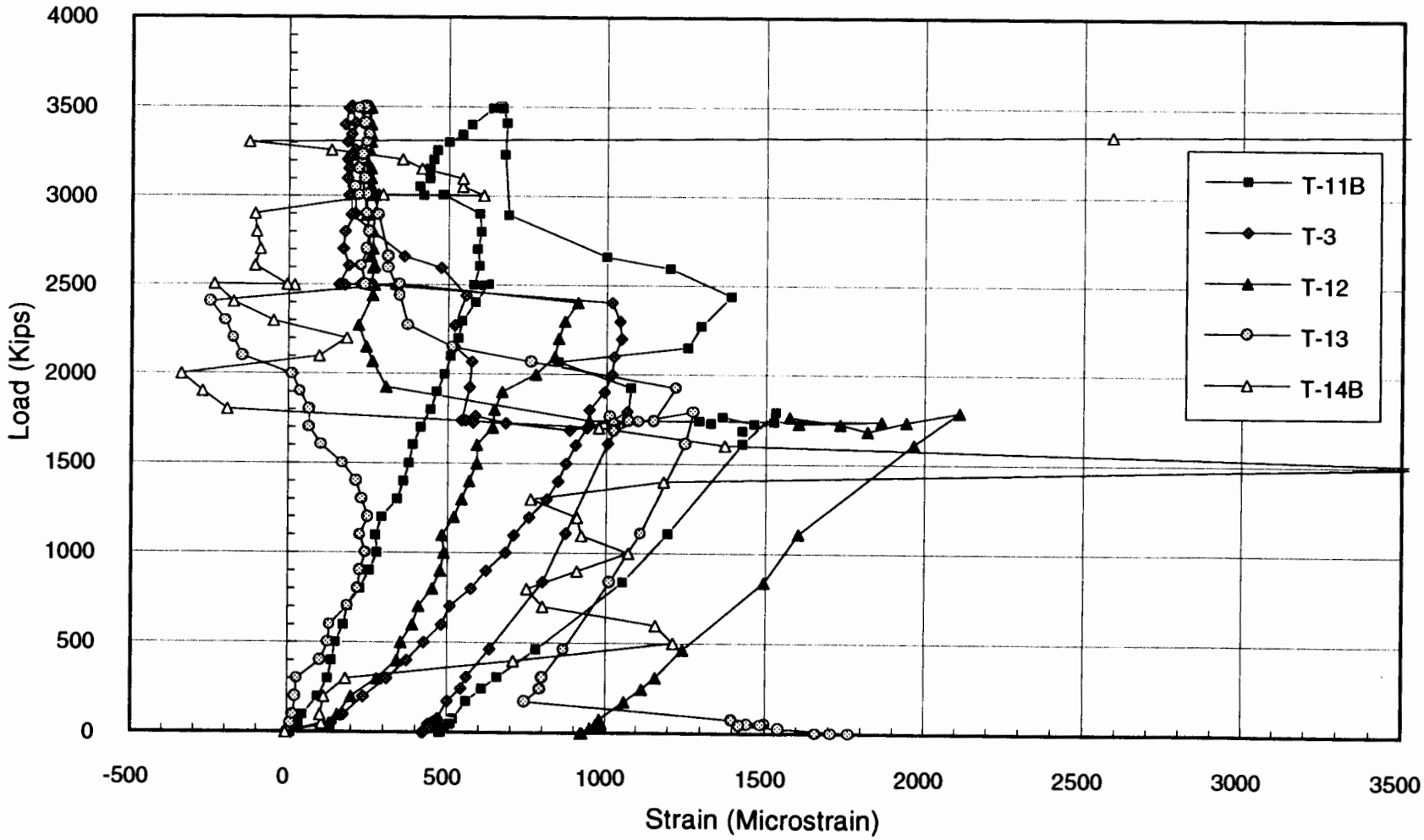


Fig. 32: Load vs. Strain for Two Exterior (top) Vertical (trans.) Bars for Spec. 2A-2

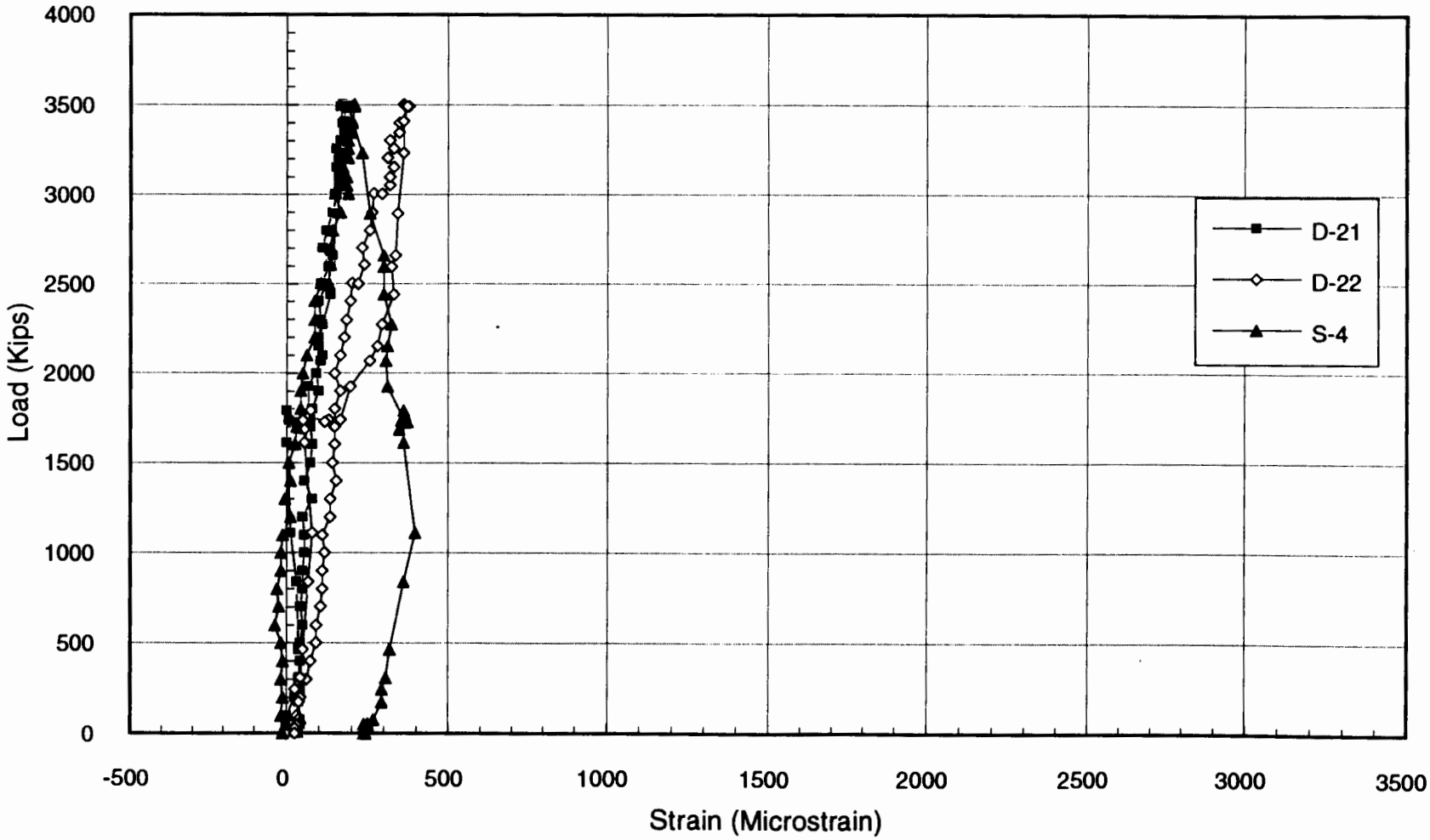


Fig. 33: Load vs. Strain for Two Interior (btm) Vertical (trans.) Bars for Spec. 2A-2

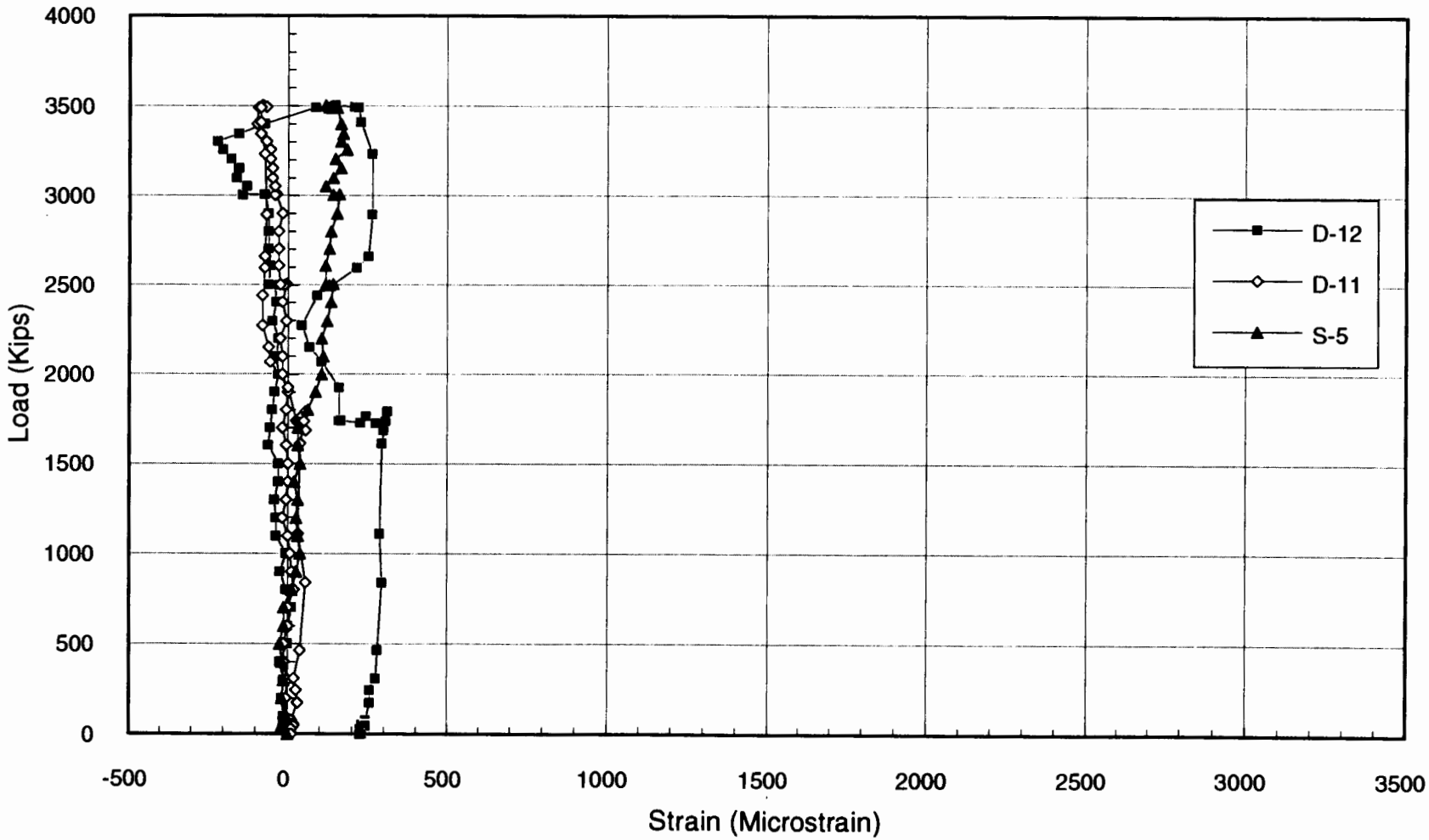


Fig. 34: Load vs. Strain for T-Headed Stirrups along Long. Line Side A, Spec. 2A-2

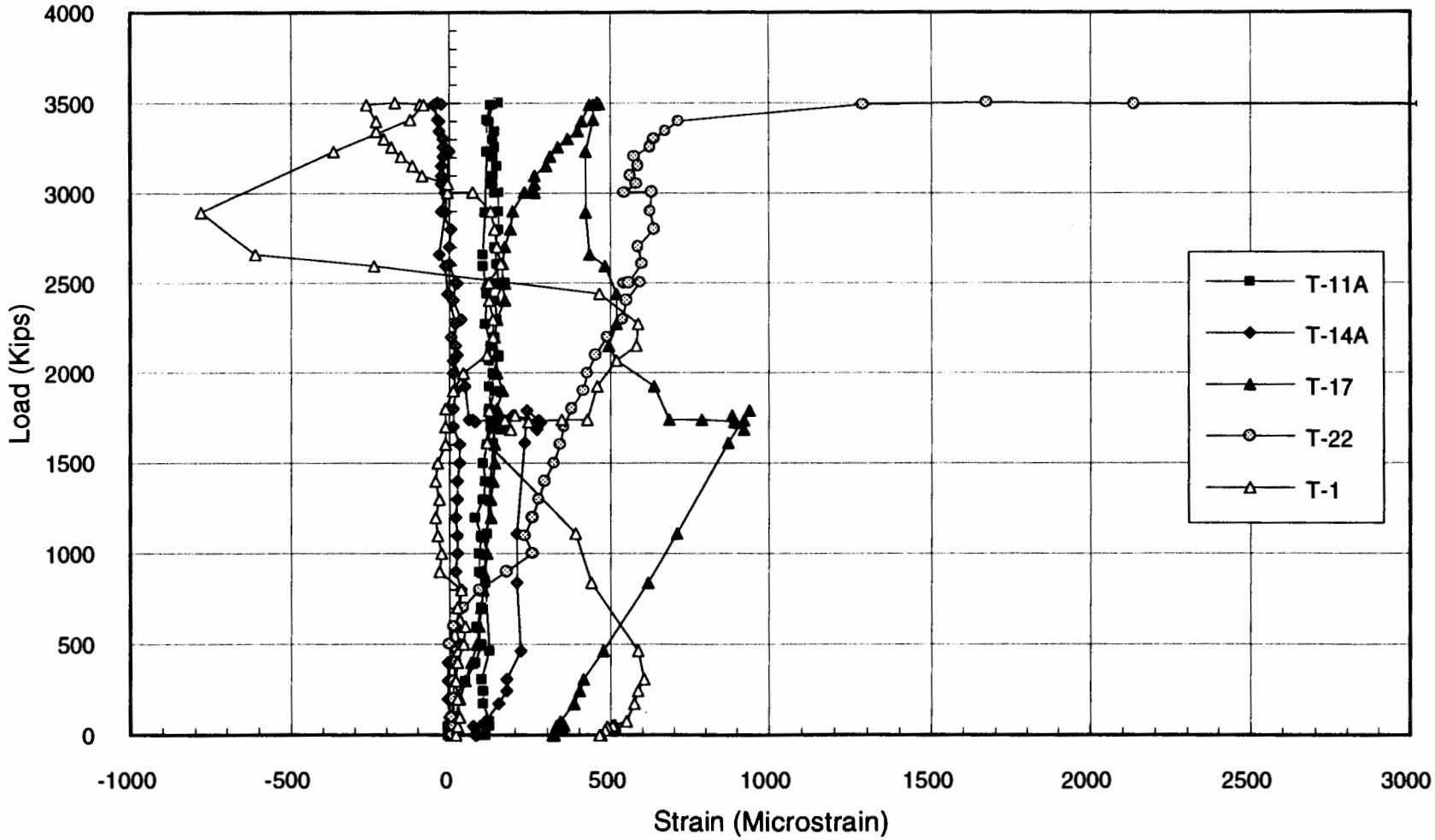


Fig. 35: Load vs. Strain for T-Headed Stirrups along Long. Line Side B, Spec. 2A-2

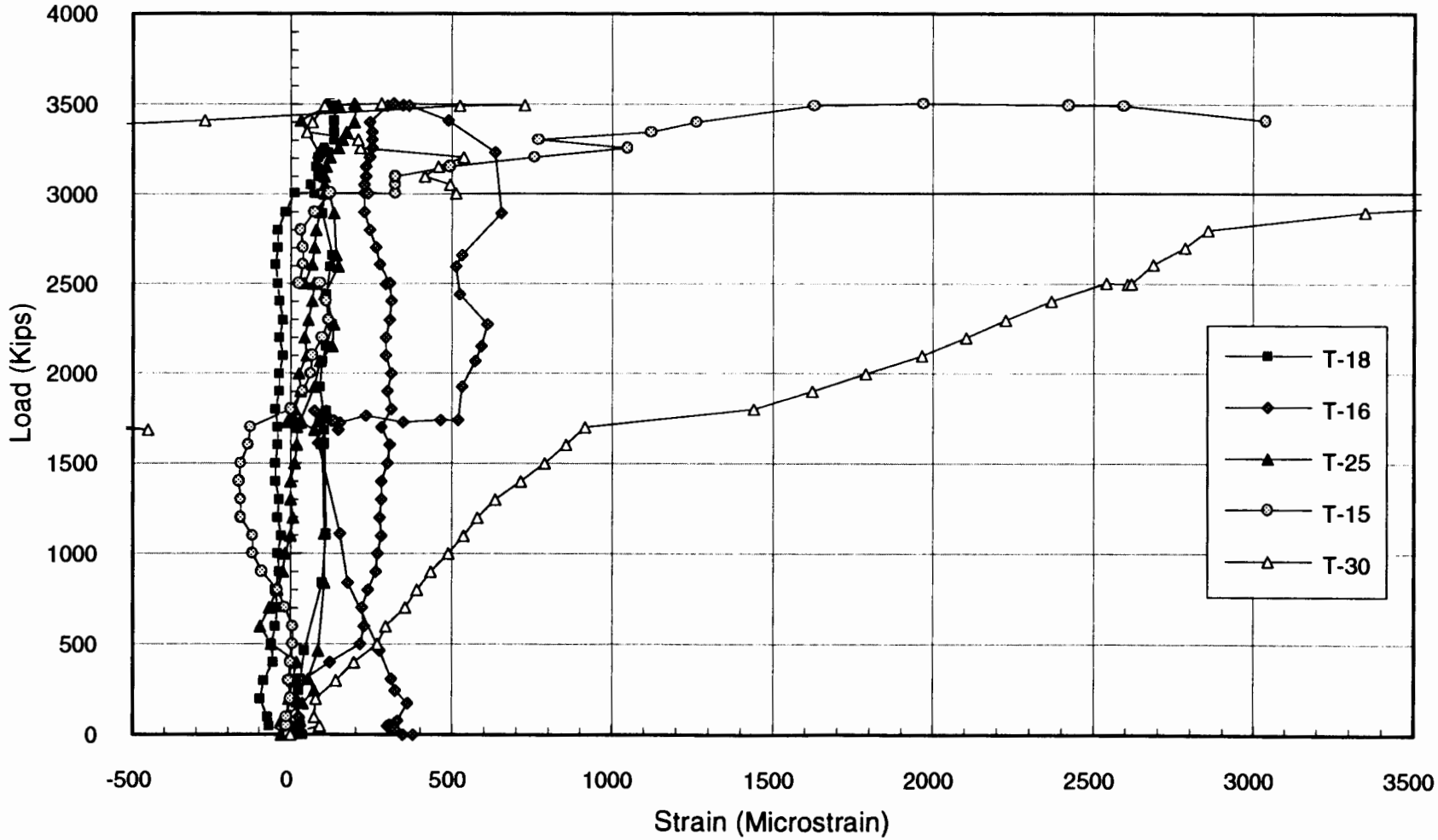


Fig. 36: Load vs. Strain along One Haunch Bar Side A for Spec. 2A-2

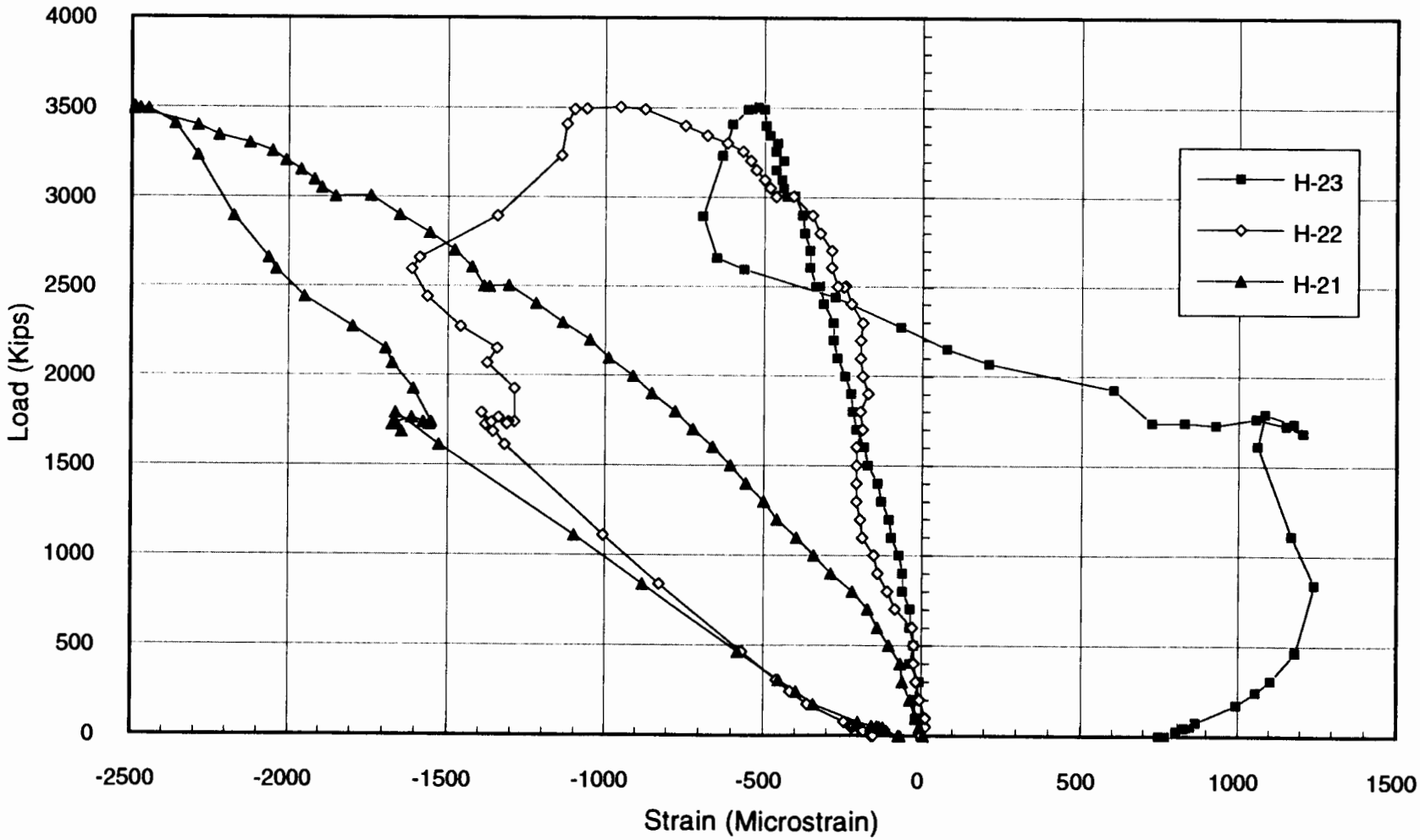


Fig. 37: Load vs. Strain along One Haunch Bar Side B for Spec. 2A-2

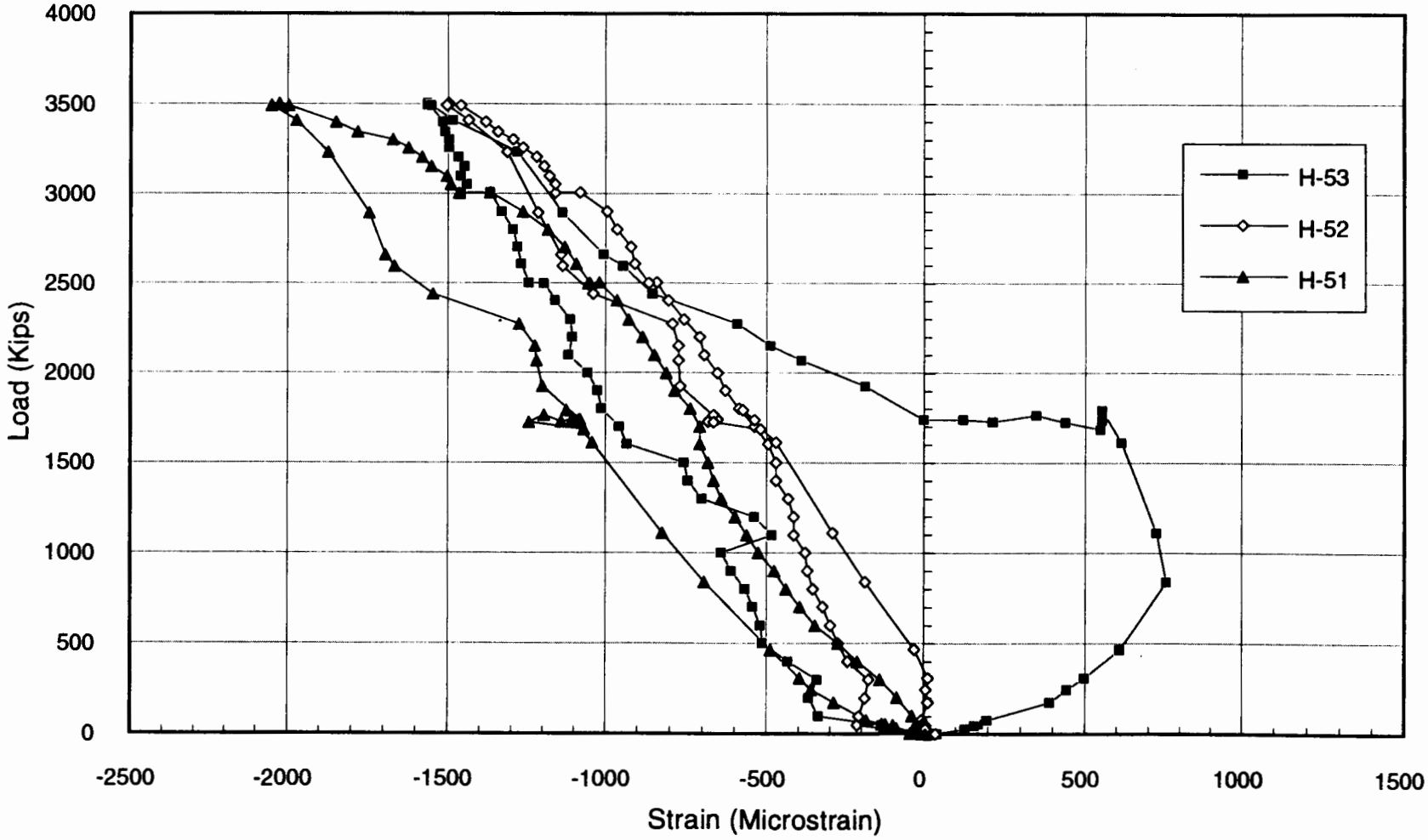


Fig. 38: Load vs. Strain along Exterior (top) Long. Bars Side A for Spec. 2A-3

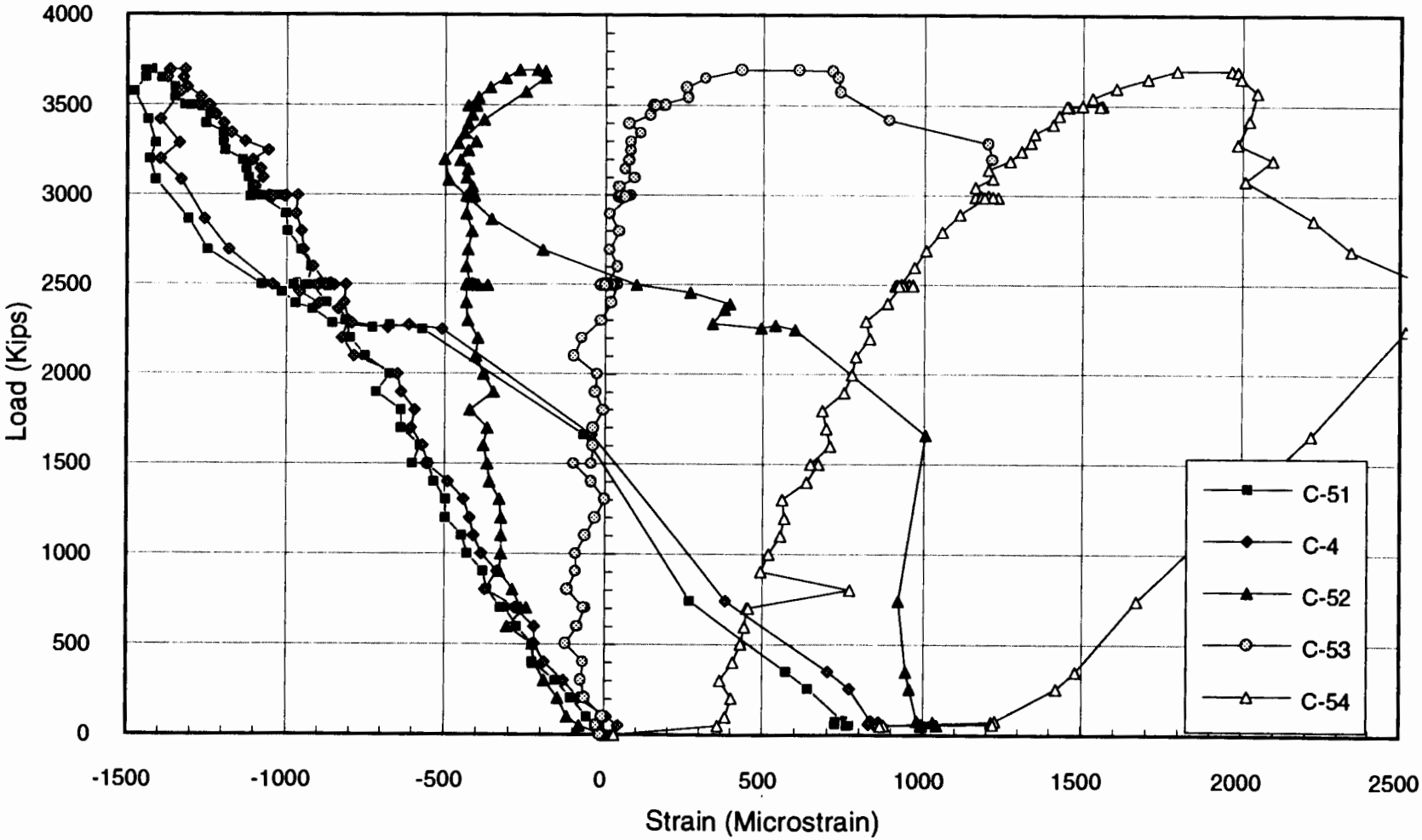


Fig. 39: Load vs. Strain along Exterior (top) Long. Bars Side B for Spec. 2A-3

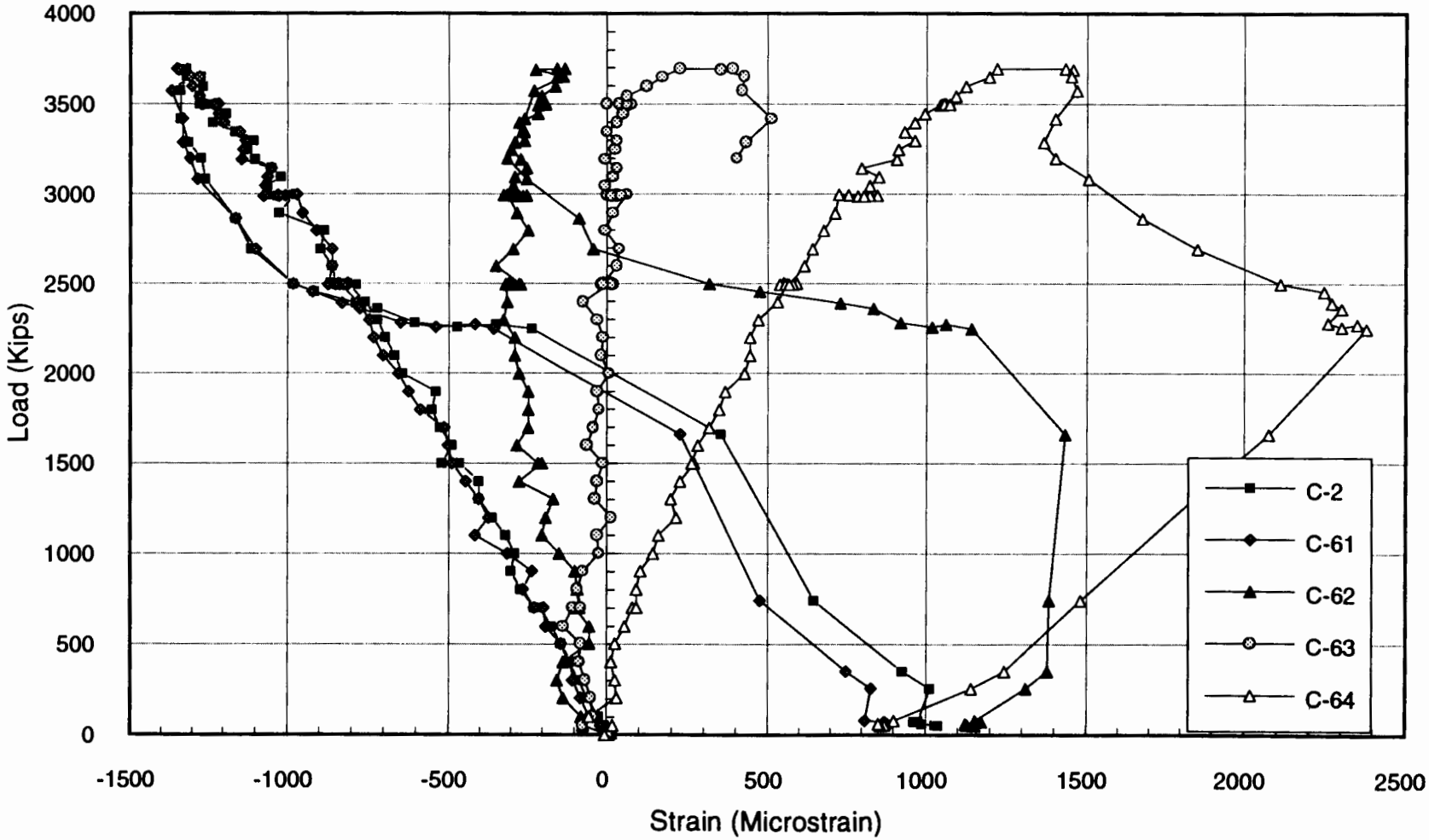


Fig. 40: Load vs. Strain along Interior (btm) Long. Bars Side A for Spec. 2A-3

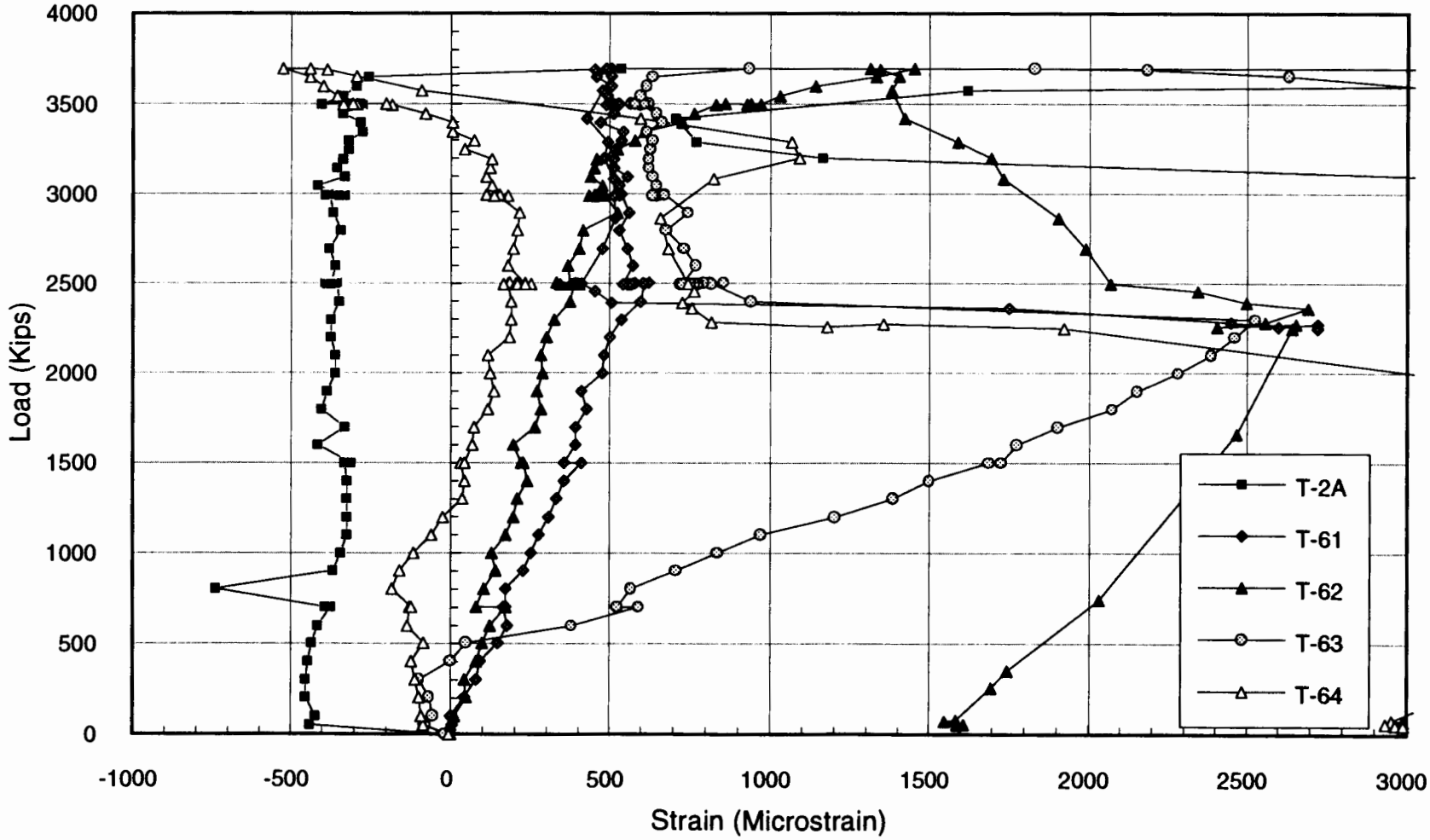


Fig. 41: Load vs. Strain along Interior (btm) Long. Bars Side B for Spec. 2A-3

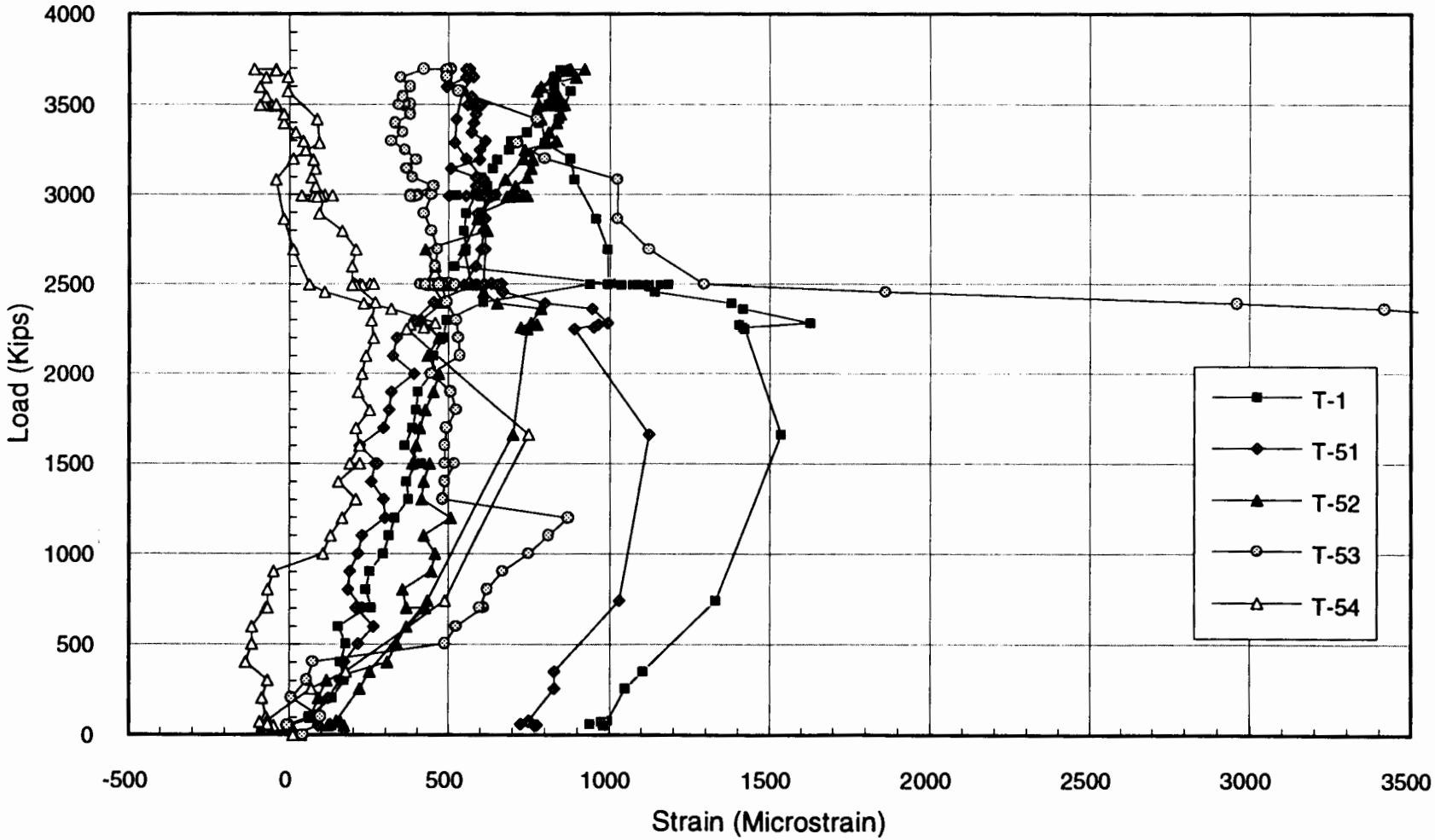


Fig. 42: Load vs. Strain for Two Exterior (top) Vertical (trans.) Bars for Spec. 2A-3

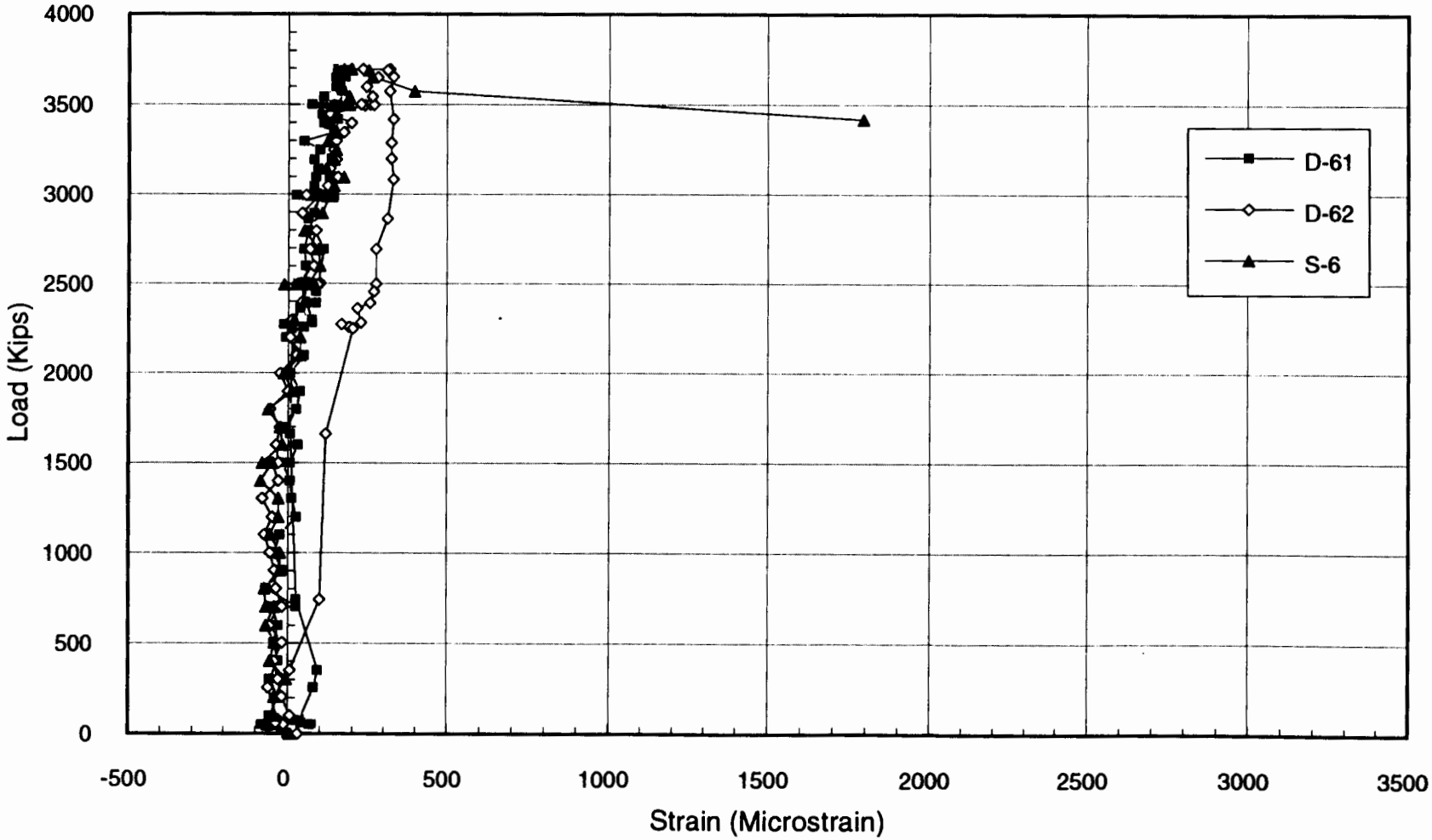


Fig. 43: Load vs. Strain for Two Interior (btm) Vertical (trans.) Bars for Spec. 2A-3

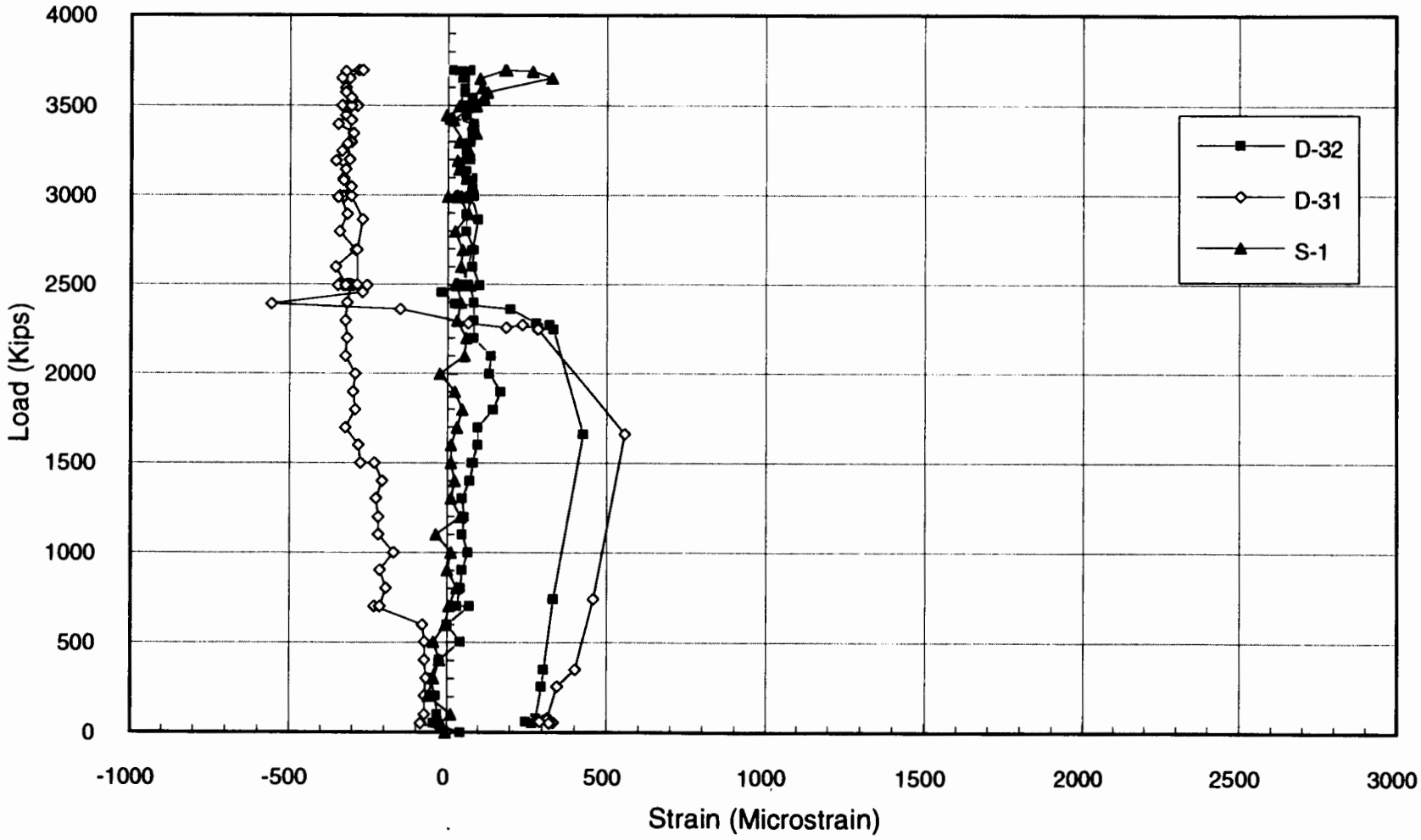


Fig. 44: Load vs. Strain for T-Headed Stirrups along Long. Line Side A, Spec. 2A-3

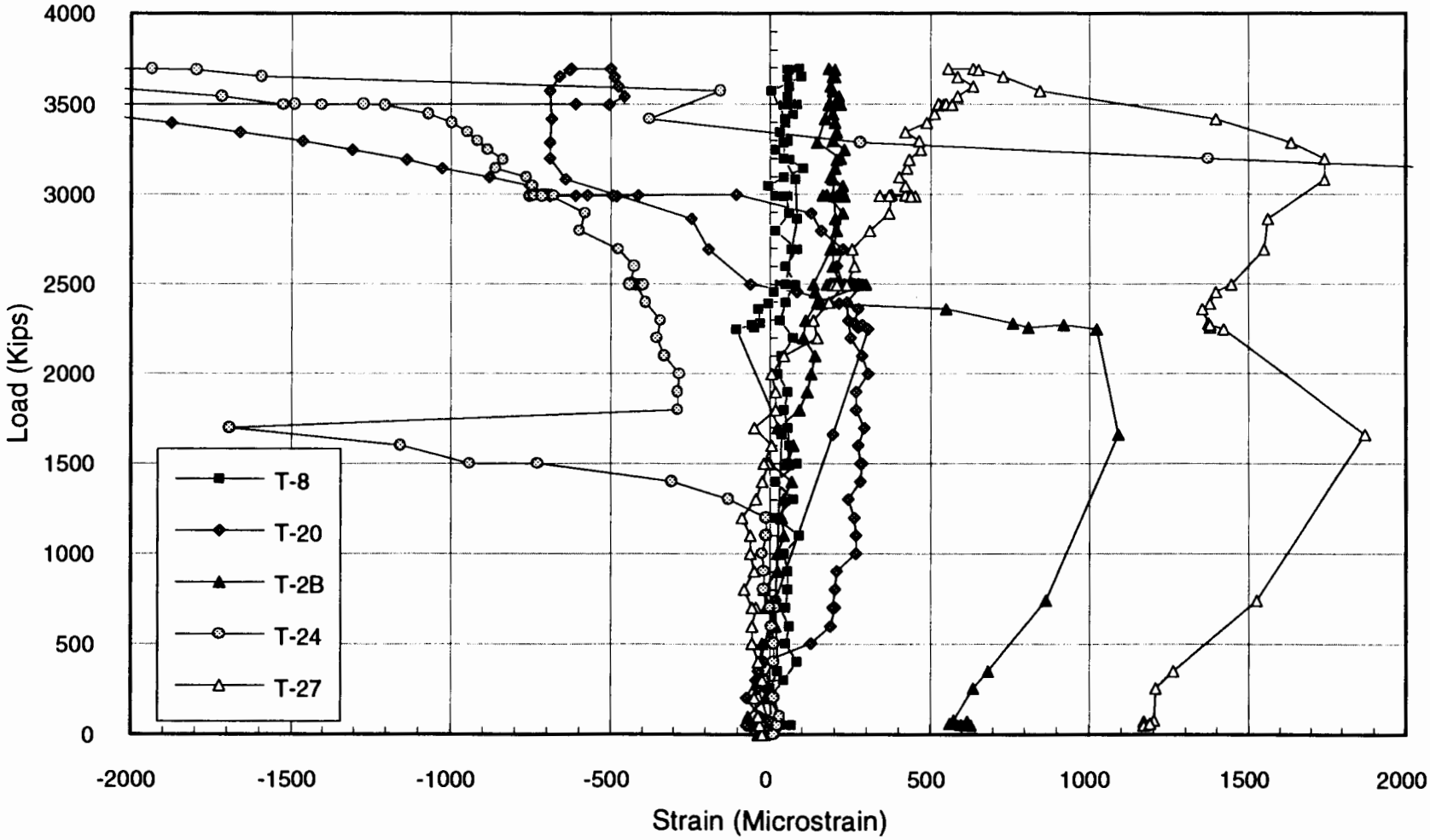


Fig. 45: Load vs. Strain for T-Headed Stirrups along Long. Line Side B, Spec. 2A-3

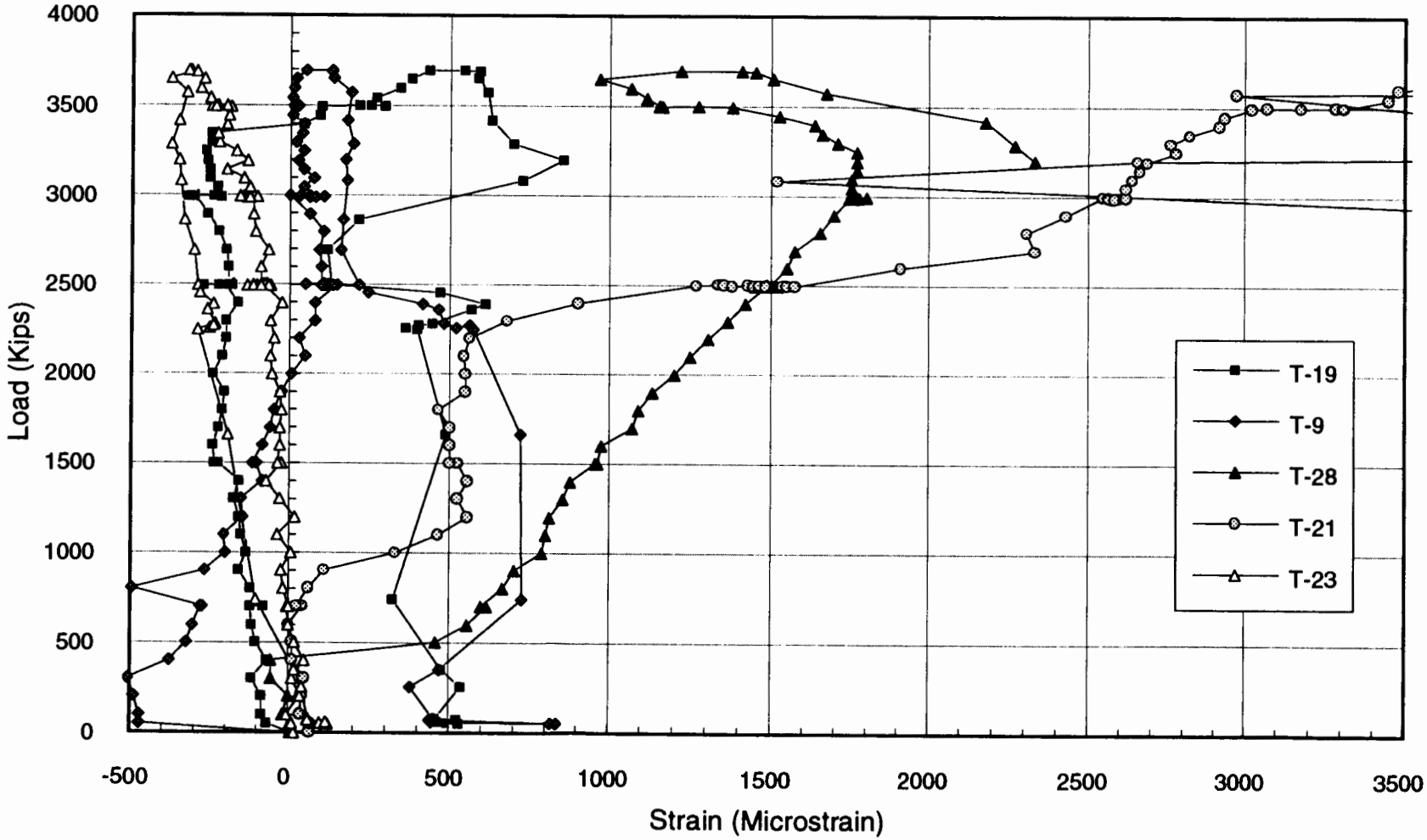


Fig. 46: Load vs. Strain along One Haunch Bar Side A for Spec. 2A-3

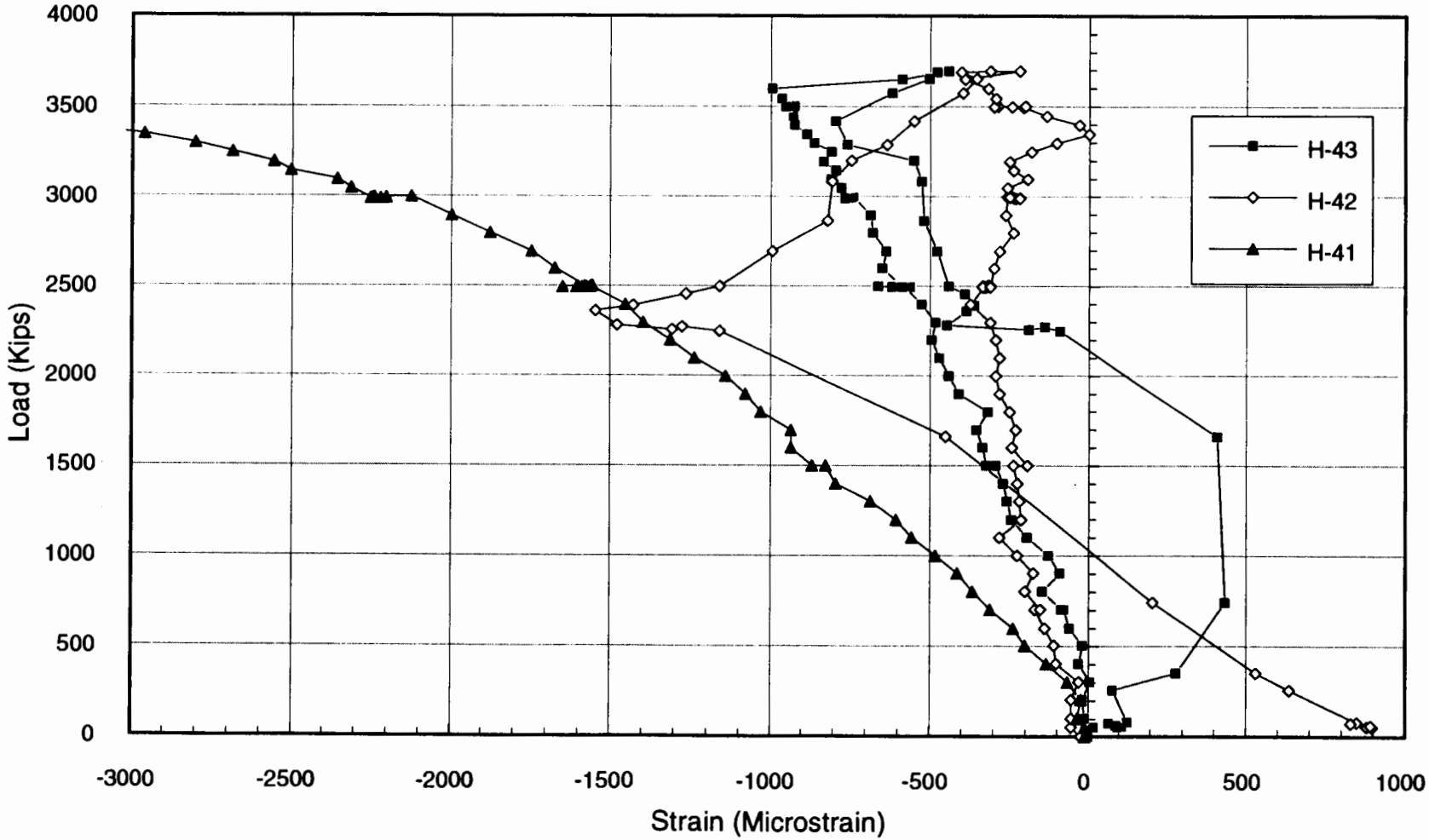


Fig. 46: Load vs. Strain along One Haunch Bar Side A for Spec. 2A-3 (Cont'd)

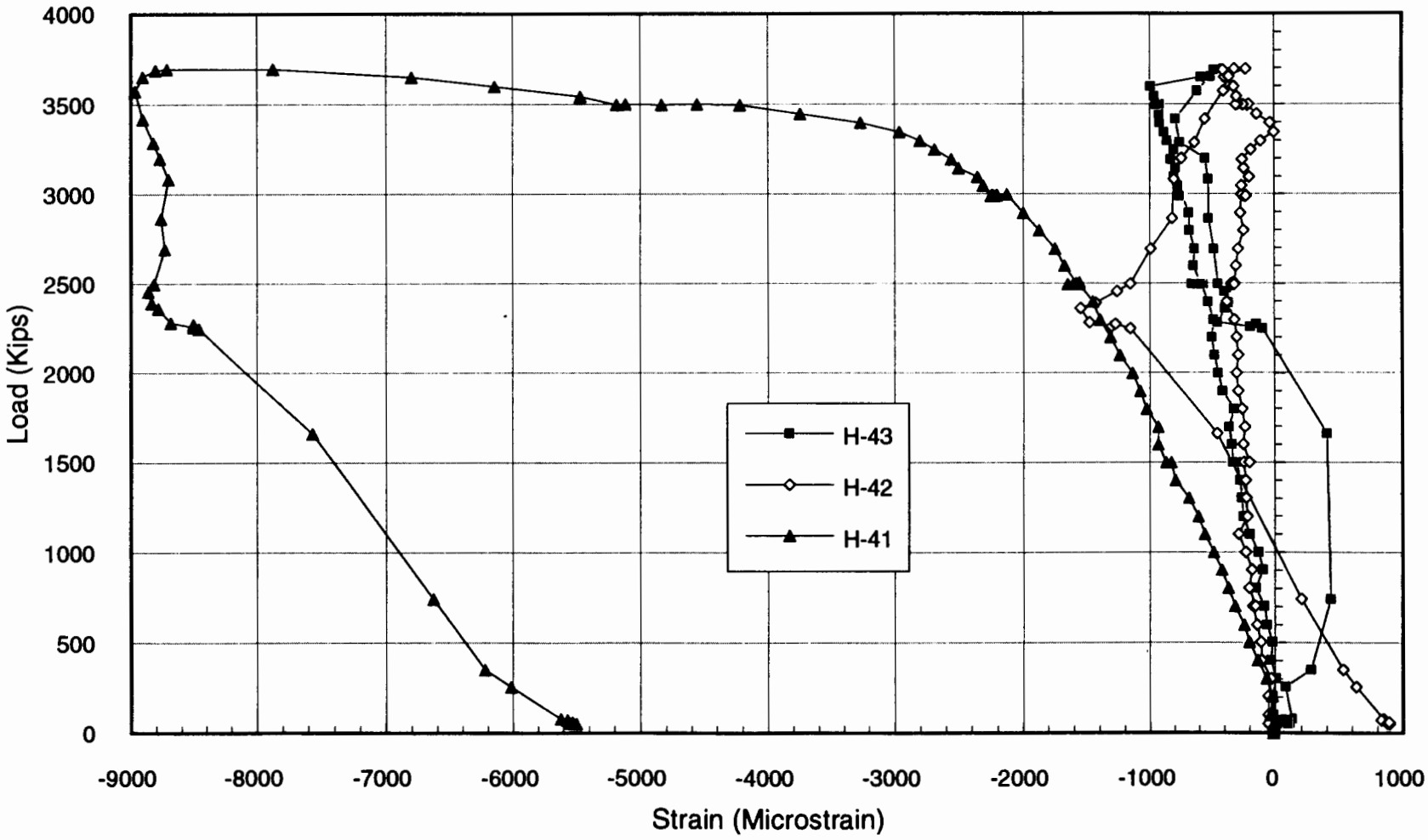


Fig. 47: Load vs. Strain along One Haunch Bar Side B for Spec. 2A-3

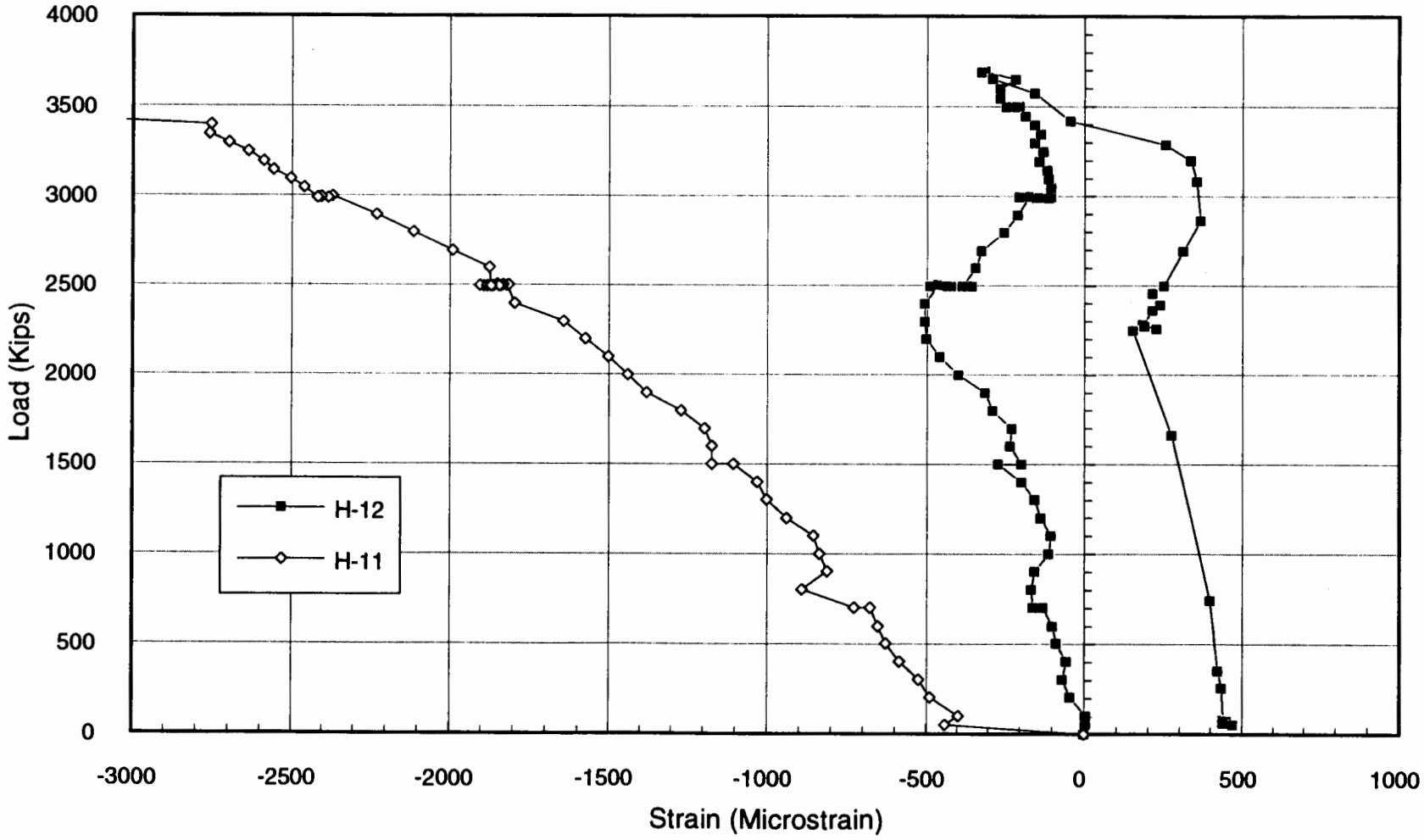


Fig. 47: Load vs. Strain along One Haunch Bar Side B for Spec. 2A-3 (Cont'd)

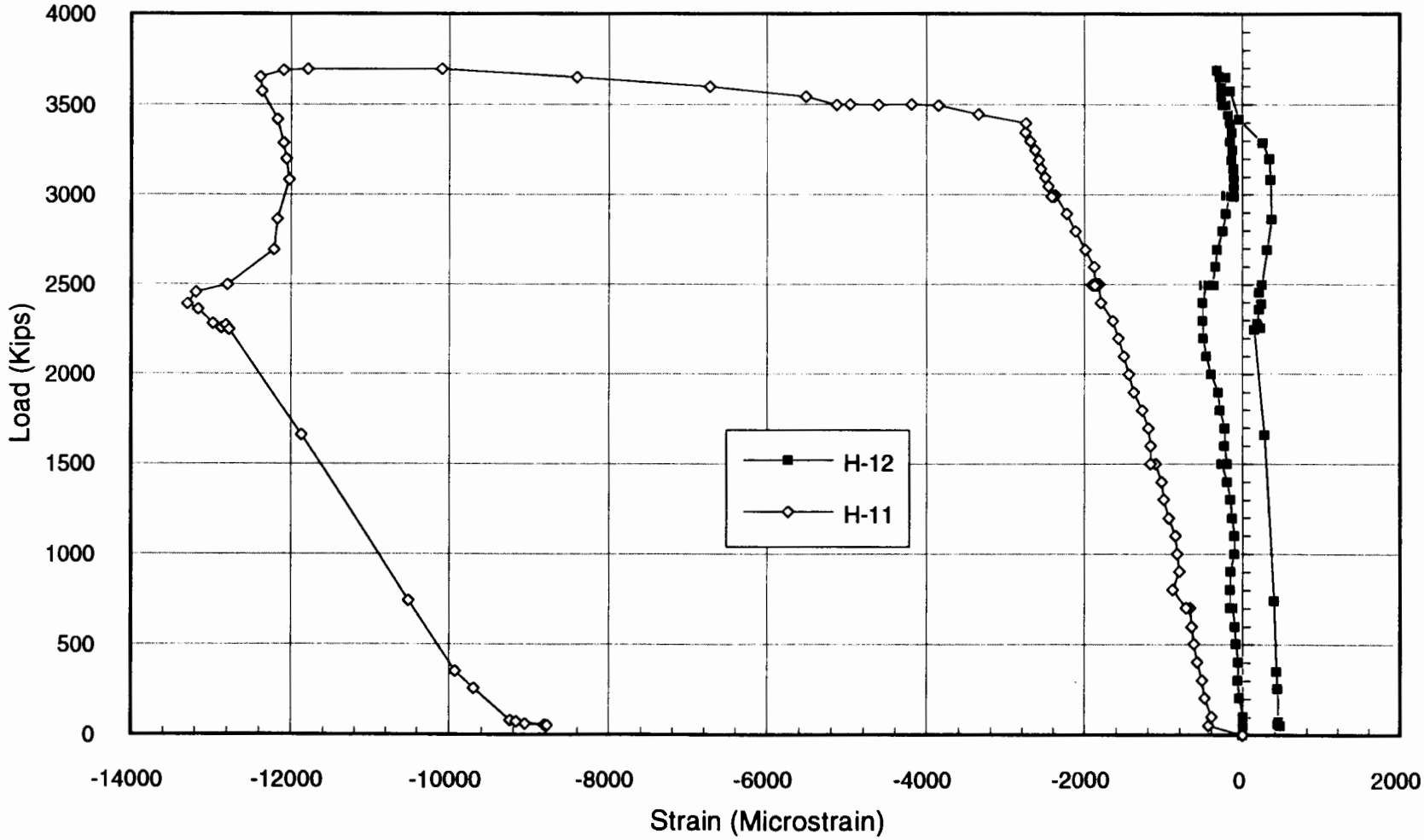


Fig. 48: Load vs. Strain on Top Haunch Tail End for Spec. 2A-3