RIGID FRAME STUDIES

Progress Report

FULL SCALE FRAME TESTS

STR4 50 12/25 14/25

Submitted to

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Oklahoma City, Oklahoma

by

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INTRODUCTION

A series of tests was conducted in the Fears Structural Engineering Laboratory, School of Civil Engineering and Environmental Science, University of Oklahoma, using standard rigid frames produced and erected by Star Manufacturing Company, Oklahoma City, Oklahoma. The purpose of these tests was to determine the structural strength and stiffness of rigid frames designated by Star Manufacturing Company as STR4 50 12/25 14/25. The frames, referred to herein as STR4 50, are normally used in pre-engineered buildings with the following design parameters:

Clear Span	50 ft.
Design Live Load	12 psf
Design Wind Load	25 psf
Eave Height	14 ft.
Frame Spacing	25 ft.
Roof Slope	½:12

The STR series consists of clear span rigid frames with non-prismatic columns and rafters of shop-welded steel plate. A roof slope of ½:12 is used for frames of this series.

The test specimens were fabricated as part of standard production runs. The test set-up and testing procedures were developed using details and descriptions found in the

literature. The test set-up consisted of two frames spaced 24 ft. 0 in. apart, with connecting simple span purlin and girts, standard flange brace angles, and rod braces as shown in Figure 1. Simulated live load was applied using gravity load simulators similar to those described in Reference 1. Lateral loads were applied using A-frames and hydraulic cylinders. The A-frames were located outside the frames at one end and are not shown in Figure 1. Tests conducted included: unbalanced live load, lateral load only, combined unbalanced live and lateral load, and full live load.

The purpose of the testing was twofold: 1) to verify existing design procedures used by Star Manufacturing Company to predict deflections and strength, and 2) to verify a proposed method for determining the lateral torsional buckling load of an unbraced span. This report provides a detailed description of the testing procedures, instrumentation, and results. Comparisons are made with the standard Star Manufacturing Company design procedures and preliminary comparisons are made to the proposed method.

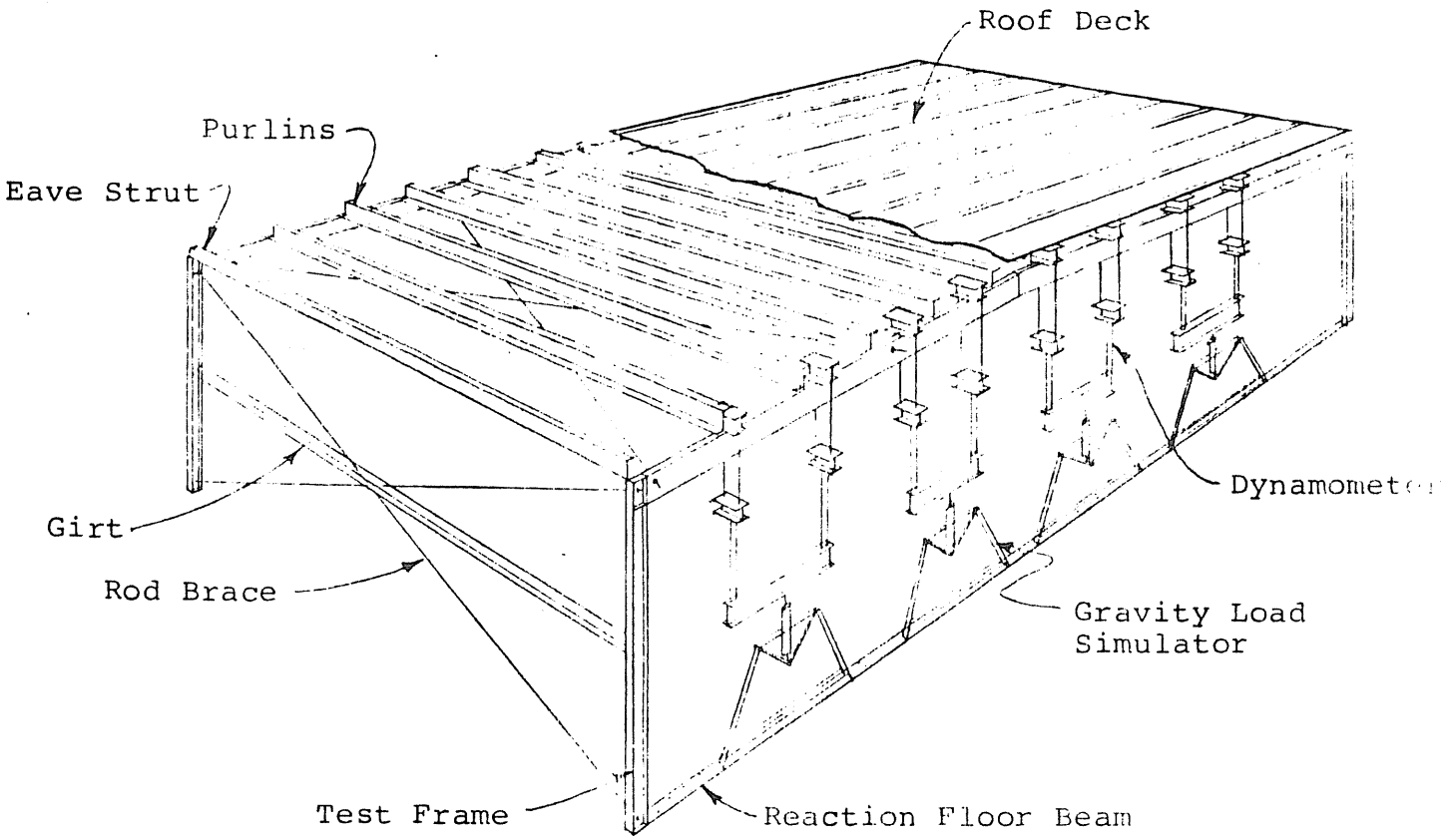


Figure 1. Overall View of Test Set-up

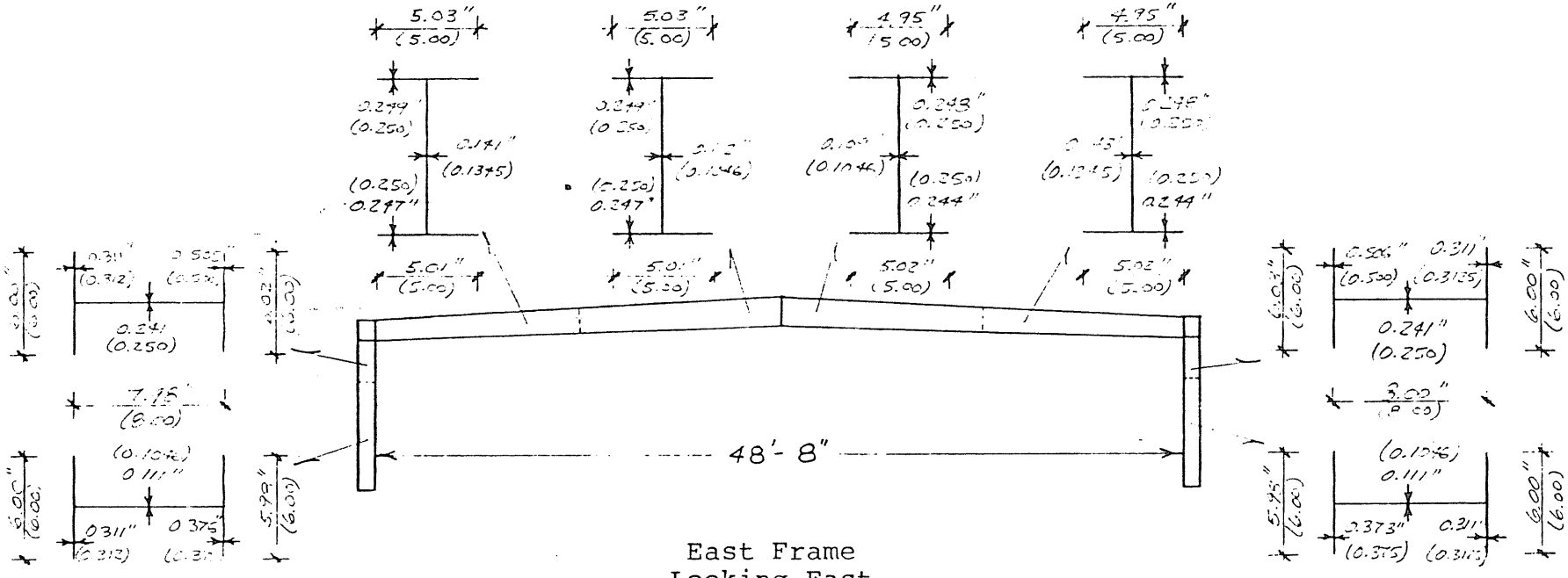
TEST DETAILS

Description of Specimens

Details and dimensions of the test specimens are shown in Figure 2 and points of load application are shown in Figure 3. The specimens were fabricated from A572 Gr 50 Steel. The only modification made to the specimens compared to standard production frames was the addition of holes in the top flanges of the rafters to permit installation of loading devices.

Test Set-up

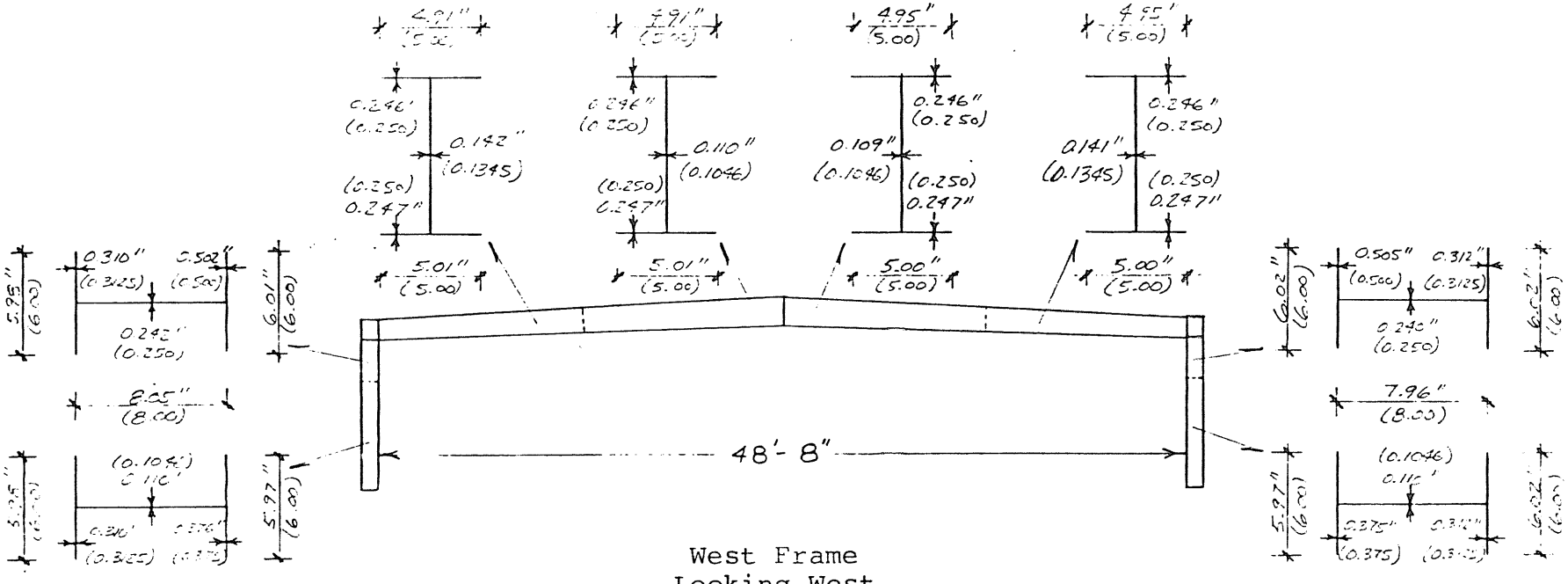
The frames were erected inside the Fears Structural Engineering Laboratory on the laboratory reaction floor. The floor is a concrete slab 30 ft. by 60 ft. by 3 ft. 6 in. deep with four W36x150 steel beams embedded in concrete. The slab weighs one million pounds and is capable of reacting 320,000 lb. in any one location. The frames were erected directly over two of the embedded W36 beams, spaced 24 ft. 0 in. apart. Purlins and girts at standard bracing spacings were connected between the frames along with standard rod bracing in both the roof and side walls. Compression flange braces at the standard locations were connected between the purlins and the bottom flanges of the rafters. These braces were later moved to nonstandard locations for additional tests to evaluate a proposed analytical method for predicting



Frame 8
STR4 50 12/25 14/25

0.373" : Measured Dimension
(0.375) : Nominal Dimension

Figure 2a. Details and Dimensions of Test Specimens, East Frame



Frame 7
STR4 50 12/25 14/25

5.97" : Measured Dimension
(6.00) : Nominal Dimension

Figure 2b. Details and Dimensions of Test Specimens, West Frame

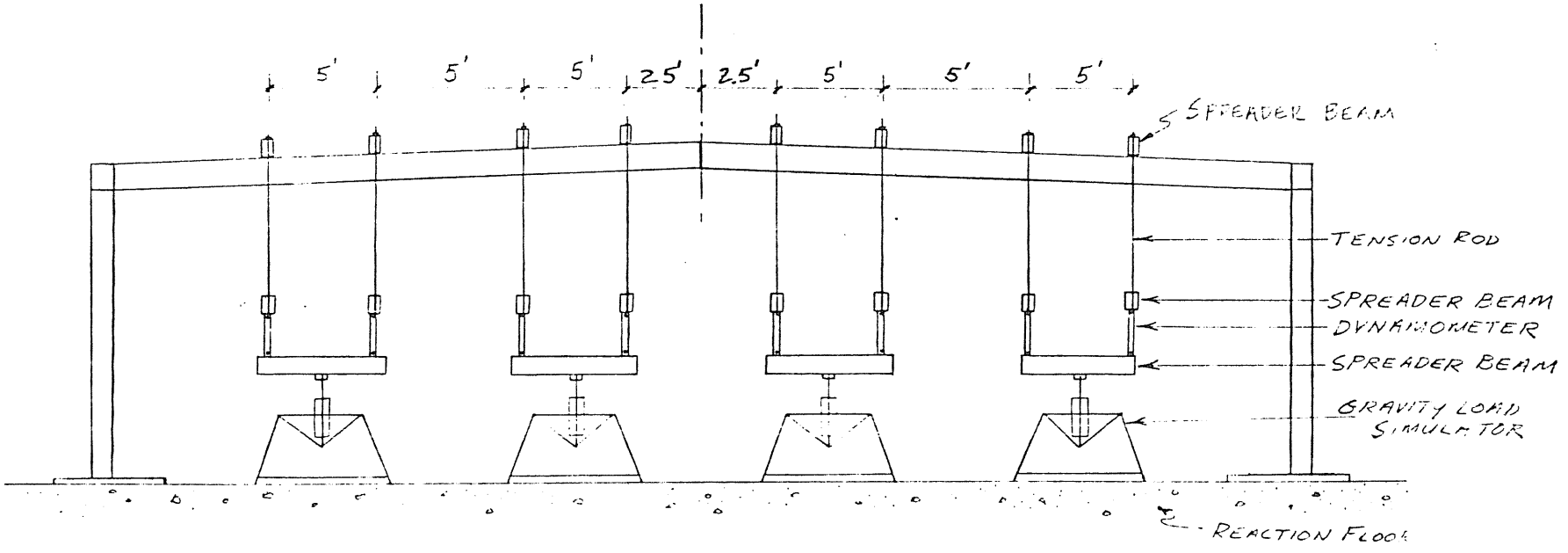


Figure 3. Simulated Live Load Loading

lateral buckling strength of rafters. The entire roof area was sheeted using standard roof deck and fasteners.

The column base plates were bolted to channel sections which in turn were bolted to the reaction floor beams as shown in Figure 4. Six, 7/8 in. diameter, A325 bolts were used at the rafter to column connection, six, 7/8 in. diameter, A325 bolts were used at the peak splice connection, and 1/2 in. diameter by 1 1/4 in. hex screws were used to connect all cold-formed parts to the frames. The erection procedure was as near as possible to standard practice and no specific procedure was used to tighten the bolts in the end plate connections.

Load Applications

Simulated live load was applied using the loading apparatus shown in Figure 3. The loading apparatus consists of a gravity load simulator (Figure 5), a 35 kip tension-compression hydraulic cylinder, spreader beam, two calibrated dynamometers, and spreader beams and tension rods attached to the frame. The simulator is a device which permits horizontal movement of the point of load application while maintaining a vertical line of action of the applied load. For the simulator used in these tests, the point of application of the load can move left or right a maximum of 10 in. and the hydraulic ram will remain vertical.

Lateral load was applied using an A-frame constructed adjacent to the frame with hydraulic cylinders and calibrated

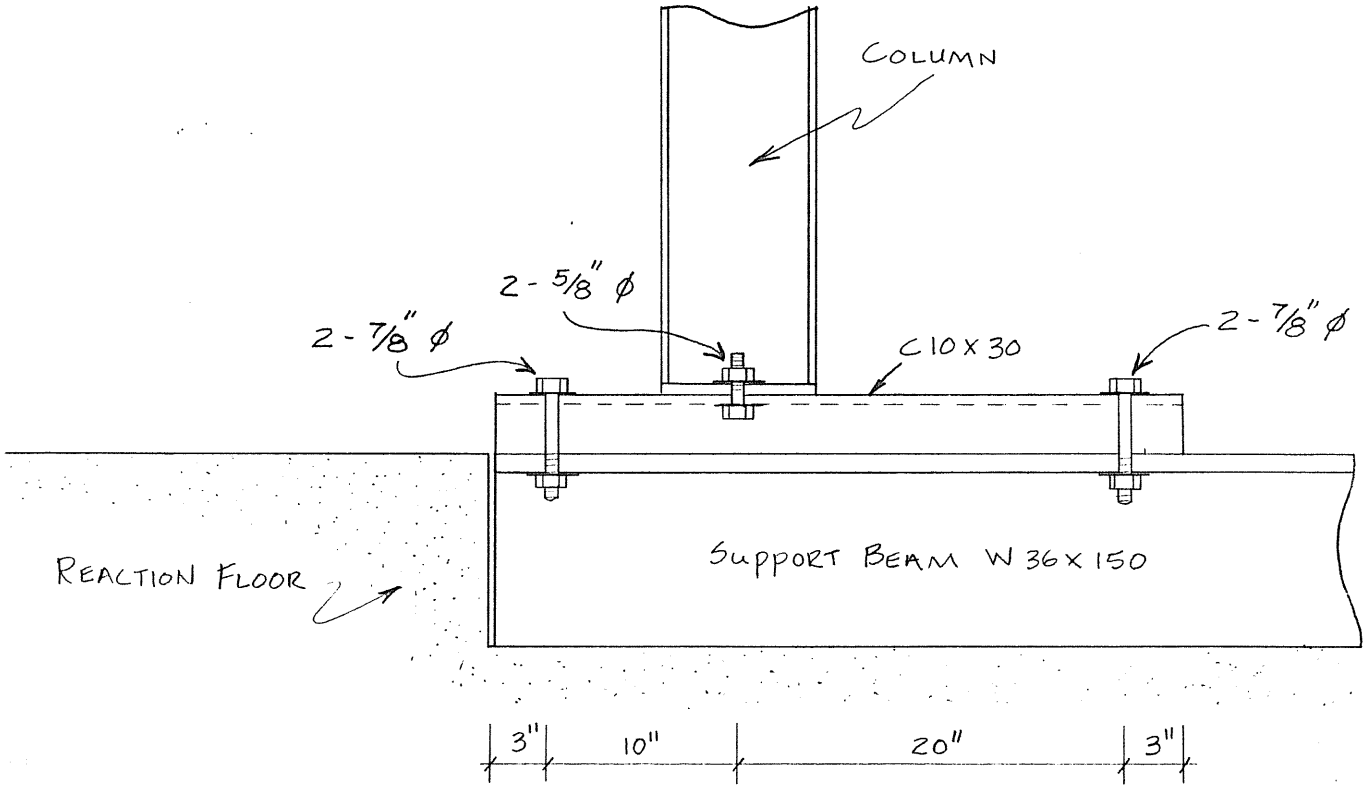


Figure 4. Details of Column to Reaction Floor Connection

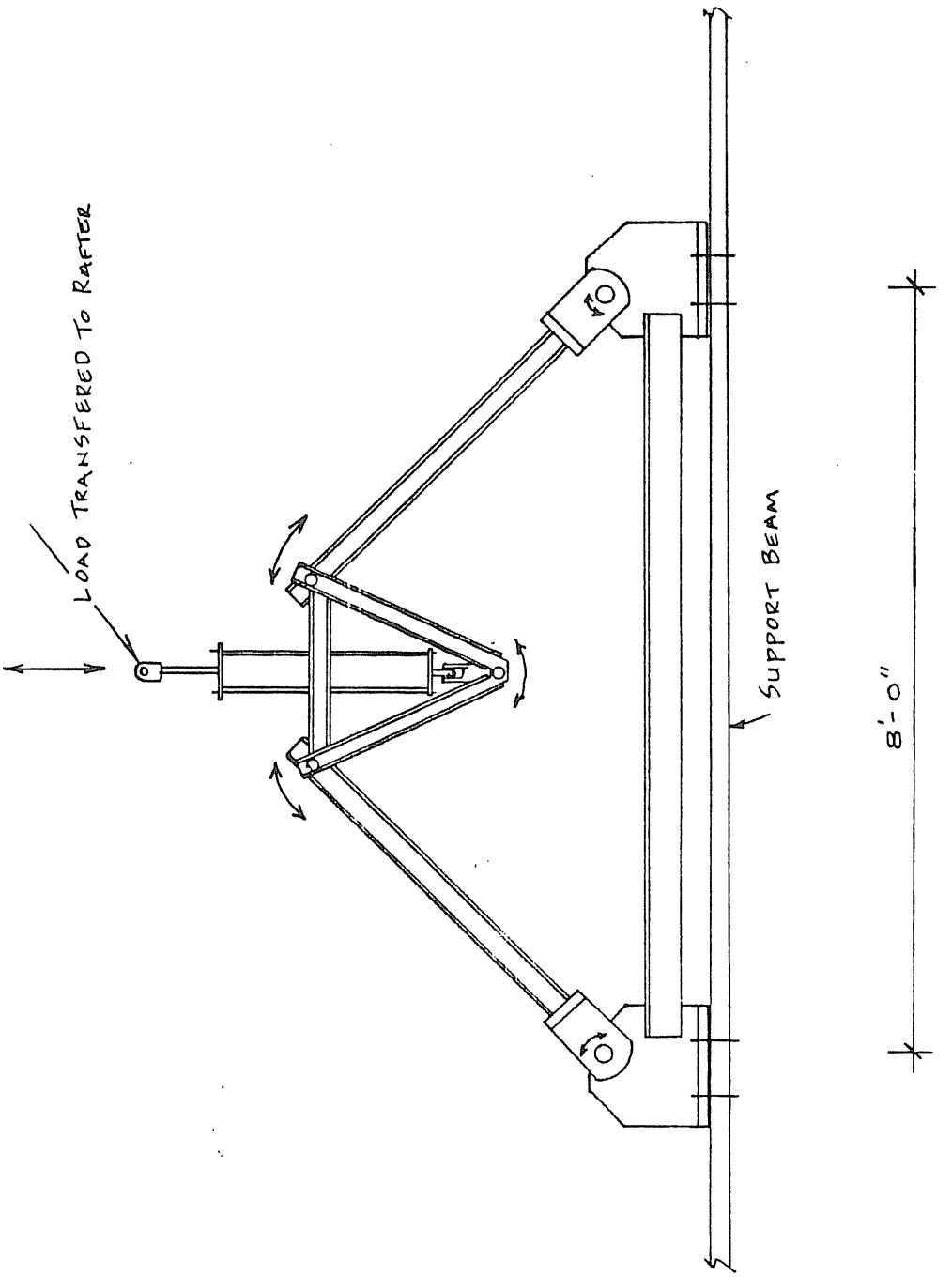


Figure 5. Gravity Load Simulator

load cells positioned as shown in Figure 6. For all lateral load applications, load was applied to both frames simultaneously using two identical hydraulic cylinders connected in series to a manual pump.

Five loading schemes were used as shown in Figure 7. Figure 7a is the case of unbalanced live load. For this loading, both frames were loaded simultaneously with the four hydraulic rams connected in series to an electric pump. Figure 7b is lateral load only, applied as described above. Figure 7c shows combined lateral load and unbalanced live load on the windward side. Figure 7d shows combined lateral load and unbalanced live load on the leeward side. Figure 7e shows full gravity load applied to one frame. For this loading condition, all four hydraulic cylinders were connected in series to an electric pump.

Instrumentation

Instrumentation consisted of calibrated dynamometers, calibrated load cells, strain gages, dial gages and horizontal deflection gages. Gravity load was measured using the calibrated dynamometers positioned as shown in Figure 3; lateral load was measured using the calibrated load cells positioned as shown in Figure 6.

Vertical deflection of the center line of the frames was measured using either a taut wire and a dial gage, Figure 8a, or a weighted scale and a fixed level, Figure 8b. The former was used for symmetrical loading conditions and

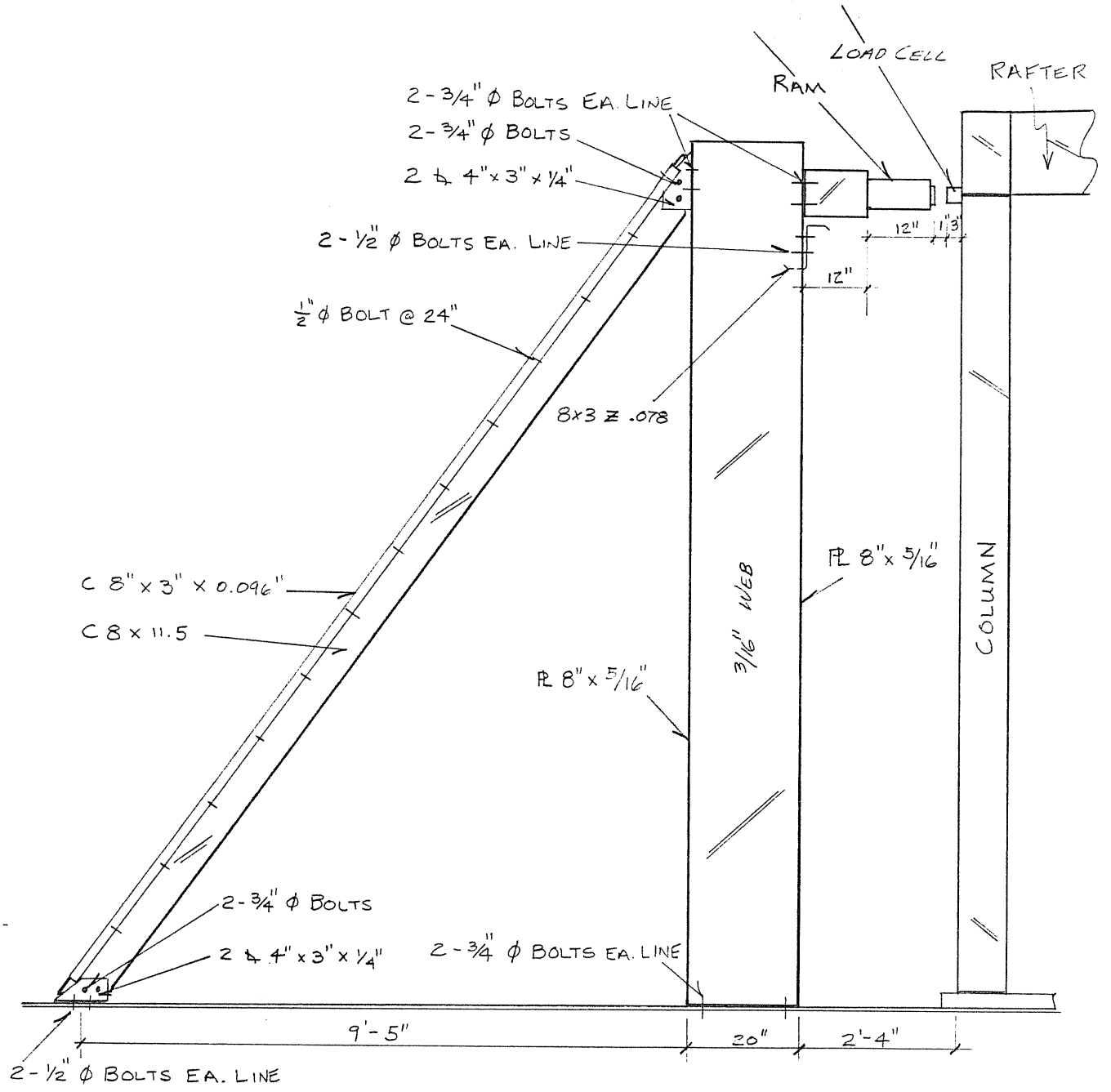
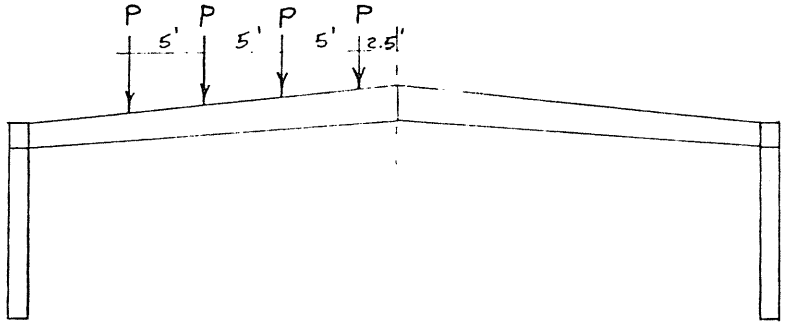
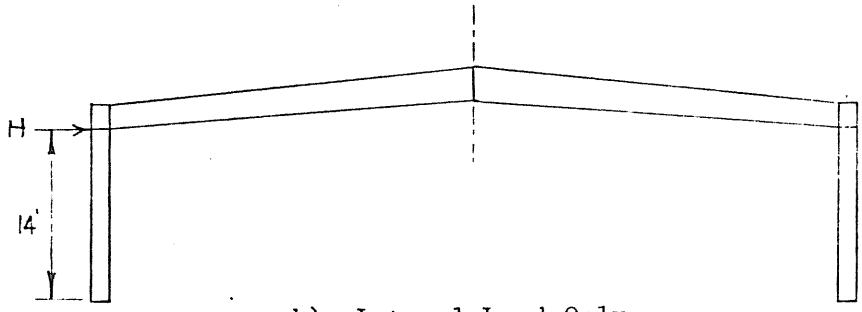


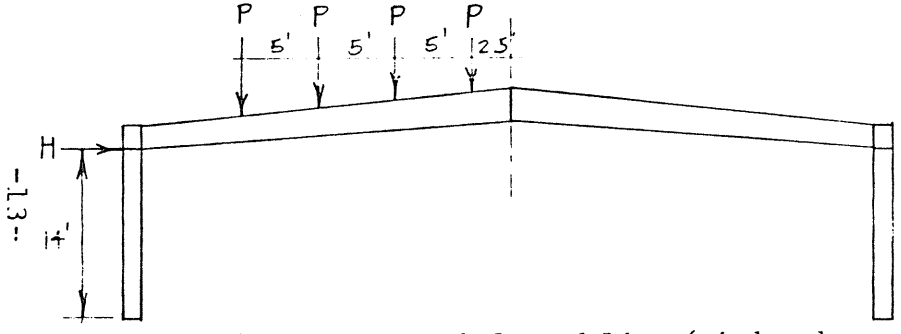
Figure 6. Lateral Load Application



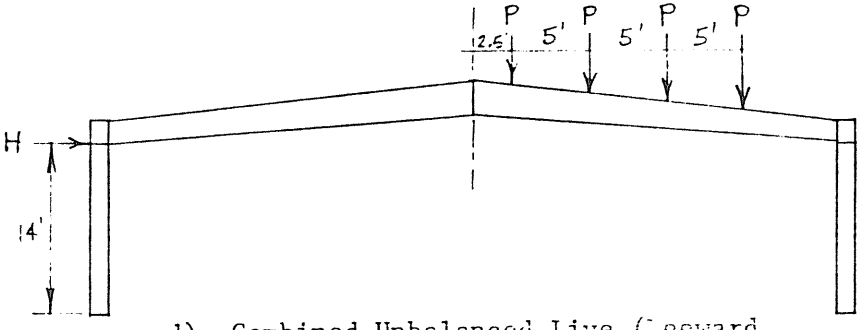
a) Unbalanced Live Load



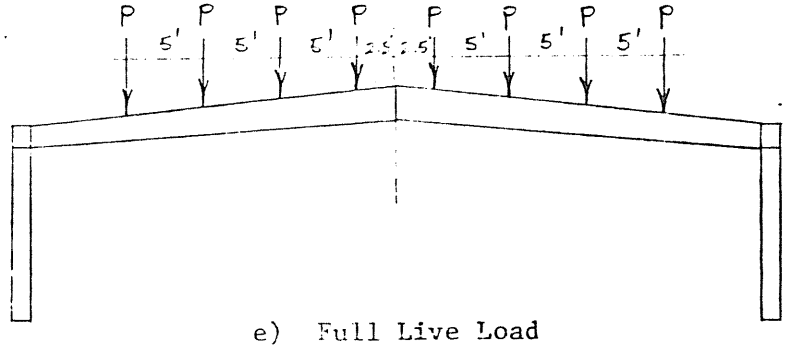
b) Lateral Load Only



c) Combined Unbalanced Live (windward side) and Lateral Load



d) Combined Unbalanced Live (Leeward side) and Lateral Load



e) Full Live Load

Conditions

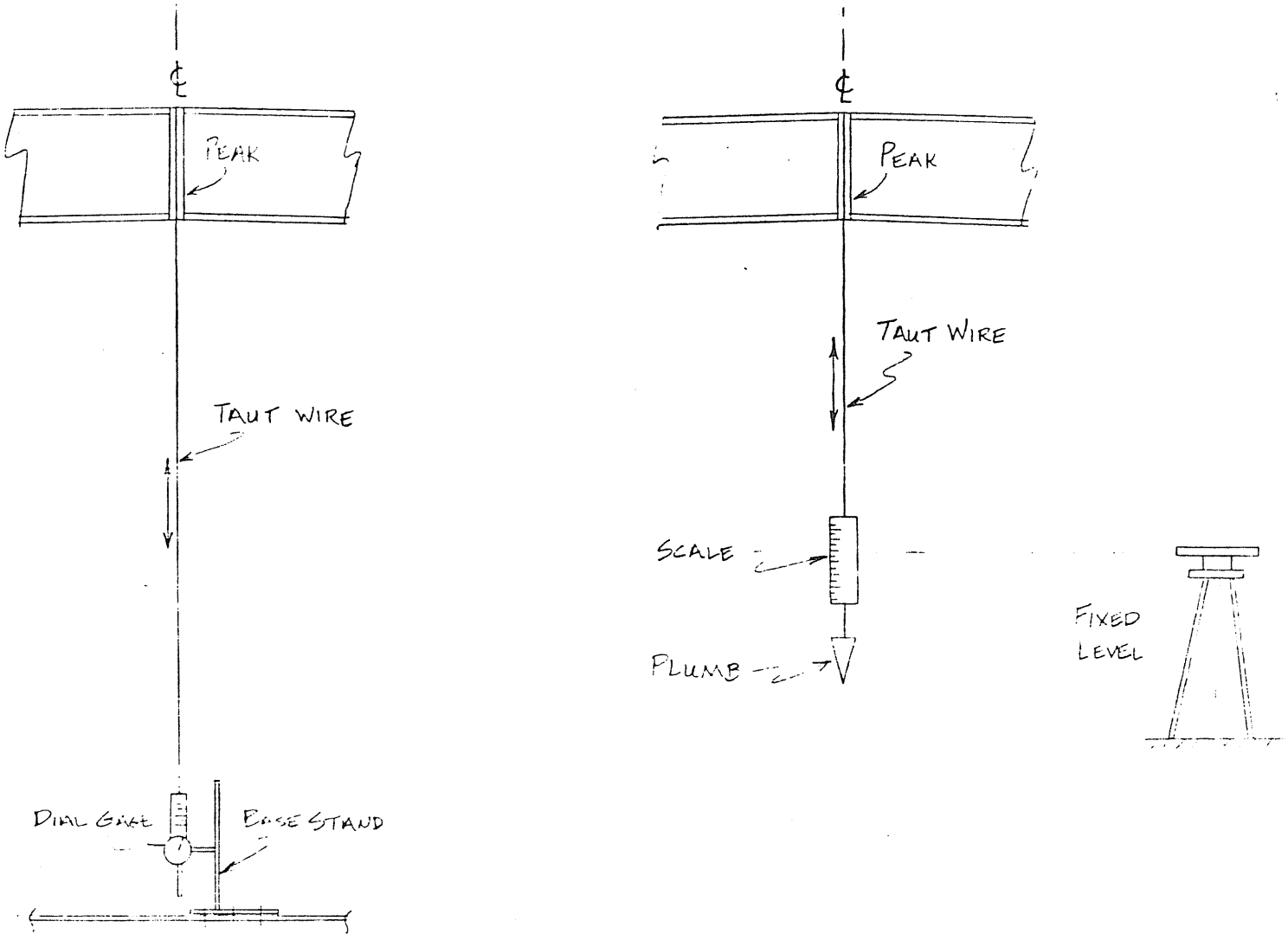


Figure 8. Measurement of Vertical Deflections

the latter for loading conditions where significant frame sidesway was expected. Sidesway of the top of the column was measured using a horizontal scale (0.1 in.) located as shown in Figure 9 and a fixed transit. Lateral movement of the column and rafter flanges was measured by means of a transit set in a fixed position with the telescope free to move only in a vertical plane. Graduated scales (0.1 in.) were attached perpendicular to the plane of the web at the flange locations shown in Figure 10.

Foil strain gages were positioned on both frames at critical locations, as shown in Figure 11. Gages on the same side of the web but on opposite sides of a flange were wired so that the average strain at a particular location was recorded. An electronic data acquisition system was used to record all strain gage data.

Testing Procedures

Prior to any actual testing, an overall check of the testing apparatus and instrumentation was made and zero readings were recorded. In general, load was applied in increments until near the failure load at which time the increment was decreased. After each load increment, deflection and strain gage readings were recorded and the specimens were checked for signs of yielding. Yielding was detected by flaking of mill scale under the whitewash coat on the

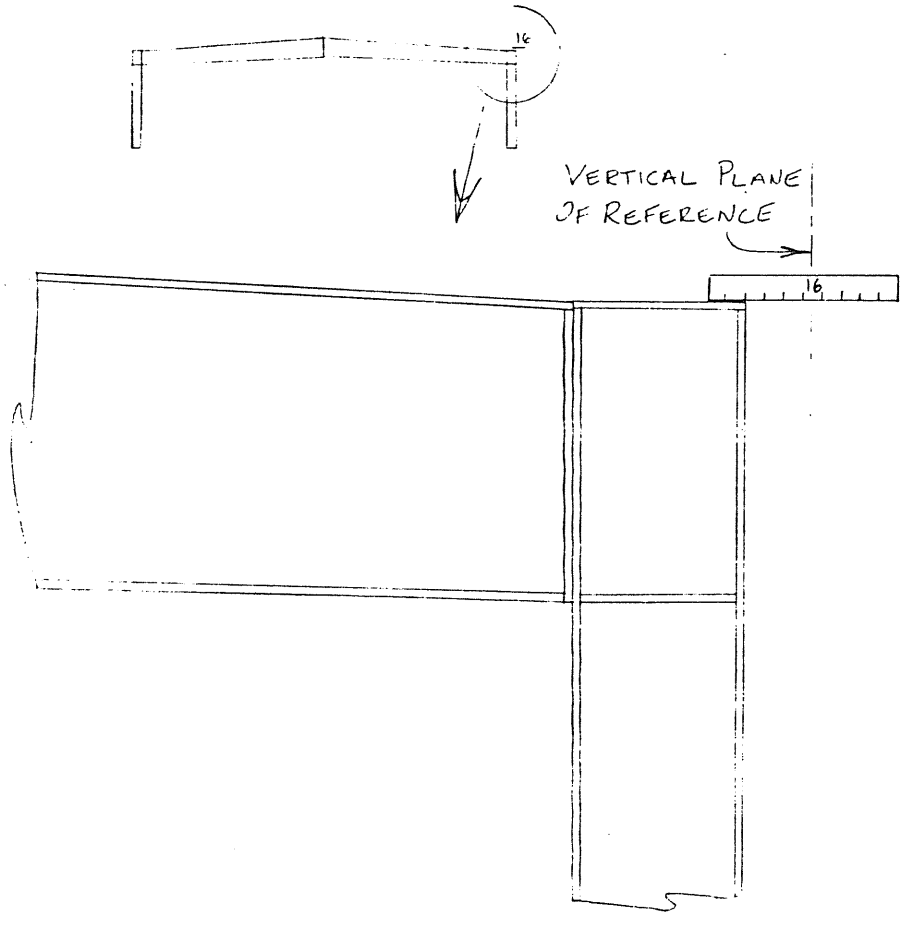


Figure 9. Measurement of Sidesway Deflections

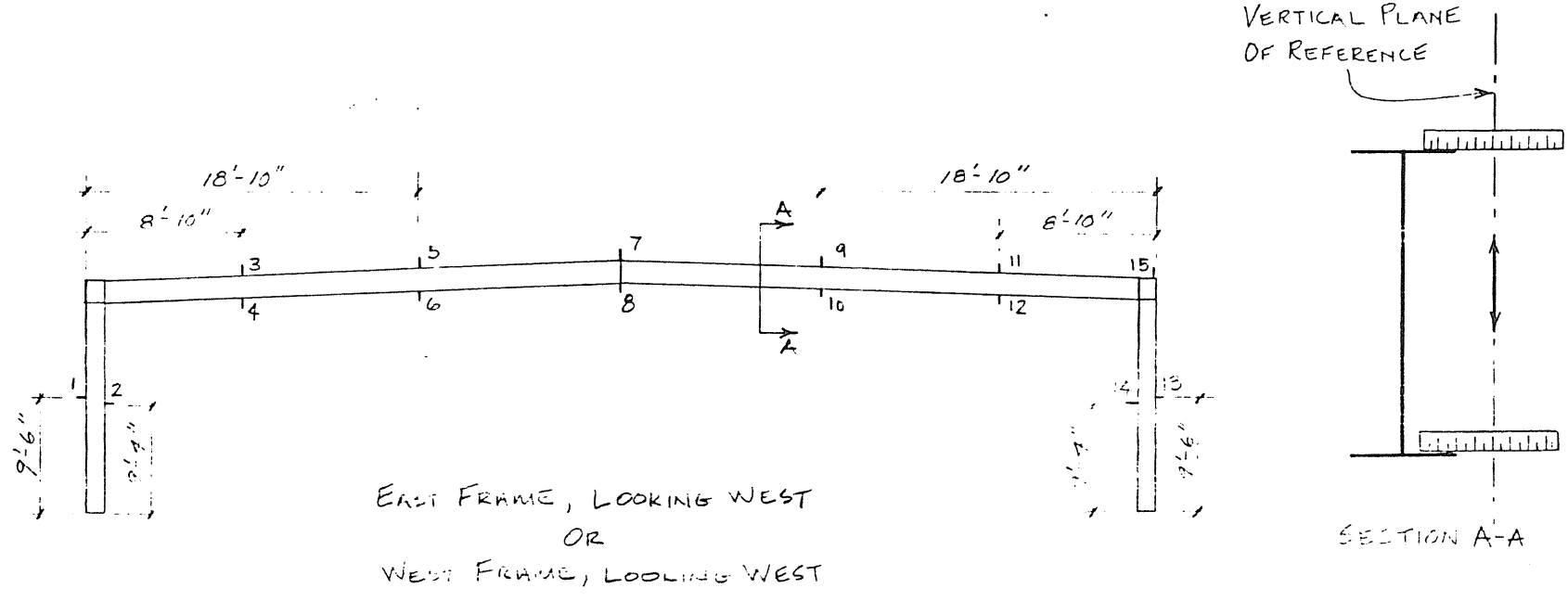


Figure 10. Measurement of Lateral Deflections

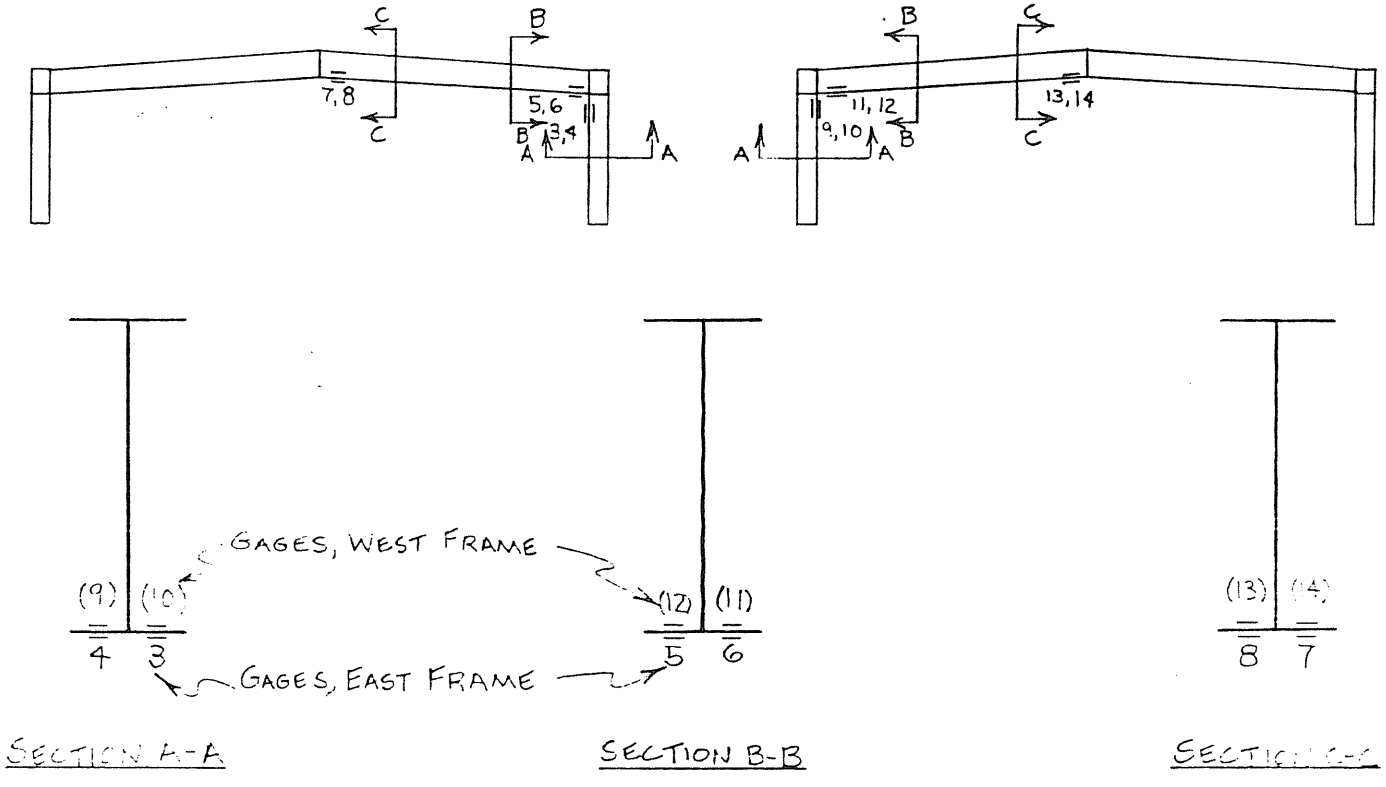


Figure 11. Strain Gage Locations

frame. When the specimens were no longer able to resist any additional loading, the maximum load was recorded and the load was then removed.

Two series of tests were conducted: initial tests to verify the performance of the frames relative to analytical predictions for a number of loading cases and final tests to determine the load-carrying capacity of the frames under non-standard flange bracing.

For the initial tests, the frames were loaded to approximately the design or working loads for the frames. The following initial tests were conducted:

a) Full live load east frame, Figure 7e. Maximum load 1.8 kips.

b) Unbalanced live load on both frames simultaneously, Figure 7a. Maximum load 3.0 kips at each location.

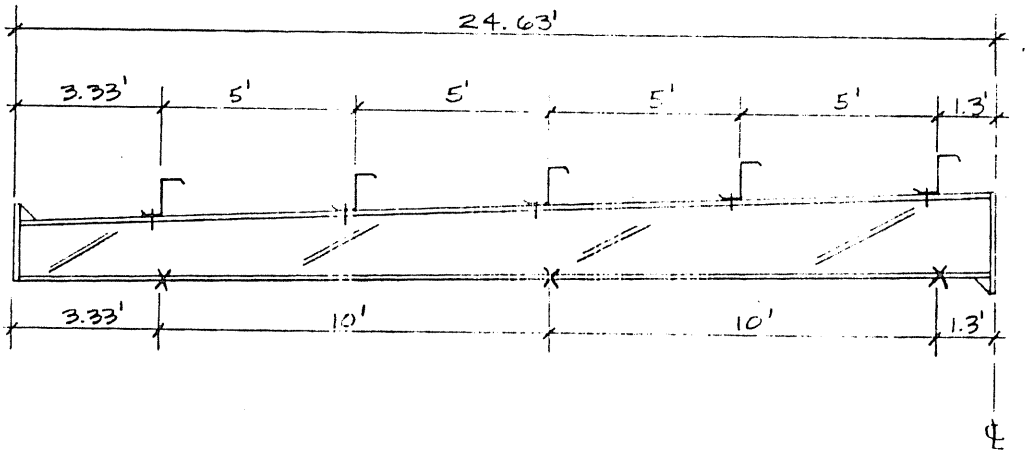
c) Lateral load only applied to both frames simultaneously, Figure 7b. Maximum load 8.08 kips.

d) Unbalanced live load on the windward side followed by lateral load on both frames simultaneously, Figure 7c. Maximum gravity load 2.0 kips, maximum lateral load 4.65 kips.

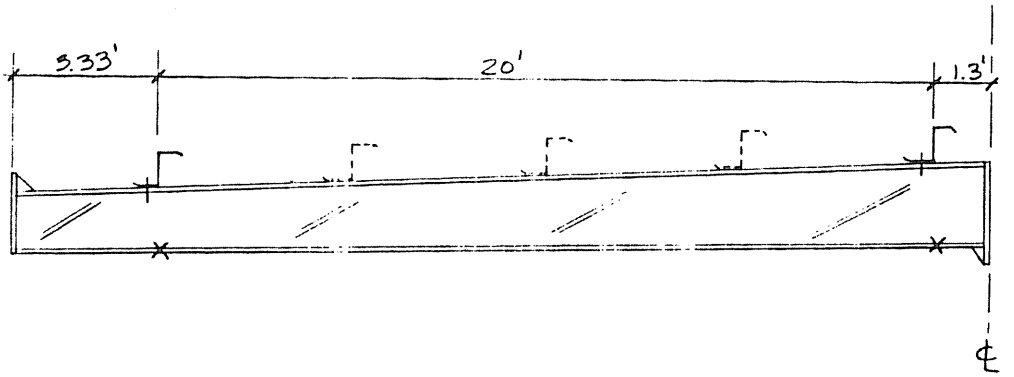
e) Unbalanced live load on the leeward side followed by lateral load on both frames simultaneously, Figure 7d. Maximum gravity load 3.0 kips, maximum lateral load 3.37 kips.

For the case of unbalanced live load with lateral load the simulated live load was applied first until the maximum load was reached. At that point, the gravity load was maintained and the lateral load was increased in 1 kip increments.

Final tests included full live load on the west frame and unbalanced live load with lateral load on both frames. In both tests a modified flange brace spacing was used as shown in Figure 12. In both tests, care was used so that excessive deformation did not occur and therefore reloading is possible.



a) Standard Flange Bracing



b) Modified Flange Bracing

X Braced Points

Purlin Bolted to Top Flange

Purlin Disconnected From Top Flange

Figure 12. Standard and Modified Flange Bracing

ANALYTICAL PROCEDURES

In the section following, test results are compared to two analytical procedures. Star Manufacturing Company's standard computer design program was used to obtain theoretical frame stiffness and failure predictions. This program uses a standard stiffness analysis to determine internal axial forces, shears and moments and external deflections. For analysis purposes, non-prismatic members are divided into a number of segments each with uniform properties. The stiffness matrix is then developed and solutions obtained. Stresses at the end of all segments are calculated and standard AISC interaction equations (Formulas 1.6-1a, 1.6-1b or 1.6-2) are used to determine allowable or service load. The interaction equations are checked at each analysis point and the location with a maximum value less than 1.0 (unity check) is used as a criterion for determining maximum service load. In addition, local buckling and shear failure is checked using AISC provisions.

The basic factor of safety in the AISC specification is 1.67. To determine the ultimate load of the frames from the Star Manufacturing Company design procedure, the service loading was increased until a unity check value of approxi-

mately 1.67 was attained for at least one analysis point in the frame. Computer output showing geometry and section property data and the analyses for ultimate loads for the five loading cases shown in Figure 7 are found in Appendix A.

The design check procedures used in the Star Manufacturing Company computer program are based on standard AISC design procedures which were developed specifically for prismatic, doubly symmetrical sections. The columm sections used to construct the STR4 50 frames are singly symmetrical and the rafters are tapered. An analytical procedure, currently under development, for singly symmetrical, non-prismatic members was also used to predict the failure loads. This procedure is described in Reference 3 and is summarized as follows.

For the case of non-prismatic member subjected to end moments which cause a varying flange stress along the member and without transverse load, the elastic critical moment at the small end is given by

$$(M_e)_S = C_b\, C_a\, M_e \tag{1}$$

and at the large end by

$$(M_e)_L = C_b\, R\, C_a\, M_e \tag{2}$$

where C_a = a modifying factor to account for taper, C_b = a modifying factor to account for stress variation due to unequal compressive flange stresses at the beam ends, R = ratio of the section moduli to the extreme fiber of the

compression flange at the large end to that at the small end, and M_e = the critical elastic moment for a prismatic beam with small end section properties subjected to equal but opposite end moments, single curvature bending. (See Reference 3 for complete details and formulas of all terms.) To account for inelastic effects the CRC formula is used

$$M_{cr} = M_y - \frac{M_y^2}{4(M_e)} \qquad (3)$$

where M_{cr} = inelastic critical moment, M_y = first yield moment referenced to the compression flange and (M_e) = elastic critical moment.

Using the computer program described in Reference 3, a failure analysis was conducted for the east frame with modified compression flange brace locations and subjected to unbalanced live load combined with lateral load as shown in Figure 7d. A failure analysis was also conducted for the west frame with modified compression flange bracing and subjected to full live load. Results of these analyses can be found in Appendix G.

TEST RESULTS

Initial Tests

Full Live Load, East Frame. Test results and theoretical prediction from Star Manufacturing Company's design program are shown in Appendix B. The maximum load applied was 1.80 kips at each loading point. This load is approximately the service load for the frame and corresponds to a unity check value of 1.02 as determined using Star's design program. Output is shown in Figure A.2.

As shown in Figure B.1, excellent agreement was attained between measured and predicted vertical centerline deflections. Lateral deflections of the outside and inside flanges are shown in Figures B.2 and B.3, respectively. The maximum lateral deflection was 0.20 in. near the peak. This deflection is not considered to be of significance.

Comparisons between predicted and experimental stresses can be found in Figures B.4, B.5, and B.6. As can be seen in Figure B.4, experimental stresses in the column at the knee connection were lower than predicted. However, as can be seen in Figures B.5 and B.6, the stresses in the rafter were in good agreement with those predicted. Strain readings were converted to stress assuming a modulus of elasticity

of 29,000 ksi.

Results of this test indicate that frame stiffness is adequately predicted by Star Manufacturing Company's design program.

Unbalanced Live Load. Test results and theoretical predictions from Star Manufacturing Company's design program are shown in Appendix C for both frames subjected to the unbalanced live load shown in Figure 7a. For this test, 3.0 kips was applied at each load point on each frame representing approximately the working load for the frames. Output is shown in Figure A.4.

Figures C.1 and C.2 show experimental centerline deflection and sidesway deflection, respectively. Excellent agreement was found between predicted and measured vertical deflections. The measured sidesway deflections are based on perfectly pinned columns which was not achieved in the test set-up and could explain the discrepancy in the sidesway deflections.

Lateral deflections of the inside and outside flanges of both frames are shown in Figure C.3 to C.6. Maximum lateral deflection was approximately 0.12 in. and is not considered to be significant.

Load versus experimental stress can be found in Figures C.7 to C.12. Stresses ranged from 65 to 90 percent of their predicted values.

This test shows that the design program is slightly conservative in predicting both the sidesway stiffness of

frames and the stresses developed by an unbalanced live loading.

Lateral Load Only. Test results for both frames subjected to a concentrated lateral load at the knee of the south column is shown in Appendix D. Approximately 8.0 kips was applied horizontally to each frame simultaneously. Load versus sidesway deflection data is shown in Figure D.1. Measured sidesway deflections were approximately 89 percent of the predicted values.

Lateral deflection data on both the inside and outside flanges of both frames is shown in Figure D.2 to D.5. Again the maximum lateral displacement was approximately 0.14 in. and is not considered significant.

Load versus experimental stress is shown in Figures D.6 to D.9. Experimental stresses were substantially lower than their predicted values.

This test shows that the design program is slightly conservative in predicting the sidesway stiffness of frames and very conservative in predicting the stresses developed by lateral loading.

Unbalanced Live Load on Windward Side Combined with Lateral Load. For this test both frames were loaded as shown in Figure 7c. First, 2.0 kips simulated live load was applied at each load point in 0.5 kip increments and then approximately 4.65 kips lateral load in 0.93 kip increments was applied simultaneously at the knee of the south columns. After each lateral load increment, the gravity load was

adjusted to 2.0 kips and then the data was recorded.

Figure E.1 shows good agreement between predicted and measured centerline vertical deflections. Figure E.2 shows that sidesway deflections were in close agreement with those predicted. Figures E.3 to E.6 show lateral deflections of the outside and inside flanges of both frames. The maximum lateral displacement was 0.1 in. and is not considered significant. Figures E.7 to E.12 show load versus measured and predicted stress. Experimental stresses ranged from 69 to 85 percent of those predicted.

Test results indicate the design program is slightly conservative in predicting both the stresses and sidesway deflections of the frame under combined loading.

Unbalanced Live Load on Leeward Side Combined with Lateral Load. Test results for this loading are shown in Appendix F. For this test both frames were loaded simultaneously with unbalanced live load and lateral load as shown in Figure 7d. First, 3.0 kips simulated live load was applied at each load point in 1.0 kip increments and then 3.37 kips lateral load was applied in varying increments. After each lateral load increment, the gravity load was adjusted to 3.0 kips and then the data was recorded.

Figures F.1 and F.2 show excellent agreement between measured and predicted centerline vertical deflections and sidesway deflections. Lateral deflections on both

the outside and inside flanges of both frames are shown in Figures F.3 to F.6. The maximum lateral displacement was approximately 0.10 in. and is not considered to be significant. Stresses calculated from measured strains are shown in Figures F.7 to F.12. The measured stresses ranged from 72 to 92 percent of their predicted values.

Results of this test indicate that the design program is conservative in estimating the stresses produced by this combined loading.

Final Tests

Unbalanced Live Load on Leeward Side and Lateral Load, with Nonstandard Flange Brace Spacings. To verify the proposed design procedure for singly symmetrical tapered members, the locations of the flange braces were changed on the southeast rafter as shown in Figure 12. In addition, the purlins were disconnected from the top flanges except directly over the flange braces. Consequently, an unbraced span of 20 feet was developed for testing.

For this test both frames were loaded simultaneously with unbalanced live load and lateral load as shown in Figure 7.d. First, 1.5 kips simulated live load was applied at each load point in 0.5 kip increments and then 7.5 kips lateral load was applied in varying increments. After each lateral loading, the gravity load was adjusted to 1.5 kips and then the data was recorded.

A valid analysis using Star's Computer program was not possible because the weak axis column slenderness ratio, kl/r, for the unbraced span, exceeded 200. A computer analysis using the proposed designed method estimated a failure by lateral buckling of the unbraced span at approximately 83 per cent of the maximum load attained (Results of this analysis can be found in Figure G.1.) The reason that failure did not occur at the maximum load was that the measured stresses were much lower than the theoretical stresses. Thus, the theoretical moments used as input in the proposed design program were never attained in the test frame.

Good agreement was attained between measured and predicted vertical and sidesway deflections as can be seen in Figures H.1 and H.2 respectively.

Lateral deflections for the outside and inside flanges of the east frame are shown in Figures H.3 and H.4 respectively. Lateral deflections were large at the higher loads but proved to be lateral sway of both frames rather than lateral buckling.

Full Live Load, West Frame, with Nonstandard Flange Brace Spacings. The previous test, as in the initial tests, showed that stresses due to combined loadings were much lower than their predicted values. Thus, the logical choice of loading for a legitimate test of the proposed design method was the loading scheme that best produced stresses close to their predicted values.

Full live loading was chosen for this test.

As in the previous test, a 20 ft. unbraced span was developed in the south rafter as shown in Figure 12. Again an analysis using Star's program was not possible because of the excessive weak axis column slenderness ratio. A computer analysis using the proposed design method predicted an estimated failure load of 1.71 kips at each load location. Results of this analysis can be found in Figure G.2. The frame was subjected to full live load and failed by lateral buckling of the unbraced span at a load of 2.1 kips.

Figure I.1 shows excellent agreement between measured and predicted vertical deflections. Lateral deflections are shown in Figures I.2 and I.3 for the outside and inside flanges, respectively. The maximum lateral deflection was 0.48 in. and the buckled configuration can be clearly seen in Figure I.2.

Load versus brace force, measured at both ends of the unbraced span, is shown in Figure I.4. The braces used at these positions were dynamometers calibrated to measure brace force.

Load versus experimentally determined and predicted stresses are shown in Figures I.5 to I.7. Excellent agreement was obtained between experimental and predicted stress for the south rafter at the peak. Measured stresses in both the column and rafter at the knee connection were lower than those predicted.

Results of this test show the proposed method was conservative in predicting the lateral buckling load of an unbraced span. However, this can be explained by the lower than predicted stresses that were measured at the knee. This indicates that the theoretical bending moments used in the proposed analysis were never developed.

Coupon Tests

During fabrication of the frame components, samples of the plate material used were taken and machined into standard tensile coupons. The coupons were then tested and results are shown in Table 1. Measured yield stresses varied from 51.1 to 56.4 ksi. These results are sufficiently close to the specified minimum yield stress, 50 ksi, to be acceptable.

For both the Star Manufacturing Company computer analyses and the proposed analyses, a yield of 55 ksi was used in all cases.

TABLE 1

Results of Coupon Tests

No.	Location	Yield Stress ksi	Ultimate Stress ksi	Elongation % in 2 in.
1	Rafter Web near peak	54.4	74.6	31
2	Rafter Web near knee	N.A.	73.9	33
3	Column Web near knee	51.1	71.5	41
4	Column Web near base	53.9	72.6	28
5	Outside Flange of Column	56.4	69.7	29
6	Rafter Flange	53.0	72.7	37

SUMMARY AND CONCLUSIONS

A series of tests was conducted on standard pre-engineered metal building frames fabricated by Star Manufacturing Company, Oklahoma City. The frames tested are designated by the manufacturer as STR4 50 12/25 14/25. The test set-up consisted of two frames forming a single bay, 24 ft. by 50 ft. Standard roof deck, purlins, eave struts, girts, flange braces, and rod braces were used to construct the test set-up. The frames were subjected to a range of loadings, including unbalanced live load, lateral load, combined unbalanced live and lateral load, and full live load. All loading conditions other than full live load were applied to each frame independently.

Experimentally determined results were compared to predicted values using Star Manufacturing Company's design computer program. The results from the two final tests were compared to a proposed design method for singly symmetrical tapered beams. Vertical deflections predicted by Star's design program were in excellent agreement with measured deflections. Measured sidesway deflections were slightly less than the predicted values. The predictions were based on perfectly pinned supports which was not achieved in the test set-up and could explain the discrepancy in the sidesway deflections.

Measured stresses near the peak splice were approximately 90 per cent of predicted values. However, measured

stresses near the knee were substantially lower than the predicted values. Stiffness method analyses of the east frame were made in an attempt to explain the low stresses. An analysis with stiffened rafter to column connections resulted in higher stresses as compared to the original predictions. A second analysis was made with fixed column supports which showed lower stresses at the knee, but still above the measured stresses.

In all initial tests, the frames were loaded to approximately the service load for the particular loading case. Thus, Star Manufacturing Company's failure load predictions were not tested. In the only test to failure (full live load with special lateral brace locations), a proposed design method predicted a failure load 23 per cent lower than the experimentally determined failure load. This can be explained by the lower than predicted stresses which were measured near the knee. Star Manufacturing Company's design program could not be used for this test configuration because an AISC slenderness limit was excluded.

It is apparent from the test results that the Star Manufacturing Company design program accurately predicts frame deflections. However, measured bending moments at the column-rafter connection were less than predicted values. The proposed design method for singly symmetrical tapered members predicted a failure load lower than the experimentally determined failure load. However, this can be explained by the lower than predicted bending moments which developed at the knee.

REFERENCES

1. Fisher, J.W., Lee, G.C., Yura, J.A., and Driscoll, G.C., "Plastic Design and Tests of Haunched Corner Connections", Welding Research Council Bulletin, No. 91, October 1963.

2. "Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings", American Institute of Steel Construction, New York, 1978.

3. Yazdani, N. and Murray, T.M., "Design Methodology for Tapered Beams", Research Report submitted to Star Manufacturing Company, Fears Structural Engineering Laboratory, University of Oklahoma, Norman, OK, May 1980.

APPENDIX A

STAR MANUFACTURING COMPANY
COMPUTER ANALYSES

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 FILE OU.FRA.8
DESIGN DIMENSIONS AND PROPERTIES REPORT PAGE 2

MEMBER NO. 1- 2 LENGTH= 12.68 FT ANGLE= 89.87 DEG FYF=50.KSI FYW=50.KSI
SECTION 1 LENGTH= 10.54 FT OF= 6.00 X 0.3110 WEB=0.1110 IF= 5.98 X 0.3730
SECTION 2 LENGTH= 0.50 FT OF= 6.00 X 0.3110 WEB=0.1110 IF= 6.03 X 0.5060
SECTION 3 LENGTH= 0.99 FT OF= 6.00 X 0.3110 WEB=0.2410 IF= 6.03 X 0.5060

POINT NO.	X (FT)	Y (FT)	DEPTH (IN)	AREA (IN2)	IX (IN4)	RX (IN)	RY (IN)	SOX (IN3)	SIX (IN3)	RTO (IN)	RTI (IN)
1*	0.00	0.00	8.00	4.91	63.3	3.59	1.58	14.8	17.0	1.668	1.680
101	0.00	0.75	8.00	4.91	63.3	3.59	1.58	14.8	17.0	1.668	1.680
102	0.00	2.26	8.00	4.91	63.3	3.59	1.58	14.8	17.0	1.668	1.680
103	0.01	3.76	8.00	4.91	63.3	3.59	1.58	14.8	17.0	1.668	1.680
104	0.01	5.27	8.00	4.91	63.3	3.59	1.58	14.8	17.0	1.668	1.680
105	0.01	6.78	8.00	4.91	63.3	3.59	1.58	14.8	17.0	1.668	1.680
106	0.02	8.28	8.00	4.91	63.3	3.59	1.58	14.8	17.0	1.668	1.680
107	0.02	9.79	8.00	4.91	63.3	3.59	1.58	14.8	17.0	1.668	1.680
108*	0.02	10.54	8.00	4.91	63.3	3.59	1.58	14.8	17.0	1.668	1.680
108*	0.02	10.54	8.00	5.71	70.9	3.52	1.61	15.0	21.7	1.661	1.712
109	0.03	10.79	8.00	5.71	70.9	3.52	1.61	15.0	21.7	1.661	1.712
110*	0.03	11.04	8.00	5.71	70.9	3.52	1.61	15.0	21.7	1.661	1.712
110*	0.03	11.04	8.00	6.65	75.4	3.37	1.49	16.3	22.3	1.591	1.678
111	0.03	11.54	8.00	6.65	75.4	3.37	1.49	16.3	22.3	1.591	1.678
112*	0.03	12.03	8.00	6.65	75.4	3.37	1.49	16.3	22.3	1.591	1.678

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 FILE OU.FRA.8
DESIGN DIMENSIONS AND PROPERTIES REPORT PAGE 3

MEMBER NO. 2- 3 LENGTH= 24.63 FT ANGLE= 2.00 DEG FYF=50.KSI FYW=50.KSI
SECTION 1 LENGTH= 12.00 FT OF= 4.95 X 0.2480 WEB=0.1430 IF= 5.02 X 0.2440
SECTION 2 LENGTH= 12.35 FT OF= 4.95 X 0.2480 WEB=0.1090 IF= 5.02 X 0.2440

POINT NO.	X (FT)	Y (FT)	DEPTH (IN)	AREA (IN2)	IX (IN4)	RX (IN)	RY (IN)	SOX (IN3)	SIX (IN3)	RTO (IN)	RTI (IN)
115*	0.31	12.70	15.94	4.66	195.0	6.47	1.04	24.5	24.5	1.254	1.271
116	1.81	12.75	16.19	4.70	202.0	6.56	1.04	25.0	24.9	1.251	1.268
117	4.81	12.85	16.69	4.77	216.5	6.74	1.03	25.9	25.9	1.247	1.264
118	7.81	12.96	17.19	4.84	231.5	6.92	1.02	26.9	26.9	1.242	1.259
119	10.81	13.06	17.69	4.91	247.2	7.09	1.02	28.0	27.9	1.238	1.254
120*	12.30	13.11	17.94	4.95	255.3	7.18	1.01	28.5	28.4	1.235	1.252
120*	12.30	13.11	17.94	4.35	240.2	7.43	1.08	26.8	26.8	1.274	1.292
121	13.85	13.17	18.20	4.38	248.0	7.52	1.08	27.3	27.2	1.272	1.290
122	16.93	13.27	18.71	4.44	264.1	7.71	1.07	28.2	28.2	1.268	1.286
123	20.02	13.38	19.23	4.49	280.7	7.90	1.06	29.2	29.2	1.265	1.282
124	23.10	13.49	19.74	4.55	297.9	8.09	1.06	30.2	30.2	1.261	1.278
3*	24.64	13.54	20.00	4.58	306.7	8.18	1.05	30.7	30.7	1.259	1.276

a) East Frame

Figure A.1 Geometry and Section Properties

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 FILE OU.FRA.8
DESIGN DIMENSIONS AND PROPERTIES REPORT PAGE 4

MEMBER NO. 3- 5 LENGTH= 24.63 FT ANGLE= -2.00 DEG FYF=50.KSI FYW=50.KSI
SECTION 1 LENGTH= 12.37 FT OF= 5.03 X 0.2490 WEB=0.1120 IF= 5.01 X 0.2470
SECTION 2 LENGTH= 11.98 FT OF= 5.03 X 0.2490 WEB=0.1410 IF= 5.01 X 0.2470

POINT NO.	X (FT)	Y (FT)	DEPTH (IN)	AREA (IN2)	IX (IN4)	RX (IN)	RY (IN)	SOX (IN3)	SIX (IN3)	RTO (IN)	RTI (IN)
3*	24.64	13.54	20.00	4.67	312.1	8.17	1.06	31.3	31.1	1.279	1.271
125	26.19	13.49	19.75	4.65	303.3	8.08	1.06	30.8	30.6	1.281	1.273
126	29.28	13.38	19.24	4.59	286.1	7.89	1.07	29.8	29.6	1.284	1.277
127	32.37	13.27	18.74	4.53	269.4	7.71	1.07	28.9	28.7	1.288	1.280
128	35.46	13.17	18.23	4.48	253.4	7.52	1.08	27.9	27.7	1.292	1.284
129*	37.01	13.11	17.98	4.45	245.6	7.43	1.08	27.4	27.2	1.294	1.286
129*	37.01	13.11	17.98	4.95	258.5	7.22	1.03	28.8	28.7	1.261	1.253
130	38.50	13.06	17.73	4.92	250.5	7.14	1.03	28.3	28.2	1.263	1.255
131	41.50	12.96	17.24	4.85	235.0	6.96	1.04	27.3	27.2	1.267	1.259
132	44.49	12.85	16.75	4.78	220.1	6.78	1.05	26.4	26.2	1.272	1.264
133	47.48	12.75	16.26	4.71	205.8	6.61	1.05	25.4	25.2	1.276	1.268
134*	48.98	12.69	16.02	4.68	198.8	6.52	1.06	24.9	24.7	1.278	1.271

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 FILE OU.FRA.8
DESIGN DIMENSIONS AND PROPERTIES REPORT PAGE 5

MEMBER NO. 4- 5 LENGTH= 12.68 FT ANGLE=-89.87 DEG FYF=50.KSI FYW=50.KSI
SECTION 1 LENGTH= 10.54 FT OF= 6.04 X 0.3110 WEB=0.1110 IF= 5.98 X 0.3760
SECTION 2 LENGTH= 0.50 FT OF= 6.04 X 0.3110 WEB=0.1110 IF= 6.02 X 0.5050
SECTION 3 LENGTH= 0.98 FT OF= 6.04 X 0.3110 WEB=0.2410 IF= 6.02 X 0.5050

POINT NO.	X (FT)	Y (FT)	DEPTH (IN)	AREA (IN2)	IX (IN4)	RX (IN)	RY (IN)	SOX (IN3)	SIX (IN3)	RTO (IN)	RTI (IN)
4*	49.29	0.00	7.98	4.94	63.4	3.58	1.59	14.9	17.0	1.680	1.681
136	49.29	0.75	7.98	4.94	63.4	3.58	1.59	14.9	17.0	1.680	1.681
137	49.29	2.26	7.98	4.94	63.4	3.58	1.59	14.9	17.0	1.680	1.681
138	49.28	3.76	7.98	4.94	63.4	3.58	1.59	14.9	17.0	1.680	1.681
139	49.28	5.27	7.98	4.94	63.4	3.58	1.59	14.9	17.0	1.680	1.681
140	49.28	6.78	7.98	4.94	63.4	3.58	1.59	14.9	17.0	1.680	1.681
141	49.28	8.28	7.98	4.94	63.4	3.58	1.59	14.9	17.0	1.680	1.681
142	49.27	9.79	7.98	4.94	63.4	3.58	1.59	14.9	17.0	1.680	1.681
143*	49.27	10.54	7.98	4.94	63.4	3.58	1.59	14.9	17.0	1.680	1.681
143*	49.27	10.54	7.98	5.71	70.7	3.52	1.61	15.0	21.6	1.673	1.709
144	49.26	10.79	7.98	5.71	70.7	3.52	1.61	15.0	21.6	1.673	1.709
145*	49.26	11.04	7.98	5.71	70.7	3.52	1.61	15.0	21.6	1.673	1.709
145*	49.26	11.04	7.98	6.65	75.2	3.36	1.50	16.4	22.2	1.603	1.675
146	49.26	11.53	7.98	6.65	75.2	3.36	1.50	16.4	22.2	1.603	1.675
147*	49.26	12.02	7.98	6.65	75.2	3.36	1.50	16.4	22.2	1.603	1.675

a) East Frame Continued

Figure A.1 Geometry and Section Properties Continued

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 FILE DU.FRA.7
DESIGN DIMENSIONS AND PROPERTIES REPORT PAGE 2

MEMBER NO. 1- 2 LENGTH= 12.68 FT ANGLE= 89.87 DEG FYF=50.KSI FYW=50.KSI
SECTION 1 LENGTH= 10.52 FT OF= 6.02 X 0.3120 WEB=0.1100 IF= 5.97 X 0.3750
SECTION 2 LENGTH= 0.50 FT OF= 6.02 X 0.3120 WEB=0.1100 IF= 6.02 X 0.5050
SECTION 3 LENGTH= 1.01 FT OF= 6.02 X 0.3120 WEB=0.2400 IF= 6.02 X 0.5050

POINT NO.	X (FT)	Y (FT)	DEPTH (IN)	AREA (IN2)	IX (IN4)	RX (IN)	RY (IN)	SOX (IN3)	SIX (IN3)	RTO (IN)	RTI (IN)
1*	0.00	0.00	7.96	4.92	62.9	3.58	1.58	14.8	16.9	1.675	1.678
101	0.00	0.75	7.96	4.92	62.9	3.58	1.58	14.8	16.9	1.675	1.678
102	0.00	2.25	7.96	4.92	62.9	3.58	1.58	14.8	16.9	1.675	1.678
103	0.01	3.76	7.96	4.92	62.9	3.58	1.58	14.8	16.9	1.675	1.678
104	0.01	5.26	7.96	4.92	62.9	3.58	1.58	14.8	16.9	1.675	1.678
105	0.01	6.76	7.96	4.92	62.9	3.58	1.58	14.8	16.9	1.675	1.678
106	0.01	8.27	7.96	4.92	62.9	3.58	1.58	14.8	16.9	1.675	1.678
107	0.02	9.77	7.96	4.92	62.9	3.58	1.58	14.8	16.9	1.675	1.678
108*	0.02	10.52	7.96	4.92	62.9	3.58	1.58	14.8	16.9	1.675	1.678
108*	0.02	10.52	7.96	5.70	70.2	3.51	1.61	15.0	21.5	1.668	1.710
109	0.03	10.77	7.96	5.70	70.2	3.51	1.61	15.0	21.5	1.668	1.710
110*	0.03	11.02	7.96	5.70	70.2	3.51	1.61	15.0	21.5	1.668	1.710
110*	0.03	11.02	7.96	6.63	74.7	3.36	1.50	16.3	22.1	1.599	1.676
111	0.03	11.53	7.96	6.63	74.7	3.36	1.50	16.3	22.1	1.599	1.676
112*	0.03	12.03	7.96	6.63	74.7	3.36	1.50	16.3	22.1	1.599	1.676

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 FILE DU.FRA.7
DESIGN DIMENSIONS AND PROPERTIES REPORT PAGE 3

MEMBER NO. 2- 3 LENGTH= 24.63 FT ANGLE= 1.99 DEG FYF=50.KSI FYW=50.KSI
SECTION 1 LENGTH= 12.00 FT OF= 4.95 X 0.2460 WEB=0.1410 IF= 5.00 X 0.2470
SECTION 2 LENGTH= 12.35 FT OF= 4.95 X 0.2460 WEB=0.1090 IF= 5.00 X 0.2470

POINT NO.	X (FT)	Y (FT)	DEPTH (IN)	AREA (IN2)	IX (IN4)	RX (IN)	RY (IN)	SOX (IN3)	SIX (IN3)	RTO (IN)	RTI (IN)
115*	0.31	12.69	15.95	4.63	194.6	6.48	1.05	24.3	24.5	1.254	1.269
116	1.81	12.74	16.20	4.67	201.6	6.57	1.04	24.8	25.0	1.251	1.267
117	4.81	12.85	16.70	4.74	216.0	6.75	1.03	25.8	26.0	1.247	1.263
118	7.81	12.95	17.20	4.81	231.0	6.93	1.03	26.8	27.0	1.242	1.258
119	10.80	13.06	17.70	4.88	246.5	7.11	1.02	27.8	28.0	1.238	1.254
120*	12.30	13.11	17.95	4.91	254.6	7.20	1.02	28.3	28.5	1.235	1.251
120*	12.30	13.11	17.95	4.36	240.4	7.43	1.08	26.7	26.9	1.272	1.288
121	13.85	13.16	18.20	4.38	248.2	7.52	1.07	27.2	27.4	1.270	1.286
122	16.93	13.27	18.72	4.44	264.1	7.71	1.07	28.1	28.3	1.267	1.282
123	20.02	13.38	19.23	4.49	280.7	7.90	1.06	29.1	29.3	1.263	1.279
124	23.10	13.48	19.74	4.55	297.9	8.09	1.05	30.1	30.3	1.259	1.275
3*	24.65	13.54	20.00	4.58	306.7	8.18	1.05	30.6	30.8	1.257	1.273

b) West Frame

Figure A.1 Geometry and Section Properties Continued

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 FILE OU.FRA.7
DESIGN DIMENSIONS AND PROPERTIES REPORT PAGE 4

MEMBER NO. 3- 5 LENGTH= 24.63 FT ANGLE= -2.00 DEG FYF=50.KSI FYW=50.KSI
SECTION 1 LENGTH= 12.32 FT OF= 4.91 X 0.2460 WEB=0.1100 IF= 5.01 X 0.2470
SECTION 2 LENGTH= 12.02 FT OF= 4.91 X 0.2460 WEB=0.1420 IF= 5.01 X 0.2470

POINT NO.	X (FT)	Y (FT)	DEPTH (IN)	AREA (IN2)	IX (IN4)	RX (IN)	RY (IN)	SOX (IN3)	SIX (IN3)	RTO (IN)	RTI (IN)
3*	24.65	13.54	20.00	4.59	306.6	8.17	1.05	30.5	30.9	1.244	1.275
125	26.19	13.48	19.74	4.56	297.8	8.08	1.05	30.0	30.4	1.246	1.277
126	29.27	13.38	19.23	4.51	280.8	7.89	1.06	29.0	29.4	1.250	1.281
127	32.34	13.27	18.72	4.45	264.3	7.71	1.06	28.0	28.4	1.254	1.284
128	35.42	13.16	18.21	4.39	248.4	7.52	1.07	27.1	27.5	1.257	1.288
129*	36.96	13.11	17.96	4.37	240.7	7.42	1.07	26.6	27.0	1.259	1.290
129*	36.96	13.11	17.96	4.93	254.9	7.19	1.01	28.2	28.6	1.223	1.253
130	38.46	13.06	17.71	4.89	246.9	7.10	1.01	27.7	28.0	1.225	1.256
131	41.47	12.95	17.21	4.82	231.3	6.93	1.02	26.7	27.0	1.229	1.260
132	44.47	12.85	16.72	4.75	216.4	6.75	1.03	25.7	26.0	1.234	1.265
133	47.47	12.74	16.22	4.68	202.0	6.57	1.04	24.8	25.1	1.238	1.269
134*	48.98	12.69	15.97	4.64	195.0	6.48	1.04	24.3	24.6	1.241	1.272

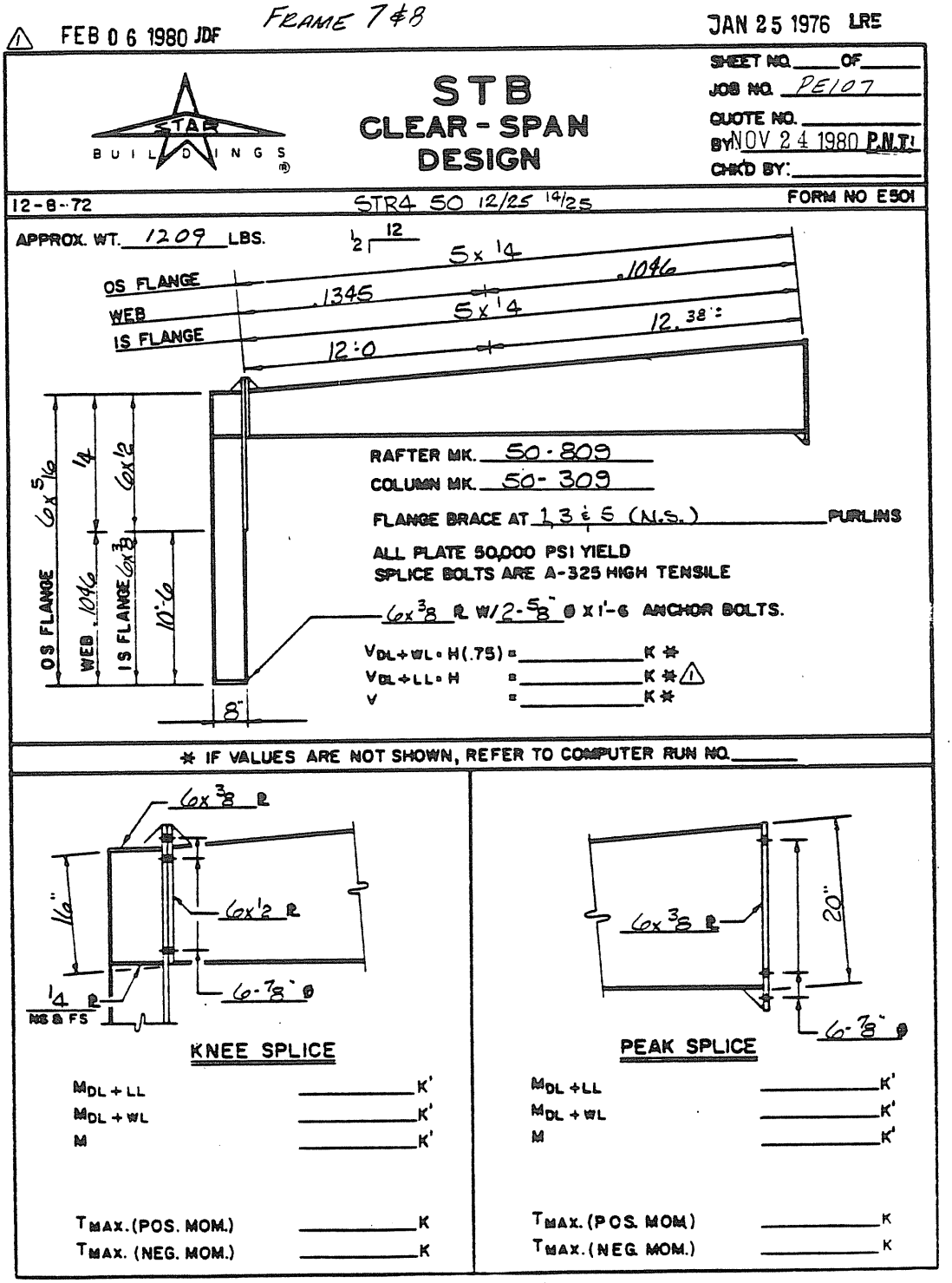
STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 FILE OU.FRA.7
DESIGN DIMENSIONS AND PROPERTIES REPORT PAGE 5

MEMBER NO. 4- 5 LENGTH= 12.68 FT ANGLE=-89.88 DEG FYF=50.KSI FYW=50.KSI
SECTION 1 LENGTH= 10.54 FT OF= 5.98 X 0.3100 WEB=0.1100 IF= 5.97 X 0.3760
SECTION 2 LENGTH= 0.50 FT OF= 5.98 X 0.3100 WEB=0.1100 IF= 6.01 X 0.5020
SECTION 3 LENGTH= 0.99 FT OF= 5.98 X 0.3100 WEB=0.2420 IF= 6.01 X 0.5020

POINT NO.	X (FT)	Y (FT)	DEPTH (IN)	AREA (IN2)	IX (IN4)	RX (IN)	RY (IN)	SOX (IN3)	SIX (IN3)	RTO (IN)	RTI (IN)
4*	49.29	0.00	8.05	4.91	64.1	3.61	1.58	14.9	17.2	1.662	1.678
136	49.29	0.75	8.05	4.91	64.1	3.61	1.58	14.9	17.2	1.662	1.678
137	49.28	2.26	8.05	4.91	64.1	3.61	1.58	14.9	17.2	1.662	1.678
138	49.28	3.76	8.05	4.91	64.1	3.61	1.58	14.9	17.2	1.662	1.678
139	49.28	5.27	8.05	4.91	64.1	3.61	1.58	14.9	17.2	1.662	1.678
140	49.28	6.78	8.05	4.91	64.1	3.61	1.58	14.9	17.2	1.662	1.678
141	49.27	8.28	8.05	4.91	64.1	3.61	1.58	14.9	17.2	1.662	1.678
142	49.27	9.79	8.05	4.91	64.1	3.61	1.58	14.9	17.2	1.662	1.678
143*	49.27	10.54	8.05	4.91	64.1	3.61	1.58	14.9	17.2	1.662	1.678
143*	49.27	10.54	8.05	5.67	71.3	3.55	1.61	15.0	21.6	1.655	1.706
144	49.26	10.79	8.05	5.67	71.3	3.55	1.61	15.0	21.6	1.655	1.706
145*	49.26	11.04	8.05	5.67	71.3	3.55	1.61	15.0	21.6	1.655	1.706
145*	49.26	11.04	8.05	6.62	76.0	3.39	1.49	16.4	22.3	1.584	1.671
146	49.26	11.53	8.05	6.62	76.0	3.39	1.49	16.4	22.3	1.584	1.671
147*	49.26	12.03	8.05	6.62	76.0	3.39	1.49	16.4	22.3	1.584	1.671

b) West Frame Continued

Figure A.1 Geometry and Section Properties Continued

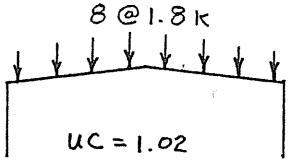


c) Nominal Dimensions

Figure A.1 Geometry and Section Properties

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 FULL LIVE - EAST FILE OUB.FRA.1
FORCE, MOMENT, AND STRESS REPORT PAGE 7
MEMBER 1 - 2 LOAD CONDITION 1 - DL+FULL LIVE LOAD

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
1*	8.35	0.0	-3.53	22.10	30.00	30.00	13.24	NONE	0.08	0.00	0.00	0.08	0.008057	0.0000	0.0000
101	8.34	-2.7	-3.53	22.10	30.00	30.00	13.24	NONE	0.08	0.07	0.06	0.14	0.007900	-0.0721	-0.0004
102	8.32	-8.0	-3.54	22.10	30.00	30.00	13.24	NONE	0.08	0.22	0.19	0.26	0.007272	-0.2108	-0.0011
103	8.30	-13.3	-3.54	22.10	30.00	30.00	13.24	NONE	0.08	0.36	0.31	0.39	0.006015	-0.3323	-0.0019
104	8.28	-18.6	-3.54	22.10	30.00	30.00	13.24	NONE	0.08	0.50	0.44	0.52	0.004130	-0.4255	-0.0027
105	8.26	-24.0	-3.54	22.10	30.00	30.00	13.24	NONE	0.08	0.65	0.56	0.64	0.001616	-0.4790	-0.0036
106	8.24	-29.3	-3.54	22.10	30.00	30.00	13.24	NONE	0.08	0.79	0.69	0.77	-0.001525	-0.4814	-0.0047
107	8.22	-34.6	-3.54	22.10	30.00	30.00	13.24	NONE	0.08	0.93	0.82	0.89	-0.005296	-0.4213	-0.0058
108*	8.20	-37.3	-3.54	22.10	30.00	30.00	13.24	NONE	0.08	1.00	0.88	0.95	------	------	------
108*	8.30	-37.3	-3.31	21.68	30.00	30.00	13.24	NONE	0.07	1.00	0.69	0.95	------	------	------
109	8.24	-38.1	-3.31	21.68	30.00	30.00	13.24	NONE	0.07	1.02	0.70	0.97	-0.008005	-0.3413	-0.0067
110*	8.22	-38.9	-3.31	21.68	30.00	30.00	13.24	NONE	0.07	1.04	0.72	0.99	------	------	------
110*	8.11	-38.9	-3.59	21.35	30.00	30.00	34.62	NONE	0.06	0.95	0.70	0.91	------	------	------
111	8.11	-40.7	-3.59	21.35	30.00	30.00	34.62	NONE	0.06	1.00	0.73	0.96	-0.009999	-0.2608	-0.0073
112*	8.11	-42.5	-3.59	21.35	30.00	30.00	34.62	NONE	0.06	1.04	0.76	1.00	------	------	------



STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 FULL LIVE - EAST FILE OUB.FRA.1
FORCE, MOMENT, AND STRESS REPORT PAGE 8
MEMBER 2 - 3 LOAD CONDITION 1 - DL+FULL LIVE LOAD

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
115*	3.83	-42.5	7.98	25.01	30.00	30.00	15.74	NONE	0.03	0.70	0.70	0.73	------	------	------
116	3.83	-30.6	7.92	25.10	30.00	30.00	15.49	NONE	0.03	0.49	0.49	0.52	-0.014633	-0.0916	-0.3065
117	3.82	-7.0	7.81	11.04	30.00	18.58	15.01	NONE	0.07	0.11	0.18	0.25	-0.016004	-0.0731	-0.8656
118	3.76	15.1	5.90	10.83	29.52	30.00	14.56	NONE	0.07	0.23	0.22	0.30	-0.015762	-0.0539	-1.4436
119	3.75	32.6	5.79	10.72	29.49	30.00	14.14	NONE	0.07	0.47	0.47	0.55	-0.014295	-0.0359	-1.9888
120*	3.69	41.0	3.93	10.64	29.47	30.00	13.93	NONE	0.07	0.59	0.58	0.66	------	------	------
120*	3.69	41.0	3.93	12.09	29.23	30.00	6.17	NONE	0.07	0.63	0.61	0.70	------	------	------
121	3.69	47.0	3.83	12.01	29.16	30.00	6.08	NONE	0.07	0.71	0.69	0.78	-0.011861	-0.0201	-2.4701
122	3.68	58.8	3.76	11.86	29.01	30.00	5.91	NONE	0.07	0.86	0.83	0.93	-0.008702	-0.0078	-2.8531
123	3.62	65.1	1.85	11.71	28.85	30.00	5.75	NONE	0.07	0.93	0.89	1.00	-0.005220	0.0001	-3.1114
124	3.55	68.9	-0.06	11.56	28.69	30.00	5.59	NONE	0.07	0.95	0.91	1.02	-0.001671	0.0035	-3.2390
3*	3.55	69.7	-0.12	26.37	28.96	30.00	5.52	NONE	0.03	0.93	0.90	0.96	0.000102	0.0035	-3.2535

A-2

Figure A.2 Stress and Deflection Data, Full Live Load, East Frame

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 FULL LIVE - EAST FILE OU8.FRA.1
FORCE, MOMENT, AND STRESS REPORT PAGE 9
MEMBER 3 - 5 LOAD CONDITION 1 - DL+FULL LIVE LOAD

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
3*	3.55	68.7	0.12	26.36	29.07	30.00	5.99	NONE	0.03	0.91	0.88	0.93	0.000102	0.0035	-3.2535
125	3.55	68.9	0.07	11.66	28.91	30.00	6.07	NONE	0.07	0.93	0.90	0.99	0.001845	0.0036	-3.2354
126	3.62	65.1	-1.85	11.81	29.06	30.00	6.23	NONE	0.07	0.90	0.88	0.97	0.005335	0.0072	-3.1022
127	3.68	58.7	-3.76	11.95	29.21	30.00	6.40	NONE	0.07	0.84	0.82	0.90	0.008755	0.0153	-2.8402
128	3.69	46.9	-3.88	12.10	29.35	30.00	6.59	NONE	0.07	0.69	0.68	0.76	0.011851	0.0277	-2.4558
129*	3.69	40.9	-3.93	12.18	29.42	30.00	6.68	NONE	0.07	0.61	0.60	0.68	------	------	------
129*	3.69	40.9	-3.93	10.94	29.63	30.00	13.33	NONE	0.07	0.57	0.57	0.64	------	------	------
130	3.75	32.5	-5.79	11.02	29.64	30.00	13.52	NONE	0.07	0.46	0.46	0.53	0.014238	0.0434	-1.9757
131	3.76	15.0	-5.90	11.17	29.67	30.00	13.92	NONE	0.07	0.22	0.22	0.29	0.015677	0.0614	-1.4340
132	3.82	-7.1	-7.81	11.33	30.00	18.59	14.34	NONE	0.07	0.11	0.17	0.25	0.015913	0.0805	-0.8602
133	3.83	-30.6	-7.92	25.15	30.00	30.00	14.78	NONE	0.03	0.48	0.49	0.52	0.014566	0.0989	-0.3050
134*	3.83	-42.6	-7.98	25.06	30.00	30.00	15.01	NONE	0.03	0.68	0.69	0.72	------	------	------

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 FULL LIVE - EAST FILE OU8.FRA.1
FORCE, MOMENT, AND STRESS REPORT PAGE 10
MEMBER 4 - 5 LOAD CONDITION 1 - DL+FULL LIVE LOAD

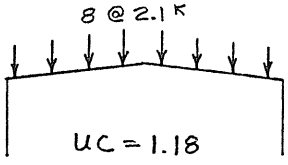
POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
4*	8.36	0.0	3.54	22.08	30.00	30.00	13.24	NONE	0.08	0.00	0.00	0.08	-0.008099	0.0000	0.0000
136	8.35	-2.7	3.54	22.08	30.00	30.00	13.24	NONE	0.08	0.07	0.06	0.14	-0.007942	0.0725	-0.0004
137	8.32	-8.0	3.54	22.08	30.00	30.00	13.24	NONE	0.08	0.21	0.19	0.26	-0.007315	0.2119	-0.0011
138	8.30	-13.3	3.54	22.08	30.00	30.00	13.24	NONE	0.08	0.36	0.31	0.39	-0.006059	0.3343	-0.0019
139	8.28	-18.6	3.54	22.08	30.00	30.00	13.24	NONE	0.08	0.50	0.44	0.51	-0.004176	0.4283	-0.0027
140	8.26	-24.0	3.54	22.08	30.00	30.00	13.24	NONE	0.08	0.64	0.56	0.64	-0.001664	0.4826	-0.0036
141	8.24	-29.3	3.54	22.08	30.00	30.00	13.24	NONE	0.08	0.79	0.69	0.76	0.001475	0.4858	-0.0047
142	8.22	-34.6	3.54	22.08	30.00	30.00	13.24	NONE	0.08	0.93	0.81	0.89	0.005242	0.4267	-0.0058
143*	8.21	-37.3	3.54	22.08	30.00	30.00	13.24	NONE	0.08	1.00	0.88	0.95	------	------	------
143*	8.30	-37.3	3.32	21.86	30.00	30.00	13.24	NONE	0.07	0.99	0.69	0.94	------	------	------
144	8.24	-38.1	3.32	21.86	30.00	30.00	13.24	NONE	0.07	1.01	0.71	0.97	0.007951	0.3473	-0.0067
145*	8.22	-38.9	3.32	21.86	30.00	30.00	13.24	NONE	0.07	1.04	0.72	0.99	------	------	------
145*	8.11	-38.9	3.59	21.33	30.00	30.00	34.53	NONE	0.06	0.95	0.70	0.91	------	------	------
146	8.11	-40.7	3.59	21.33	30.00	30.00	34.53	NONE	0.06	0.99	0.73	0.95	0.009944	0.2677	-0.0072
147*	8.11	-42.5	3.59	21.33	30.00	30.00	34.53	NONE	0.06	1.04	0.77	1.00	------	------	------

A.2

Figure A.2 Stress and Deflection Data, Full Live Load, East Frame Continued

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 FULL LIVE - WEST FILE OU7.FRA.1
FORCE, MOMENT, AND STRESS REPORT PAGE 7
MEMBER 1 - 2 LOAD CONDITION 1 - DL+ FULL LIVE LOAD

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
1*	9.55	0.0	-4.08	22.05	30.00	30.00	13.00	NONE	0.09	0.00	0.00	0.09	0.009530	0.0000	0.0000
101	9.54	-3.1	-4.08	22.05	30.00	30.00	13.00	NONE	0.09	0.08	0.07	0.16	0.009348	-0.0852	-0.0004
102	9.52	-9.2	-4.08	22.05	30.00	30.00	13.00	NONE	0.09	0.25	0.22	0.31	0.008620	-0.2490	-0.0012
103	9.50	-15.3	-4.08	22.05	30.00	30.00	13.00	NONE	0.09	0.41	0.36	0.45	0.007164	-0.3931	-0.0021
104	9.48	-21.5	-4.08	22.05	30.00	30.00	13.00	NONE	0.09	0.58	0.51	0.60	0.004980	-0.5044	-0.0031
105	9.46	-27.6	-4.08	22.05	30.00	30.00	13.00	NONE	0.09	0.74	0.65	0.74	0.002068	-0.5697	-0.0041
106	9.43	-33.7	-4.08	22.05	30.00	30.00	13.00	NONE	0.09	0.91	0.80	0.89	-0.001572	-0.5760	-0.0053
107	9.41	-39.9	-4.08	22.05	30.00	30.00	13.00	NONE	0.09	1.08	0.94	1.03	-0.005940	-0.5100	-0.0066
108*	9.40	-43.0	-4.08	22.05	30.00	30.00	13.00	NONE	0.09	1.16	1.02	1.10	------	------	------
108*	9.51	-43.0	-3.83	21.84	30.00	30.00	13.00	NONE	0.08	1.15	0.80	1.09	------	------	------
109	9.45	-43.9	-3.83	21.84	30.00	30.00	13.00	NONE	0.08	1.17	0.82	1.12	-0.009082	-0.4198	-0.0076
110*	9.43	-44.9	-3.83	21.84	30.00	30.00	13.00	NONE	0.08	1.20	0.83	1.14	------	------	------
110*	9.30	-44.9	-4.14	21.30	30.00	30.00	34.29	NONE	0.07	1.10	0.81	1.05	------	------	------
111	9.30	-47.0	-4.14	21.30	30.00	30.00	34.29	NONE	0.07	1.15	0.85	1.11	-0.011435	-0.3270	-0.0083
112*	9.30	-49.1	-4.14	21.30	30.00	30.00	34.29	NONE	0.07	1.20	0.89	1.16	------	------	------



STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 FULL LIVE - WEST FILE OU7.FRA.1
FORCE, MOMENT, AND STRESS REPORT PAGE 8
MEMBER 2 - 3 LOAD CONDITION 1 - DL+ FULL LIVE LOAD

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
115*	4.42	-49.2	9.15	25.02	30.00	30.00	15.08	NONE	0.04	0.81	0.80	0.84	------	------	------
116	4.42	-35.5	9.10	25.11	30.00	30.00	14.84	NONE	0.04	0.57	0.57	0.61	-0.016851	-0.1316	-0.3526
117	4.41	-8.3	8.99	11.07	30.00	18.56	14.38	NONE	0.08	0.13	0.21	0.29	-0.018449	-0.1103	-0.9968
118	4.34	17.1	6.78	10.91	29.52	30.00	13.95	NONE	0.08	0.26	0.25	0.34	-0.018184	-0.0883	-1.6633
119	4.33	37.3	6.67	10.75	29.49	30.00	13.55	NONE	0.08	0.55	0.53	0.63	-0.016507	-0.0675	-2.2925
120*	4.26	46.9	4.51	10.67	29.48	30.00	13.36	NONE	0.08	0.68	0.66	0.76	------	------	------
120*	4.26	46.9	4.51	12.04	29.22	30.00	6.17	NONE	0.08	0.72	0.70	0.80	------	------	------
121	4.26	53.8	4.46	11.96	29.14	30.00	6.08	NONE	0.08	0.82	0.79	0.90	-0.013718	-0.0494	-2.8487
122	4.25	67.4	4.34	11.81	28.99	30.00	5.91	NONE	0.08	0.99	0.95	1.07	-0.010098	-0.0352	-3.2924
123	4.18	74.6	2.13	11.66	28.84	30.00	5.75	NONE	0.08	1.07	1.02	1.15	-0.006104	-0.0260	-3.5931
124	4.10	79.0	-0.09	11.52	28.67	30.00	5.59	NONE	0.08	1.10	1.04	1.18	-0.002032	-0.0220	-3.7437
3*	4.10	78.8	-0.14	26.36	28.95	30.00	5.52	NONE	0.03	1.07	1.02	1.10	0.000004	-0.0219	-3.7625

A.3

Figure A.3 Stress and Deflection Data, Full Live Load, West Frame

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK.
STR4 50 12/25 14/25 FULL LIVE - WEST
FORCE, MOMENT, AND STRESS REPORT
MEMBER 3 - 5 LOAD CONDITION 1 - DL+ FULL LIVE LOAD

JOB PE107
FILE OU7.FRA.1
PAGE 9

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
3*	4.10	78.8	0.14	26.36	28.97	30.00	5.67	NONE	0.03	1.07	1.02	1.11	0.000004	-0.0219	-3.7625
125	4.10	79.0	0.08	11.39	28.63	30.00	5.75	NONE	0.08	1.10	1.04	1.18	0.002033	-0.0219	-3.7437
126	4.18	74.6	-2.13	11.53	28.79	30.00	5.90	NONE	0.08	1.07	1.02	1.15	0.006096	-0.0179	-3.5935
127	4.25	67.5	-4.34	11.69	28.95	30.00	6.07	NONE	0.08	1.00	0.95	1.08	0.010082	-0.0086	-3.2938
128	4.26	53.9	-4.46	11.82	29.10	30.00	6.24	NONE	0.08	0.82	0.79	0.90	0.013696	0.0055	-2.8518
129*	4.26	47.0	-4.51	11.90	29.17	30.00	6.34	NONE	0.08	0.73	0.70	0.81	------	------	------
129*	4.26	47.0	-4.51	10.55	29.39	30.00	13.63	NONE	0.08	0.68	0.66	0.76	------	------	------
130	4.33	37.4	-6.67	10.63	29.41	30.00	13.83	NONE	0.08	0.55	0.53	0.63	0.016488	0.0237	-2.2964
131	4.34	17.2	-6.78	10.79	29.44	30.00	14.24	NONE	0.08	0.26	0.25	0.35	0.018174	0.0445	-1.6666
132	4.41	-8.2	-8.99	10.95	30.00	18.60	14.68	NONE	0.08	0.13	0.20	0.29	0.018445	0.0667	-0.9992
133	4.42	-35.4	-9.10	25.11	30.00	30.00	15.14	NONE	0.04	0.57	0.57	0.60	0.016853	0.0880	-0.3539
134*	4.42	-49.1	-9.16	25.02	30.00	30.00	15.38	NONE	0.04	0.81	0.80	0.84	------	------	------

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK.
STR4 50 12/25 14/25 FULL LIVE - WEST
FORCE, MOMENT, AND STRESS REPORT
MEMBER 4 - 5 LOAD CONDITION 1 - DL+ FULL LIVE LOAD

JOB PE107
FILE OU7.FRA.1
PAGE 10

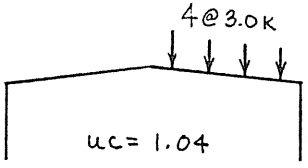
POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
4*	9.55	0.0	4.08	22.17	30.00	30.00	13.00	NONE	0.09	0.00	0.00	0.09	-0.009085	0.0000	0.0000
136	9.54	-3.1	4.08	22.17	30.00	30.00	13.00	NONE	0.09	0.08	0.07	0.16	-0.008905	0.0813	-0.0004
137	9.52	-9.2	4.08	22.17	30.00	30.00	13.00	NONE	0.09	0.25	0.22	0.30	-0.008188	0.2375	-0.0013
138	9.50	-15.4	4.08	22.17	30.00	30.00	13.00	NONE	0.09	0.41	0.36	0.45	-0.006754	0.3742	-0.0022
139	9.48	-21.5	4.08	22.17	30.00	30.00	13.00	NONE	0.09	0.58	0.50	0.59	-0.004603	0.4786	-0.0032
140	9.46	-27.7	4.08	22.17	30.00	30.00	13.00	NONE	0.09	0.74	0.65	0.73	-0.001735	0.5376	-0.0043
141	9.43	-33.8	4.08	22.17	30.00	30.00	13.00	NONE	0.09	0.91	0.79	0.88	0.001850	0.5383	-0.0055
142	9.41	-40.0	4.08	22.17	30.00	30.00	13.00	NONE	0.09	1.08	0.93	1.02	0.006152	0.4677	-0.0068
143*	9.40	-43.0	4.08	22.17	30.00	30.00	13.00	NONE	0.09	1.16	1.00	1.09	------	------	------
143*	9.50	-43.0	3.85	21.96	30.00	30.00	13.00	NONE	0.08	1.15	0.80	1.09	------	------	------
144	9.44	-44.0	3.85	21.96	30.00	30.00	13.00	NONE	0.08	1.17	0.81	1.12	0.009249	0.3751	-0.0078
145*	9.43	-45.0	3.85	21.96	30.00	30.00	13.00	NONE	0.08	1.20	0.83	1.14	------	------	------
145*	9.30	-45.0	4.15	21.42	30.00	30.00	35.03	NONE	0.07	1.10	0.81	1.05	------	------	------
146	9.30	-47.0	4.15	21.42	30.00	30.00	35.03	NONE	0.07	1.15	0.84	1.10	0.011534	0.2823	-0.0084
147*	9.30	-49.1	4.15	21.42	30.00	30.00	35.03	NONE	0.07	1.20	0.88	1.15	------	------	------

4.3

Figure A.3 Stress and Deflection Data, Full Live Load, West Frame Continued

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 UNBAL LIVE - EAST FILE OU8.FRA.4
FORCE, MOMENT, AND STRESS REPORT PAGE 6
MEMBER 1 - 2 LOAD CONDITION 1 - DL+UNBAL LIVE

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
1*	4.72	0.0	-3.00	22.10	30.00	30.00	13.24	NONE	0.04	0.00	0.00	0.04	0.010353	0.0000	0.0000
101	4.71	-2.3	-3.00	22.10	30.00	30.00	13.24	NONE	0.04	0.06	0.05	0.10	0.010219	-0.0930	-0.0001
102	4.69	-6.8	-3.00	22.10	30.00	30.00	13.24	NONE	0.04	0.18	0.16	0.20	0.009686	-0.2741	-0.0002
103	4.67	-11.3	-3.00	22.10	30.00	30.00	13.24	NONE	0.04	0.30	0.27	0.31	0.008618	-0.4407	-0.0005
104	4.65	-15.8	-3.00	22.10	30.00	30.00	13.24	NONE	0.04	0.43	0.37	0.42	0.007018	-0.5832	-0.0007
105	4.62	-20.3	-3.00	22.10	30.00	30.00	13.24	NONE	0.04	0.55	0.48	0.52	0.004883	-0.6920	-0.0010
106	4.60	-24.9	-3.00	22.10	30.00	30.00	13.24	NONE	0.04	0.67	0.59	0.64	0.002215	-0.7574	-0.0015
107	4.58	-29.4	-3.00	22.10	30.00	30.00	13.24	NONE	0.04	0.79	0.69	0.76	-0.000987	-0.7698	-0.0020
108*	4.57	-31.6	-3.00	22.10	30.00	30.00	13.24	NONE	0.04	0.85	0.75	0.82	------	------	------
108*	4.65	-31.6	-2.88	21.88	30.00	30.00	13.24	NONE	0.04	0.84	0.58	0.82	------	------	------
109	4.60	-32.4	-2.88	21.88	30.00	30.00	13.24	NONE	0.04	0.86	0.60	0.84	-0.003288	-0.7441	-0.0025
110*	4.58	-33.1	-2.88	21.88	30.00	30.00	13.24	NONE	0.04	0.88	0.61	0.86	------	------	------
110*	4.48	-33.1	-3.03	21.35	30.00	30.00	34.62	NONE	0.03	0.81	0.59	0.79	------	------	------
111	4.48	-34.6	-3.03	21.35	30.00	30.00	34.62	NONE	0.03	0.85	0.62	0.82	-0.004983	-0.7071	-0.0028
112*	4.48	-36.1	-3.03	21.35	30.00	30.00	34.62	NONE	0.03	0.88	0.65	0.86	------	------	------



STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 UNBAL LIVE - EAST FILE OU8.FRA.4
FORCE, MOMENT, AND STRESS REPORT PAGE 7
MEMBER 2 - 3 LOAD CONDITION 1 - DL+UNBAL LIVE

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
115*	3.16	-36.8	4.37	25.01	30.00	30.00	15.74	NONE	0.03	0.60	0.60	0.63	------	------	------
116	3.16	-30.3	4.31	25.10	30.00	30.00	15.49	NONE	0.03	0.49	0.49	0.51	-0.009085	-0.6143	-0.1832
117	3.16	-17.6	4.20	11.04	30.00	18.58	15.01	NONE	0.06	0.27	0.44	0.50	-0.010807	-0.6025	-0.5457
118	3.15	-5.1	4.09	10.88	30.00	18.47	14.56	NONE	0.06	0.08	0.12	0.18	-0.011576	-0.5891	-0.9523
119	3.15	7.0	3.98	10.72	29.49	30.00	14.14	NONE	0.06	0.10	0.10	0.16	-0.011532	-0.5754	-1.3713
120*	3.15	12.9	3.92	10.64	29.47	30.00	13.93	NONE	0.06	0.18	0.18	0.24	------	------	------
120*	3.15	12.9	3.92	12.09	29.23	30.00	6.17	NONE	0.06	0.20	0.19	0.26	------	------	------
121	3.15	18.9	3.86	12.01	29.16	30.00	6.08	NONE	0.06	0.29	0.28	0.34	-0.010738	-0.5619	-1.7811
122	3.14	30.6	3.75	11.86	29.01	30.00	5.91	NONE	0.06	0.45	0.43	0.51	-0.009266	-0.5498	-2.1542
123	3.14	42.0	3.63	11.71	28.85	30.00	5.75	NONE	0.06	0.60	0.58	0.66	-0.007229	-0.5400	-2.4619
124	3.13	53.1	3.52	11.56	28.69	30.00	5.59	NONE	0.06	0.74	0.70	0.79	-0.004716	-0.5331	-2.6851
3*	3.13	58.4	3.46	26.37	28.96	30.00	5.52	NONE	0.03	0.79	0.76	0.82	-0.003350	-0.5310	-2.7597

A.4

a) East Frame

Figure A.4 Stress and Deflection Data, Unbalanced Live Load

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 UNBAL LIVE - EAST FILE OU8.FRA.4
FORCE, MOMENT, AND STRESS REPORT PAGE 8
MEMBER 3 - 5 LOAD CONDITION 1 - DL+UNBAL LIVE

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
3*	2.88	58.4	3.67	26.36	29.07	30.00	5.99	NONE	0.02	0.77	0.75	0.79	-0.003350	-0.5310	-2.7597
125	2.89	64.1	3.61	11.66	28.91	30.00	6.07	NONE	0.05	0.86	0.84	0.92	-0.001728	-0.5331	-2.8068
126	3.00	68.7	0.50	11.81	29.06	30.00	6.23	NONE	0.06	0.95	0.93	1.01	0.001738	-0.5340	-2.8086
127	3.10	69.3	-2.61	11.95	29.21	30.00	6.40	NONE	0.06	0.99	0.97	1.04	0.005556	-0.5302	-2.6745
128	3.11	61.1	-2.73	12.10	29.35	30.00	6.59	NONE	0.06	0.90	0.88	0.95	0.009383	-0.5214	-2.3963
129*	3.11	56.8	-2.79	12.18	29.42	30.00	6.68	NONE	0.06	0.85	0.83	0.90	-------	-------	-------
129*	3.11	56.8	-2.79	10.94	29.63	30.00	13.33	NONE	0.06	0.80	0.79	0.86	-------	-------	-------
130	3.22	48.5	-5.84	11.02	29.64	30.00	13.52	NONE	0.06	0.69	0.69	0.75	0.012673	-0.5081	-1.9904
131	3.22	30.8	-5.95	11.17	29.67	30.00	13.92	NONE	0.06	0.46	0.45	0.52	0.015088	-0.4913	-1.4876
132	3.33	5.8	-9.06	11.33	29.69	30.00	14.34	NONE	0.06	0.09	0.09	0.15	0.016259	-0.4722	-0.9176
133	3.33	-21.5	-9.17	25.15	30.00	30.00	14.78	NONE	0.03	0.34	0.34	0.37	0.015676	-0.4527	-0.3353
134*	3.33	-35.3	-9.23	25.06	30.00	30.00	15.01	NONE	0.03	0.57	0.57	0.60	-------	-------	-------

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 UNBAL LIVE - EAST FILE OU8.FRA.4
FORCE, MOMENT, AND STRESS REPORT PAGE 9
MEMBER 4 - 5 LOAD CONDITION 1 - DL+UNBAL LIVE

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
4*	9.59	0.0	2.99	22.08	30.00	30.00	13.24	NONE	0.09	0.00	0.00	0.09	-0.003348	0.0000	0.0000
136	9.58	-2.3	2.99	22.08	30.00	30.00	13.24	NONE	0.09	0.06	0.05	0.14	-0.003215	0.0297	-0.0005
137	9.56	-6.8	2.99	22.08	30.00	30.00	13.24	NONE	0.09	0.18	0.16	0.25	-0.002683	0.0843	-0.0016
138	9.53	-11.3	2.99	22.08	30.00	30.00	13.24	NONE	0.09	0.30	0.26	0.35	-0.001620	0.1246	-0.0027
139	9.51	-15.8	2.99	22.08	30.00	30.00	13.24	NONE	0.09	0.42	0.37	0.46	-0.000025	0.1408	-0.0039
140	9.49	-20.3	2.99	22.08	30.00	30.00	13.24	NONE	0.09	0.54	0.48	0.56	0.002101	0.1233	-0.0051
141	9.47	-24.8	2.99	22.08	30.00	30.00	13.24	NONE	0.09	0.67	0.58	0.67	0.004759	0.0627	-0.0064
142	9.45	-29.3	2.99	22.08	30.00	30.00	13.24	NONE	0.09	0.79	0.69	0.77	0.007949	-0.0508	-0.0079
143*	9.44	-31.6	2.99	22.08	30.00	30.00	13.24	NONE	0.09	0.85	0.74	0.83	-------	-------	-------
143*	9.51	-31.6	2.75	21.86	30.00	30.00	13.24	NONE	0.08	0.84	0.59	0.78	-------	-------	-------
144	9.46	-32.2	2.75	21.86	30.00	30.00	13.24	NONE	0.08	0.86	0.60	0.80	0.010243	-0.1602	-0.0089
145*	9.44	-32.9	2.75	21.86	30.00	30.00	13.24	NONE	0.08	0.88	0.61	0.82	-------	-------	-------
145*	9.34	-32.9	3.06	21.33	30.00	30.00	34.53	NONE	0.07	0.80	0.59	0.76	-------	-------	-------
146	9.34	-34.4	3.06	21.33	30.00	30.00	34.53	NONE	0.07	0.84	0.62	0.79	0.011929	-0.2588	-0.0096
147*	9.34	-35.9	3.06	21.33	30.00	30.00	34.53	NONE	0.07	0.88	0.65	0.83	-------	-------	-------

A.4

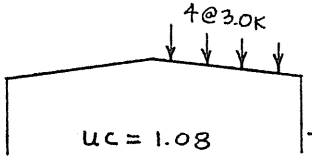
a) East Frame Continued

Figure A.4 Stress and Deflection Data, Unbalanced Live Load Continued

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK.
STR4 50 12/25 14/25 UNBAL LIVE - WEST
FORCE, MOMENT, AND STRESS REPORT
MEMBER 1 - 2 LOAD CONDITION 1 - DL+UNBAL LL

JOB PE107
FILE OU7.FRA.3
PAGE 6

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
1*	4.72	0.0	-3.02	22.05	30.00	30.00	13.00	NONE	0.04	0.00	0.00	0.04	0.010589	0.0000	0.0000
101	4.71	-2.3	-3.02	22.05	30.00	30.00	13.00	NONE	0.04	0.06	0.05	0.10	0.010454	-0.0949	-0.0001
102	4.68	-6.8	-3.02	22.05	30.00	30.00	13.00	NONE	0.04	0.18	0.16	0.20	0.009916	-0.2799	-0.0002
103	4.66	-11.3	-3.02	22.05	30.00	30.00	13.00	NONE	0.04	0.31	0.27	0.31	0.008840	-0.4503	-0.0005
104	4.64	-15.9	-3.02	22.05	30.00	30.00	13.00	NONE	0.04	0.43	0.38	0.42	0.007225	-0.5964	-0.0007
105	4.62	-20.4	-3.02	22.05	30.00	30.00	13.00	NONE	0.04	0.55	0.48	0.53	0.005072	-0.7086	-0.0010
106	4.60	-25.0	-3.02	22.05	30.00	30.00	13.00	NONE	0.04	0.67	0.59	0.64	0.002380	-0.7771	-0.0015
107	4.58	-29.5	-3.02	22.05	30.00	30.00	13.00	NONE	0.04	0.80	0.70	0.76	-0.000850	-0.7921	-0.0020
108*	4.57	-31.8	-3.02	22.05	30.00	30.00	13.00	NONE	0.04	0.86	0.75	0.83	------	------	------
108*	4.65	-31.8	-2.90	21.84	30.00	30.00	13.00	NONE	0.04	0.85	0.59	0.82	------	------	------
109	4.59	-32.5	-2.90	21.84	30.00	30.00	13.00	NONE	0.04	0.87	0.60	0.84	-0.003173	-0.7680	-0.0024
110*	4.57	-33.2	-2.90	21.84	30.00	30.00	13.00	NONE	0.04	0.89	0.62	0.86	------	------	------
110*	4.47	-33.2	-3.05	21.30	30.00	30.00	34.29	NONE	0.03	0.81	0.60	0.79	------	------	------
111	4.47	-34.7	-3.05	21.30	30.00	30.00	34.29	NONE	0.03	0.85	0.63	0.83	-0.004914	-0.7314	-0.0028
112*	4.47	-36.3	-3.05	21.30	30.00	30.00	34.29	NONE	0.03	0.89	0.66	0.87	------	------	------



STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK.
STR4 50 12/25 14/25 UNBAL LIVE - WEST
FORCE, MOMENT, AND STRESS REPORT
MEMBER 2 - 3 LOAD CONDITION 1 - DL+UNBAL LL

JOB PE107
FILE OU7.FRA.3
PAGE 7

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
115*	3.18	-37.0	4.36	25.02	30.00	30.00	15.08	NONE	0.03	0.61	0.60	0.63	------	------	------
116	3.18	-30.5	4.31	25.11	30.00	30.00	14.84	NONE	0.03	0.49	0.49	0.52	-0.009086	-0.6386	-0.1830
117	3.17	-17.8	4.19	11.07	30.00	18.56	14.38	NONE	0.06	0.28	0.44	0.50	-0.010828	-0.6268	-0.5459
118	3.17	-5.4	4.08	10.91	30.00	18.45	13.95	NONE	0.06	0.08	0.13	0.19	-0.011614	-0.6135	-0.9535
119	3.17	6.7	3.97	10.75	29.49	30.00	13.55	NONE	0.06	0.10	0.10	0.16	-0.011584	-0.5997	-1.3742
120*	3.17	12.6	3.92	10.67	29.48	30.00	13.36	NONE	0.06	0.18	0.18	0.24	------	------	------
120*	3.16	12.6	3.92	12.04	29.22	30.00	6.17	NONE	0.06	0.19	0.19	0.25	------	------	------
121	3.16	18.6	3.86	11.96	29.14	30.00	6.08	NONE	0.06	0.28	0.27	0.34	-0.010806	-0.5862	-1.7862
122	3.16	30.4	3.75	11.81	28.99	30.00	5.91	NONE	0.06	0.45	0.43	0.51	-0.009348	-0.5741	-2.1622
123	3.15	41.8	3.63	11.66	28.84	30.00	5.75	NONE	0.06	0.60	0.57	0.66	-0.007326	-0.5642	-2.4733
124	3.15	52.8	3.52	11.52	28.67	30.00	5.59	NONE	0.06	0.73	0.70	0.80	-0.004827	-0.5572	-2.7003
3*	3.15	58.2	3.46	26.36	28.95	30.00	5.52	NONE	0.03	0.79	0.76	0.82	-0.003466	-0.5550	-2.7771

A.4

b) West Frame

Figure A.4 Stress and Deflection Data, Unbalanced Live Load Continued

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 UNBAL LIVE - WEST FILE OU7.FRA.3
FORCE, MOMENT, AND STRESS REPORT PAGE 8
MEMBER 3 - 5 LOAD CONDITION 1 - DL+UNBAL LL

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
3*	2.90	58.2	3.67	26.36	28.97	30.00	5.67	NONE	0.02	0.79	0.75	0.82	-0.003466	-0.5550	-2.7771
125	2.90	63 8	3.61	11.39	28.63	30.00	5.75	NONE	0.06	0.89	0.84	0.95	-0.001828	-0.5571	-2.8260
126	3.01	68.4	0.50	11.53	28.79	30.00	5.90	NONE	0.06	0.98	0.93	1.04	0.001674	-0.5582	-2.8308
127	3.12	69.1	-2.61	11.69	28.95	30.00	6.07	NONE	0.06	1.02	0.97	1.08	0.005538	-0.5545	-2.6988
128	3.12	60.9	-2.73	11.82	29.10	30.00	6.24	NONE	0.06	0.93	0.89	0.99	0.009416	-0.5457	-2.4214
129*	3.13	56 7	-2.78	11.90	29.17	30.00	6.34	NONE	0.06	0.88	0.84	0.94	-------	-------	-------
129*	3.13	56.7	-2.78	10.55	29.39	30.00	13.63	NONE	0.06	0.82	0.79	0.88	-------	-------	-------
130	3.23	48.5	-5.84	10.63	29.41	30.00	13.83	NONE	0.06	0.71	0.69	0.78	0.012756	-0.5324	-2.0134
131	3.24	30.8	-5.95	10.79	29.44	30.00	14.24	NONE	0.06	0.47	0.46	0.53	0.015213	-0.5155	-1.5051
132	3.34	5.7	-9.06	10.95	29.47	30.00	14.68	NONE	0.06	0.09	0.09	0.15	0.016402	-0.4962	-0.9282
133	3.35	-21.7	-9.17	25.11	30.00	30.00	15.14	NONE	0.03	0.35	0.35	0.37	0.015798	-0.4765	-0.3390
134*	3 35	-35.5	-9.23	25.02	30.00	30.00	15.38	NONE	0.03	0.59	0.58	0.61	-------	-------	-------

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 UNBAL LIVE - WEST FILE OU7.FRA.3
FORCE, MOMENT, AND STRESS REPORT PAGE 9
MEMBER 4 - 5 LOAD CONDITION 1 - DL+UNBAL LL

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
4*	9.58	0.0	3.01	22.17	30.00	30.00	13.00	NONE	0.09	0.00	0.00	0.09	-0.003155	0.0000	0.0000
136	9.57	-2.3	3.01	22.17	30.00	30.00	13.00	NONE	0.09	0.06	0.05	0.14	-0.003023	0.0280	-0.0005
137	9.55	-6.8	3.01	22.17	30.00	30.00	13.00	NONE	0.09	0.18	0.16	0.25	-0.002494	0.0791	-0.0016
138	9.53	-11.3	3.01	22.17	30.00	30.00	13.00	NONE	0.09	0.30	0.26	0.35	-0.001437	0.1159	-0.0028
139	9.51	-15.9	3.01	22.17	30.00	30.00	13.00	NONE	0.09	0.43	0.37	0.46	0.000149	0.1289	-0.0039
140	9.49	-20.4	3.01	22.17	30.00	30.00	13.00	NONE	0.09	0.55	0.48	0.56	0.002264	0.1084	-0.0052
141	9.46	-24.9	3.01	22.17	30.00	30.00	13.00	NONE	0.09	0.67	0.58	0.67	0.004908	0.0449	-0.0065
142	9.44	-29.5	3.01	22.17	30.00	30.00	13.00	NONE	0.09	0.79	0.69	0.77	0.008080	-0.0711	-0.0080
143*	9.43	-31.7	3.01	22.17	30.00	30.00	13.00	NONE	0.09	0.85	0.74	0.83	-------	-------	-------
143*	9.50	-31.7	2.77	21.96	30.00	30.00	13.00	NONE	0.08	0.85	0.59	0.79	-------	-------	-------
144	9.45	-32.4	2.77	21.96	30.00	30.00	13.00	NONE	0.08	0.87	0.60	0.81	0.010363	-0.1820	-0.0090
145*	9.43	-33.1	2.77	21.96	30.00	30.00	13.00	NONE	0.08	0.88	0.61	0.83	-------	-------	-------
145*	9.34	-33.1	3.07	21.42	30.00	30.00	35.03	NONE	0.07	0.81	0.60	0.76	-------	-------	-------
146	9.34	-34.6	3.07	21.42	30.00	30.00	35.03	NONE	0.07	0.85	0.62	0.80	0.012046	-0.2820	-0.0097
147*	9.34	-36.2	3.07	21.42	30.00	30.00	35.03	NONE	0.07	0.88	0.65	0.84	-------	-------	-------

A.4

b) West Frame Continued

Figure A.4 Stress and Deflection Data, Unbalanced Live Load Continued

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 FILE OU.FRA.8
FORCE, MOMENT, AND STRESS REPORT PAGE 6
MEMBER 1 - 2 LOAD CONDITION 1 - DL + WLR

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
1*	4.81	0.0	-7.41	29.47	40.00	40.00	17.65	NONE	0.03	0.00	0.00	0.03	0.061067	0.0000	0.0000
101	4.80	-5.6	-7.41	29.47	40.00	40.00	17.65	NONE	0.03	0.11	0.10	0.13	0.060738	-0.5502	0.0010
102	4.78	-16.7	-7.41	29.47	40.00	40.00	17.65	NONE	0.03	0.34	0.30	0.33	0.059421	-1.6388	0.0029
103	4.76	-27.9	-7.41	29.47	40.00	40.00	17.65	NONE	0.03	0.56	0.49	0.54	0.056788	-2.6917	0.0047
104	4.74	-39.0	-7.41	29.47	40.00	40.00	17.65	NONE	0.03	0.79	0.69	0.76	0.052838	-3.6852	0.0064
105	4.72	-50.2	-7.41	29.47	40.00	40.00	17.65	NONE	0.03	1.01	0.89	0.99	0.047571	-4.5953	0.0078
106	4.70	-61.3	-7.41	29.47	40.00	40.00	17.65	NONE	0.03	1.24	1.08	1.22	0.040988	-5.3985	0.0091
107	4.67	-72.5	-7.41	29.47	40.00	40.00	17.65	NONE	0.03	1.47	1.28	1.44	0.033088	-6.0707	0.0100
108*	4.66	-78.1	-7.41	29.47	40.00	40.00	17.65	NONE	0.03	1.58	1.38	1.55	------	------	------
108*	4.86	-78.1	-7.28	29.17	40.00	40.00	17.65	NONE	0.03	1.56	1.08	1.54	------	------	------
109	4.81	-79.9	-7.28	29.17	40.00	40.00	17.65	NONE	0.03	1.60	1.11	1.58	0.027410	-6.4347	0.0105
110*	4.79	-81.7	-7.28	29.17	40.00	40.00	17.65	NONE	0.03	1.64	1.13	1.62	------	------	------
110*	4.54	-81.7	-7.44	28.46	40.00	40.00	46.16	NONE	0.02	1.50	1.10	1.48	------	------	------
111	4.54	-85.4	-7.44	28.46	40.00	40.00	46.16	NONE	0.02	1.57	1.15	1.55	0.023225	-6.6613	0.0108
112*	4.54	-89.1	-7.44	28.46	40.00	40.00	46.16	NONE	0.02	1.63	1.20	1.62	------	------	------

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 FILE OU.FRA.8
FORCE, MOMENT, AND STRESS REPORT PAGE 7
MEMBER 2 - 3 LOAD CONDITION 1 - DL + WLR

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
115*	7.57	-92.7	4.30	33.34	40.00	40.00	20.99	NONE	0.05	1.14	1.14	1.19	------	------	------
116	7.57	-86.3	4.24	33.47	40.00	40.00	20.65	NONE	0.05	1.04	1.04	1.09	0.012658	-6.9480	0.3222
117	7.56	-73.8	4.13	14.72	40.00	24.77	20.01	NONE	0.11	0.85	1.38	1.49	0.006937	-6.9620	0.6689
118	7.56	-61.5	4.02	14.50	40.00	24.63	19.41	NONE	0.11	0.69	1.11	1.22	0.002418	-6.9697	0.8322
119	7.56	-49.7	3.91	14.29	40.00	24.48	18.85	NONE	0.11	0.53	0.87	0.98	-0.001057	-6.9723	0.8523
120*	7.55	-43.8	3.85	14.19	40.00	24.41	18.58	NONE	0.11	0.46	0.76	0.87	------	------	------
120*	7.55	-43.8	3.85	16.11	40.00	25.62	8.23	NONE	0.11	0.49	0.77	0.87	------	------	------
121	7.55	-37.9	3.79	16.01	40.00	25.56	8.11	NONE	0.11	0.42	0.65	0.76	-0.003726	-6.9712	0.7617
122	7.55	-26.4	3.68	15.81	40.00	25.44	7.88	NONE	0.11	0.28	0.44	0.55	-0.005664	-6.9672	0.5841
123	7.54	-15.2	3.56	15.61	40.00	25.33	7.66	NONE	0.11	0.16	0.25	0.35	-0.006846	-6.9612	0.3493
124	7.54	-4.4	3.45	15.42	40.00	25.18	7.46	NONE	0.11	0.04	0.07	0.18	-0.007375	-6.9541	0.0832
3*	7.54	0.9	3.39	33.50	38.61	40.00	7.36	NONE	0.05	0.01	0.01	0.06	-0.007485	-6.9503	-0.0543

A.5

a) East Frame

Figure A.5 Stress and Deflection Data, Lateral Load Only

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 FILE OU.FRA.8
FORCE, MOMENT, AND STRESS REPORT PAGE 8
MEMBER 3 - 5 LOAD CONDITION 1 - DL + WLR

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
3*	7.28	0.9	3.91	34.05	38.77	40.00	7.99	NONE	0.05	0.01	0.01	0.05	-0.007485	-6.9503	-0.0543
125	7.29	6.9	3.85	15.55	38.55	40.00	8.09	NONE	0.10	0.07	0.07	0.17	-0.007311	-6.9561	-0.1914
126	7.29	18.6	3.74	15.74	38.75	40.00	8.31	NONE	0.10	0.19	0.19	0.29	-0.006637	-6.9673	-0.4530
127	7.29	30.0	3.62	15.94	38.95	40.00	8.54	NONE	0.10	0.32	0.31	0.42	-0.005283	-6.9772	-0.6772
128	7.30	41.0	3.50	16.14	39.14	40.00	8.78	NONE	0.10	0.45	0.44	0.55	-0.003186	-6.9848	-0.8377
129*	7.30	46.4	3.45	16.24	39.23	40.00	8.91	NONE	0.10	0.52	0.51	0.62	------	------	------
129*	7.30	46.4	3.45	14.59	39.50	40.00	17.78	NONE	0.10	0.49	0.49	0.59	------	------	------
130	7.30	51.5	3.39	14.69	39.52	40.00	18.03	NONE	0.10	0.55	0.55	0.65	-0.000415	-6.9892	-0.9063
131	7.31	61.5	3.28	14.90	39.55	40.00	18.56	NONE	0.10	0.68	0.68	0.78	0.003060	-6.9895	-0.8624
132	7.31	71.2	3.17	15.11	39.59	40.00	19.12	NONE	0.10	0.82	0.81	0.92	0.007409	-6.9850	-0.6783
133	7.31	80.5	3.06	33.53	40.00	40.00	19.71	NONE	0.05	0.95	0.96	1.00	0.012721	-6.9744	-0.3212
134*	7.32	85.0	3.00	33.41	40.00	40.00	20.02	NONE	0.05	1.02	1.03	1.07	------	------	------

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 FILE OU.FRA.8
FORCE, MOMENT, AND STRESS REPORT PAGE 9
MEMBER 4 - 5 LOAD CONDITION 1 - DL + WLR

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
4*	-2.52	0.0	-7.58	40.00	40.00	40.00	17.65	NONE	0.01	0.00	0.00	0.01	0.061603	0.0000	0.0000
136	-2.53	5.7	-7.58	40.00	40.00	40.00	17.65	NONE	0.01	0.11	0.10	0.11	0.061267	-0.5550	-0.0011
137	-2.55	17.1	-7.58	40.00	40.00	40.00	17.65	NONE	0.01	0.34	0.30	0.34	0.059921	-1.6530	-0.0031
138	-2.57	28.5	-7.58	40.00	40.00	40.00	17.65	NONE	0.01	0.57	0.50	0.57	0.057229	-2.7144	-0.0051
139	-2.59	39.9	-7.58	40.00	40.00	40.00	17.65	NONE	0.01	0.80	0.70	0.80	0.053192	-3.7151	-0.0070
140	-2.61	51.4	-7.58	40.00	40.00	40.00	17.65	NONE	0.01	1.03	0.90	1.03	0.047808	-4.6306	-0.0087
141	-2.63	62.8	-7.58	40.00	40.00	40.00	17.65	NONE	0.01	1.26	1.11	1.26	0.041079	-5.4367	-0.0101
142	-2.65	74.2	-7.58	40.00	40.00	40.00	17.65	NONE	0.01	1.49	1.31	1.49	0.033003	-6.1091	-0.0112
143*	-2.67	79.9	-7.58	40.00	40.00	40.00	17.65	NONE	0.01	1.61	1.41	1.61	------	------	------
143*	-2.86	79.9	-7.51	40.00	40.00	40.00	17.65	NONE	0.01	1.60	1.11	1.60	------	------	------
144	-2.92	81.8	-7.51	40.00	40.00	40.00	17.65	NONE	0.01	1.63	1.14	1.63	0.027193	-6.4712	-0.0118
145*	-2.94	83.6	-7.51	40.00	40.00	40.00	17.65	NONE	0.01	1.67	1.16	1.67	------	------	------
145*	-2.69	83.6	-7.60	40.00	40.00	40.00	46.04	NONE	0.01	1.53	1.13	1.53	------	------	------
146	-2.69	87.4	-7.60	40.00	40.00	40.00	46.04	NONE	0.01	1.60	1.18	1.60	0.022915	-6.6944	-0.0122
147*	-2.76	90.8	7.40	40.00	40.00	40.00	46.04	NONE	0.01	1.66	1.23	1.66	------	------	------

A.5

a) East Frame Continued

Figure A.5 Stress and Deflection Data, Lateral Load Only Continued

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 FILE OU.FRA.7
FORCE, MOMENT, AND STRESS REPORT PAGE 6
MEMBER 1 - 2 LOAD CONDITION 1 - DL + WLR

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
1*	4.79	0.0	-7.35	29.41	40.00	40.00	17.33	NONE	0.03	0.00	0.00	0.03	0.060852	0.0000	0.0000
101	4.78	-5.5	-7.35	29.41	40.00	40.00	17.33	NONE	0.03	0.11	0.10	0.13	0.060524	-0.5473	0.0009
102	4.75	-16.6	-7.35	29.41	40.00	40.00	17.33	NONE	0.03	0.34	0.29	0.33	0.059213	-1.6300	0.0028
103	4.73	-27.6	-7.35	29.41	40.00	40.00	17.33	NONE	0.03	0.56	0.49	0.53	0.056591	-2.6772	0.0045
104	4.71	-38.7	-7.35	29.41	40.00	40.00	17.33	NONE	0.03	0.78	0.69	0.76	0.052657	-3.6653	0.0061
105	4.69	-49.7	-7.35	29.41	40.00	40.00	17.33	NONE	0.03	1.01	0.88	0.98	0.047412	-4.5707	0.0075
106	4.67	-60.8	-7.35	29.41	40.00	40.00	17.33	NONE	0.03	1.23	1.08	1.21	0.040856	-5.3697	0.0087
107	4.65	-71.8	-7.35	29.41	40.00	40.00	17.33	NONE	0.03	1.45	1.27	1.43	0.032989	-6.0386	0.0096
108*	4.64	-77.4	-7.35	29.41	40.00	40.00	17.33	NONE	0.03	1.56	1.37	1.54	------	------	------
108*	4.83	-77.4	-7.23	29.11	40.00	40.00	17.33	NONE	0.03	1.55	1.08	1.53	------	------	------
109	4.77	-79.2	-7.23	29.11	40.00	40.00	17.33	NONE	0.03	1.59	1.10	1.57	0.027328	-6.4009	0.0101
110*	4.76	-81.0	-7.23	29.11	40.00	40.00	17.33	NONE	0.03	1.62	1.13	1.60	------	------	------
110*	4.51	-81.0	-7.38	28.40	40.00	40.00	45.72	NONE	0.02	1.49	1.10	1.47	------	------	------
111	4.51	-84.7	-7.38	28.40	40.00	40.00	45.72	NONE	0.02	1.56	1.15	1.54	0.023085	-6.6294	0.0103
112*	4.51	-88.4	-7.38	28.40	40.00	40.00	45.72	NONE	0.02	1.63	1.20	1.61	------	------	------

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 FILE OU.FRA.7
FORCE, MOMENT, AND STRESS REPORT PAGE 7
MEMBER 2 - 3 LOAD CONDITION 1 - DL + WLR

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
115*	7.52	-92.0	4.27	33.36	40.00	40.00	20.11	NONE	0.05	1.14	1.13	1.18	------	------	------
116	7.51	-85.7	4.22	33.49	40.00	40.00	19.79	NONE	0.05	1.04	1.03	1.08	0.012485	-6.9153	0.3177
117	7.51	-73.2	4.11	14.76	40.00	24.74	19.18	NONE	0.11	0.85	1.37	1.47	0.006795	-6.9292	0.6588
118	7.51	-61.0	3.99	14.54	40.00	24.60	18.60	NONE	0.11	0.68	1.10	1.21	0.002303	-6.9366	0.8176
119	7.50	-49.2	3.88	14.33	40.00	24.45	18.07	NONE	0.11	0.53	0.86	0.97	-0.001152	-6.9391	0.8340
120*	7.50	-43.4	3.83	14.23	40.00	24.38	17.81	NONE	0.11	0.46	0.75	0.86	------	------	------
120*	7.50	-43.4	3.83	16.05	40.00	25.51	8.23	NONE	0.11	0.49	0.76	0.87	------	------	------
121	7.50	-37.6	3.77	15.95	40.00	25.46	8.11	NONE	0.11	0.41	0.65	0.75	-0.003800	-6.9379	0.7403
122	7.49	-26.1	3.66	15.75	40.00	25.34	7.88	NONE	0.11	0.28	0.44	0.54	-0.005718	-6.9339	0.5604
123	7.49	-15.0	3.54	15.55	40.00	25.23	7.66	NONE	0.11	0.15	0.24	0.35	-0.006885	-6.9278	0.3238
124	7.49	-4.2	3.43	15.36	40.00	25.09	7.46	NONE	0.11	0.04	0.07	0.17	-0.007403	-6.9206	0.0566
3*	7.48	1.0	3.37	33.54	38.60	40.00	7.36	NONE	0.05	0.01	0.01	0.06	-0.007507	-6.9169	-0.0815

A.5

b) West Frame

Figure A.5 Stress and Deflection Data, Lateral Load Only Continued

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 FILE OU.FRA.7
FORCE, MOMENT, AND STRESS REPORT PAGE 8
MEMBER 3 - 5 LOAD CONDITION 1 - DL + WLR

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
3*	7.23	1.0	3.88	33.80	38.63	40.00	7.56	NONE	0.05	0.01	0.01	0.06	-0.007507	-6.9169	-0.0815
125	7.23	7.0	3.82	15.18	38.17	40.00	7.66	NONE	0.10	0.07	0.07	0.18	-0.007328	-6.9227	-0.2185
126	7.24	18.6	3.71	15.37	38.39	40.00	7.87	NONE	0.10	0.20	0.19	0.30	-0.006643	-6.9338	-0.4795
127	7.24	29.8	3.60	15.57	38.60	40.00	8.09	NONE	0.10	0.33	0.31	0.44	-0.005274	-6.9436	-0.7029
128	7.25	40.7	3.48	15.77	38.79	40.00	8.33	NONE	0.10	0.46	0.45	0.57	-0.003157	-6.9513	-0.8621
129*	7.25	46.0	3.42	15.87	38.89	40.00	8.45	NONE	0.10	0.53	0.51	0.64	------	------	------
129*	7.25	46.0	3.42	14.07	39.19	40.00	18.17	NONE	0.10	0.50	0.48	0.60	------	------	------
130	7.25	51.1	3.37	14.17	39.21	40.00	18.44	NONE	0.10	0.56	0.55	0.67	-0.000357	-6.9556	-0.9291
131	7.25	61.1	3.26	14.38	39.25	40.00	18.98	NONE	0.10	0.70	0.68	0.80	0.003160	-6.9558	-0.8824
132	7.26	70.7	3.15	14.59	39.29	40.00	19.57	NONE	0.10	0.84	0.81	0.94	0.007569	-6.9511	-0.6931
133	7.26	80.0	3.03	33.49	40.00	40.00	20.19	NONE	0.05	0.97	0.96	1.02	0.012963	-6.9403	-0.3277
134*	7.26	84.5	2.98	33.36	40.00	40.00	20.51	NONE	0.05	1.04	1.03	1.09	------	------	------

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 FILE OU.FRA.7
FORCE, MOMENT, AND STRESS REPORT PAGE 9
MEMBER 4 - 5 LOAD CONDITION 1 - DL + WLR

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
4*	-2.50	0.0	-7.53	40.00	40.00	40.00	17.33	NONE	0.01	0.00	0.00	0.01	0.061113	0.0000	0.0000
136	-2.51	5.7	-7.53	40.00	40.00	40.00	17.33	NONE	0.01	0.11	0.10	0.11	0.060783	-0.5506	-0.0010
137	-2.53	17.0	-7.53	40.00	40.00	40.00	17.33	NONE	0.01	0.34	0.30	0.34	0.059460	-1.6400	-0.0030
138	-2.55	28.4	-7.53	40.00	40.00	40.00	17.33	NONE	0.01	0.57	0.50	0.57	0.056814	-2.6934	-0.0049
139	-2.57	39.7	-7.53	40.00	40.00	40.00	17.33	NONE	0.01	0.80	0.69	0.80	0.052845	-3.6871	-0.0067
140	-2.59	51.0	-7.53	40.00	40.00	40.00	17.33	NONE	0.01	1.03	0.89	1.03	0.047554	-4.5972	-0.0083
141	-2.62	62.4	-7.53	40.00	40.00	40.00	17.33	NONE	0.01	1.26	1.09	1.26	0.040940	-5.3997	-0.0096
142	-2.64	73.7	-7.53	40.00	40.00	40.00	17.33	NONE	0.01	1.49	1.29	1.49	0.033003	-6.0707	-0.0107
143*	-2.65	79.4	-7.53	40.00	40.00	40.00	17.33	NONE	0.01	1.60	1.39	1.60	------	------	------
143*	-2.84	79.4	-7.46	40.00	40.00	40.00	17.33	NONE	0.01	1.59	1.10	1.59	------	------	------
144	-2.89	81.3	-7.46	40.00	40.00	40.00	17.33	NONE	0.01	1.63	1.13	1.63	0.027288	-6.4335	-0.0113
145*	-2.91	83.1	-7.46	40.00	40.00	40.00	17.33	NONE	0.01	1.66	1.15	1.66	------	------	------
145*	-2.67	83.1	-7.55	40.00	40.00	40.00	46.71	NONE	0.01	1.52	1.12	1.52	------	------	------
146	-2.67	86.9	-7.55	40.00	40.00	40.00	46.71	NONE	0.01	1.59	1.17	1.59	0.023067	-6.6584	-0.0116
147*	-2.74	90.2	7.35	40.00	40.00	40.00	46.71	NONE	0.01	1.65	1.22	1.65	------	------	------

A.5

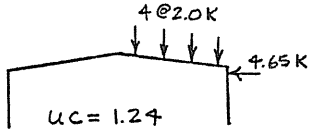
b) West Frame Continued

Figure A.5 Stress and Deflection Data, Lateral Load Only Continued

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK.
STR4 50 12/25 14/25 UNBAL LL SAME & LAT - EAST
FORCE, MOMENT, AND STRESS REPORT
MEMBER 1 - 2 LOAD CONDITION 1 - DL+UNBAL SAME SIDE+LAT

JOB PE107
FILE OU8.FRA.3
PAGE 6

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
1*	4.66	0.0	-4.31	22.10	30.00	30.00	13.24	NONE	0.04	0.00	0.00	0.04	0.025851	0.0000	0.0000
101	4.65	-3.2	-4.31	22.10	30.00	30.00	13.24	NONE	0.04	0.09	0.08	0.12	0.025659	-0.2327	0.0002
102	4.63	-9.7	-4.31	22.10	30.00	30.00	13.24	NONE	0.04	0.26	0.23	0.27	0.024894	-0.6912	0.0007
103	4.61	-16.2	-4.31	22.10	30.00	30.00	13.24	NONE	0.04	0.44	0.38	0.42	0.023363	-1.1290	0.0011
104	4.59	-22.7	-4.31	22.10	30.00	30.00	13.24	NONE	0.04	0.61	0.54	0.58	0.021068	-1.5322	0.0015
105	4.57	-29.2	-4.31	22.10	30.00	30.00	13.24	NONE	0.04	0.79	0.69	0.76	0.018006	-1.8870	0.0017
106	4.55	-35.7	-4.31	22.10	30.00	30.00	13.24	NONE	0.04	0.96	0.84	0.93	0.014180	-2.1796	0.0018
107	4.53	-42.1	-4.31	22.10	30.00	30.00	13.24	NONE	0.04	1.14	0.99	1.10	0.009588	-2.3961	0.0017
108*	4.52	-45.4	-4.31	22.10	30.00	30.00	13.24	NONE	0.04	1.22	1.07	1.19			
108*	4.63	-45.4	-4.18	21.88	30.00	30.00	13.24	NONE	0.04	1.21	0.84	1.18			
109	4.58	-46.4	-4.18	21.88	30.00	30.00	13.24	NONE	0.04	1.24	0.86	1.21	0.006287	-2.4916	0.0016
110*	4.56	-47.5	-4.18	21.88	30.00	30.00	13.24	NONE	0.04	1.27	0.88	1.24			
110*	4.41	-47.5	-4.34	21.35	30.00	30.00	34.62	NONE	0.03	1.16	0.85	1.14			
111	4.41	-49.6	-4.34	21.35	30.00	30.00	34.62	NONE	0.03	1.21	0.89	1.19	0.003855	-2.5370	0.0015
112*	4.41	-51.8	-4.34	21.35	30.00	30.00	34.62	NONE	0.03	1.27	0.93	1.24			



STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK.
STR4 50 12/25 14/25 UNBAL LL SAME & LAT - EAST
FORCE, MOMENT, AND STRESS REPORT
MEMBER 2 - 3 LOAD CONDITION 1 - DL+UNBAL SAME SIDE+LAT

JOB PE107
FILE OU8.FRA.3
PAGE 7

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
115*	4.46	-53.4	4.26	25.01	30.00	30.00	15.74	NONE	0.04	0.87	0.87	0.91			
116	4.46	-47.0	4.21	25.10	30.00	30.00	15.49	NONE	0.04	0.75	0.75	0.79	-0.002166	-2.5636	-0.0230
117	4.46	-34.6	4.10	11.04	30.00	18.58	15.01	NONE	0.08	0.53	0.86	0.95	-0.005090	-2.5601	-0.1584
118	4.45	-22.5	3.98	10.89	30.00	18.47	14.56	NONE	0.08	0.33	0.54	0.63	-0.007003	-2.5535	-0.3801
119	4.45	-10.7	3.87	10.72	30.00	18.36	14.14	NONE	0.08	0.15	0.25	0.33	-0.008048	-2.5451	-0.6545
120*	4.45	-4.9	3.82	10.64	30.00	18.31	13.93	NONE	0.08	0.07	0.11	0.20			
120*	4.45	-4.9	3.82	12.09	30.00	19.21	6.17	NONE	0.08	0.07	0.11	0.20			
121	4.45	0.9	3.76	12.01	29.16	30.00	6.08	NONE	0.08	0.01	0.01	0.10	-0.008340	-2.5357	-0.9568
122	4.44	12.4	3.65	11.86	29.01	30.00	5.91	NONE	0.08	0.18	0.18	0.27	-0.007952	-2.5264	-1.2615
123	4.44	23.4	3.53	11.71	28.85	30.00	5.75	NONE	0.08	0.33	0.32	0.42	-0.006953	-2.5180	-1.5400
124	4.44	34.2	3.42	11.56	28.69	30.00	5.59	NONE	0.08	0.47	0.45	0.56	-0.005434	-2.5112	-1.7715
3*	4.43	39.4	3.36	26.37	28.96	30.00	5.52	NONE	0.04	0.53	0.51	0.57	-0.004553	-2.5086	-1.8640

A.6

a) East Frame

Figure A.6 Stress and Deflection Data, Unbalanced Live Load (Windward Side) Combined with Lateral Load

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 UNBAL LL SAME & LAT - EAST FILE OU8.FRA.3
FORCE, MOMENT, AND STRESS REPORT PAGE 8
MEMBER 3 - 5 LOAD CONDITION 1 - DL+UNBAL SAME SIDE+LAT

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
3*	4.19	39.4	3.66	26.36	29.07	30.00	5.99	NONE	0.03	0.52	0.51	0.55	-0.004553	-2.5086	-1.8640
125	4.19	45.0	3.60	11.66	28.91	30.00	6.07	NONE	0.08	0.61	0.59	0.68	-0.003414	-2.5118	-1.9378
126	4.26	51.7	1.49	11.81	29.06	30.00	6.23	NONE	0.08	0.72	0.70	0.79	-0.000887	-2.5158	-2.0198
127	4.34	55.7	-0.63	11.95	29.21	30.00	6.40	NONE	0.08	0.79	0.78	0.87	0.002086	-2.5164	-1.9993
128	4.34	53.5	-0.74	12.10	29.35	30.00	6.59	NONE	0.08	0.78	0.77	0.86	0.005294	-2.5128	-1.8627
129*	4.34	52.3	-0.80	12.18	29.42	30.00	6.68	NONE	0.08	0.78	0.77	0.86	-------	-------	-------
129*	4.34	52.3	-0.80	10.94	29.63	30.00	13.33	NONE	0.08	0.74	0.73	0.82	-------	-------	-------
130	4.42	48.4	-2.85	11.02	29.64	30.00	13.52	NONE	0.08	0.69	0.69	0.77	0.008352	-2.5053	-1.6123
131	4.42	39.7	-2.97	11.17	29.67	30.00	13.92	NONE	0.08	0.59	0.58	0.67	0.011043	-2.4942	-1.2623
132	4.49	25.9	-5.08	11.33	29.69	30.00	14.34	NONE	0.08	0.40	0.40	0.48	0.013172	-2.4800	-0.8240
133	4.50	10.5	-5.19	25.15	30.00	30.00	14.78	NONE	0.04	0.17	0.17	0.20	0.014427	-2.4637	-0.3238
134*	4.50	2.7	-5.24	25.06	30.00	30.00	15.01	NONE	0.04	0.04	0.04	0.08	-------	-------	-------

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 UNBAL LL SAME & LAT - EAST FILE OU8.FRA.3
FORCE, MOMENT, AND STRESS REPORT PAGE 9
MEMBER 4 - 5 LOAD CONDITION 1 - DL+UNBAL SAME SIDE+LAT

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
4*	5.64	0.0	-0.35	22.08	30.00	30.00	13.24	NONE	0.05	0.00	0.00	0.05	0.016847	0.0000	0.0000
136	5.63	0.3	-0.35	22.08	30.00	30.00	13.24	NONE	0.05	0.01	0.01	0.06	0.016831	-0.1521	-0.0007
137	5.61	0.8	-0.35	22.08	30.00	30.00	13.24	NONE	0.05	0.02	0.02	0.07	0.016770	-0.4557	-0.0020
138	5.59	1.3	-0.35	22.08	30.00	30.00	13.24	NONE	0.05	0.03	0.03	0.09	0.016647	-0.7577	-0.0034
139	5.56	1.8	-0.35	22.08	30.00	30.00	13.24	NONE	0.05	0.05	0.04	0.10	0.016463	-1.0569	-0.0048
140	5.54	2.3	-0.35	22.08	30.00	30.00	13.24	NONE	0.05	0.06	0.06	0.11	0.016217	-1.3522	-0.0061
141	5.52	2.9	-0.35	22.08	30.00	30.00	13.24	NONE	0.05	0.08	0.07	0.13	0.015910	-1.6425	-0.0074
142	5.50	3.4	-0.35	22.08	30.00	30.00	13.24	NONE	0.05	0.09	0.08	0.14	0.015542	-1.9267	-0.0088
143*	5.49	3.6	-0.35	22.08	30.00	30.00	13.24	NONE	0.05	0.10	0.09	0.15	-------	-------	-------
143*	5.48	3.6	-0.49	21.86	30.00	30.00	13.24	NONE	0.04	0.10	0.07	0.14	-------	-------	-------
144	5.42	3.8	-0.49	21.86	30.00	30.00	13.24	NONE	0.04	0.10	0.07	0.14	0.015276	-2.1121	-0.0096
145*	5.40	3.9	-0.49	21.86	30.00	30.00	13.24	NONE	0.04	0.10	0.07	0.15	-------	-------	-------
145*	5.42	3.9	-0.31	21.33	30.00	30.00	34.53	NONE	0.04	0.09	0.07	0.13	-------	-------	-------
146	5.42	4.0	-0.31	21.33	30.00	30.00	34.53	NONE	0.04	0.10	0.07	0.14	0.015079	-2.2472	-0.0102
147*	5.40	4.1	4.34	21.33	30.00	30.00	34.53	NONE	0.04	0.10	0.07	0.14	-------	-------	-------

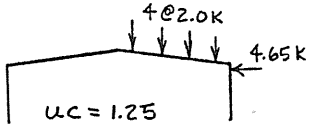
A.6

a) East Frame Continued

Figure A.6 Stress and Deflection Data, Unbalanced Live Load (Windward Side) Combined with Lateral Load Continued

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 UBL SAME & LAT - WEST FILE OU7.FRA.4
FORCE, MOMENT, AND STRESS REPORT PAGE 6
MEMBER 1 - 2 LOAD CONDITION 1 - DL+UNBAL LL SAME SIDE+LA

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
1*	4.66	0.0	-4.31	22.05	30.00	30.00	13.00	NONE	0.04	0.00	0.00	0.04	0.026067	0.0000	0.0000
101	4.65	-3.2	-4.31	22.05	30.00	30.00	13.00	NONE	0.04	0.09	0.08	0.12	0.025875	-0.2342	0.0002
102	4.63	-9.7	-4.31	22.05	30.00	30.00	13.00	NONE	0.04	0.26	0.23	0.27	0.025105	-0.6957	0.0007
103	4.61	-16.2	-4.32	22.05	30.00	30.00	13.00	NONE	0.04	0.44	0.38	0.43	0.023567	-1.1364	0.0011
104	4.59	-22.7	-4.32	22.05	30.00	30.00	13.00	NONE	0.04	0.61	0.54	0.58	0.021259	-1.5424	0.0014
105	4.57	-29.2	-4.32	22.05	30.00	30.00	13.00	NONE	0.04	0.79	0.69	0.76	0.018181	-1.8998	0.0017
106	4.55	-35.7	-4.32	22.05	30.00	30.00	13.00	NONE	0.04	0.96	0.84	0.93	0.014334	-2.1948	0.0017
107	4.52	-42.2	-4.32	22.05	30.00	30.00	13.00	NONE	0.04	1.14	1.00	1.11	0.009718	-2.4135	0.0016
108*	4.51	-45.4	-4.32	22.05	30.00	30.00	13.00	NONE	0.04	1.22	1.07	1.19	---	---	---
108*	4.63	-45.4	-4.19	21.84	30.00	30.00	13.00	NONE	0.04	1.21	0.84	1.19	---	---	---
109	4.57	-46.4	-4.20	21.84	30.00	30.00	13.00	NONE	0.04	1.24	0.86	1.22	0.006397	-2.5103	0.0015
110*	4.55	-47.5	-4.20	21.84	30.00	30.00	13.00	NONE	0.04	1.27	0.88	1.24	---	---	---
110*	4.41	-47.5	-4.34	21.30	30.00	30.00	34.29	NONE	0.03	1.16	0.86	1.14	---	---	---
111	4.41	-49.7	-4.34	21.30	30.00	30.00	34.29	NONE	0.03	1.22	0.90	1.20	0.003907	-2.5571	0.0014
112*	4.41	-51.9	-4.34	21.30	30.00	30.00	34.29	NONE	0.03	1.27	0.94	1.25	---	---	---



STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 UBL SAME & LAT - WEST FILE OU7.FRA.4
FORCE, MOMENT, AND STRESS REPORT PAGE 7
MEMBER 2 - 3 LOAD CONDITION 1 - DL+UNBAL LL SAME SIDE+LA

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
115*	4.47	-53.5	4.26	25.02	30.00	30.00	15.08	NONE	0.04	0.88	0.87	0.91	---	---	---
116	4.47	-47.2	4.20	25.11	30.00	30.00	14.84	NONE	0.04	0.76	0.76	0.79	-0.002191	-2.5841	-0.0235
117	4.47	-34.7	4.09	11.07	30.00	18.56	14.38	NONE	0.09	0.54	0.86	0.95	-0.005131	-2.5805	-0.1601
118	4.46	-22.6	3.98	10.91	30.00	18.45	13.95	NONE	0.09	0.34	0.55	0.63	-0.007056	-2.5739	-0.3835
119	4.46	-10.8	3.87	10.75	30.00	18.34	13.55	NONE	0.09	0.16	0.25	0.34	-0.008112	-2.5655	-0.6600
120*	4.46	-5.1	3.82	10.67	30.00	18.29	13.36	NONE	0.09	0.07	0.12	0.20	---	---	---
120*	4.46	-5.1	3.82	12.04	30.00	19.14	6.17	NONE	0.09	0.08	0.12	0.20	---	---	---
121	4.46	0.8	3.76	11.96	29.14	30.00	6.08	NONE	0.09	0.01	0.01	0.10	-0.008414	-2.5561	-0.9648
122	4.45	12.2	3.64	11.81	28.99	30.00	5.91	NONE	0.08	0.18	0.17	0.26	-0.008035	-2.5467	-1.2724
123	4.45	23.3	3.53	11.66	28.84	30.00	5.75	NONE	0.08	0.33	0.32	0.42	-0.007043	-2.5382	-1.5542
124	4.44	34.0	3.42	11.52	28.67	30.00	5.59	NONE	0.08	0.47	0.45	0.56	-0.005532	-2.5313	-1.7892
3*	4.44	39.2	3.36	26.36	28.95	30.00	5.52	NONE	0.04	0.53	0.51	0.57	-0.004653	-2.5286	-1.8835

A-6

b) West Frame

Figure A.6 Stress and Deflection Data, Unbalanced Live Load (Windward Side) Combined with Lateral Load Continued

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 UBL SAME & LAT - WEST FILE OU7.FRA.4
FORCE, MOMENT, AND STRESS REPORT PAGE 8
MEMBER 3 - 5 LOAD CONDITION 1 - DL+UNBAL LL SAME SIDE+LA

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
3*	4.20	39.2	3.66	26.36	28.97	30.00	5.67	NONE	0.03	0.53	0.51	0.57	-0.004653	-2.5286	-1.8835
125	4.20	44.8	3.60	11.39	28.63	30.00	5.75	NONE	0.08	0.63	0.59	0.71	-0.003502	-2.5319	-1.9588
126	4.27	51.5	1.49	11.53	28.79	30.00	5.90	NONE	0.08	0.74	0.70	0.82	-0.000946	-2.5361	-2.0432
127	4.35	55.5	-0.63	11.68	28.95	30.00	6.07	NONE	0.08	0.82	0.78	0.90	0.002064	-2.5366	-2.0244
128	4.35	53.4	-0.74	11.82	29.10	30.00	6.24	NONE	0.08	0.81	0.78	0.90	0.005316	-2.5332	-1.8884
129*	4.35	52.2	-0.80	11.90	29.17	30.00	6.34	NONE	0.08	0.81	0.77	0.89	------	------	------
129*	4.35	52.2	-0.80	10.55	29.39	30.00	13.63	NONE	0.08	0.76	0.73	0.84	------	------	------
130	4.42	48.3	-2.85	10.63	29.41	30.00	13.83	NONE	0.09	0.71	0.69	0.80	0.008422	-2.5256	-1.6363
131	4.43	39.6	-2.96	10.79	29.44	30.00	14.24	NONE	0.09	0.60	0.59	0.69	0.011161	-2.5143	-1.2817
132	4.50	25.9	-5.07	10.95	29.47	30.00	14.68	NONE	0.09	0.41	0.40	0.50	0.013330	-2.5000	-0.8369
133	4.51	10.5	-5.19	25.11	30.00	30.00	15.14	NONE	0.04	0.17	0.17	0.21	0.014608	-2.4834	-0.3289
134*	4.51	2.6	-5.24	25.02	30.00	30.00	15.38	NONE	0.04	0.04	0.04	0.08	------	------	------

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 UBL SAME & LAT - WEST FILE OU7.FRA.4
FORCE, MOMENT, AND STRESS REPORT PAGE 9
MEMBER 4 - 5 LOAD CONDITION 1 - DL+UNBAL LL SAME SIDE+LA

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
4*	5.63	0.0	-0.34	22.17	30.00	30.00	13.00	NONE	0.05	0.00	0.00	0.05	0.016953	0.0000	0.0000
136	5.62	0.3	-0.34	22.17	30.00	30.00	13.00	NONE	0.05	0.01	0.01	0.06	0.016938	-0.1531	-0.0007
137	5.60	0.8	-0.34	22.17	30.00	30.00	13.00	NONE	0.05	0.02	0.02	0.07	0.016879	-0.4586	-0.0020
138	5.58	1.3	-0.34	22.17	30.00	30.00	13.00	NONE	0.05	0.03	0.03	0.09	0.016761	-0.7626	-0.0034
139	5.56	1.8	-0.34	22.17	30.00	30.00	13.00	NONE	0.05	0.05	0.04	0.10	0.016583	-1.0639	-0.0047
140	5.54	2.3	-0.34	22.17	30.00	30.00	13.00	NONE	0.05	0.06	0.05	0.11	0.016347	-1.3615	-0.0060
141	5.52	2.8	-0.34	22.17	30.00	30.00	13.00	NONE	0.05	0.07	0.06	0.13	0.016052	-1.6542	-0.0074
142	5.49	3.3	-0.34	22.17	30.00	30.00	13.00	NONE	0.05	0.09	0.08	0.14	0.015697	-1.9411	-0.0087
143*	5.48	3.5	-0.34	22.17	30.00	30.00	13.00	NONE	0.05	0.10	0.08	0.15	------	------	------
143*	5.47	3.5	-0.47	21.96	30.00	30.00	13.00	NONE	0.04	0.09	0.07	0.14	------	------	------
144	5.42	3.7	-0.47	21.96	30.00	30.00	13.00	NONE	0.04	0.10	0.07	0.14	0.015441	-2.1284	-0.0095
145*	5.40	3.8	-0.47	21.96	30.00	30.00	13.00	NONE	0.04	0.10	0.07	0.14	------	------	------
145*	5.41	3.8	-0.30	21.42	30.00	30.00	35.03	NONE	0.04	0.09	0.07	0.13	------	------	------
146	5.41	3.9	-0.30	21.42	30.00	30.00	35.03	NONE	0.04	0.10	0.07	0.13	0.015251	-2.2655	-0.0101
147*	5.39	3.9	4.35	21.42	30.00	30.00	35.03	NONE	0.04	0.10	0.07	0.13	------	------	------

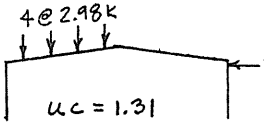
A.6

b) West Frame Continued

Figure A.6 Stress and Deflection Data, Unbalanced Live Load (Windward Side) Combined with Lateral Load Continued

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 LL OPP & LAT - EAST FILE DUB.FRA.2
FORCE, MOMENT, AND STRESS REPORT PAGE 6
MEMBER 1 - 2 LOAD CONDITION 1 - DL+UNBAL OPPOSITE+LAT

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
1*	10.38	0.0	-4.63	22.10	30.00	30.00	13.24	NONE	0.10	0.00	0.00	0.10	0.017387	0.0000	0.0000
101	10.37	-3.5	-4.63	22.10	30.00	30.00	13.24	NONE	0.10	0.09	0.08	0.18	0.017181	-0.1562	-0.0003
102	10.35	-10.5	-4.63	22.10	30.00	30.00	13.24	NONE	0.10	0.28	0.25	0.34	0.016357	-0.4612	-0.0009
103	10.33	-17.4	-4.63	22.10	30.00	30.00	13.24	NONE	0.10	0.47	0.41	0.51	0.014709	-0.7439	-0.0016
104	10.31	-24.4	-4.63	22.10	30.00	30.00	13.24	NONE	0.10	0.66	0.58	0.67	0.012237	-0.9894	-0.0023
105	10.29	-31.4	-4.64	22.10	30.00	30.00	13.24	NONE	0.09	0.85	0.74	0.84	0.008942	-1.1827	-0.0032
106	10.27	-38.4	-4.64	22.10	30.00	30.00	13.24	NONE	0.09	1.03	0.91	1.00	0.004823	-1.3091	-0.0042
107	10.25	-45.4	-4.64	22.10	30.00	30.00	13.24	NONE	0.09	1.22	1.07	1.16	-0.000121	-1.3536	-0.0054
108*	10.24	-48.9	-4.64	22.10	30.00	30.00	13.24	NONE	0.09	1.32	1.15	1.25	------	------	------
108*	10.36	-48.9	-4.35	21.88	30.00	30.00	13.24	NONE	0.08	1.30	0.90	1.24	------	------	------
109	10.30	-49.9	-4.36	21.88	30.00	30.00	13.24	NONE	0.08	1.33	0.92	1.27	-0.003673	-1.3308	-0.0063
110*	10.28	-51.0	-4.36	21.88	30.00	30.00	13.24	NONE	0.08	1.36	0.94	1.30	------	------	------
110*	10.13	-51.0	-4.70	21.35	30.00	30.00	34.62	NONE	0.07	1.25	0.92	1.20	------	------	------
111	10.13	-53.4	-4.70	21.35	30.00	30.00	34.62	NONE	0.07	1.31	0.96	1.26	-0.006288	-1.2864	-0.0069
112*	10.13	-55.7	-4.70	21.35	30.00	30.00	34.62	NONE	0.07	1.36	1.00	1.31	------	------	------



STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 LL OPP & LAT - EAST FILE DUB.FRA.2
FORCE, MOMENT, AND STRESS REPORT PAGE 7
MEMBER 2 - 3 LOAD CONDITION 1 - DL+UNBAL OPPOSITE+LAT

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
115*	5.00	-55.9	9.97	25.01	30.00	30.00	15.74	NONE	0.04	0.91	0.91	0.96	------	------	------
116	5.00	-41.0	9.91	25.10	30.00	30.00	15.49	NONE	0.04	0.66	0.66	0.70	-0.012398	-1.1635	-0.2534
117	5.00	-11.5	9.80	11.04	30.00	18.58	15.01	NONE	0.09	0.18	0.29	0.38	-0.014304	-1.1477	-0.7438
118	4.89	15.8	6.71	10.88	29.52	30.00	14.56	NONE	0.09	0.24	0.24	0.33	-0.014189	-1.1308	-1.2645
119	4.89	35.8	6.60	10.72	29.49	30.00	14.14	NONE	0.09	0.52	0.51	0.61	-0.012601	-1.1151	-1.7516
120*	4.78	45.2	3.56	10.64	29.47	30.00	13.93	NONE	0.09	0.65	0.64	0.74	------	------	------
120*	4.78	45.2	3.56	12.09	29.23	30.00	6.17	NONE	0.09	0.69	0.68	0.78	------	------	------
121	4.78	50.7	3.51	12.01	29.16	30.00	6.08	NONE	0.09	0.76	0.74	0.86	-0.009957	-1.1019	-2.1674
122	4.77	61.3	3.39	11.86	29.01	30.00	5.91	NONE	0.09	0.90	0.87	0.99	-0.006612	-1.0926	-2.4761
123	4.67	63.1	0.30	11.71	28.85	30.00	5.75	NONE	0.09	0.90	0.86	0.99	-0.003110	-1.0877	-2.6555
124	4.56	61.0	-2.79	11.56	28.69	30.00	5.59	NONE	0.09	0.84	0.81	0.93	0.000180	-1.0872	-2.7083
3*	4.56	56.6	-2.85	26.37	28.96	30.00	5.52	NONE	0.04	0.76	0.74	0.80	0.001750	-1.0885	-2.6905

A.7

a) East Frame

Figure A.7 Stress and Deflection Data, Unbalanced Live Load (Leeward Side) Combined with Lateral Load

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 LL OPP & LAT - EAST FILE 008.FRA.2
FORCE, MOMENT, AND STRESS REPORT PAGE 8
MEMBER 3 - 5 LOAD CONDITION 1 - DL+UNBAL OPPOSITE+LAT

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
3*	4.74	56.6	-2.53	26.36	29.07	30.00	5.99	NONE	0.04	0.75	0.73	0.78	0.001750	-1.0885	-2.6905
125	4.75	52.7	-2.58	11.66	28.91	30.00	6.07	NONE	0.09	0.71	0.69	0.80	0.003083	-1.0876	-2.6456
126	4.75	44.5	-2.70	11.81	29.06	30.00	6.23	NONE	0.09	0.62	0.60	0.70	0.005610	-1.0832	-2.4830
127	4.75	36.0	-2.81	11.95	29.21	30.00	6.40	NONE	0.09	0.51	0.50	0.60	0.007829	-1.0758	-2.2322
128	4.76	27.1	-2.93	12.10	29.35	30.00	6.59	NONE	0.09	0.40	0.39	0.48	0.009675	-1.0658	-1.9056
129*	4.76	22.5	-2.99	12.18	29.42	30.00	6.68	NONE	0.09	0.33	0.33	0.42	------	------	------
129*	4.76	22.5	-2.99	10.94	29.63	30.00	13.33	NONE	0.09	0.32	0.31	0.40	------	------	------
130	4.76	18.0	-3.04	11.02	29.64	30.00	13.52	NONE	0.09	0.26	0.26	0.34	0.011029	-1.0538	-1.5252
131	4.77	8.7	-3.15	11.17	29.67	30.00	13.92	NONE	0.09	0.13	0.13	0.22	0.011839	-1.0406	-1.1122
132	4.77	-0.9	-3.27	11.33	30.00	18.59	14.34	NONE	0.09	0.01	0.02	0.11	0.012084	-1.0267	-0.6797
133	4.77	-10.9	-3.38	25.15	30.00	30.00	14.78	NONE	0.04	0.17	0.17	0.21	0.011660	-1.0130	-0.2500
134*	4.78	-16.0	-3.43	25.06	30.00	30.00	15.01	NONE	0.04	0.26	0.26	0.30	------	------	------

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 LL OPP & LAT - EAST FILE 008.FRA.2
FORCE, MOMENT, AND STRESS REPORT PAGE 9
MEMBER 4 - 5 LOAD CONDITION 1 - DL+UNBAL OPPOSITE+LAT

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
4*	3.84	0.0	1.15	22.08	30.00	30.00	13.24	NONE	0.04	0.00	0.00	0.04	0.004208	0.0000	0.0000
136	3.83	-0.9	1.15	22.08	30.00	30.00	13.24	NONE	0.04	0.02	0.02	0.06	0.004259	-0.0382	-0.0003
137	3.81	-2.6	1.15	22.08	30.00	30.00	13.24	NONE	0.03	0.07	0.06	0.10	0.004463	-0.1165	-0.0010
138	3.79	-4.3	1.15	22.08	30.00	30.00	13.24	NONE	0.03	0.12	0.10	0.14	0.004870	-0.2003	-0.0016
139	3.77	-6.0	1.15	22.08	30.00	30.00	13.24	NONE	0.03	0.16	0.14	0.18	0.005481	-0.2933	-0.0023
140	3.75	-7.8	1.15	22.07	30.00	30.00	13.24	NONE	0.03	0.21	0.18	0.22	0.006296	-0.3992	-0.0030
141	3.73	-9.5	1.15	22.05	30.00	30.00	13.24	NONE	0.03	0.26	0.22	0.26	0.007314	-0.5216	-0.0037
142	3.70	-11.2	1.15	22.04	30.00	30.00	13.24	NONE	0.03	0.30	0.26	0.30	0.008537	-0.6643	-0.0045
143*	3.69	-12.1	1.15	22.03	30.00	30.00	13.24	NONE	0.03	0.32	0.28	0.32	------	------	------
143*	3.72	-12.1	1.05	21.24	30.00	30.00	13.24	NONE	0.03	0.32	0.22	0.30	------	------	------
144	3.67	-12.4	1.05	21.18	30.00	30.00	13.24	NONE	0.03	0.33	0.23	0.31	0.009416	-0.7723	-0.0051
145*	3.65	-12.6	1.05	21.16	30.00	30.00	13.24	NONE	0.03	0.34	0.23	0.31	------	------	------
145*	3.61	-12.6	1.17	21.33	30.00	30.00	34.53	NONE	0.03	0.31	0.23	0.29	------	------	------
146	3.61	-13.2	1.17	21.33	30.00	30.00	34.53	NONE	0.03	0.32	0.24	0.30	0.010062	-0.8590	-0.0054
147*	3.59	-13.9	4.67	21.33	30.00	30.00	34.53	NONE	0.03	0.34	0.25	0.32	------	------	------

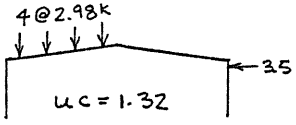
A-7

a) East Frame Continued

Figure A.7 Stress and Deflection Data, Unbalanced Live Load (Leeward Side) Combined with Lateral Load Continued

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 LL OPP & LAT - WEST FILE OU7.FRA.2
FORCE, MOMENT, AND STRESS REPORT PAGE 6
MEMBER 1 - 2 LOAD CONDITION 1 - DL+UNBAL LL OPPOSITE RAF

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
1*	10.38	0.0	-4.64	22.05	30.00	30.00	13.00	NONE	0.10	0.00	0.00	0.10	0.017573	0.0000	0.0000
101	10.37	-3.5	-4.64	22.05	30.00	30.00	13.00	NONE	0.10	0.09	0.08	0.18	0.017366	-0.1576	-0.0003
102	10.35	-10.5	-4.64	22.05	30.00	30.00	13.00	NONE	0.10	0.28	0.25	0.34	0.016539	-0.4653	-0.0009
103	10.33	-17.4	-4.64	22.05	30.00	30.00	13.00	NONE	0.10	0.47	0.41	0.51	0.014884	-0.7507	-0.0016
104	10.31	-24.4	-4.64	22.05	30.00	30.00	13.00	NONE	0.10	0.66	0.58	0.67	0.012402	-0.9988	-0.0023
105	10.29	-31.4	-4.64	22.05	30.00	30.00	13.00	NONE	0.09	0.85	0.74	0.84	0.009093	-1.1946	-0.0032
106	10 26	-38.4	-4.64	22.05	30.00	30.00	13.00	NONE	0.09	1.03	0.91	1.00	0.004957	-1.3233	-0.0042
107	10.24	-45.3	-4.64	22.05	30.00	30.00	13.00	NONE	0.09	1.22	1.07	1.17	-0.000007	-1.3700	-0.0054
108*	10.23	-48.8	-4.64	22.05	30.00	30.00	13.00	NONE	0.09	1.32	1.15	1.25	------	------	------
108*	10.35	-48.8	-4.37	21.84	30.00	30.00	13.00	NONE	0.08	1.31	0.91	1.24	------	------	------
109	10.30	-49.9	-4.37	21.84	30.00	30.00	13.00	NONE	0.08	1.33	0.93	1.27	-0.003578	-1.3485	-0.0063
110*	10.28	-51.0	-4.37	21.84	30.00	30.00	13.00	NONE	0.08	1.36	0.95	1.30	------	------	------
110*	10.13	-51 0	-4.71	21.30	30.00	30.00	34.29	NONE	0.07	1.25	0.92	1.20	------	------	------
111	10.13	-53.4	-4.71	21.30	30.00	30.00	34.29	NONE	0.07	1.31	0.97	1.26	-0.006252	-1.3041	-0.0069
112*	10.13	-55.8	-4.71	21.30	30.00	30.00	34.29	NONE	0.07	1.37	1.01	1.32	------	------	------



STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 LL OPP & LAT - WEST FILE OU7.FRA.2
FORCE, MOMENT, AND STRESS REPORT PAGE 7
MEMBER 2 - 3 LOAD CONDITION 1 - DL+UNBAL LL OPPOSITE RAF

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
115*	5.01	-56.0	9.96	25.02	30.00	30.00	15.08	NONE	0.04	0.92	0.91	0.96	------	------	------
116	5.01	-41.1	9.91	25.11	30.00	30.00	14.84	NONE	0.04	0.66	0.66	0.70	-0.012438	-1.1805	-0.2542
117	5.00	-11.5	9.80	11.07	30.00	18.56	14.38	NONE	0.10	0.18	0.29	0.38	-0.014353	-1.1647	-0.7462
118	4.89	15.8	6.71	10.91	29.52	30.00	13.95	NONE	0.09	0.24	0.23	0.33	-0.014242	-1.1478	-1.2697
119	4.89	35.7	6.60	10.75	29.49	30.00	13.55	NONE	0.09	0.52	0.51	0.62	-0.012654	-1.1321	-1.7576
120*	4.78	45.1	3.56	10.67	29.48	30.00	13.36	NONE	0.09	0.65	0.63	0.74	------	------	------
120*	4.78	45.1	3.56	12.04	29.22	30.00	6.17	NONE	0.09	0.69	0.67	0.79	------	------	------
121	4.78	50.6	3.51	11.96	29.14	30.00	6.08	NONE	0.09	0.77	0.74	0.86	-0.010011	-1.1189	-2.1753
122	4.78	61.2	3.39	11.81	28.99	30.00	5.91	NONE	0.09	0.90	0.86	0.99	-0.006671	-1.1095	-2.4062
123	4.67	63.0	0.30	11.66	28.84	30.00	5.75	NONE	0.09	0.90	0.86	0.99	-0.003173	-1.1046	-2.6679
124	4.56	60.9	-2.79	11.52	28.67	30.00	5.59	NONE	0.09	0.85	0.80	0.93	0.000115	-1.1040	-2.7231
3*	4.56	56.5	-2.85	26.36	28.95	30.00	5.52	NONE	0.04	0.77	0.73	0.80	0.001685	-1.1053	-2.7064

A.7

b) West Frame

Figure A.7 Stress and Deflection Data, Unbalanced Live Load (Leeward Side) Combined with Lateral Load Continued

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 LL OPP & LAT - WEST FILE OU7.FRA.2
FORCE, MOMENT, AND STRESS REPORT PAGE 8
MEMBER 3 - 5 LOAD CONDITION 1 - DL+UNBAL LL OPPOSITE RAF

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
3*	4.75	56.5	-2.53	26.36	28.97	30.00	5.67	NONE	0.04	0.77	0.73	0.81	0.001685	-1.1053	-2.7064
125	4.75	52.6	-2.58	11.39	28.63	30.00	5.75	NONE	0.09	0.74	0.69	0.83	0.003036	-1.1044	-2.6628
126	4.76	44.5	-2.70	11.53	28.79	30.00	5.90	NONE	0.09	0.64	0.61	0.73	0.005598	-1.1002	-2.5019
127	4.76	36.0	-2.81	11.68	28.95	30.00	6.07	NONE	0.09	0.53	0.51	0.62	0.007850	-1.0928	-2.2519
128	4.76	27.1	-2.93	11.82	29.10	30.00	6.24	NONE	0.09	0.41	0.40	0.50	0.009726	-1.0828	-1.9252
129*	4.77	22.6	-2.98	11.90	29.17	30.00	6.34	NONE	0.09	0.35	0.33	0.44	------	------	------
129*	4.76	22.6	-2.99	10.55	29.39	30.00	13.63	NONE	0.09	0.33	0.32	0.42	------	------	------
130	4.77	18.0	-3.04	10.63	29.41	30.00	13.83	NONE	0.09	0.27	0.26	0.36	0.011107	-1.0708	-1.5425
131	4.77	8.7	-3.15	10.79	29.44	30.00	14.24	NONE	0.09	0.13	0.13	0.23	0.011934	-1.0574	-1.1249
132	4.77	-0.9	-3.26	10.95	30.00	18.60	14.68	NONE	0.09	0.01	0.02	0.11	0.012185	-1.0434	-0.6874
133	4.78	-10.9	-3.38	25.11	30.00	30.00	15.14	NONE	0.04	0.18	0.17	0.21	0.011751	-1.0295	-0.2527
134*	4.78	-16.0	-3.43	25.02	30.00	30.00	15.38	NONE	0.04	0.26	0.26	0.30	------	------	------

STAR MANUFACTURING CO. 8600 S. I-35 OKLAHOMA CITY, OK. JOB PE107
STR4 50 12/25 14/25 LL OPP & LAT - WEST FILE OU7.FRA.2
FORCE, MOMENT, AND STRESS REPORT PAGE 9
MEMBER 4 - 5 LOAD CONDITION 1 - DL+UNBAL LL OPPOSITE RAF

POINT NO.	AXIAL FORCE (KIP)	MOMENT (KIP-FT)	SHEAR FORCE (KIP)	-ALLOWABLE STRESS- FA (KSI)	FBO (KSI)	FBI (KSI)	ALLOW SHEAR (KIP)	A/H RATIO	-UNITY CHECK- UCA	BEND (OF)	BEND (IF)	MAX. COMB UC	DELTA-Z	DEFLECTIONS DELTA-X (IN)	DELTA-Y (IN)
4*	3.84	0.0	1.15	22.17	30.00	30.00	13.00	NONE	0.04	0.00	0.00	0.04	0.004336	0.0000	0.0000
136	3.83	-0.9	1.15	22.17	30.00	30.00	13.00	NONE	0.04	0.02	0.02	0.06	0.004387	-0.0394	-0.0003
137	3.81	-2.6	1.15	22.17	30.00	30.00	13.00	NONE	0.03	0.07	0.06	0.10	0.004589	-0.1200	-0.0010
138	3.78	-4.3	1.15	22.17	30.00	30.00	13.00	NONE	0.03	0.12	0.10	0.14	0.004994	-0.2060	-0.0016
139	3.76	-6.1	1.15	22.17	30.00	30.00	13.00	NONE	0.03	0.16	0.14	0.18	0.005601	-0.3012	-0.0023
140	3.74	-7.8	1.15	22.17	30.00	30.00	13.00	NONE	0.03	0.21	0.18	0.22	0.006410	-0.4092	-0.0030
141	3.72	-9.5	1.15	22.17	30.00	30.00	13.00	NONE	0.03	0.26	0.22	0.26	0.007421	-0.5337	-0.0037
142	3.70	-11.3	1.15	22.17	30.00	30.00	13.00	NONE	0.03	0.30	0.26	0.30	0.008635	-0.6782	-0.0045
143*	3.69	-12.1	1.15	22.17	30.00	30.00	13.00	NONE	0.03	0.33	0.28	0.32	------	------	------
143*	3.71	-12.1	1.06	21.50	30.00	30.00	13.00	NONE	0.03	0.32	0.22	0.30	------	------	------
144	3.66	-12.4	1.06	21.44	30.00	30.00	13.00	NONE	0.03	0.33	0.23	0.31	0.009508	-0.7874	-0.0051
145*	3.64	-12.7	1.06	21.43	30.00	30.00	13.00	NONE	0.03	0.34	0.23	0.32	------	------	------
145*	3.61	-12.7	1.18	21.42	30.00	30.00	35.03	NONE	0.03	0.31	0.23	0.29	------	------	------
146	3.61	-13.3	1.18	21.42	30.00	30.00	35.03	NONE	0.03	0.32	0.24	0.31	0.010152	-0.8752	-0.0054
147*	3.59	-13.9	4.69	21.42	30.00	30.00	35.03	NONE	0.03	0.34	0.25	0.32	------	------	------

A.7

b) West Frame Continued

Figure A.7 Stress and Deflection Data, Unbalanced Live Load (Leeward Side) Combined with Lateral Load Continued

APPENDIX B

INITIAL TEST, FULL LIVE LOAD, EAST FRAME

Test Date March 24, 1981

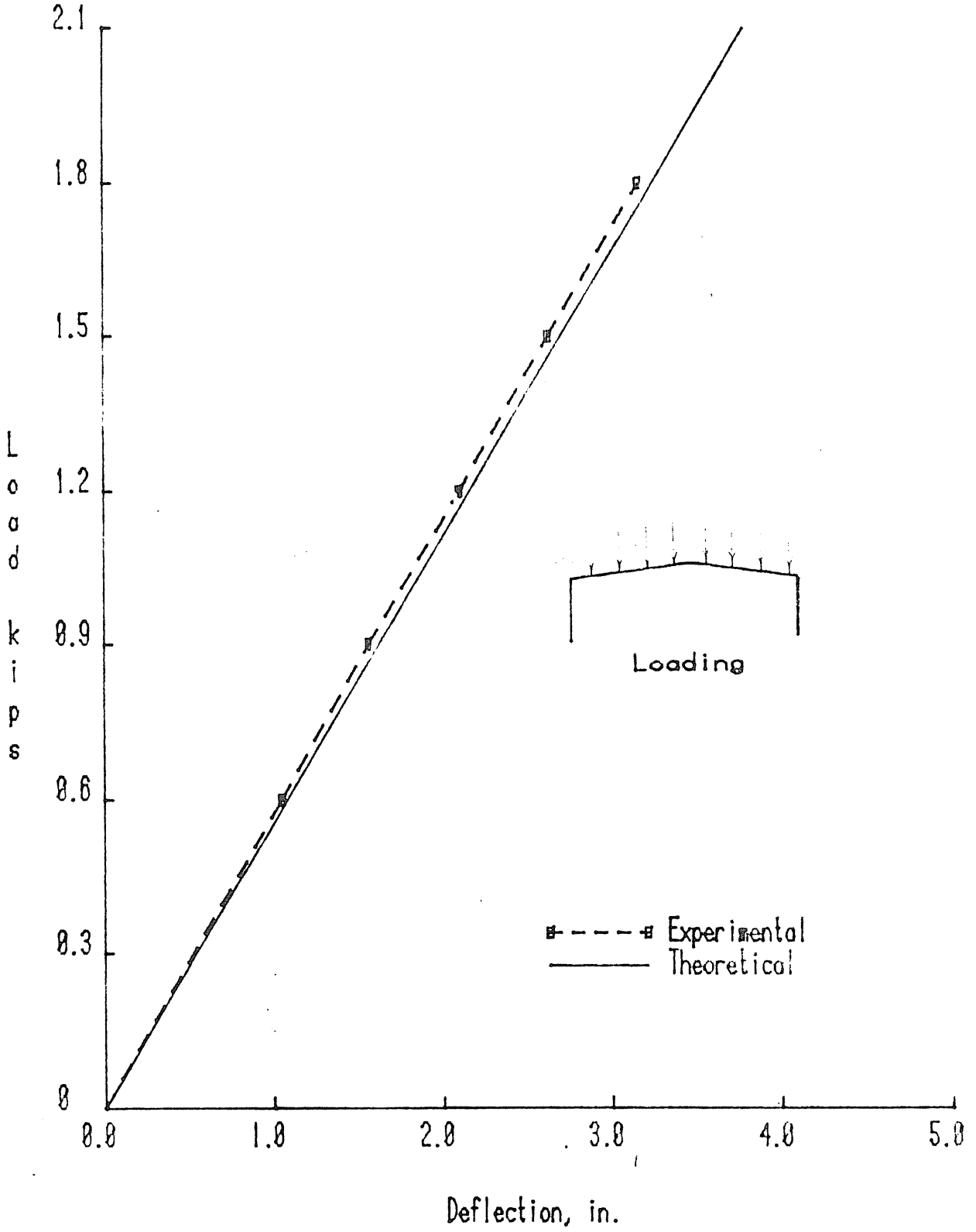


Figure B.1 Load vs. Centerline Vertical Deflection

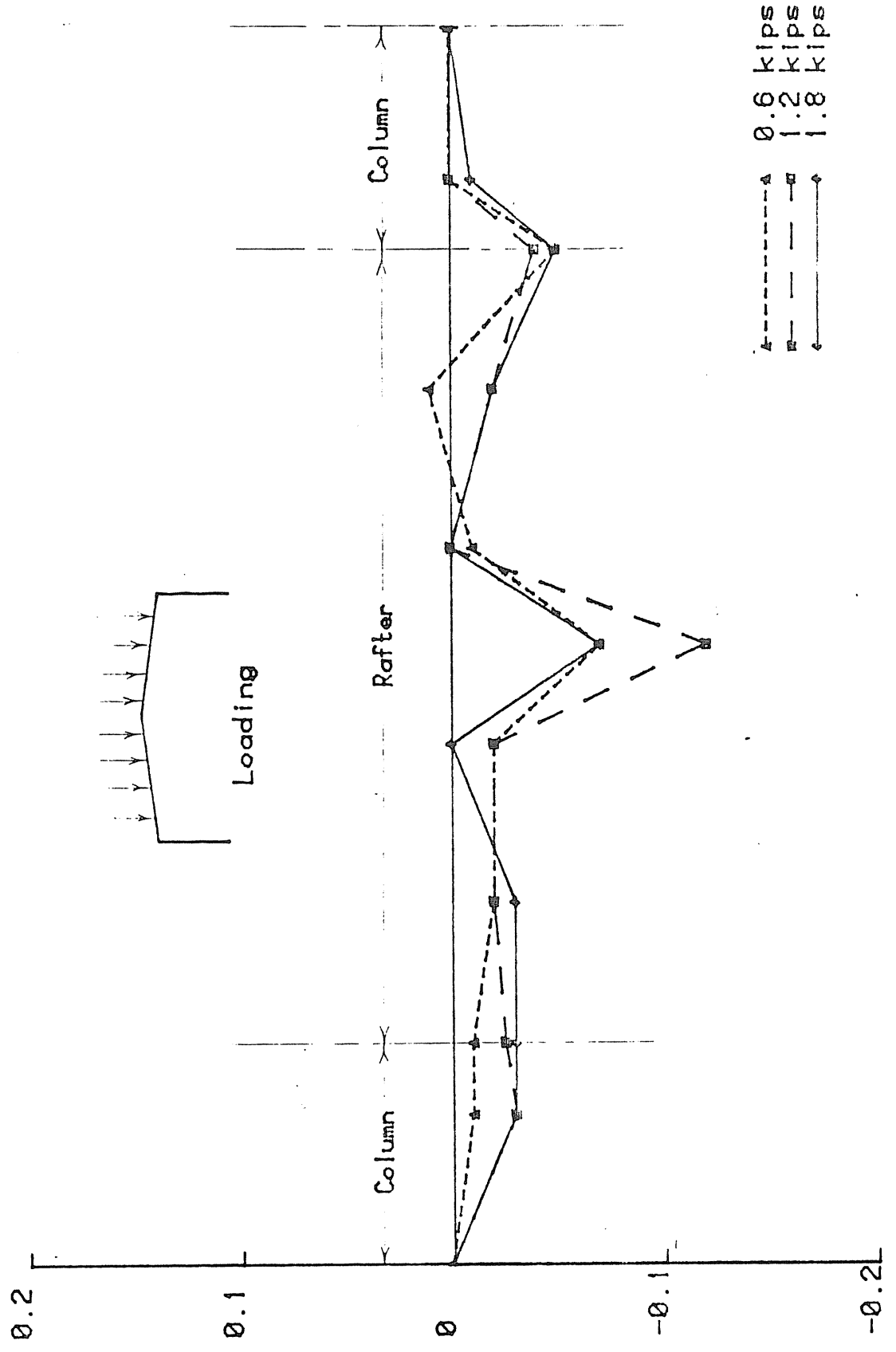


Figure B.2 Load vs. Lateral Deflection of Outside Flange, East Frame

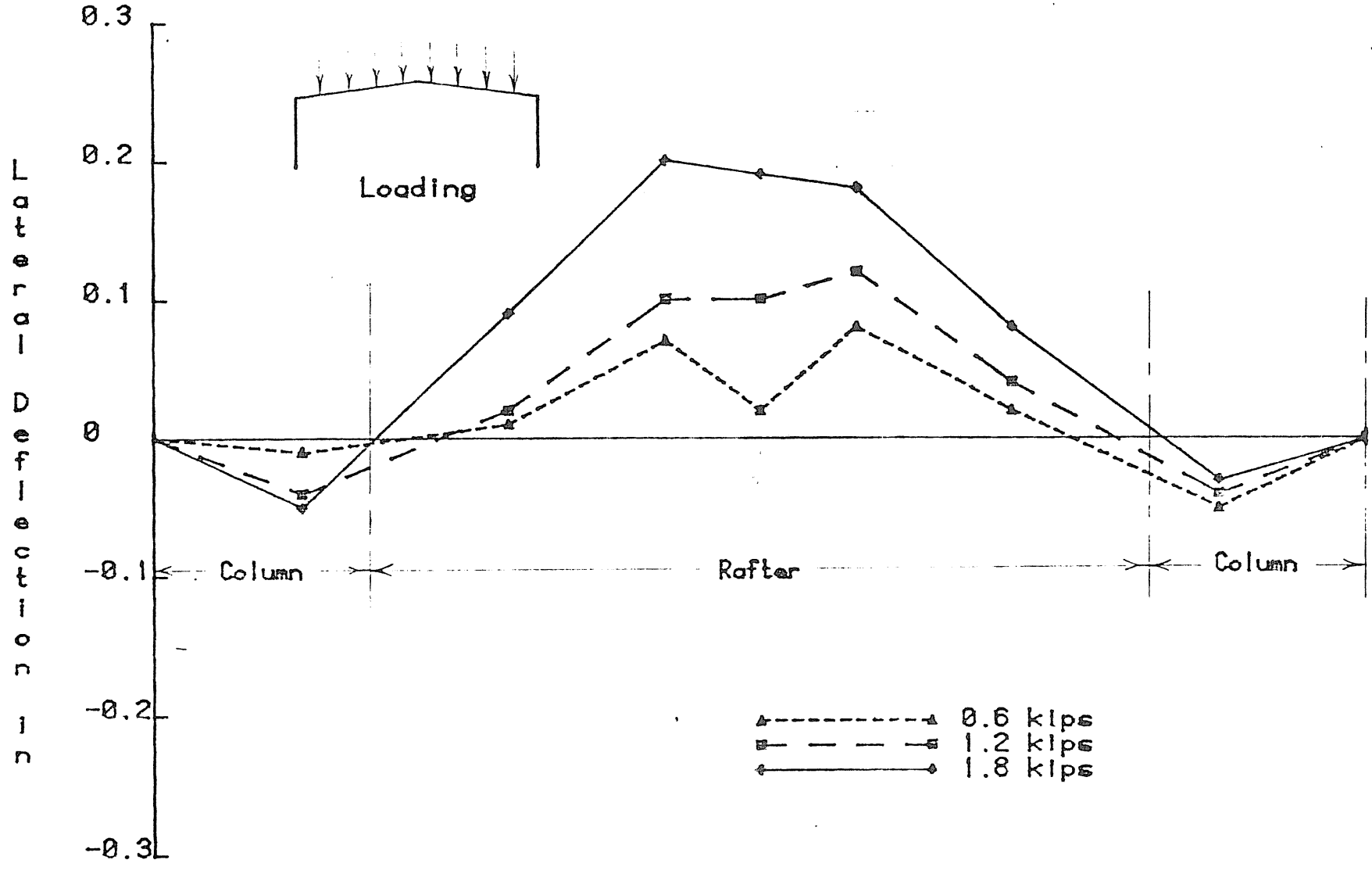


Figure B.3 Load vs. Lateral Deflection of Inside Flange, East Frame

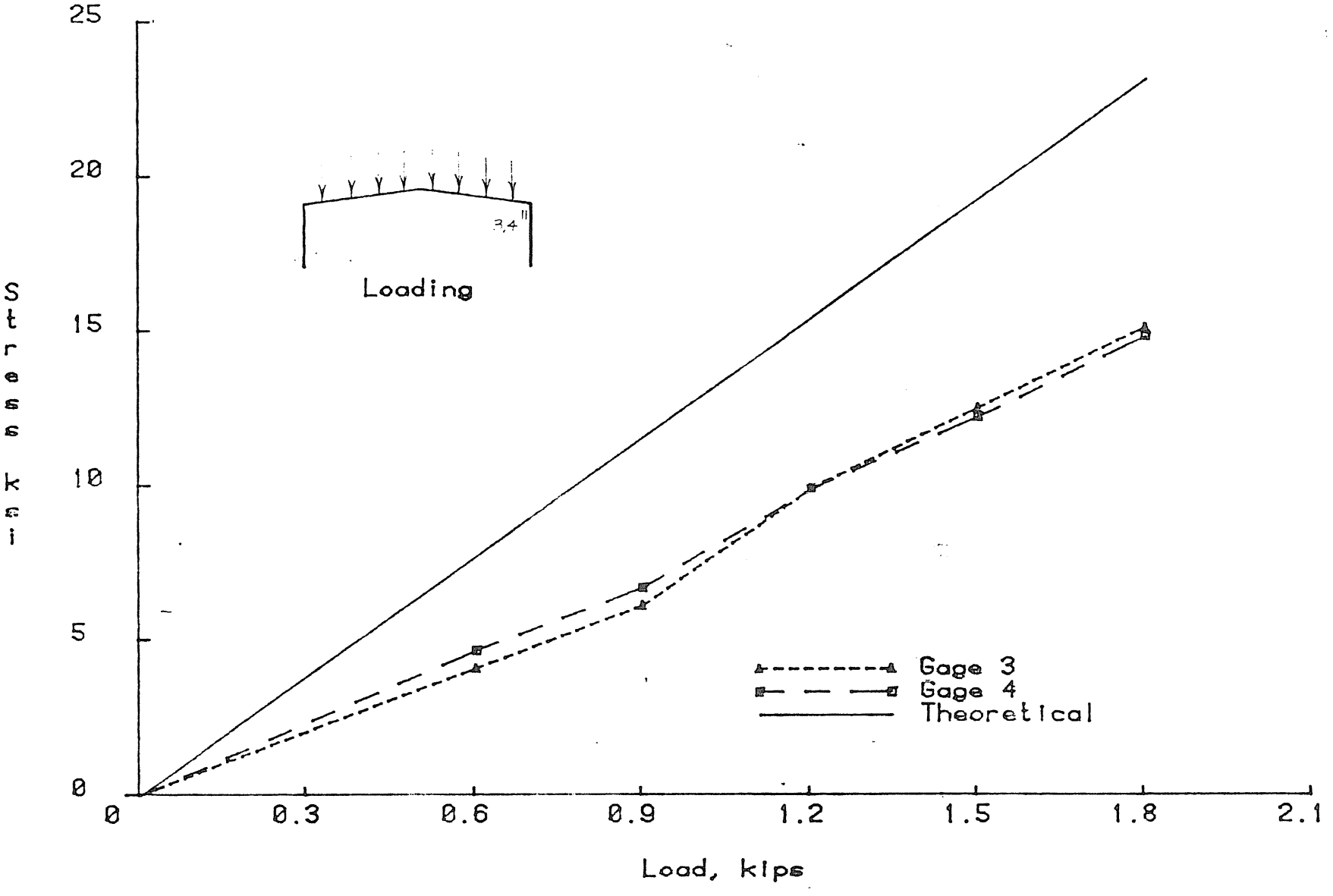


Figure B.4 Load vs. Stress, North Column at Knee

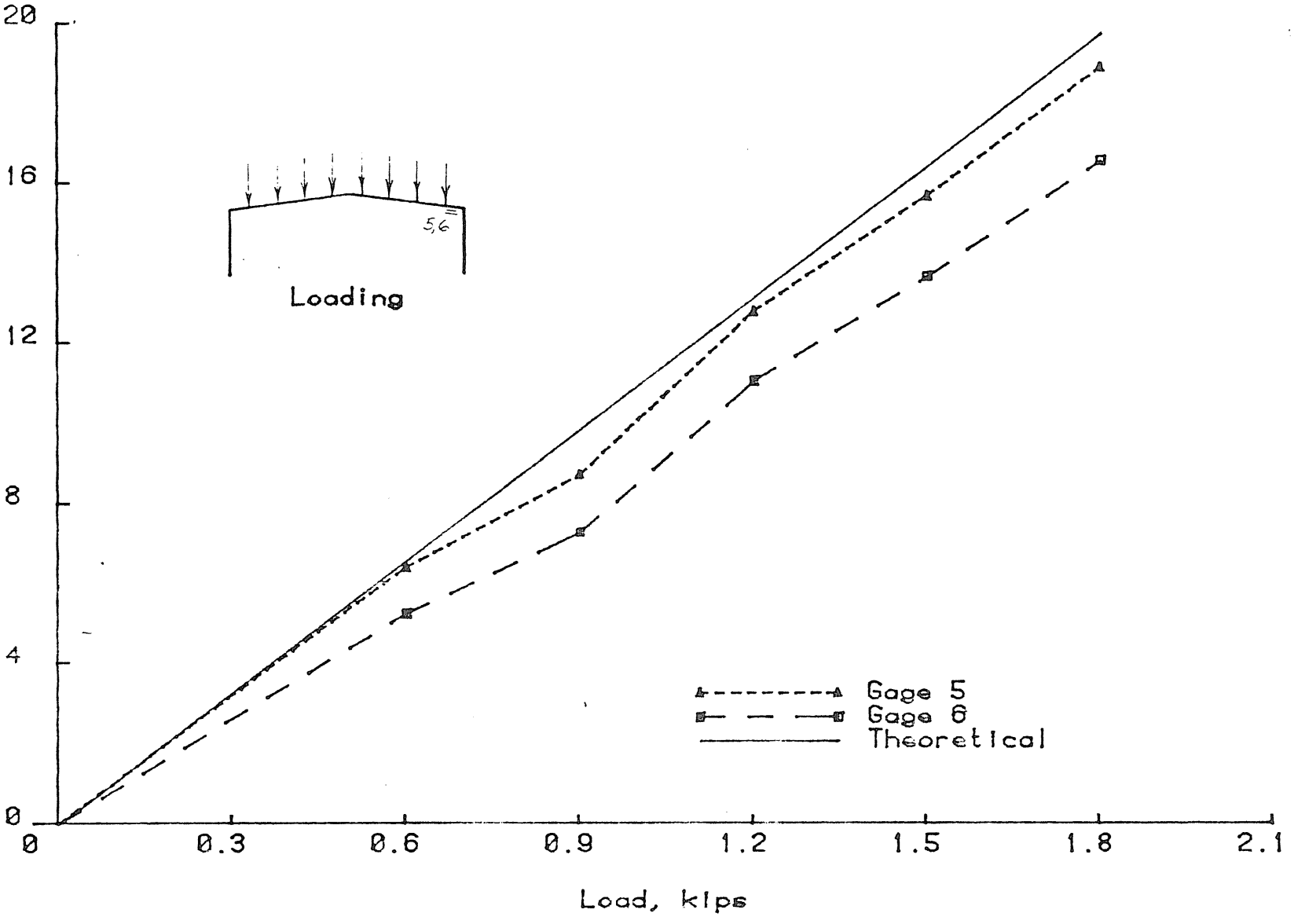


Figure B.5 Load vs. Stress, North Rafter at Knee

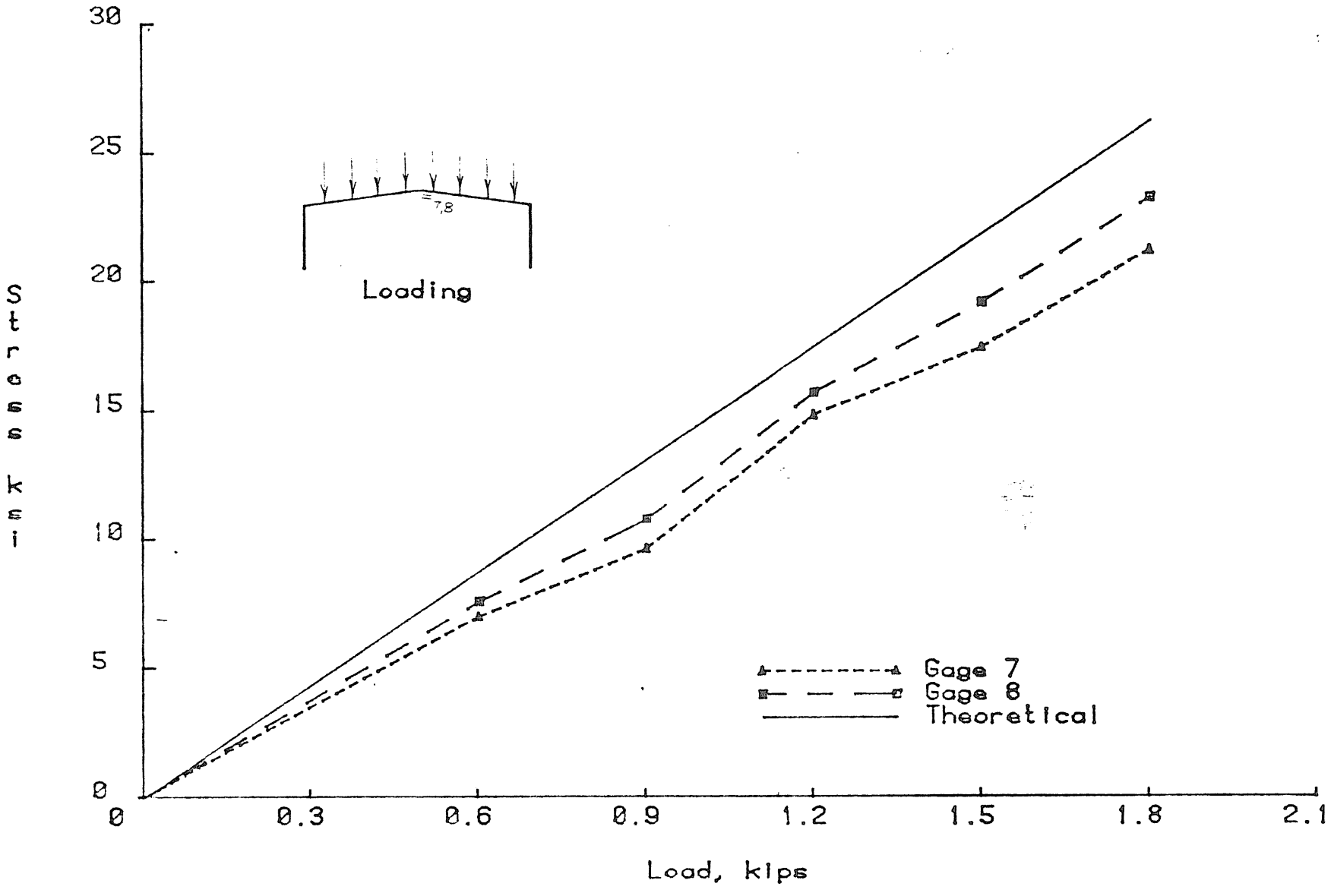


Figure 5.6 Load vs. Stress, North Rafter at Peak

APPENDIX C

INITIAL TEST, UNBALANCED LIVE LOAD

Test Date March 31, 1981

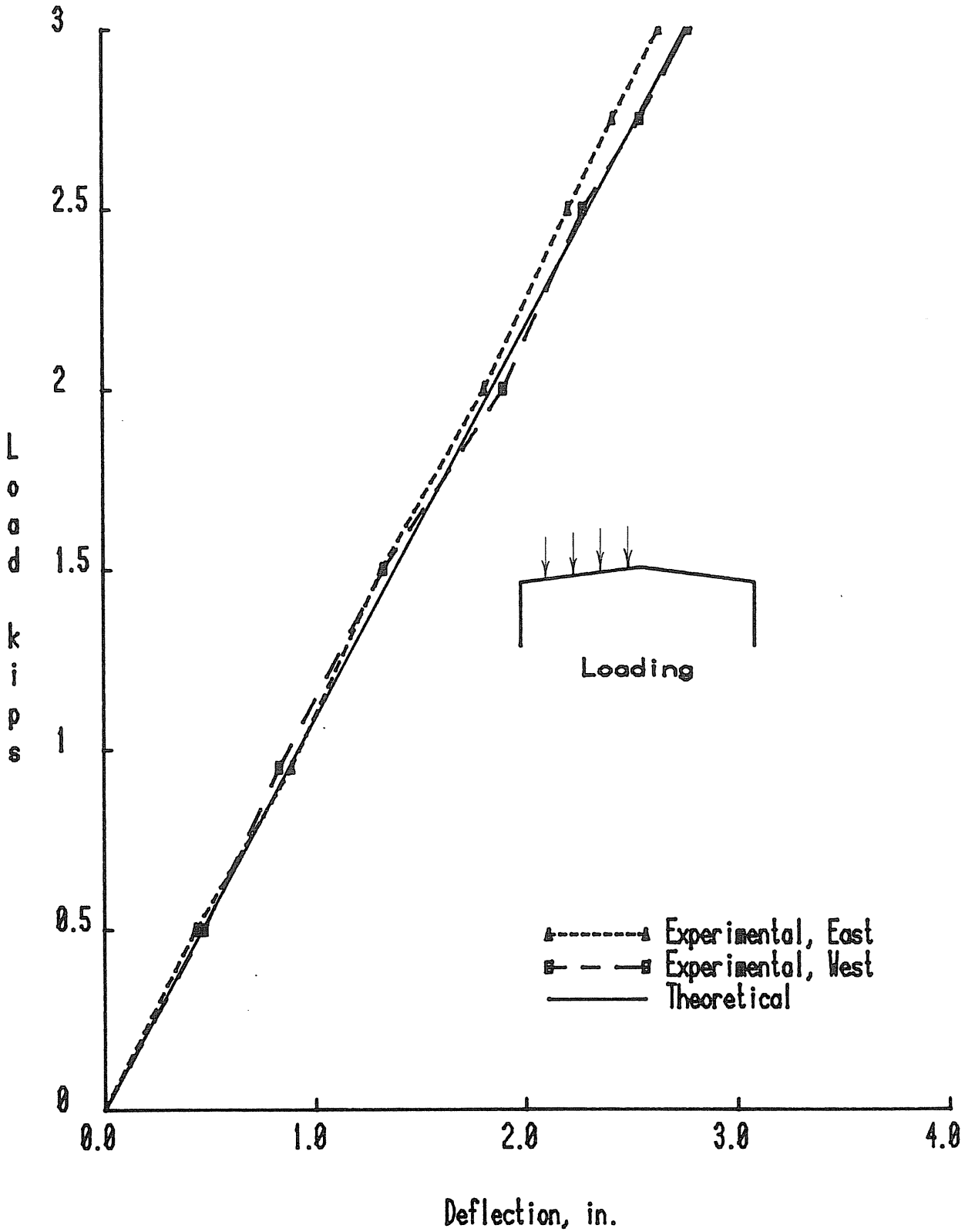


Figure C.1 Load vs. Centerline Vertical Deflection

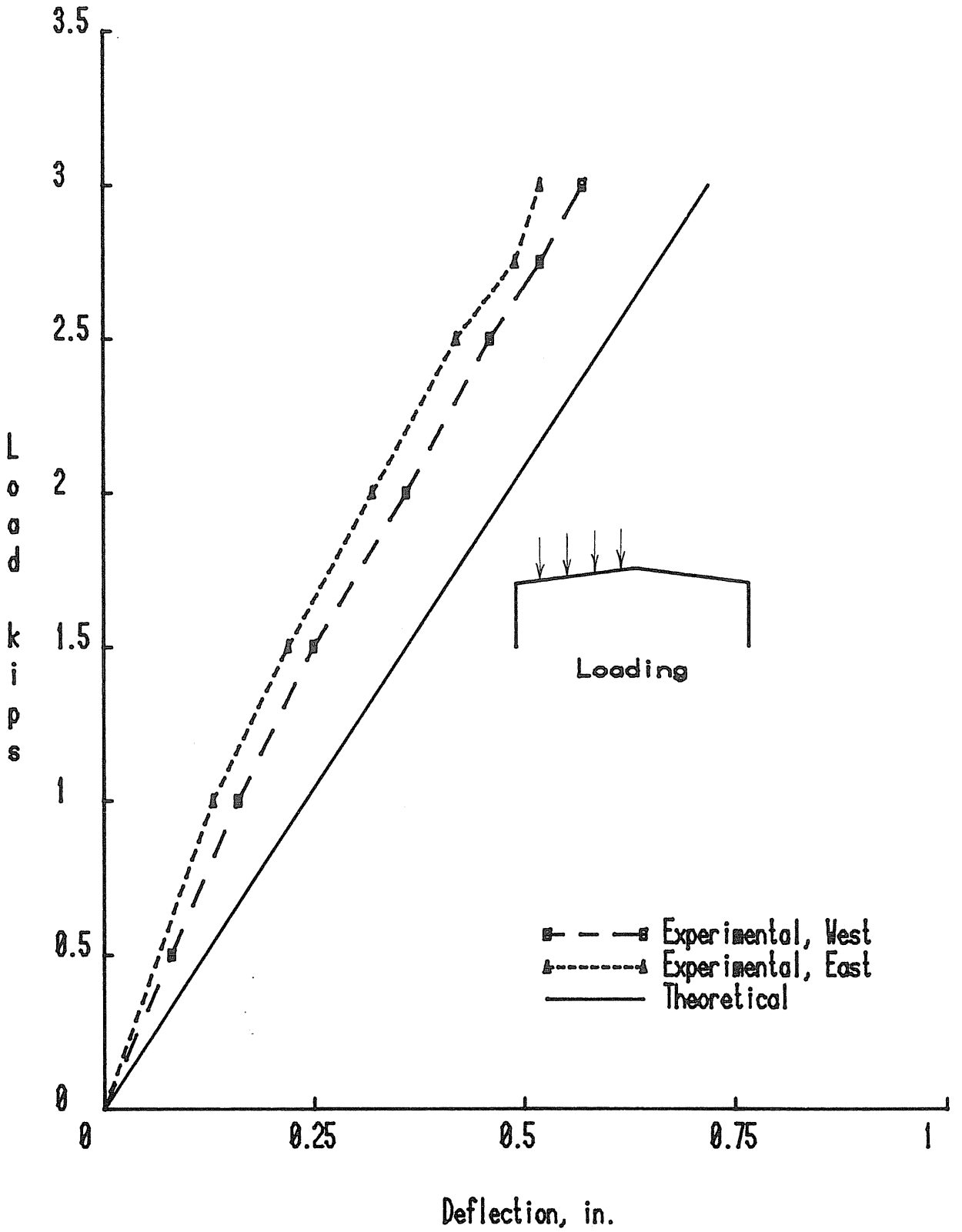


Figure C.2 Load vs. Sidesway Deflection

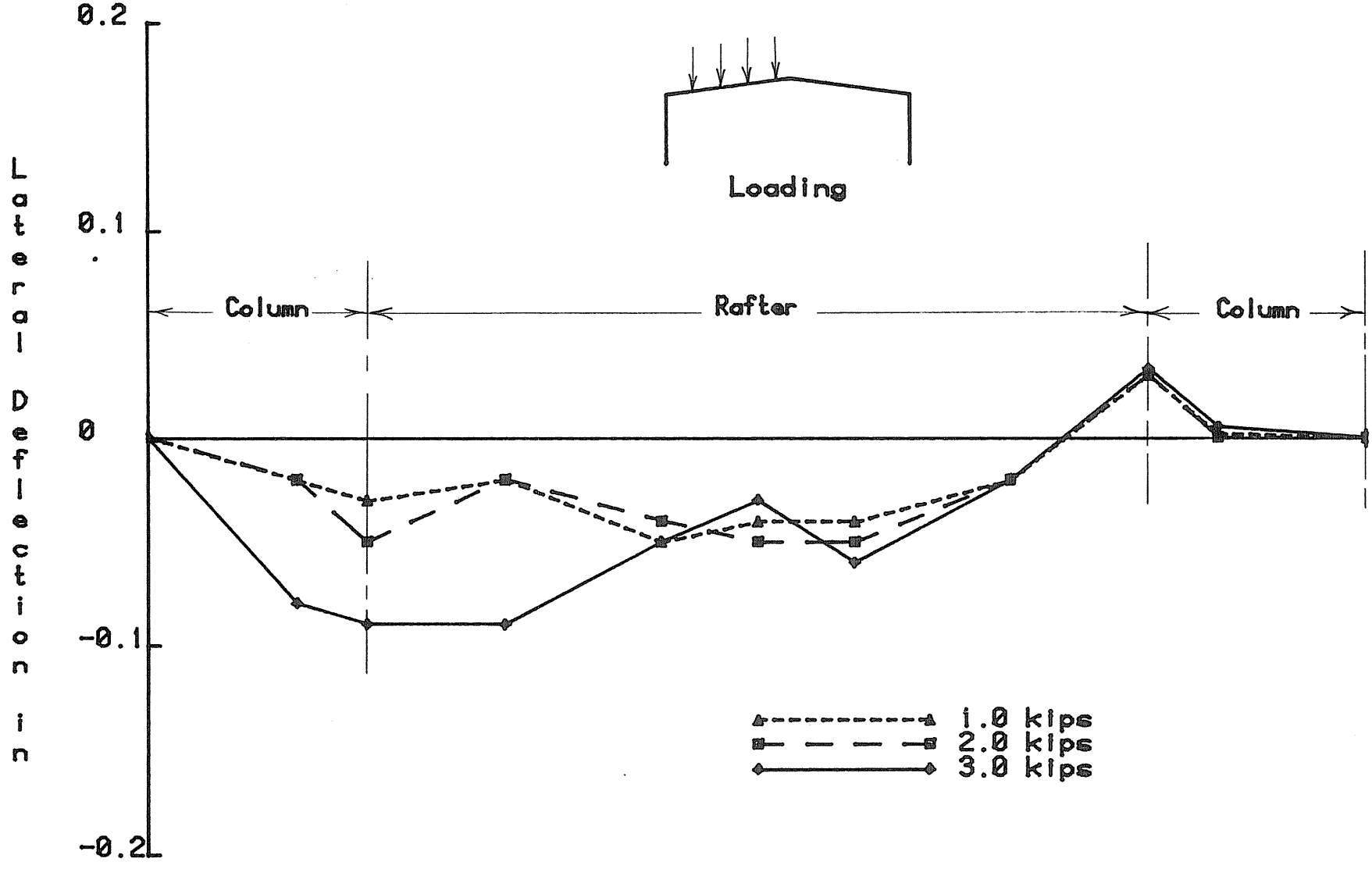


Figure C.3 Load vs. Lateral Deflection of Outside Flange, East Frame

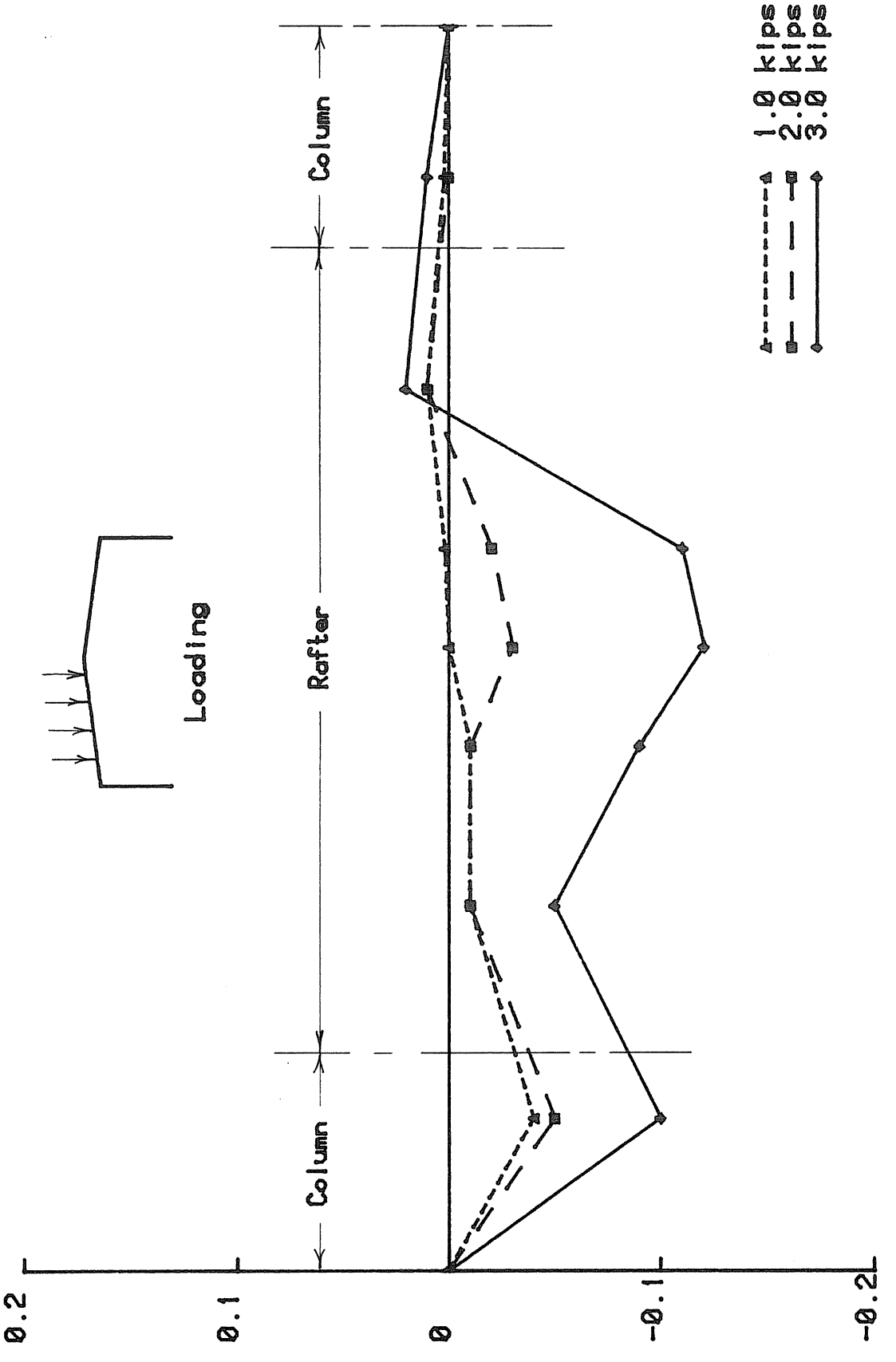


Figure C.4 Load vs. Lateral Deflection of Inside Flange, East Frame

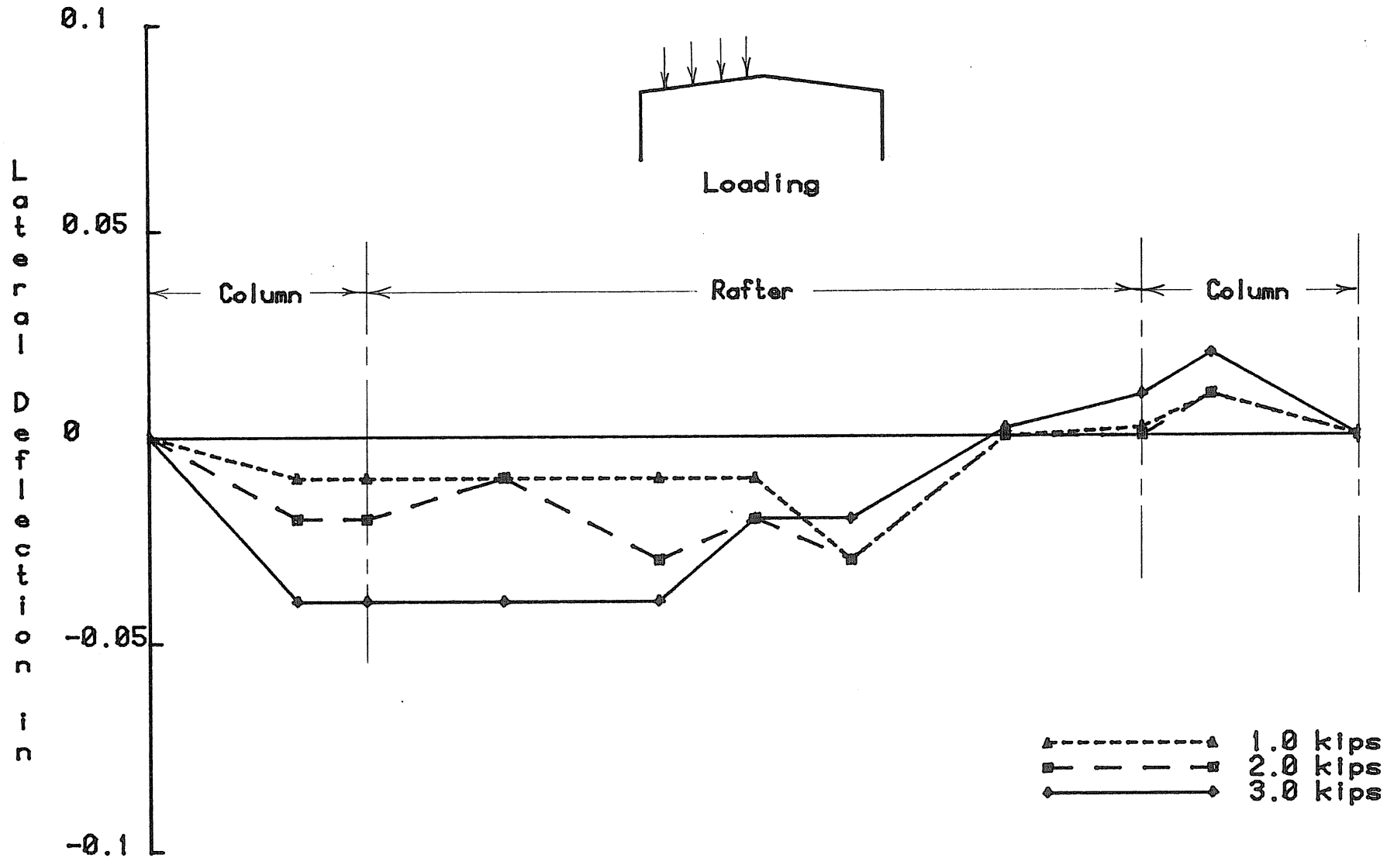


Figure C.5 Load vs. Lateral Deflection of Outside Flange, West Frame

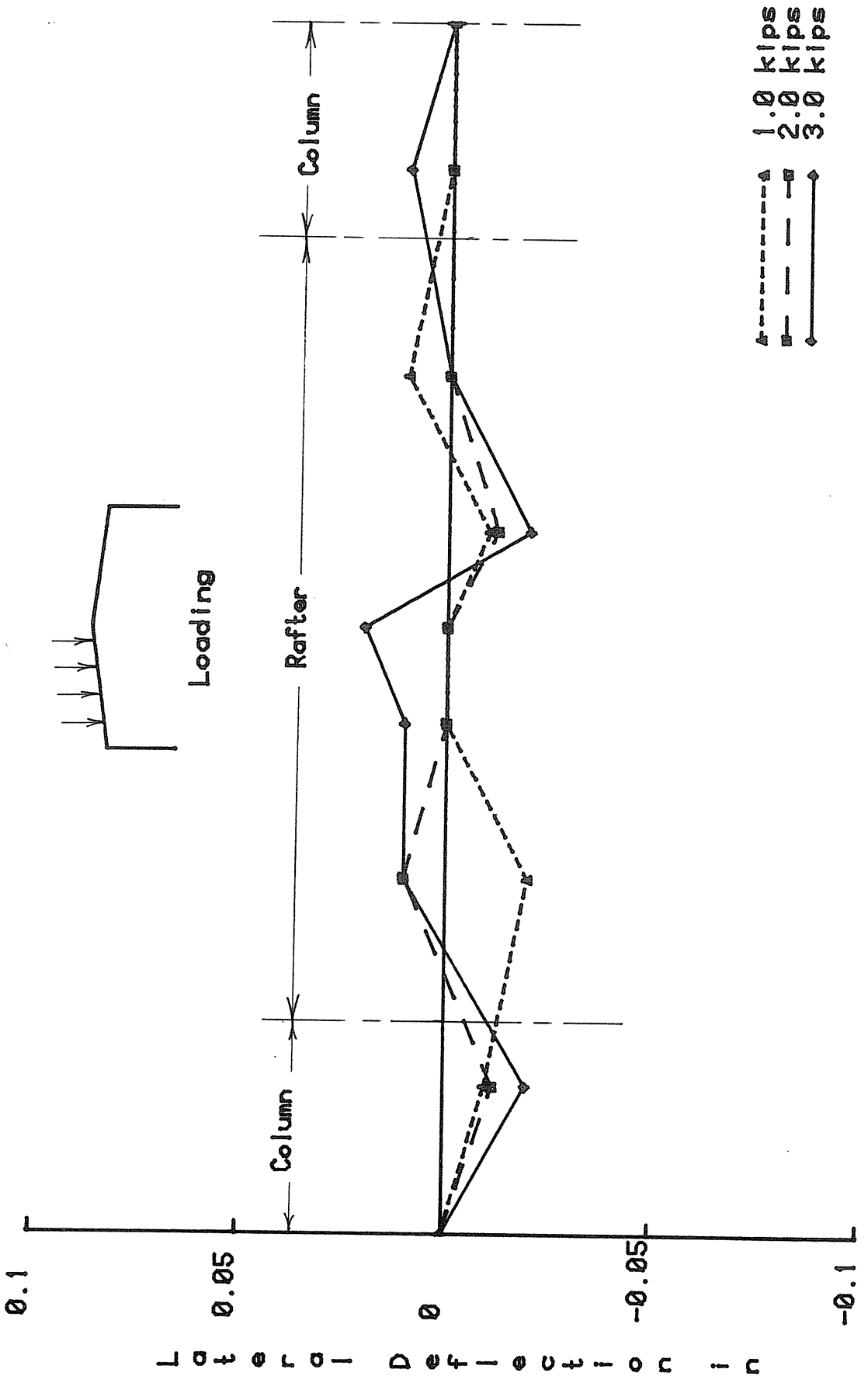


Figure C.6 Load vs. Lateral Deflection of Inside Flange, West Frame

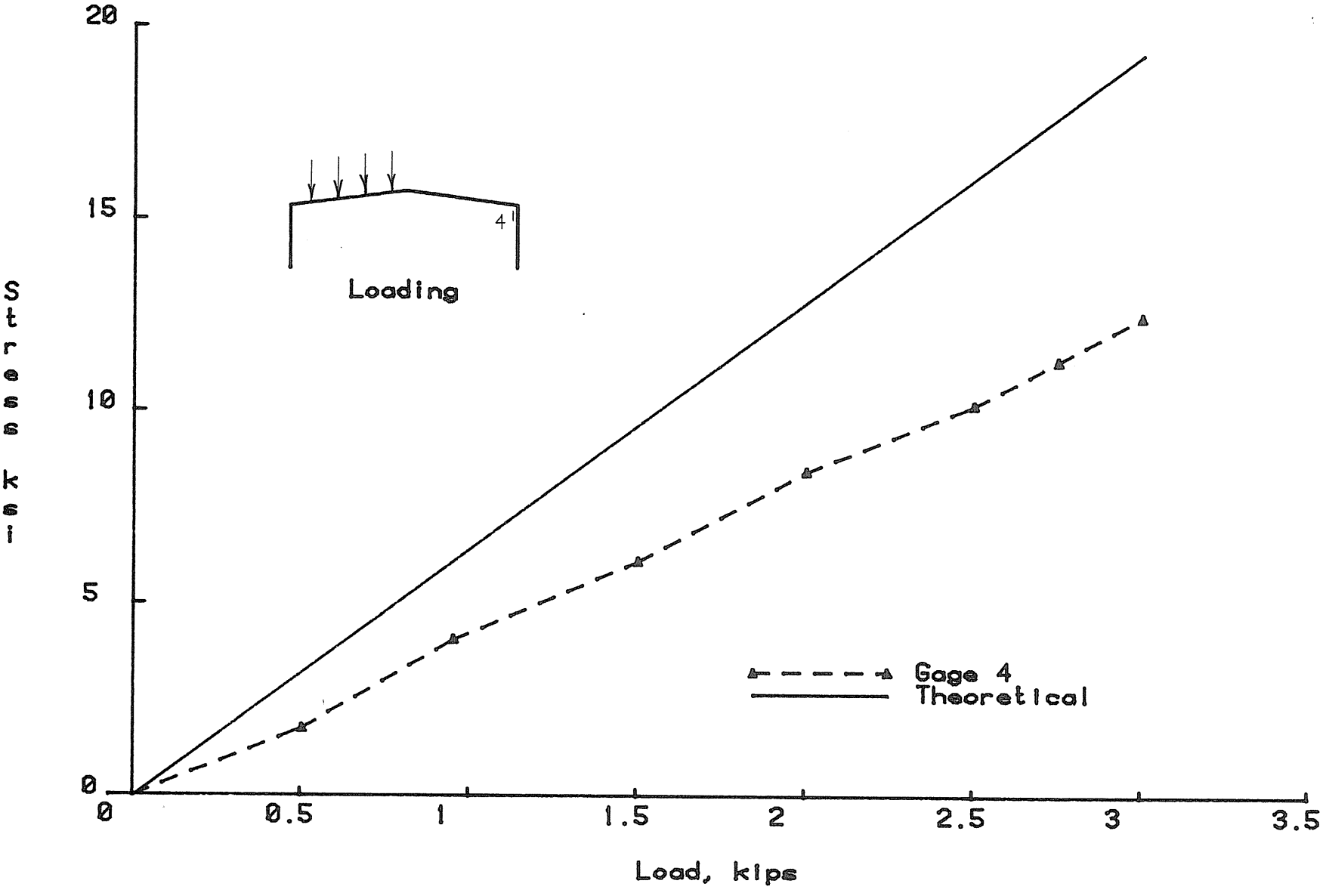


Figure C.7 Load vs. Stress, Northeast Column at Knee

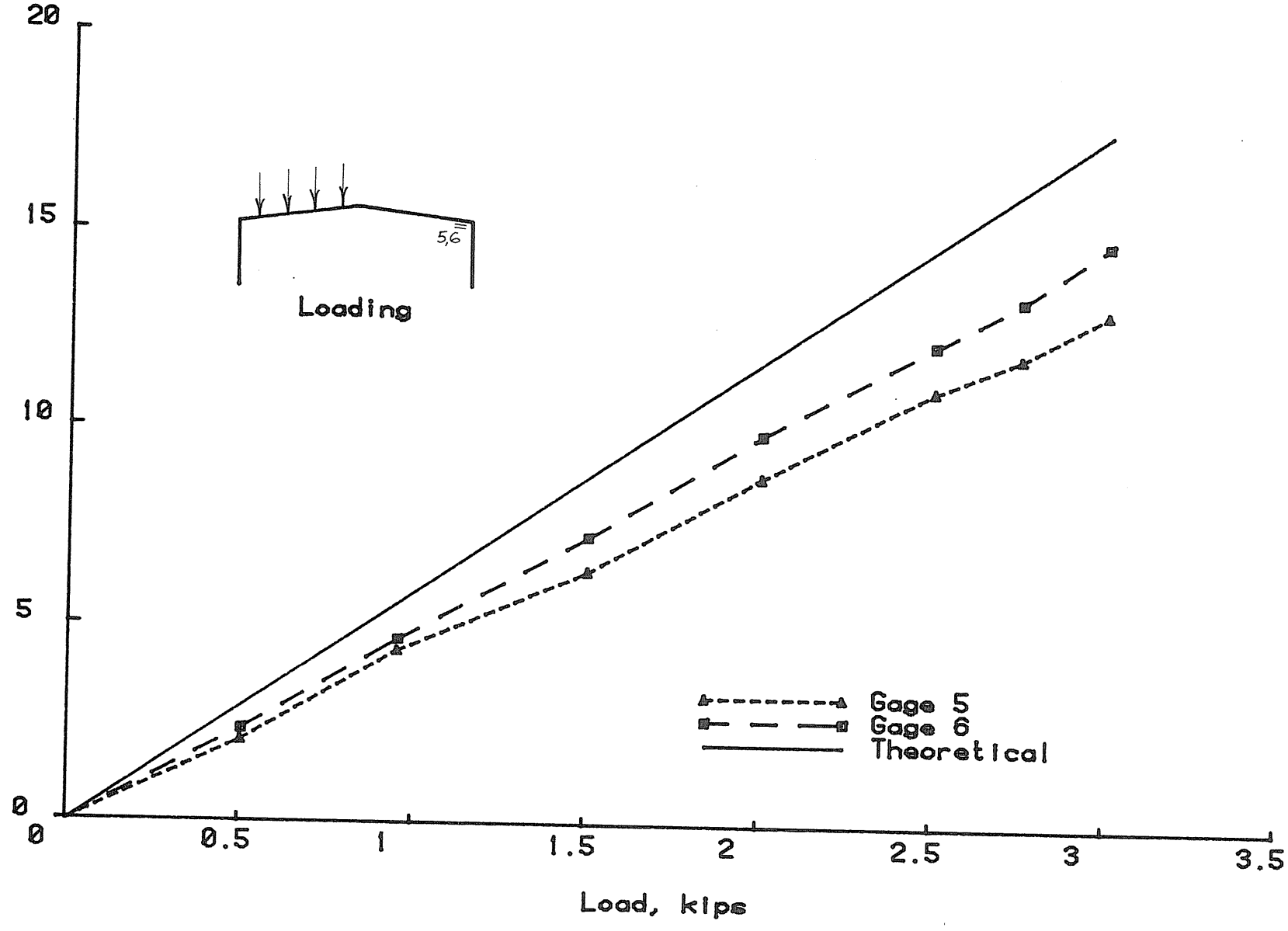


Figure C.8 Load vs. Stress, Northeast Rafter at Knee

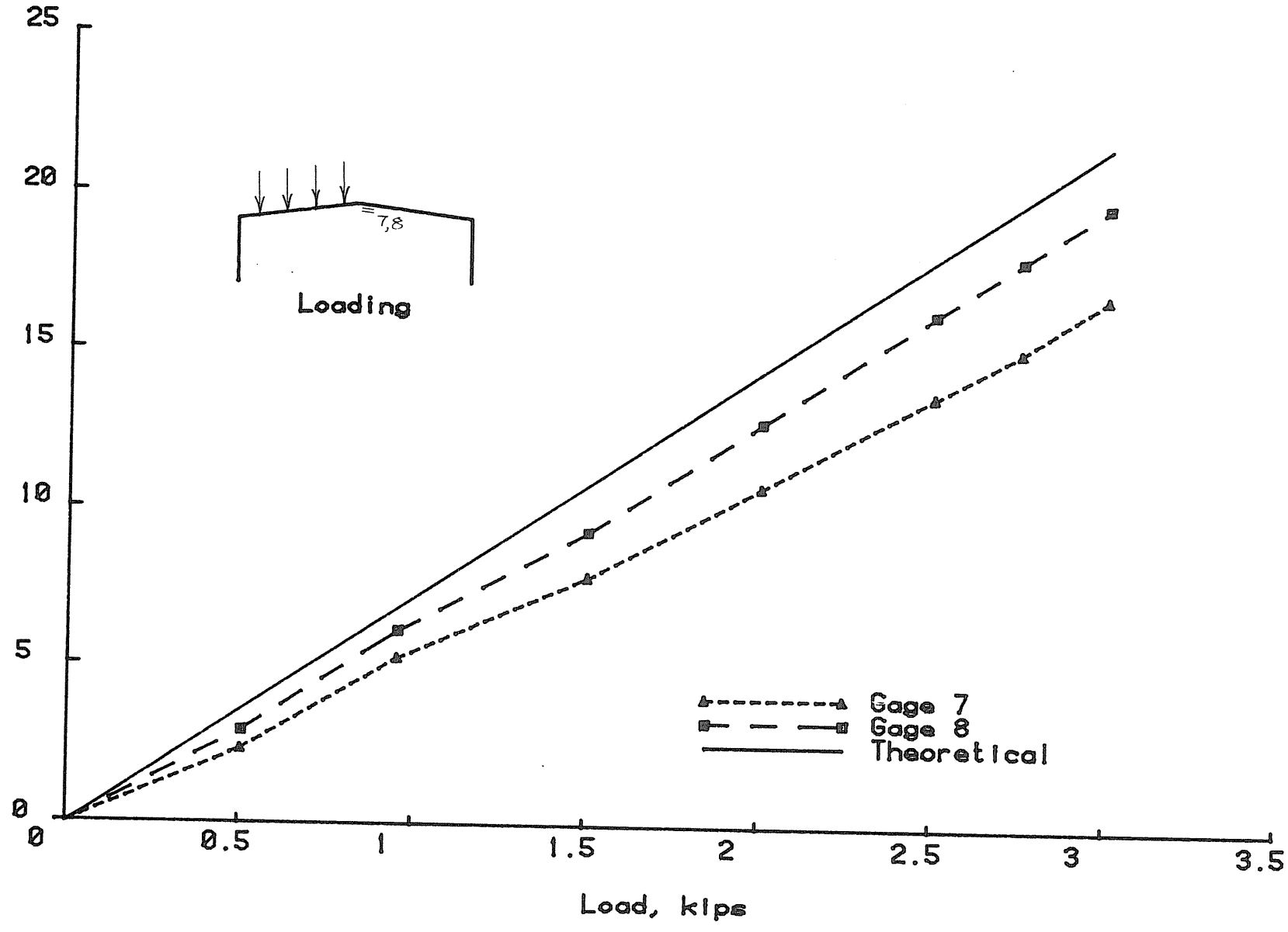


Figure C.9 Load vs. Stress, Northeast Rafter at Peak

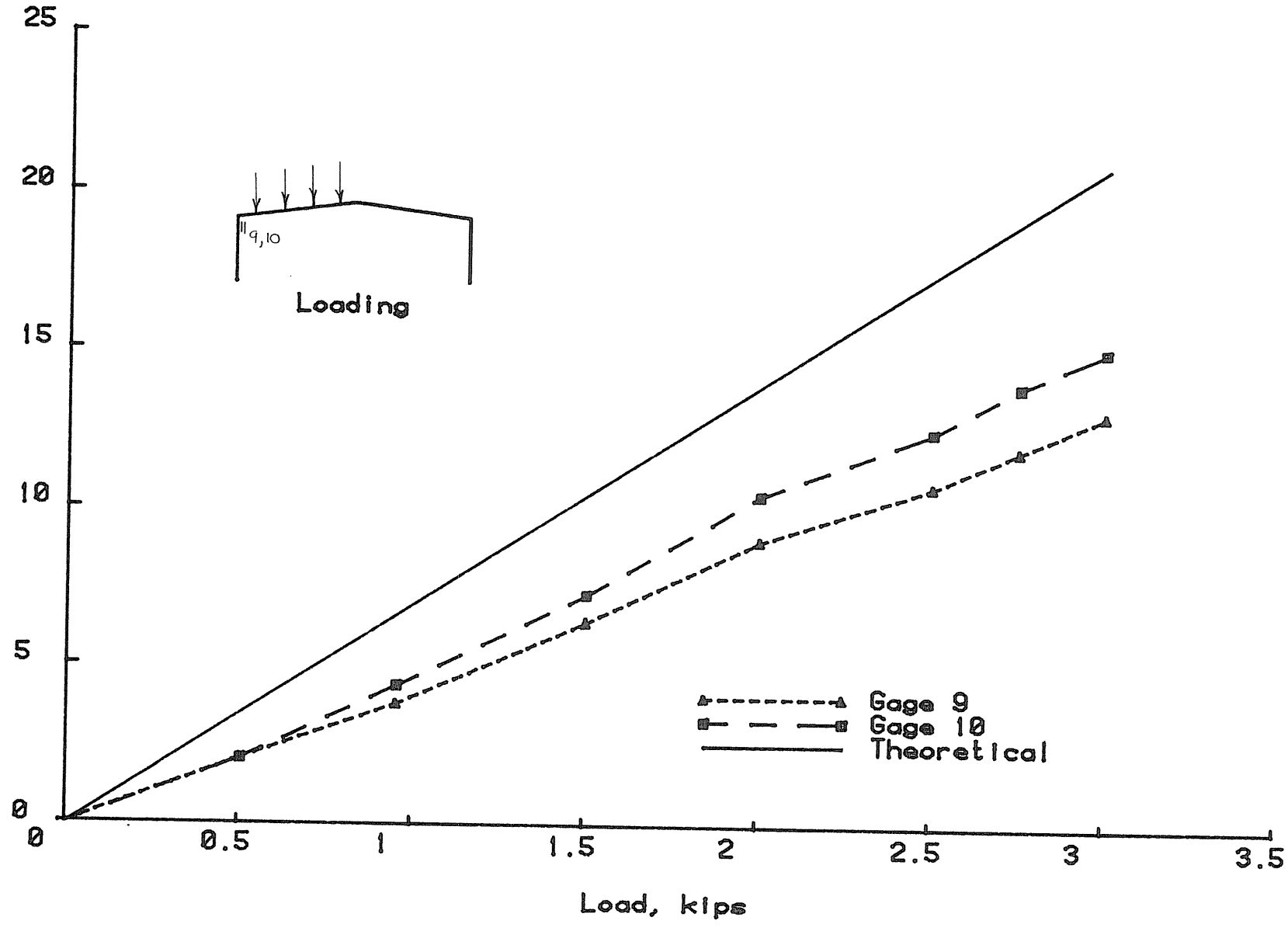


Figure C.10 Load vs. Stress, Southwest Column at Knee

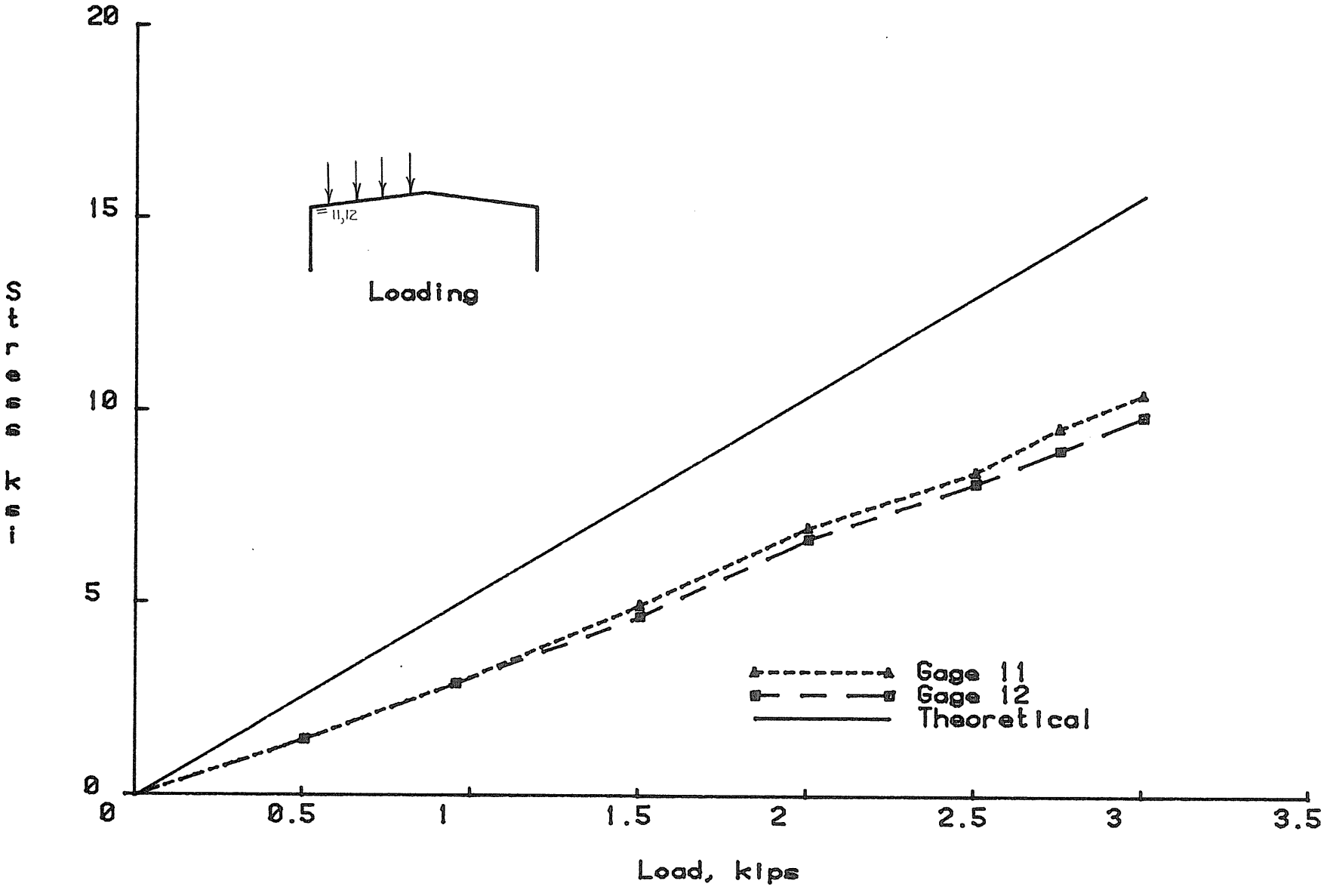


Figure C.11 Load vs. Stress, Southwest Rafter at Knee

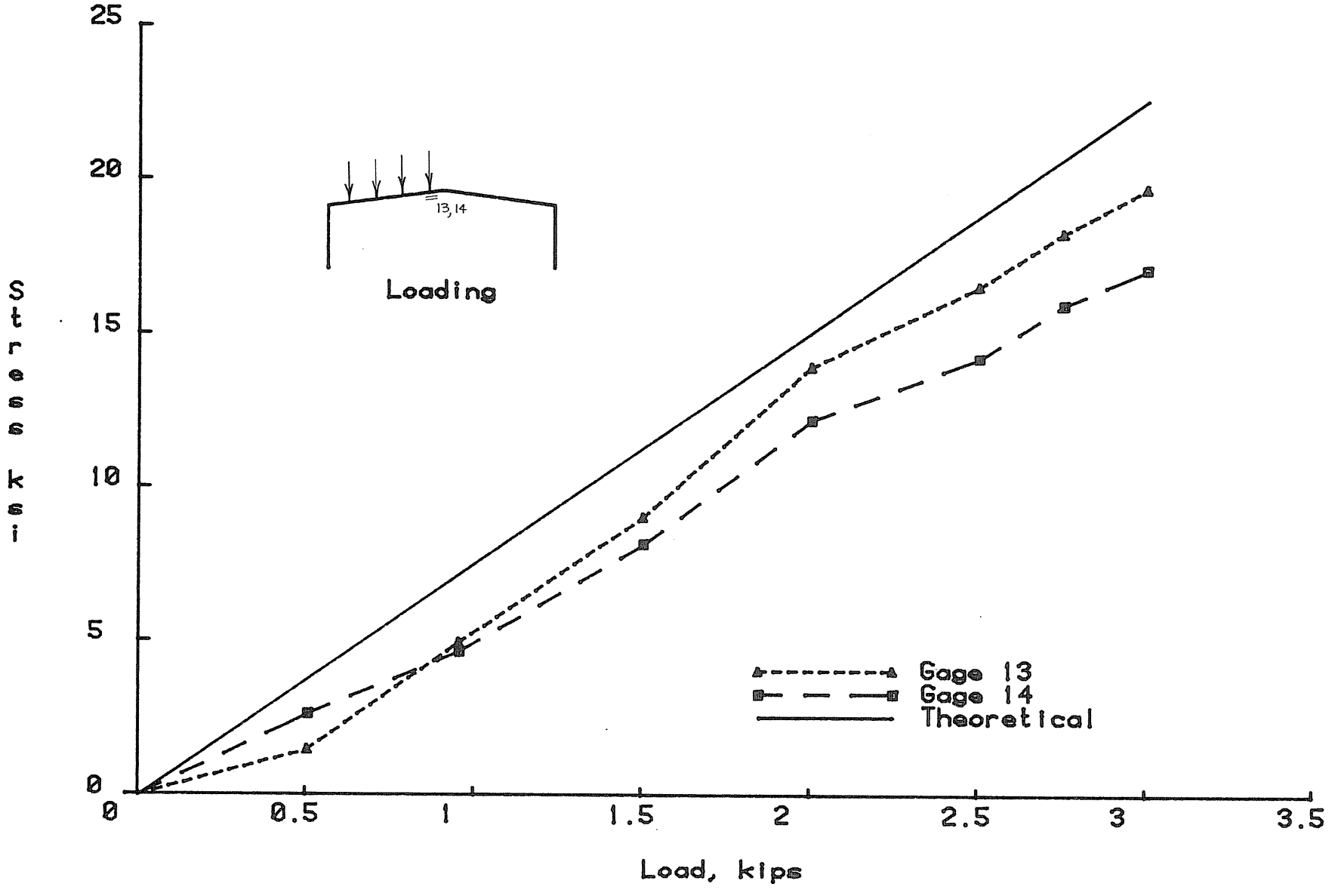


Figure C.12 Load vs. Stress, Southwest Rafter at Peak

APPENDIX D

INITIAL TEST, LATERAL LOAD ONLY

Test Date April 21, 1981

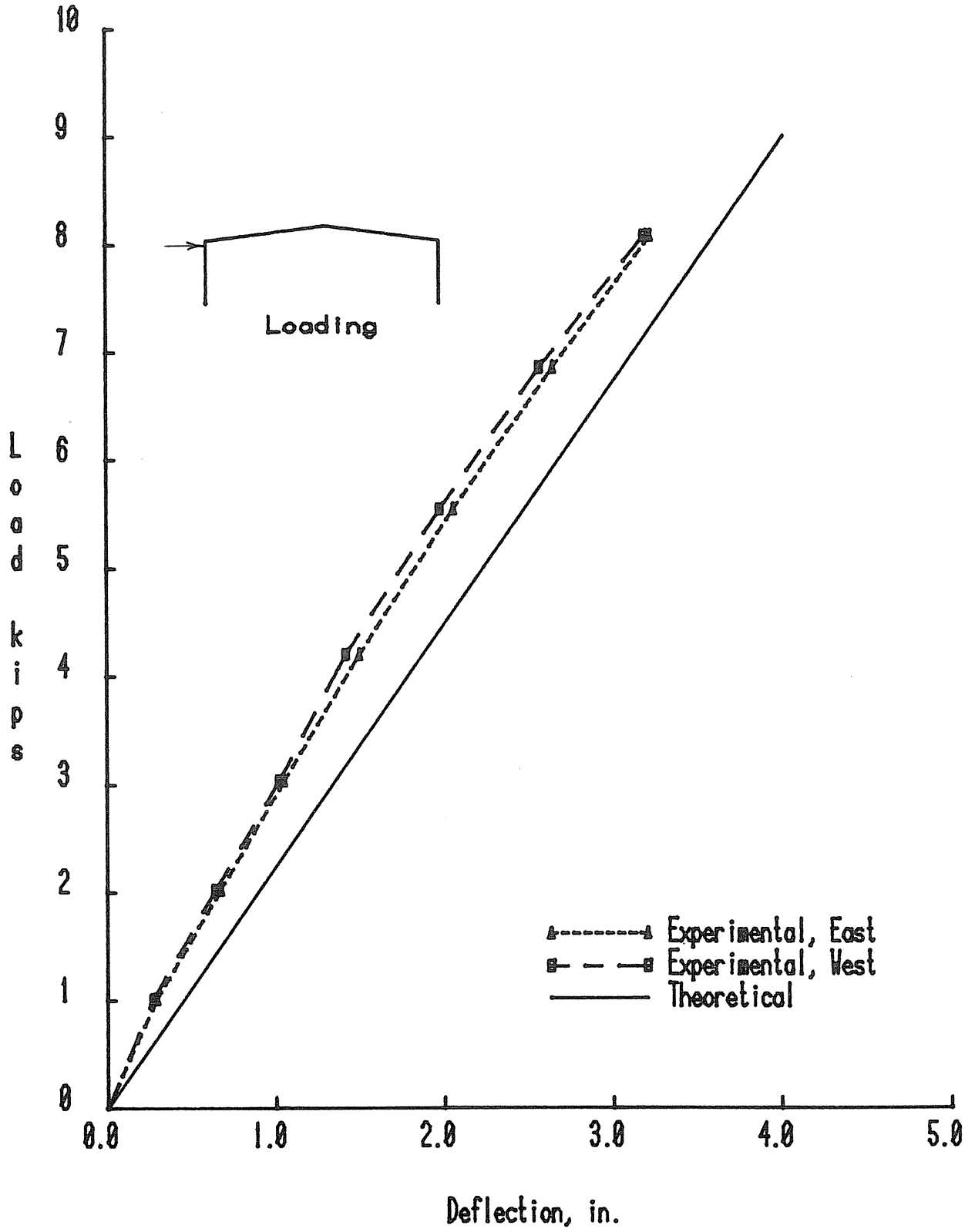


Figure D.1 Load vs. Sidesway Deflection

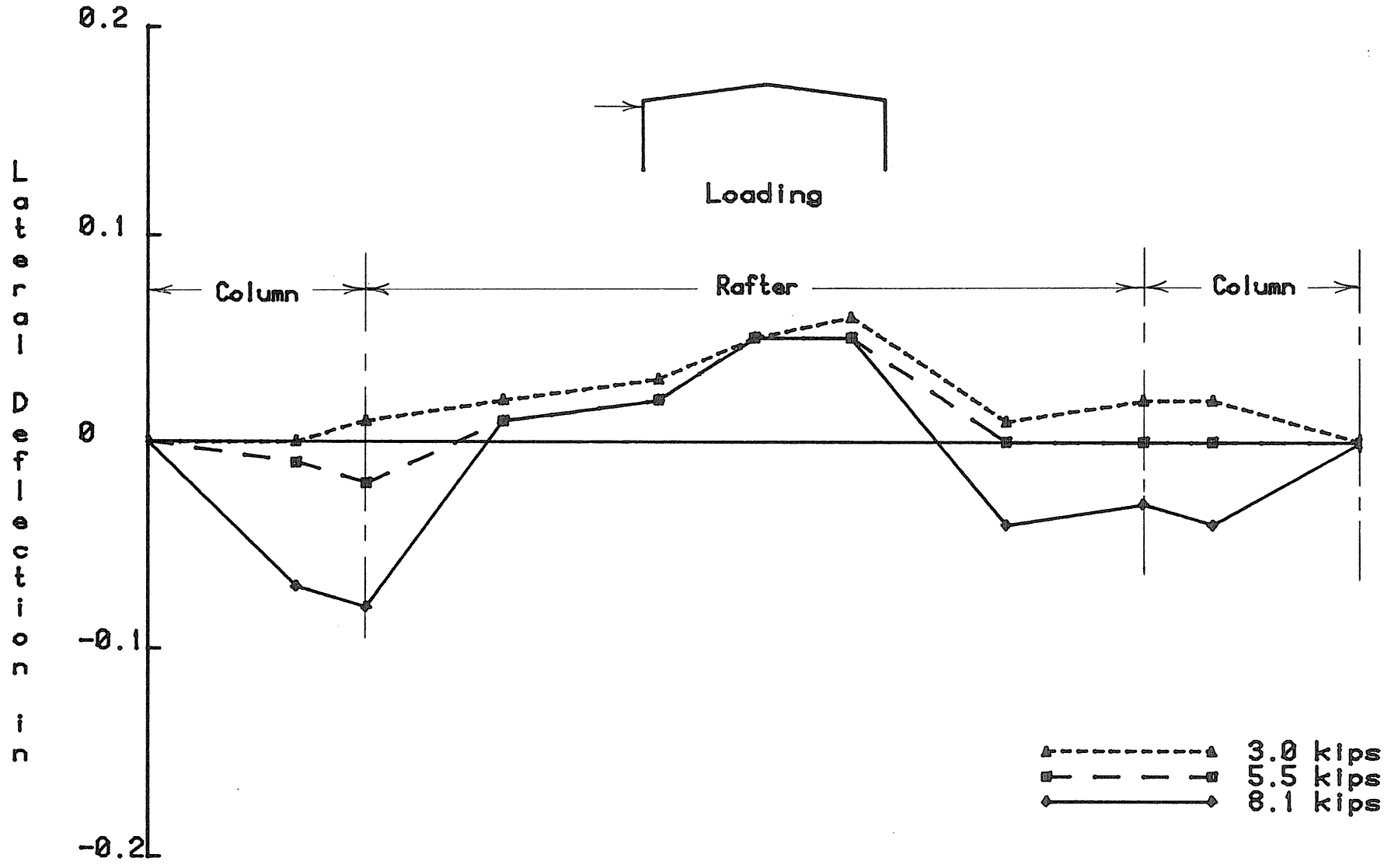


Figure D.2 Load vs. Lateral Deflection of Outside Flange, East Frame

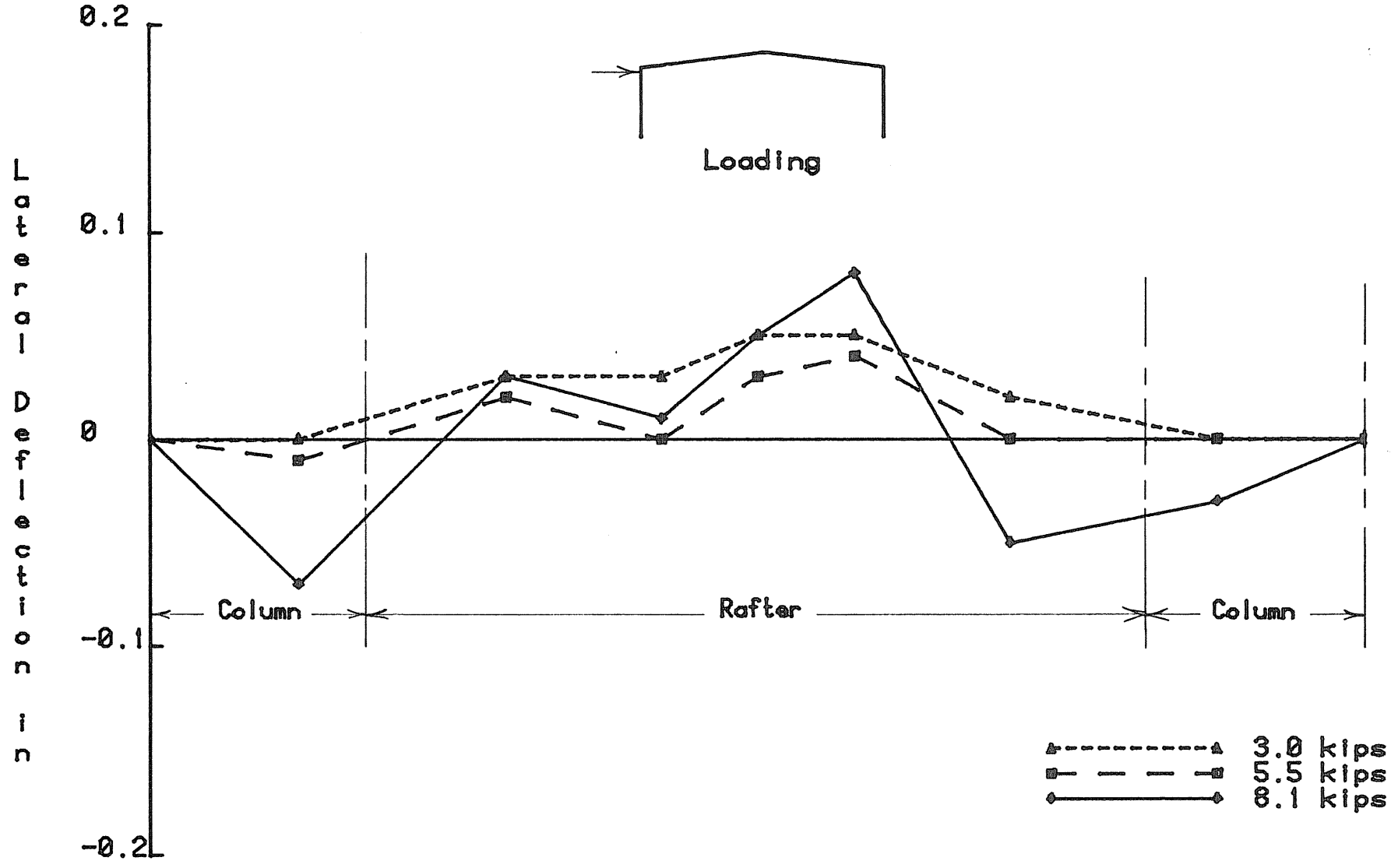


Figure D.3 Load vs. Lateral Deflection of Inside Flange, East Frame

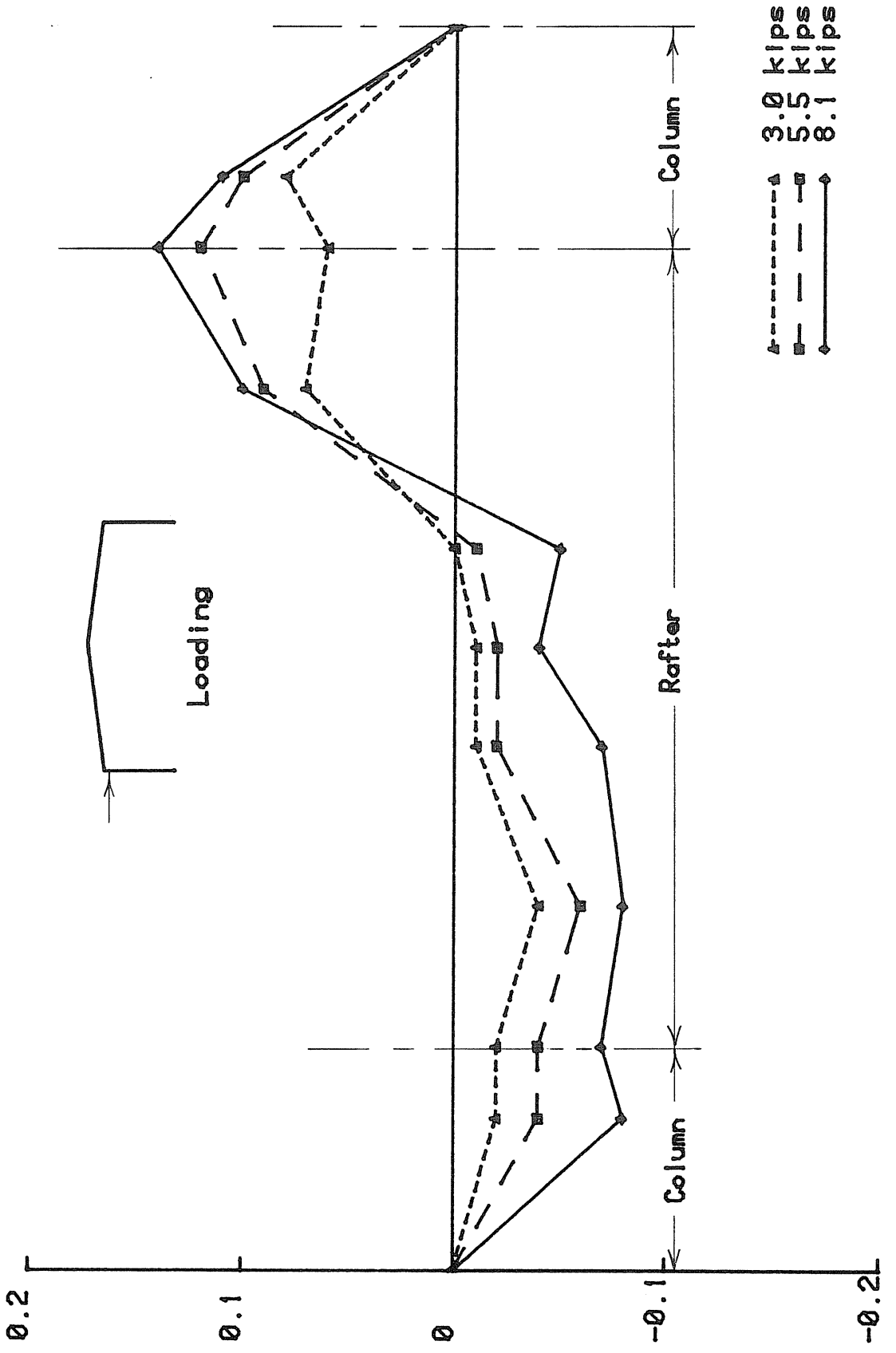


Figure D.4 Load vs. Lateral Deflection of Outside Flange, West Frame

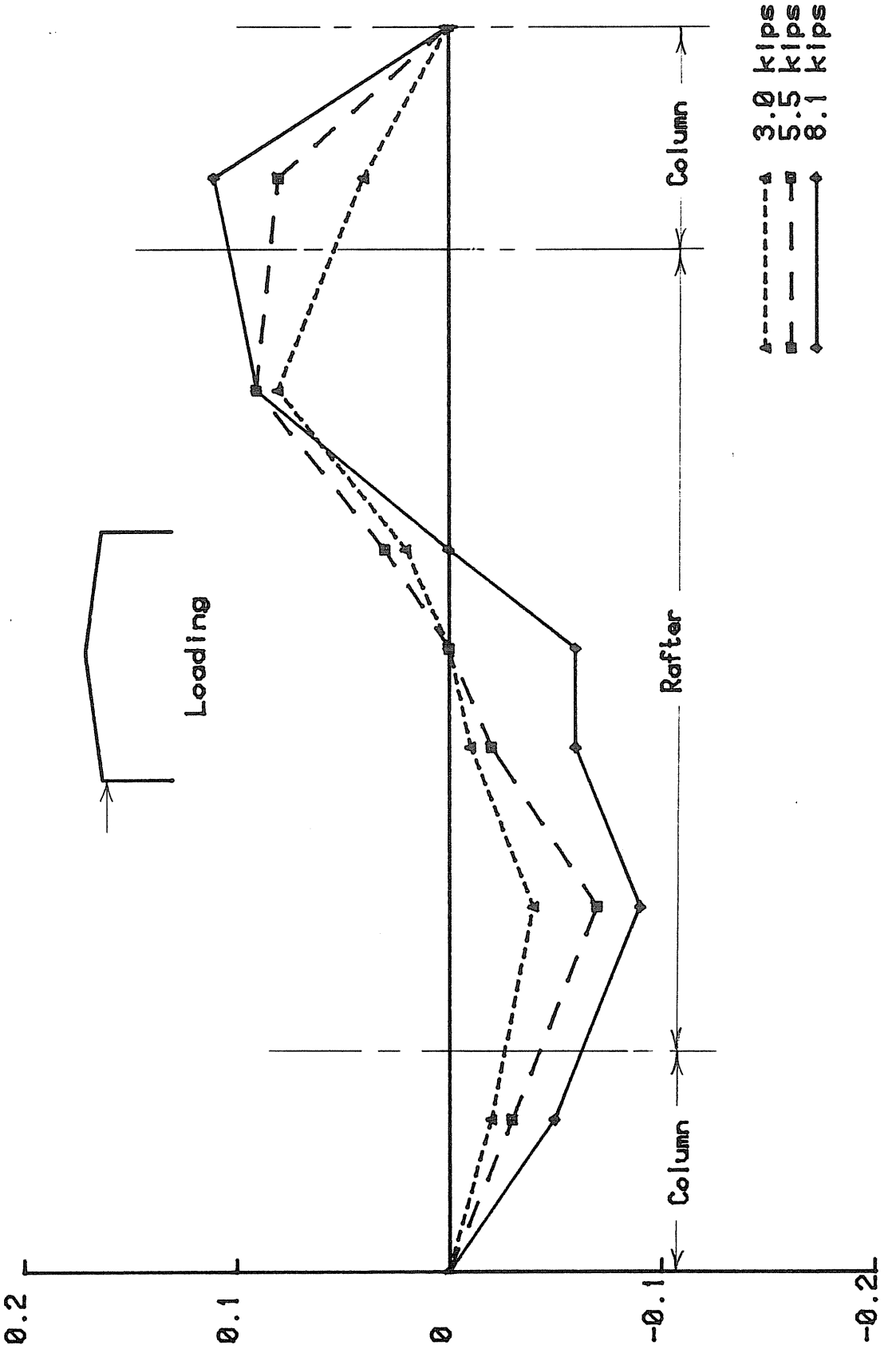


Figure D.5 Load vs. Lateral Deflection of Inside Flange, West Frame

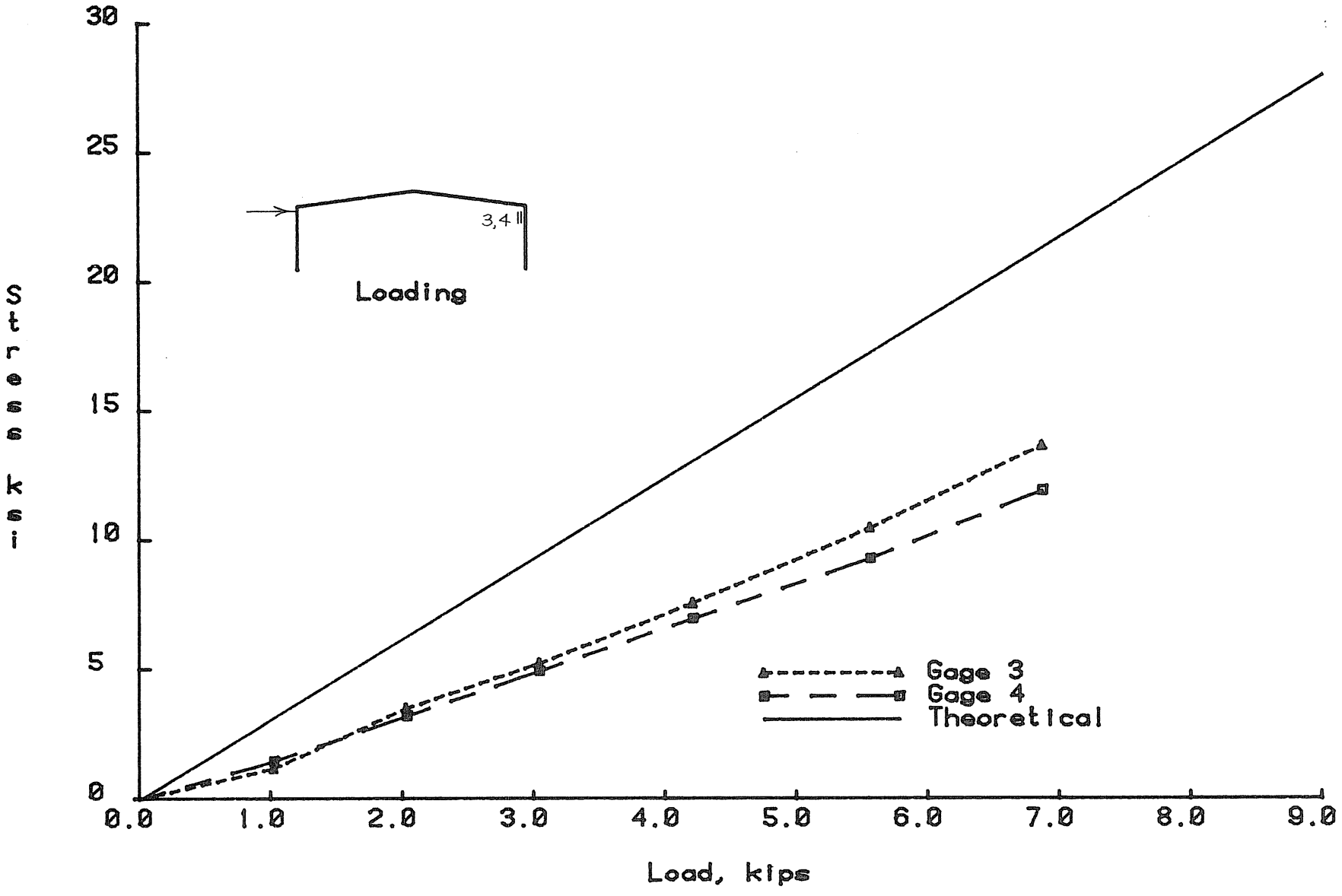


Figure D.6 Load vs. Stress, Northeast Column at Knee

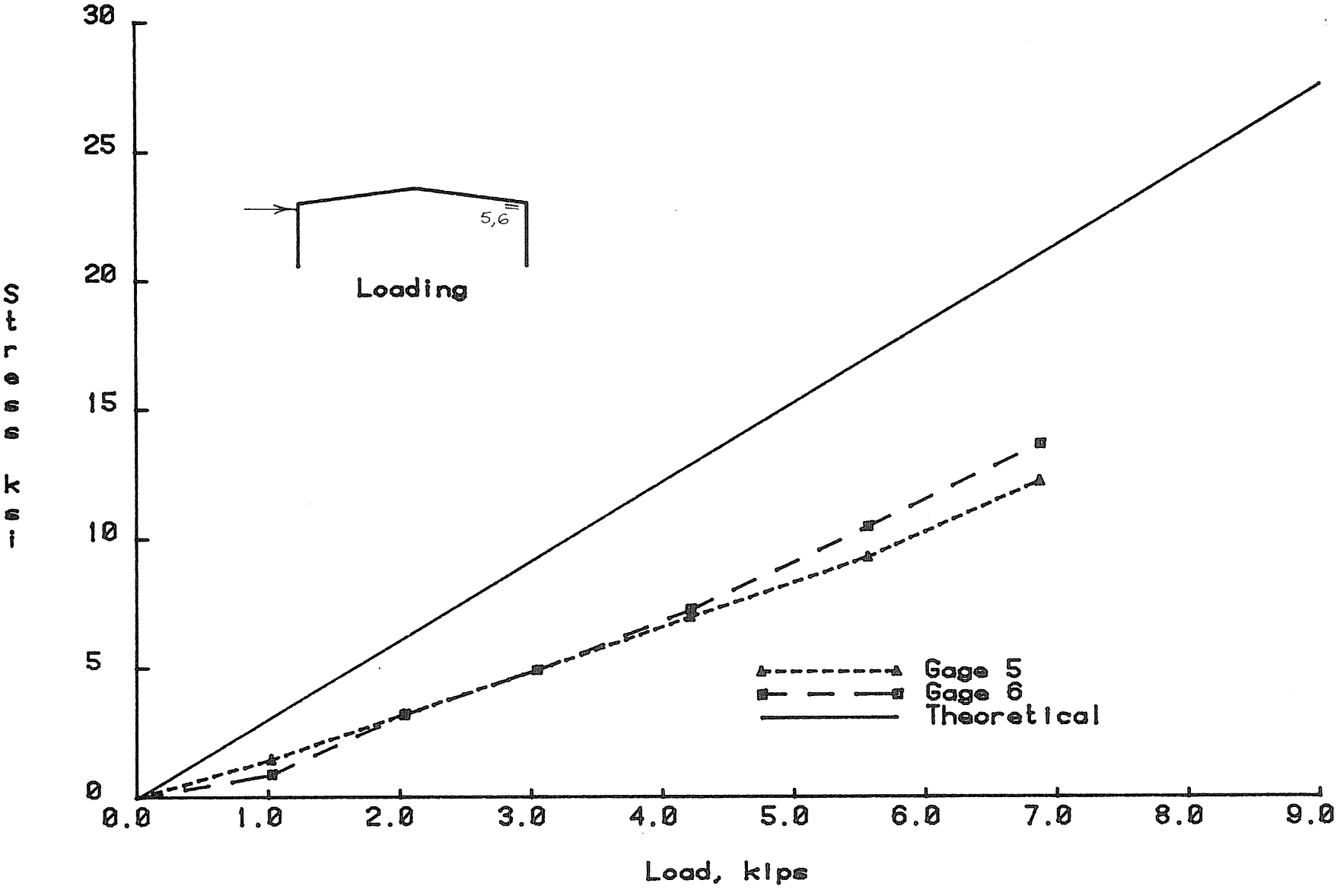


Figure D.7 Load vs. Stress, Northeast Rafter at Knee

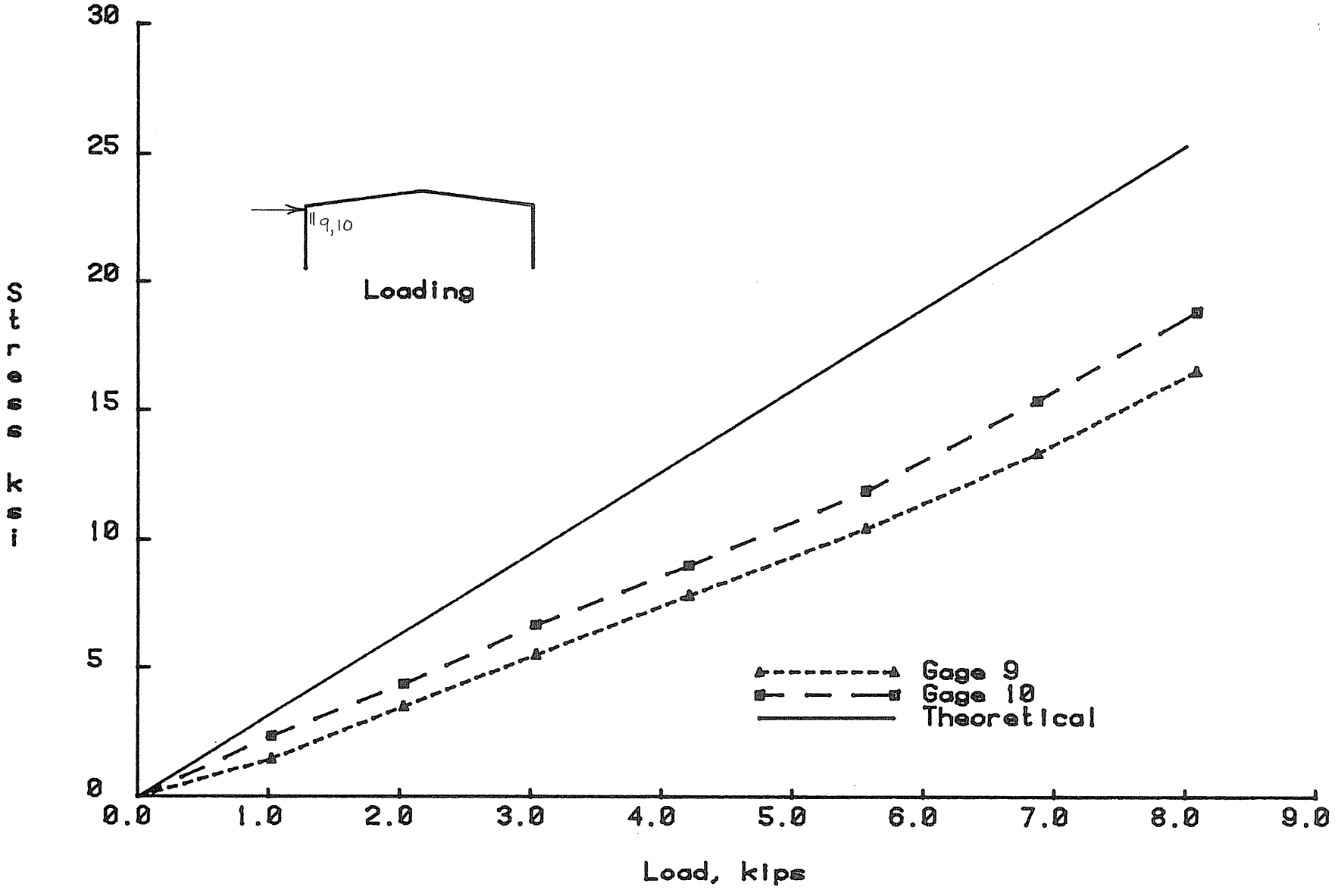


Figure D.8 Load vs. Stress, Southwest Column at Knee

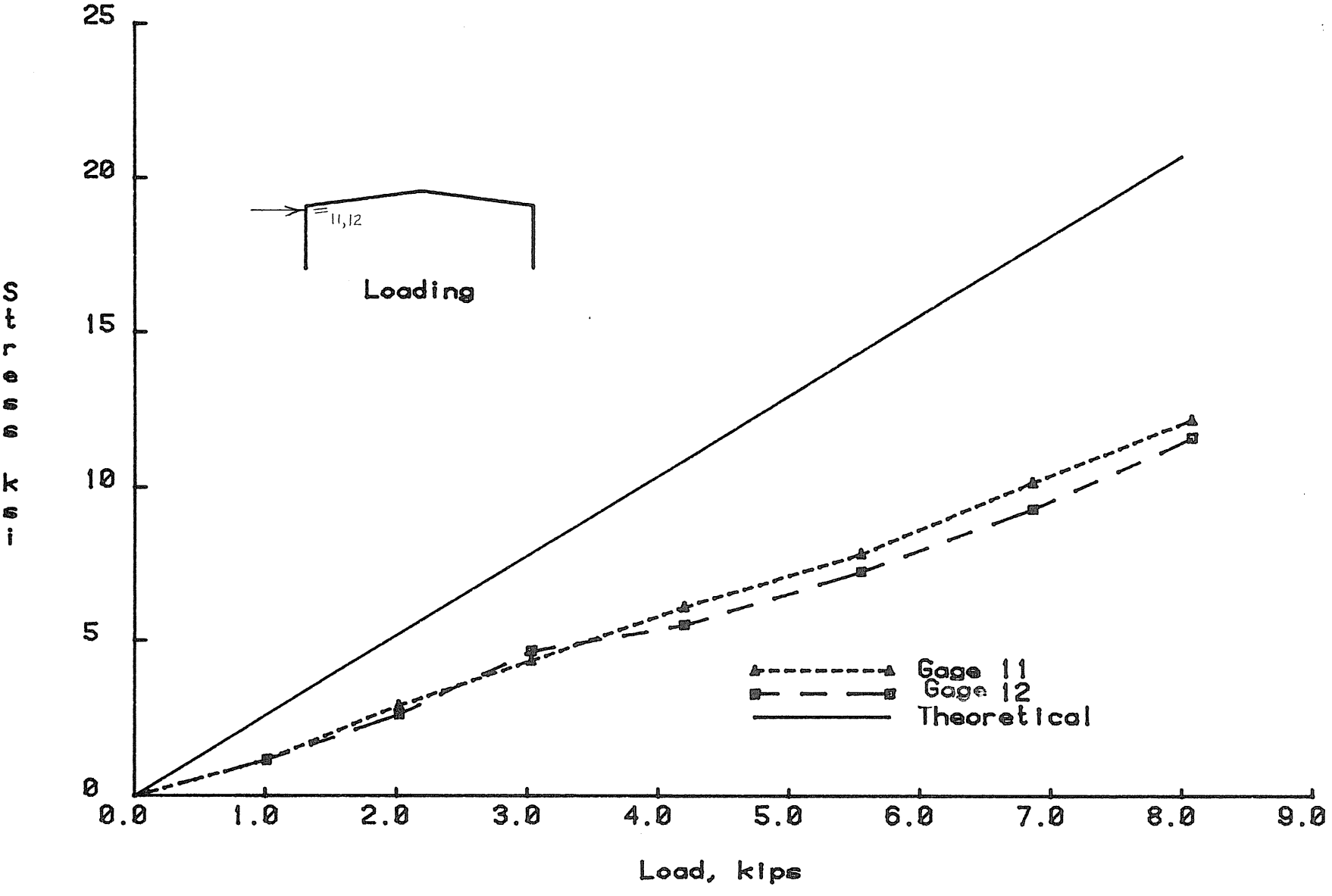


Figure D.9 Load vs. Stress, Southwest Rafter at Knee

APPENDIX E

INITIAL TEST, UNBALANCED LIVE LOAD ON WINDWARD SIDE AND LATERAL LOAD

Test Date April 28, 1981

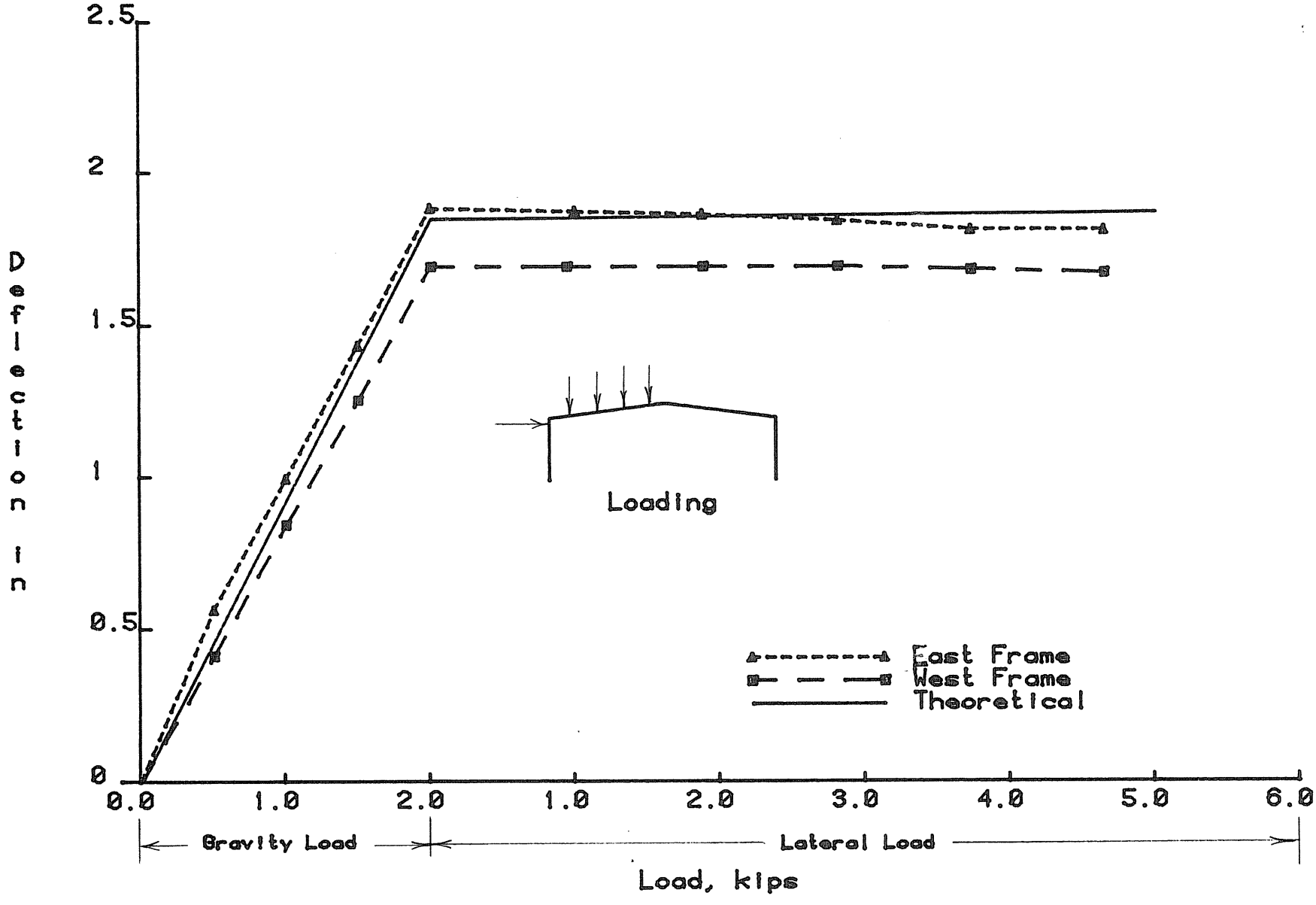


Figure E.1 Load vs. Centerline Vertical Deflection

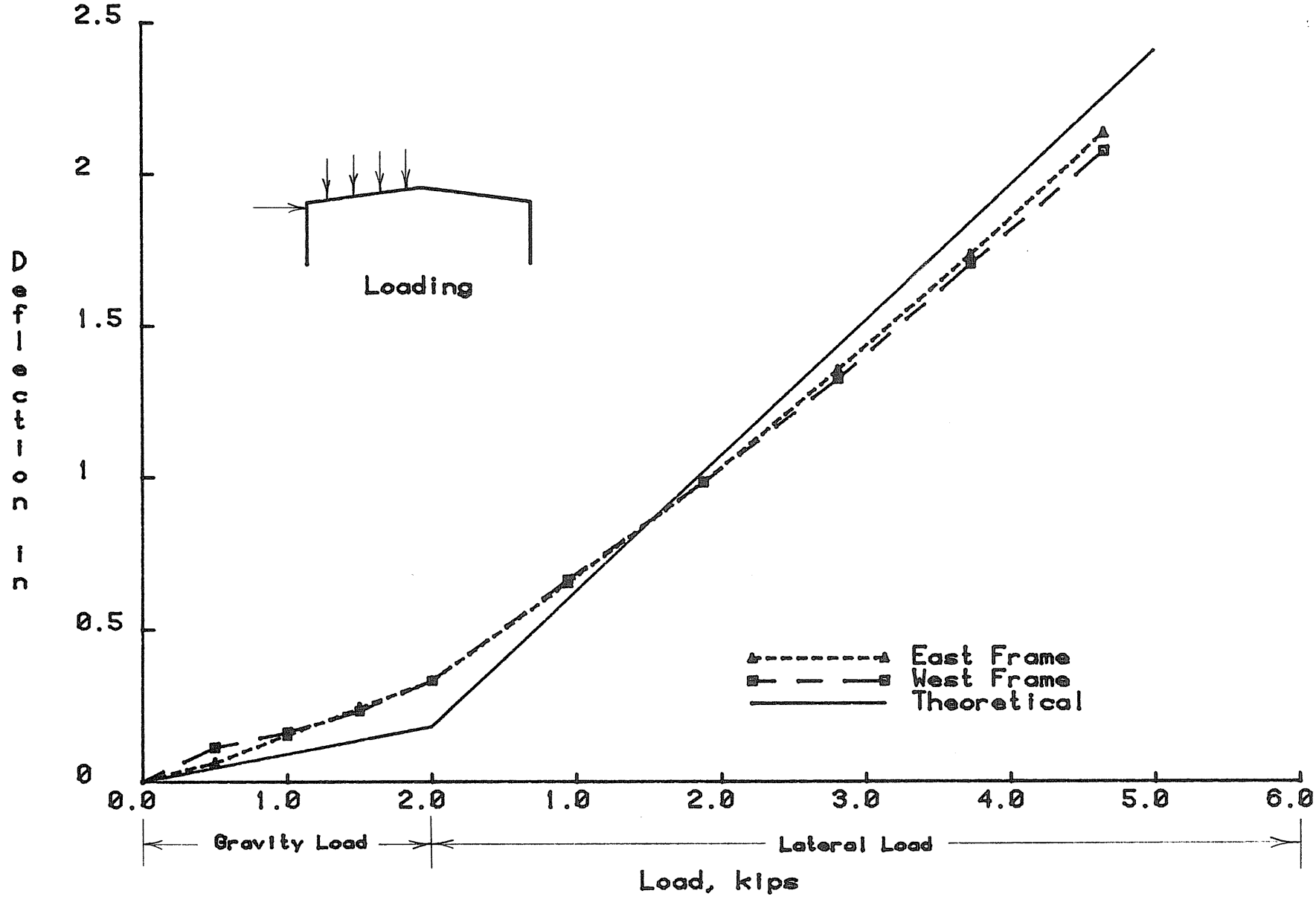


Figure E.2 Load vs. Sidesway Deflection

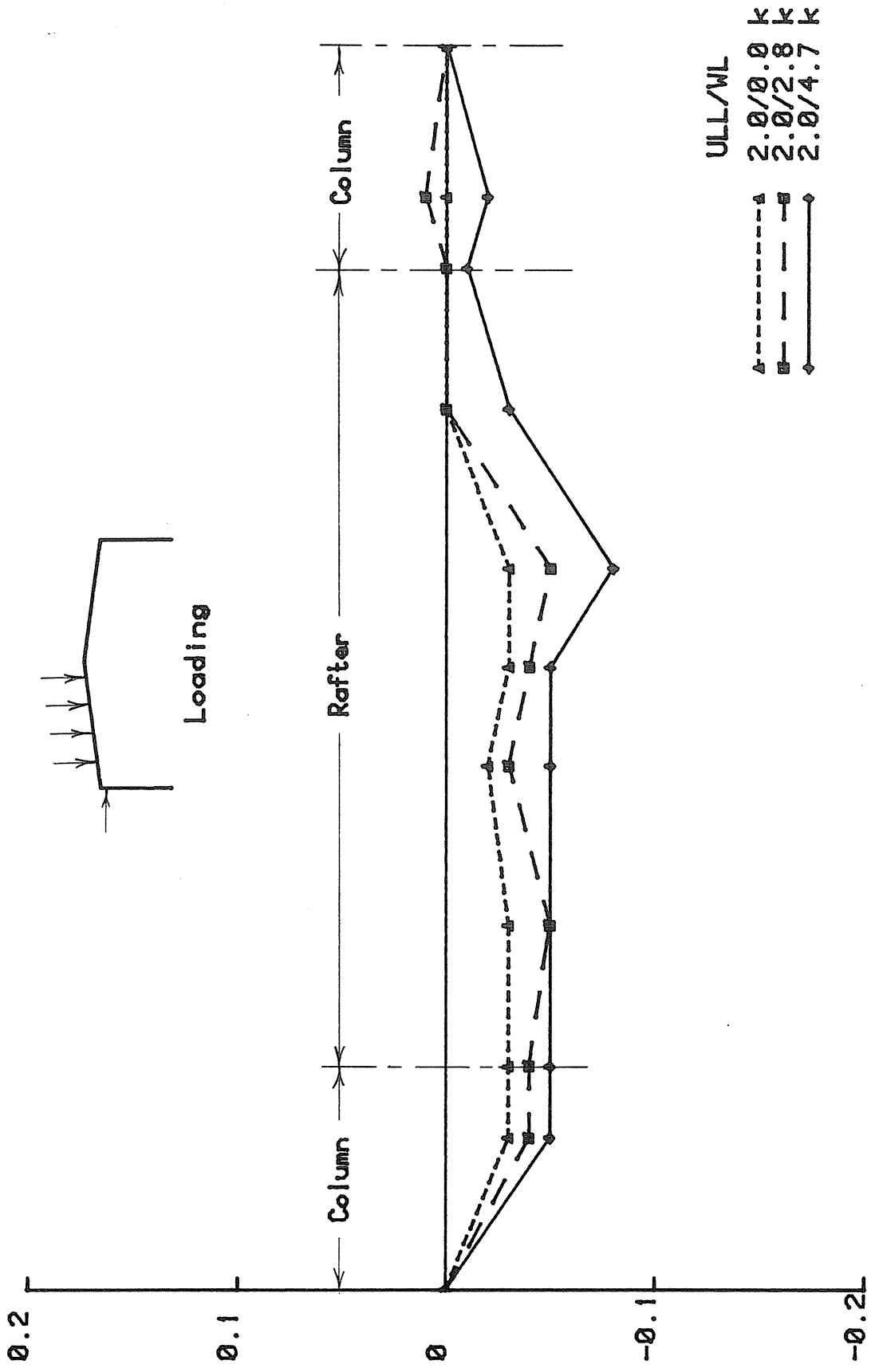


Figure E.3 Load vs. Lateral Deflection of Outside Flange, East Frame

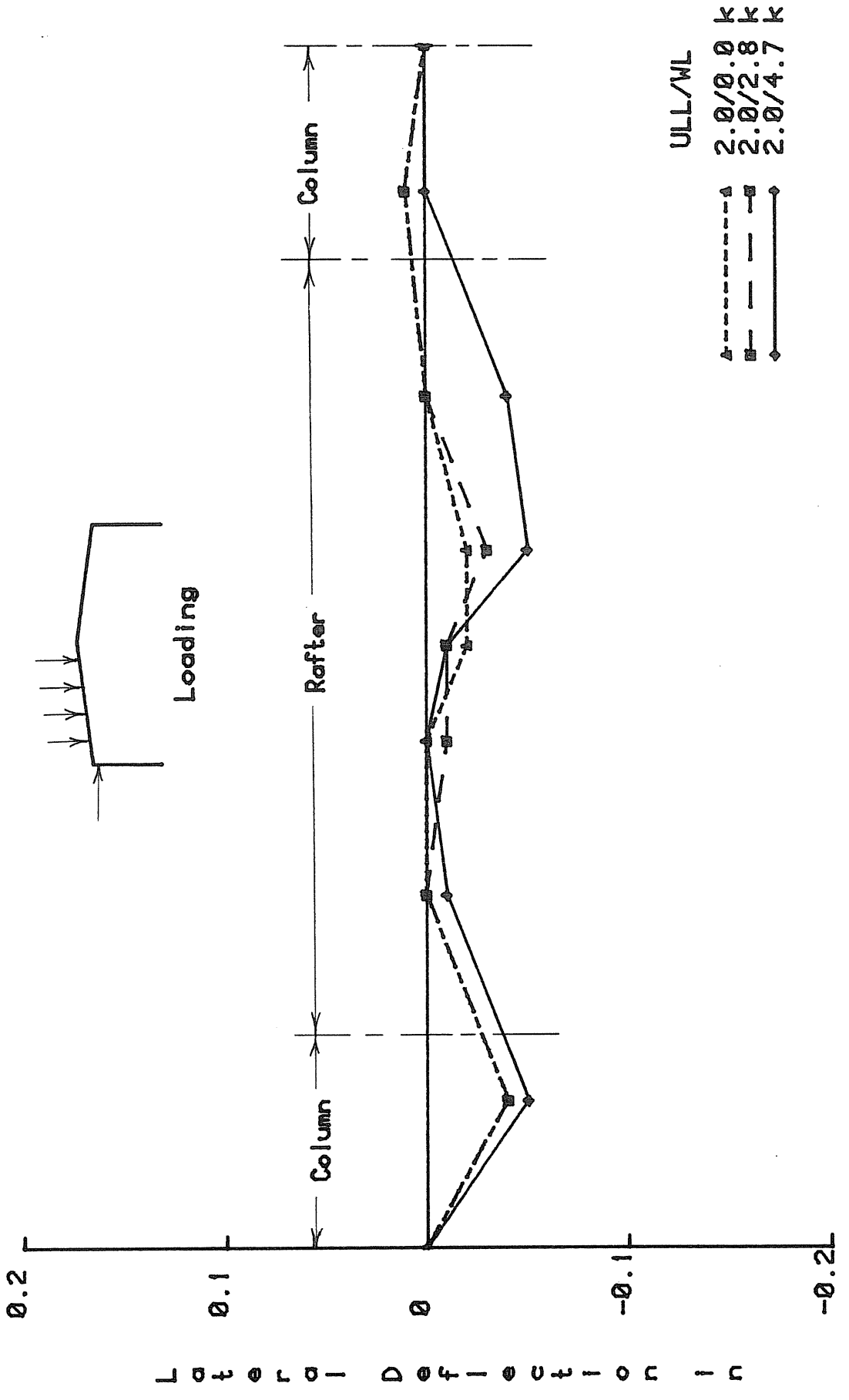


Figure E.4 Load vs. Lateral Deflection of Inside Flange, East Frame

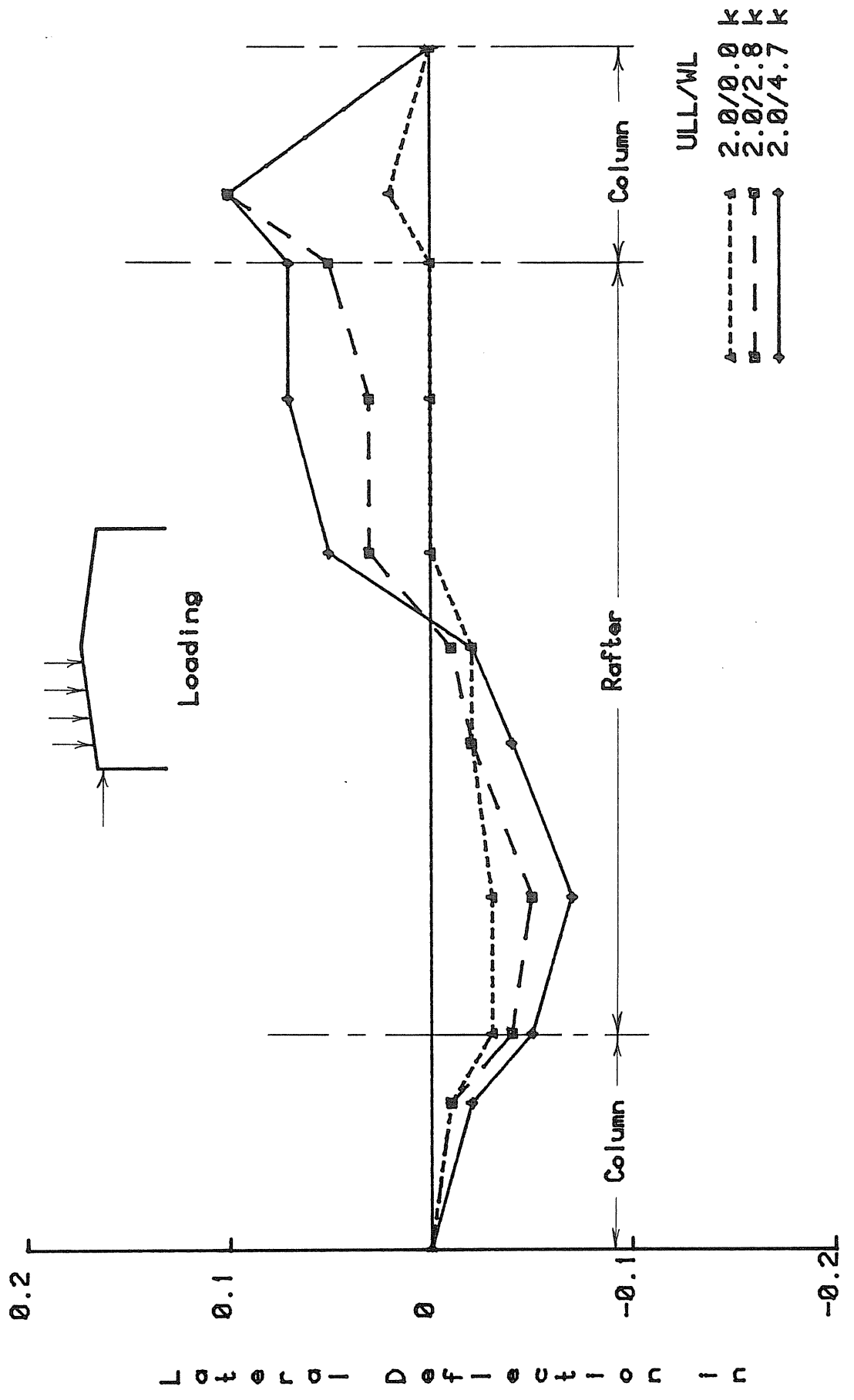


Figure E.5 Load vs. Lateral Deflection of Outside Flange, West Frame

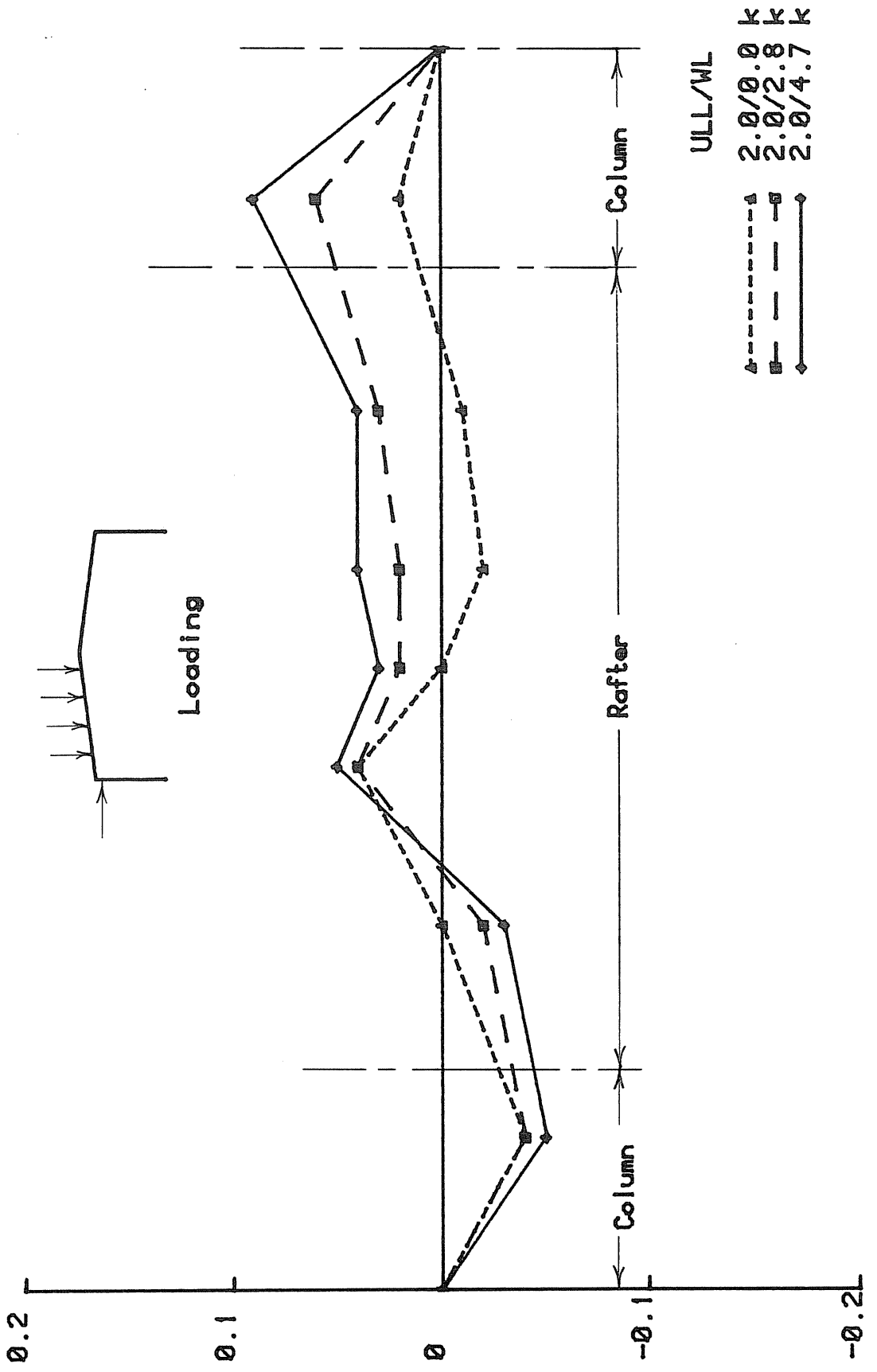


Figure E.6 Load vs. Lateral Deflection of Inside Flange, West Frame

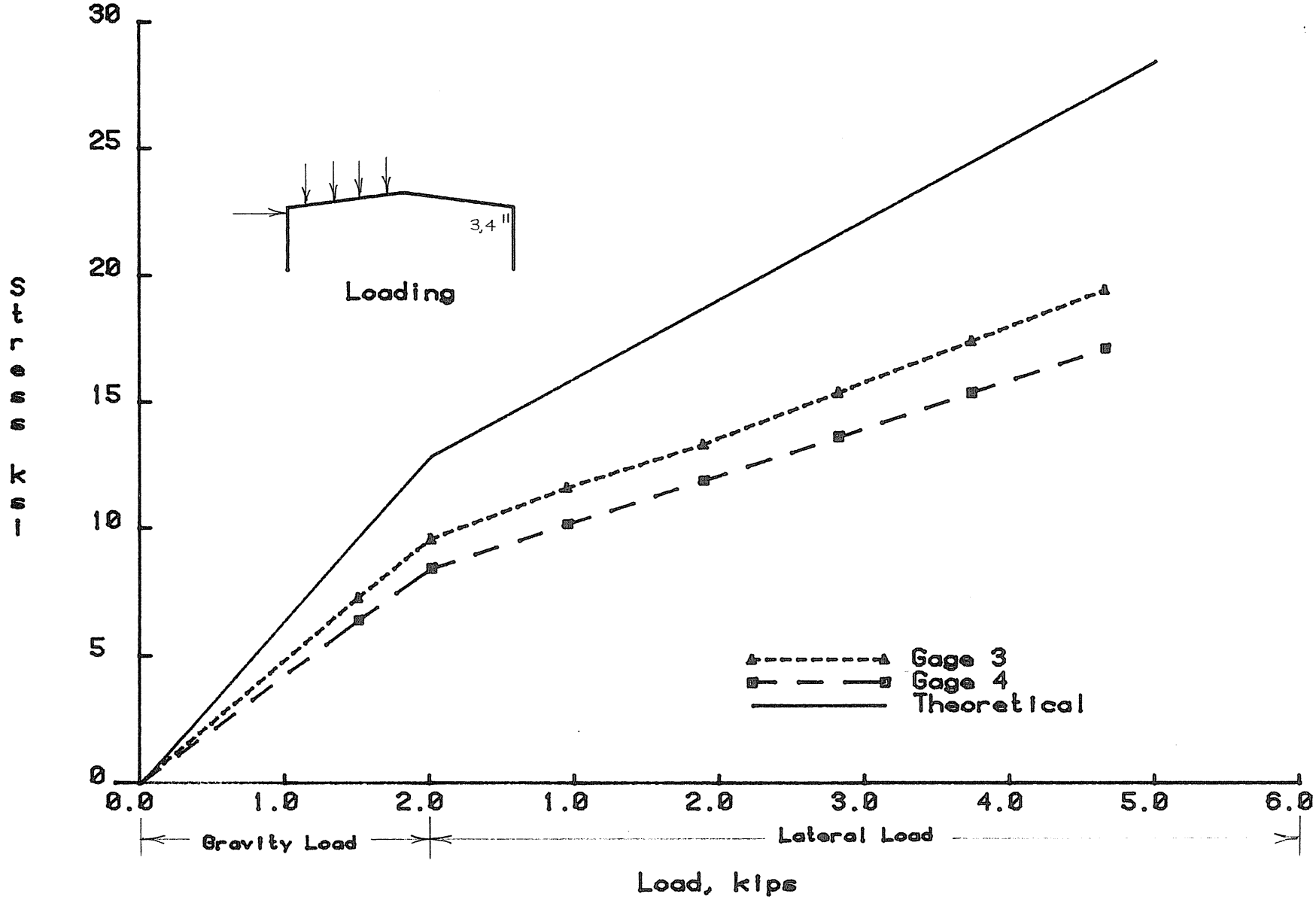


Figure E.7 Load vs. Stress, Northeast Column at Knee

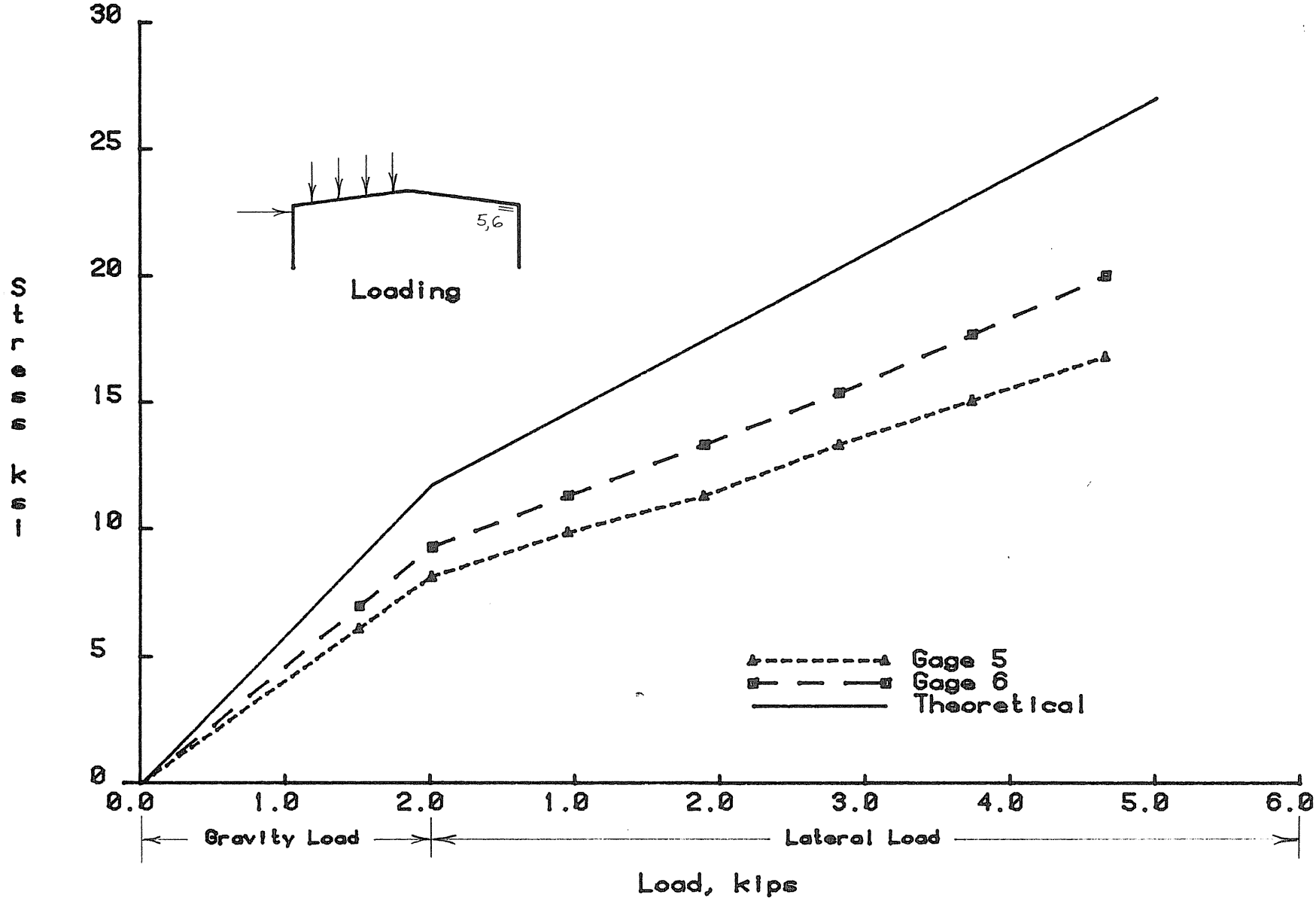


Figure E.8 Load vs. Stress, Northeast Rafter at Knee

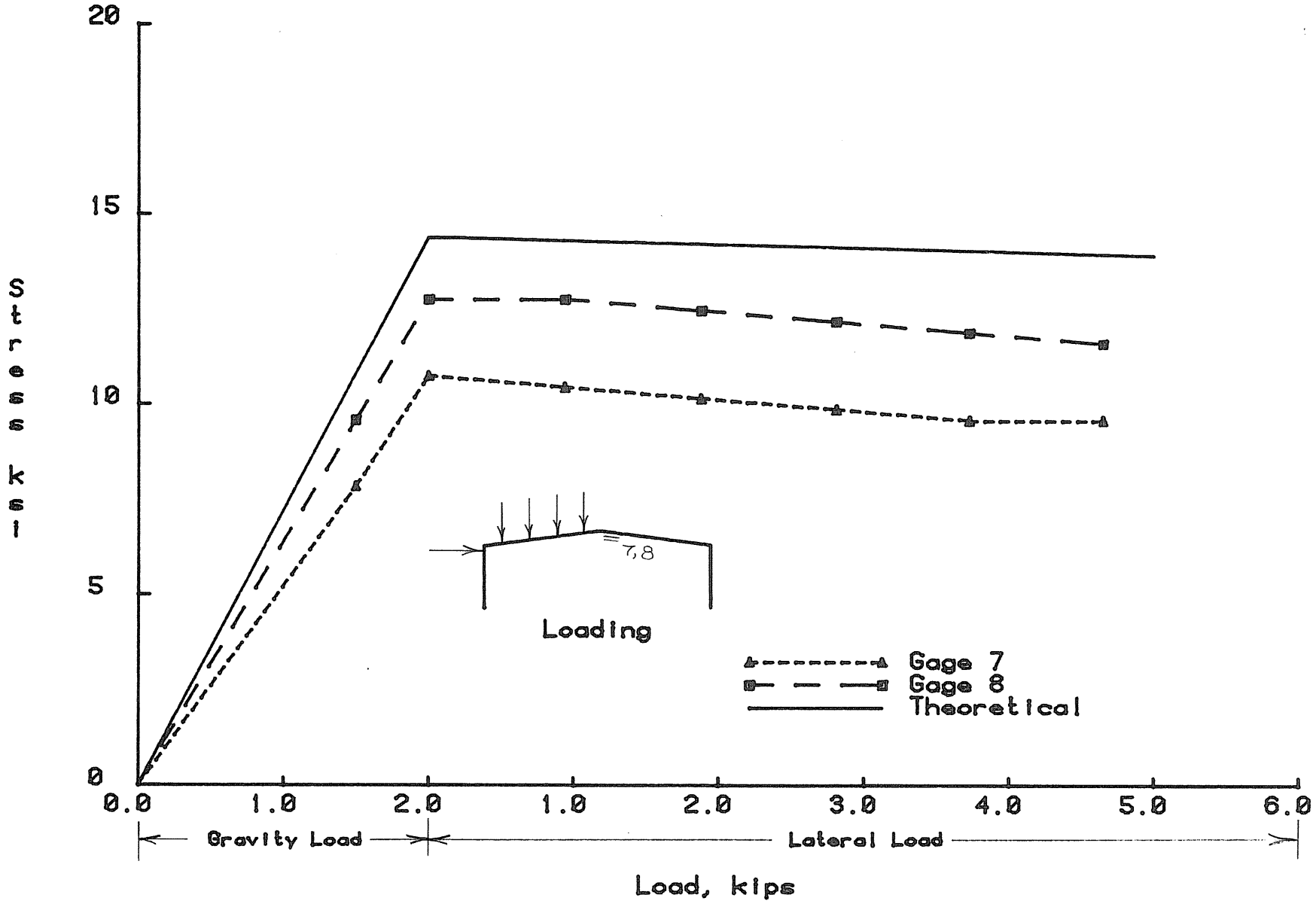


Figure E.9 Load vs. Stress, Northeast Rafter at Peak

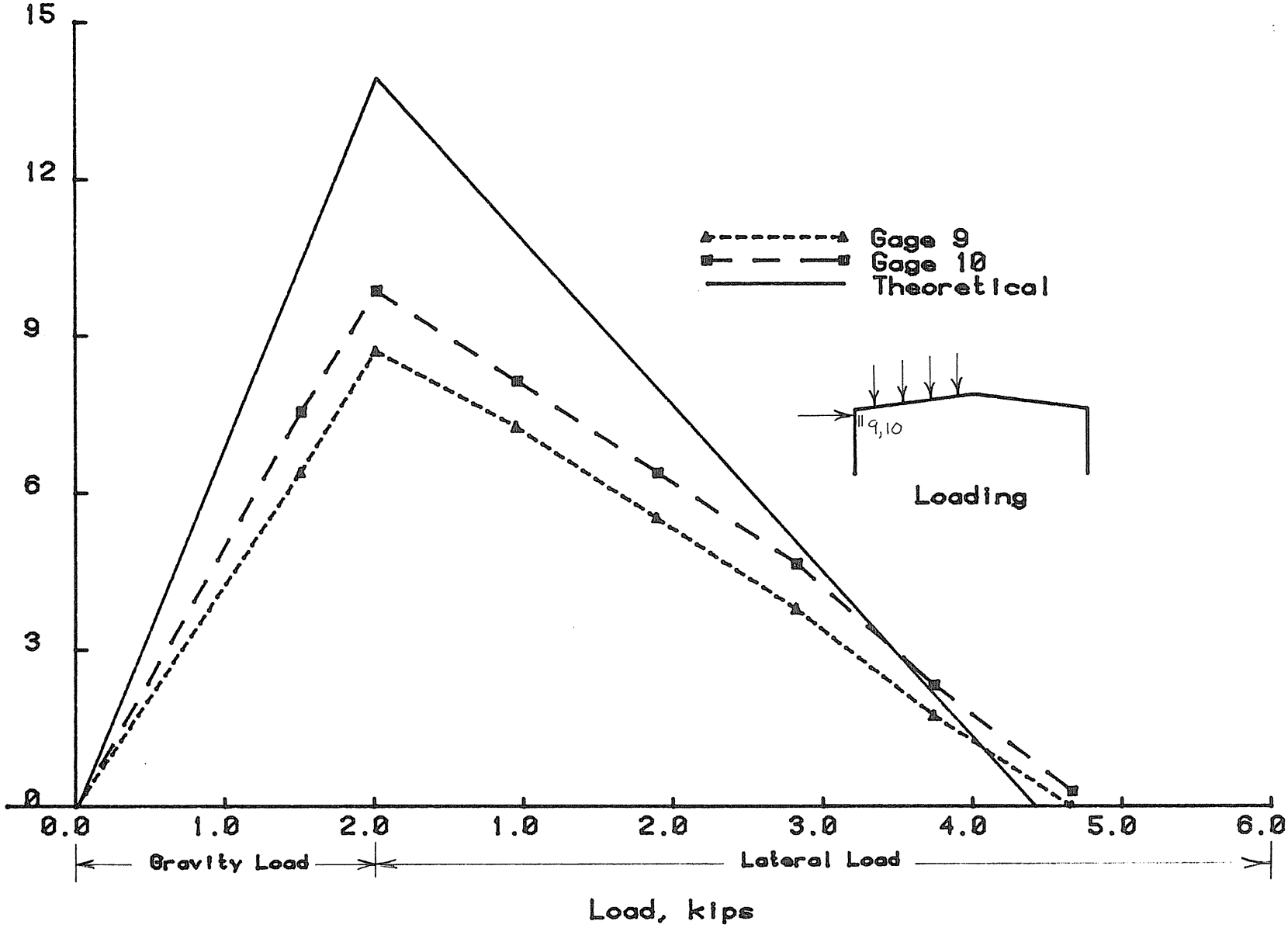


Figure E.10 Load vs. Stress, Southwest Column at Knee

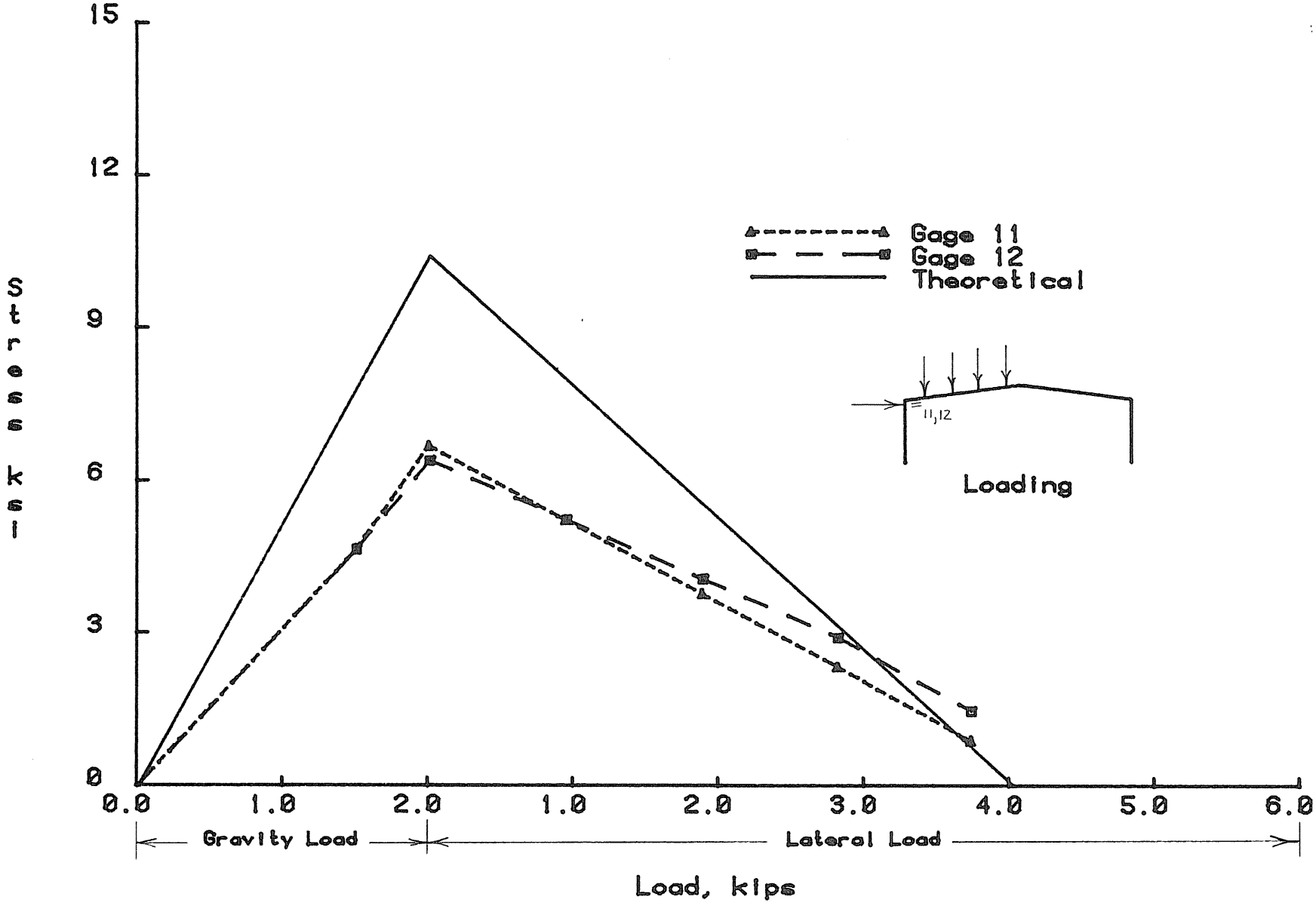


Figure E.11 Load vs. Stress, Southwest Rafter at Knee

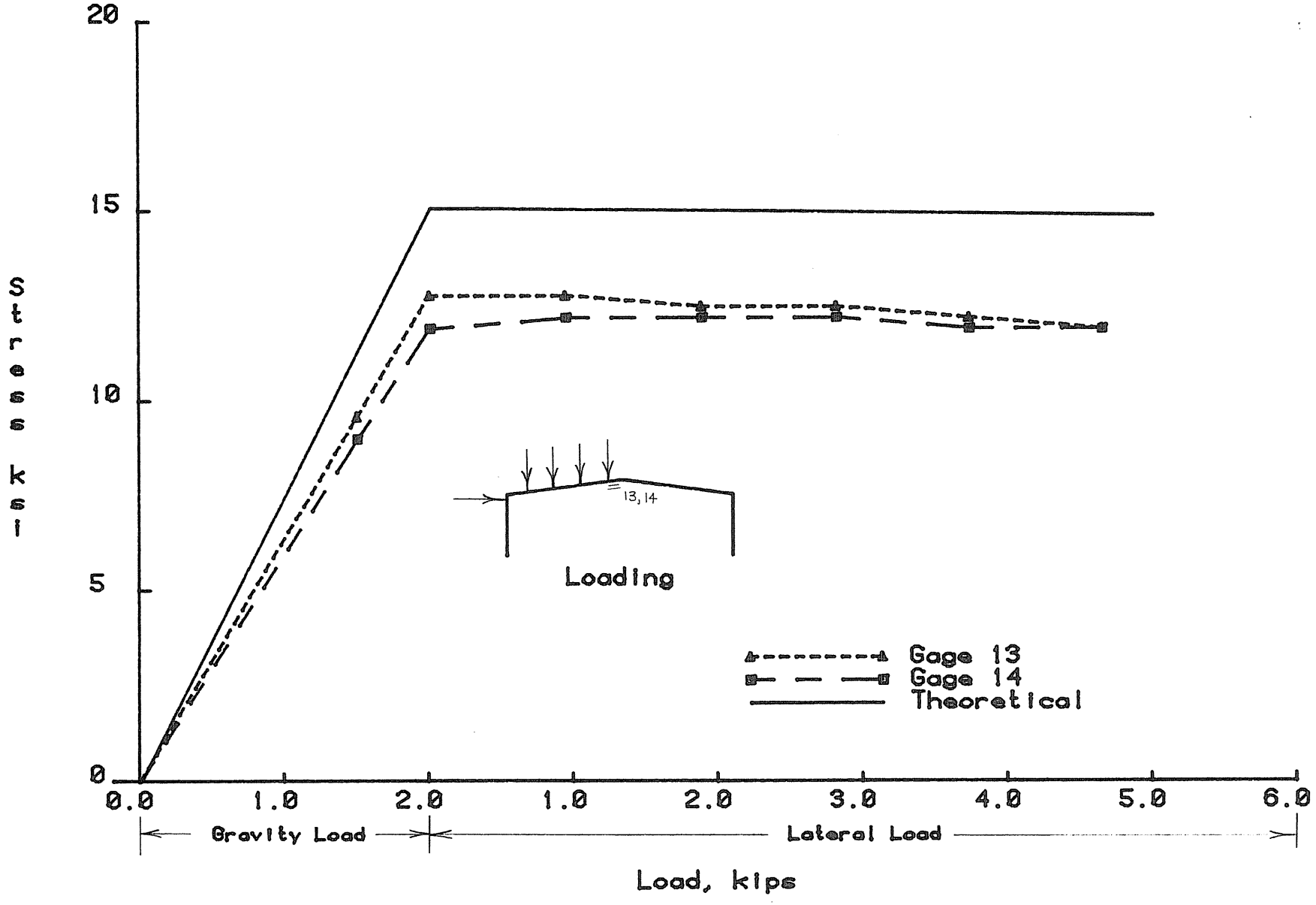


Figure E.12 Load vs. Stress, Southwest Rafter at Peak

APPENDIX F

INITIAL TEST, UNBALANCED LIVE LOAD ON LEEWARD SIDE AND LATERAL LOADS

Test Date May 1, 1981

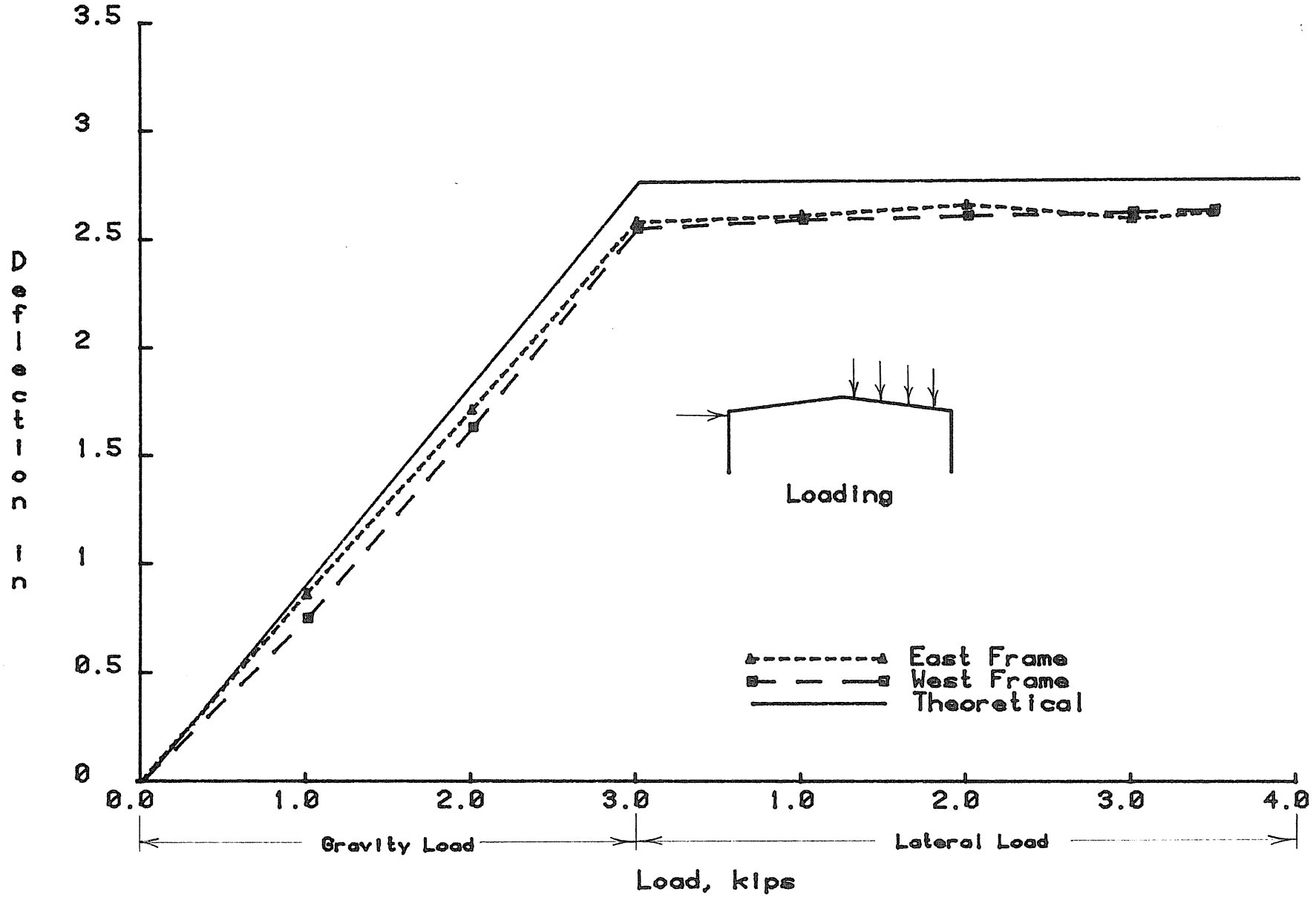


Figure F.1 Load vs. Centerline Vertical Deflection

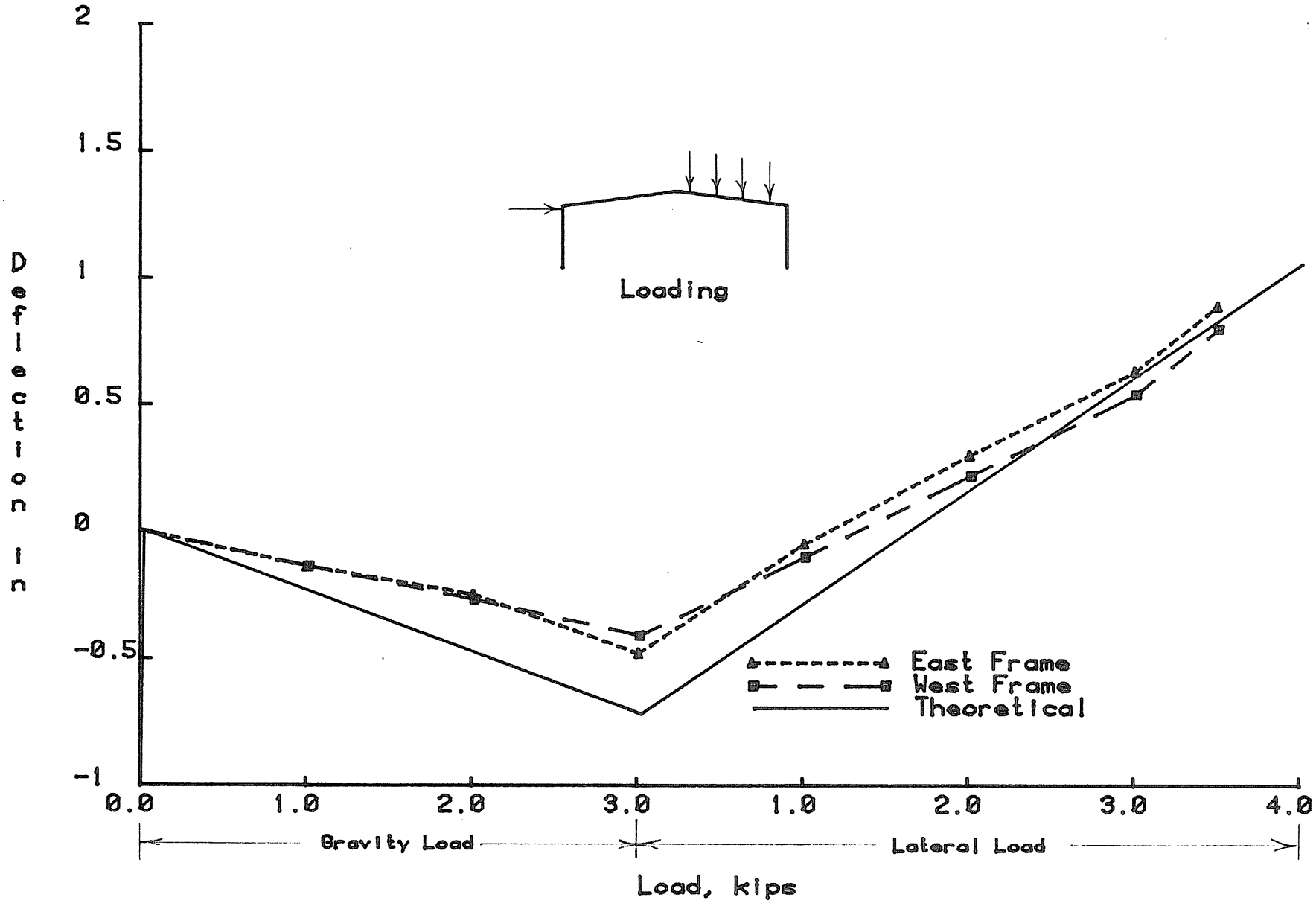


Figure F.2 Load vs. Sideswav Deflection

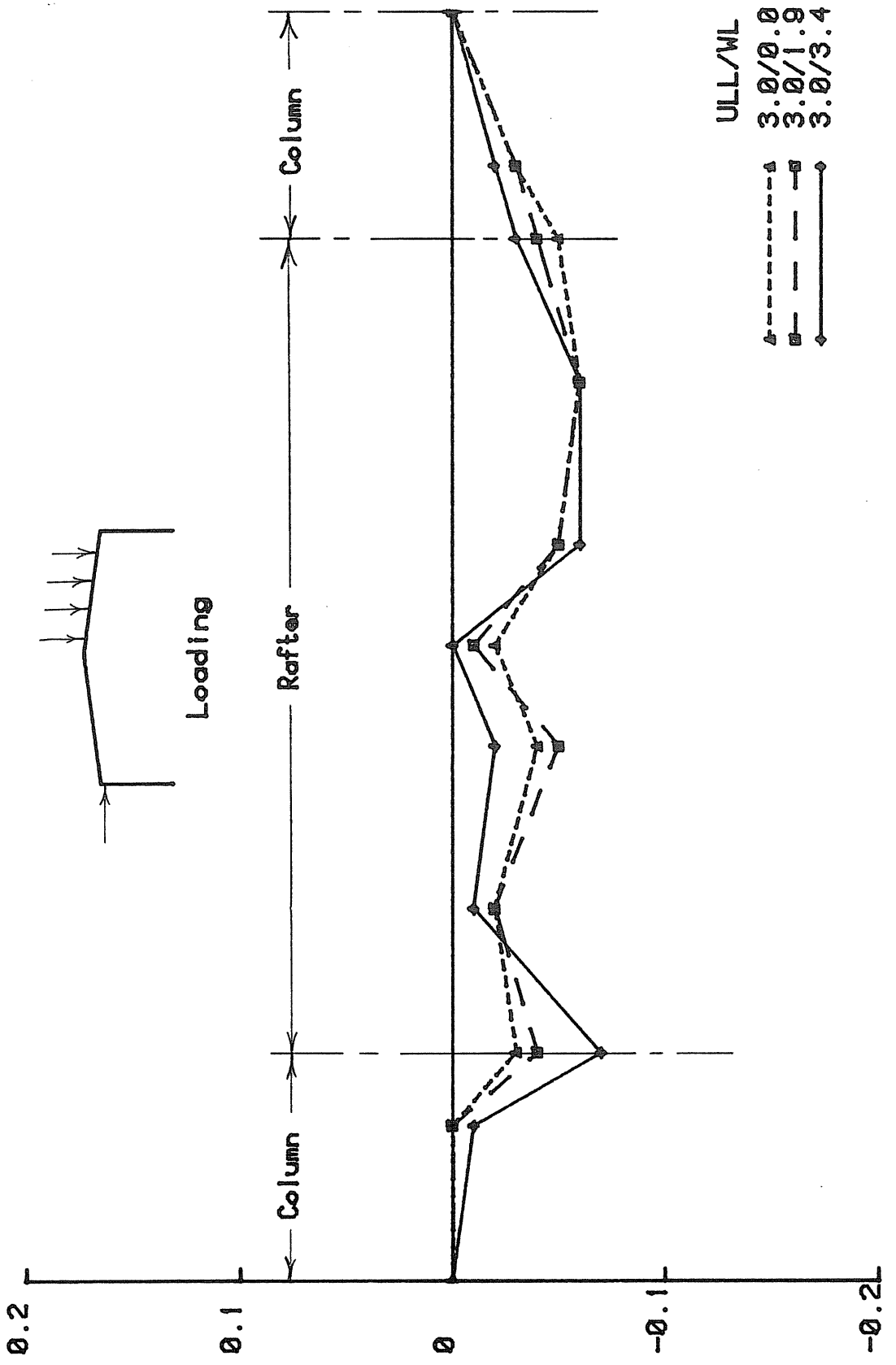


Figure F.3 Load vs. Lateral Deflection of Outside Flange, East Frame

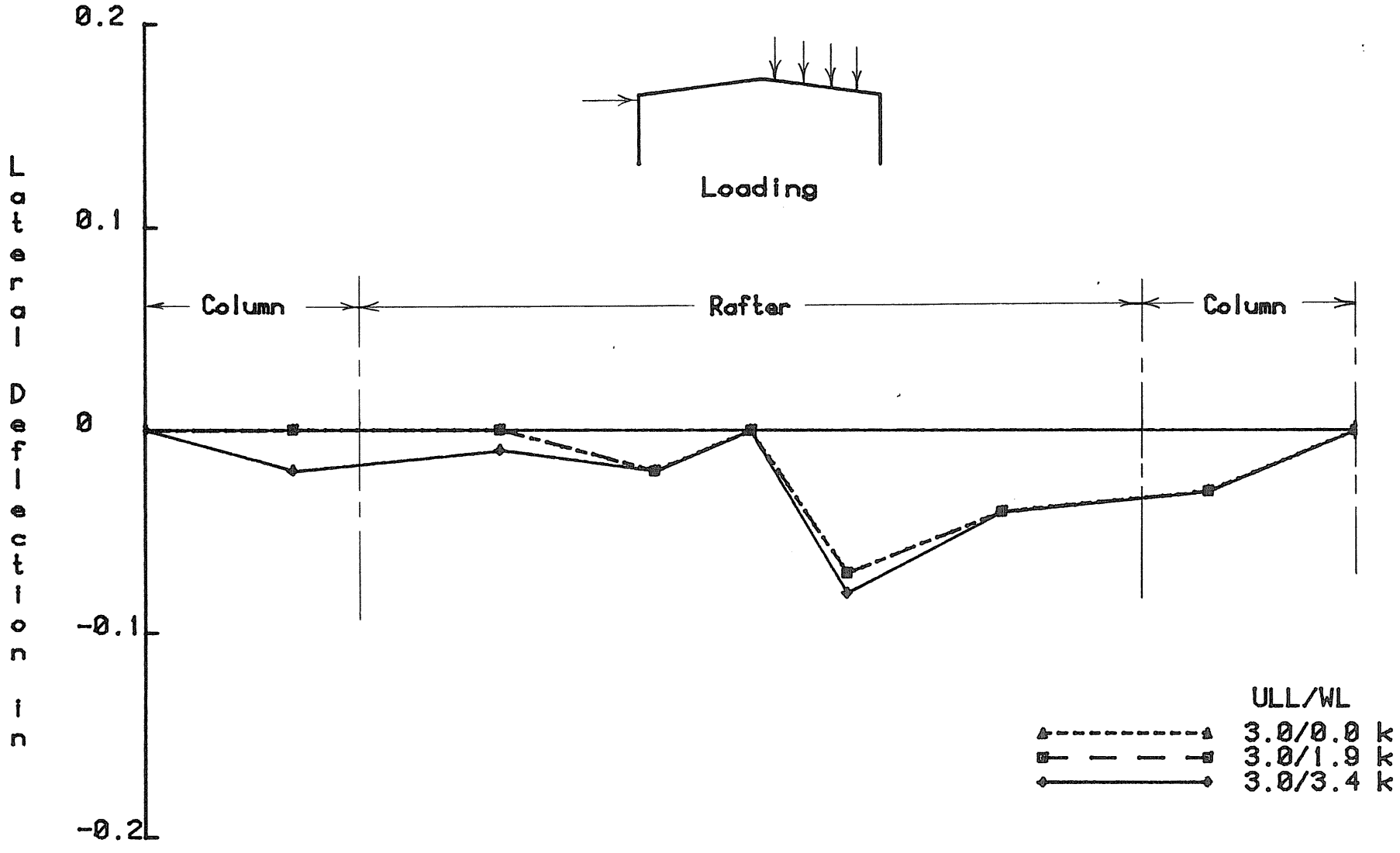


Figure F.4 Load vs. Lateral Deflection of Inside Flange, East Frame

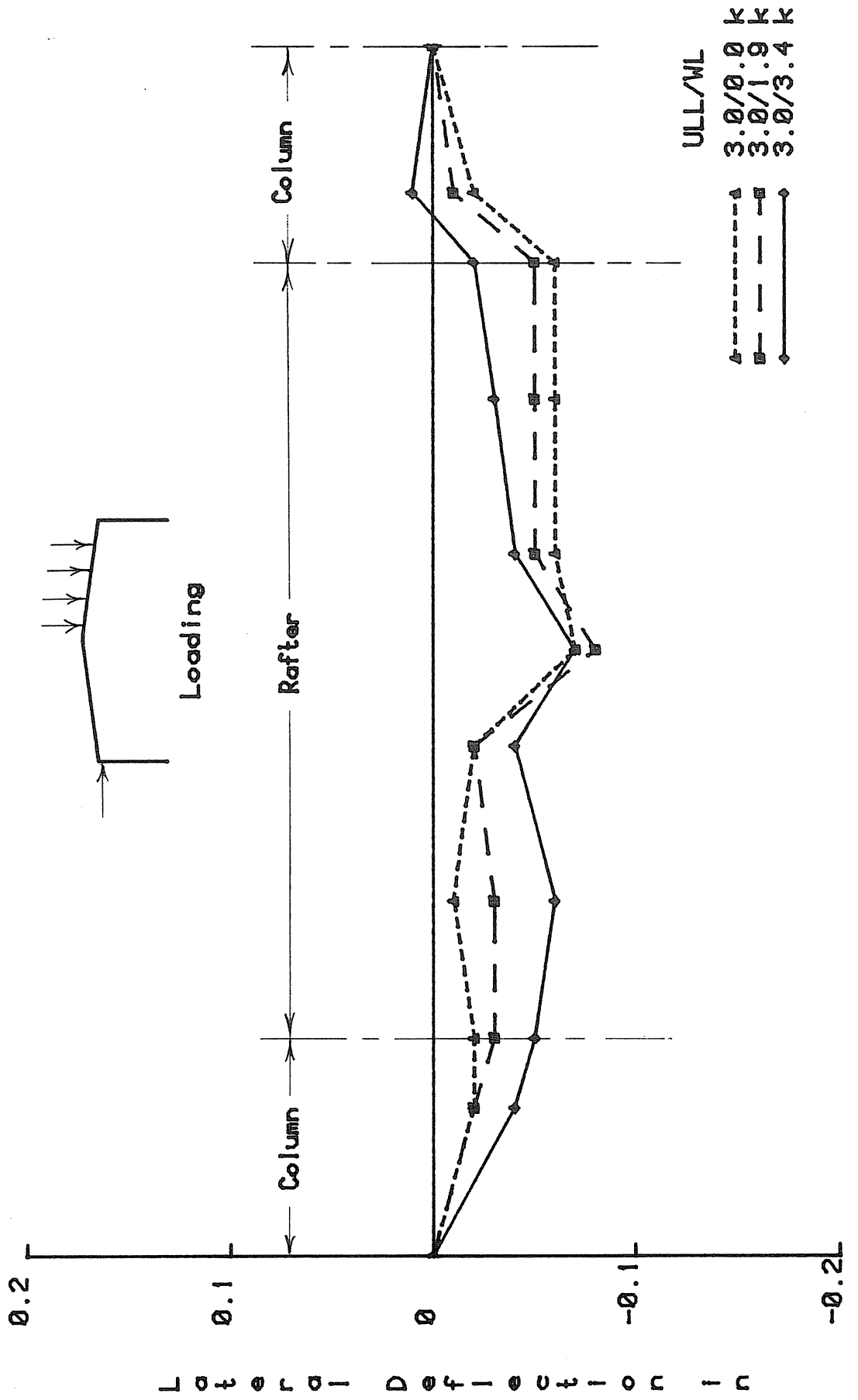


Figure F.5 Load vs. Lateral Deflection of Outside Flange, West Frame

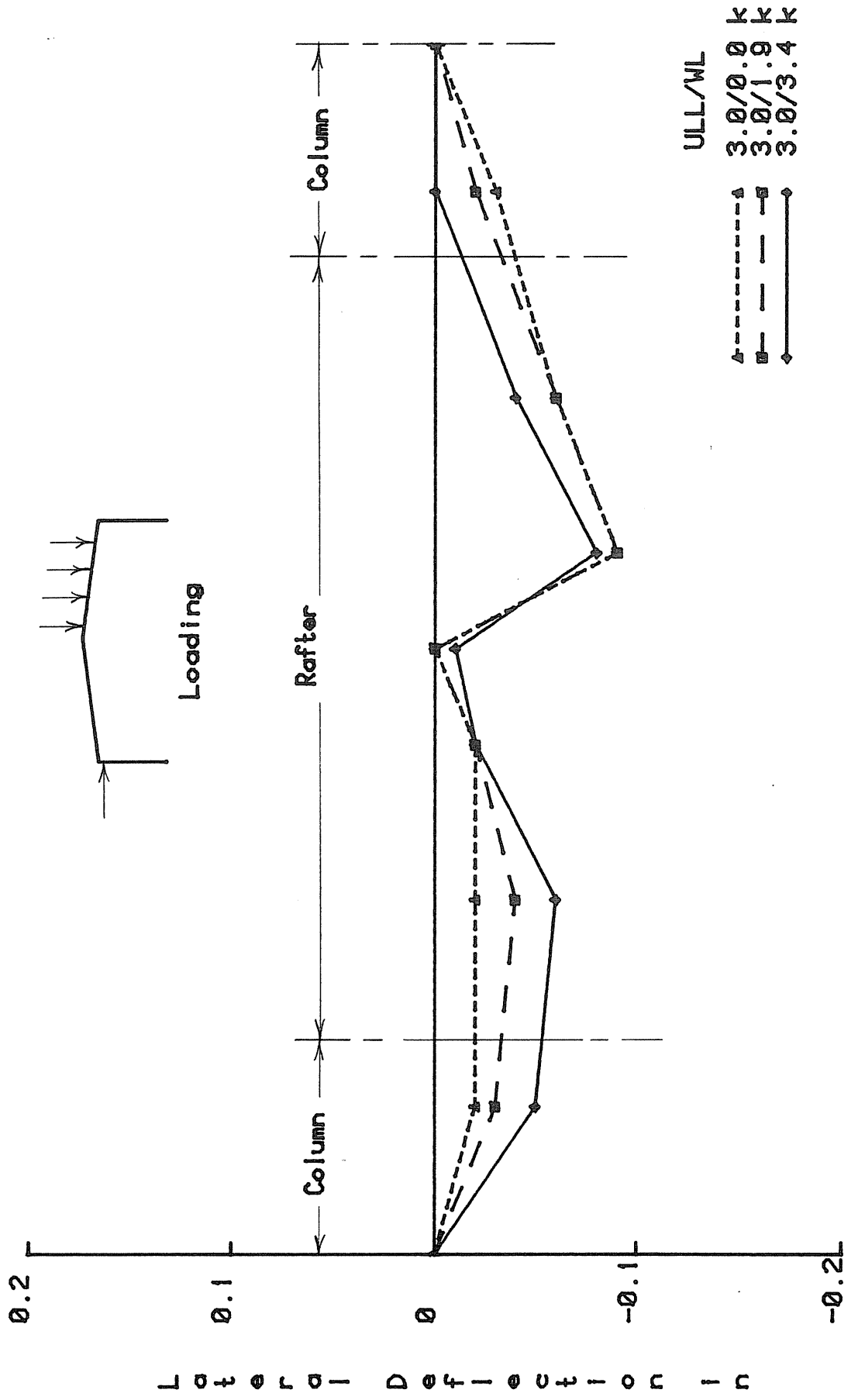


Figure F.6 Load vs. Lateral Deflection of Inside Flange, West Frame

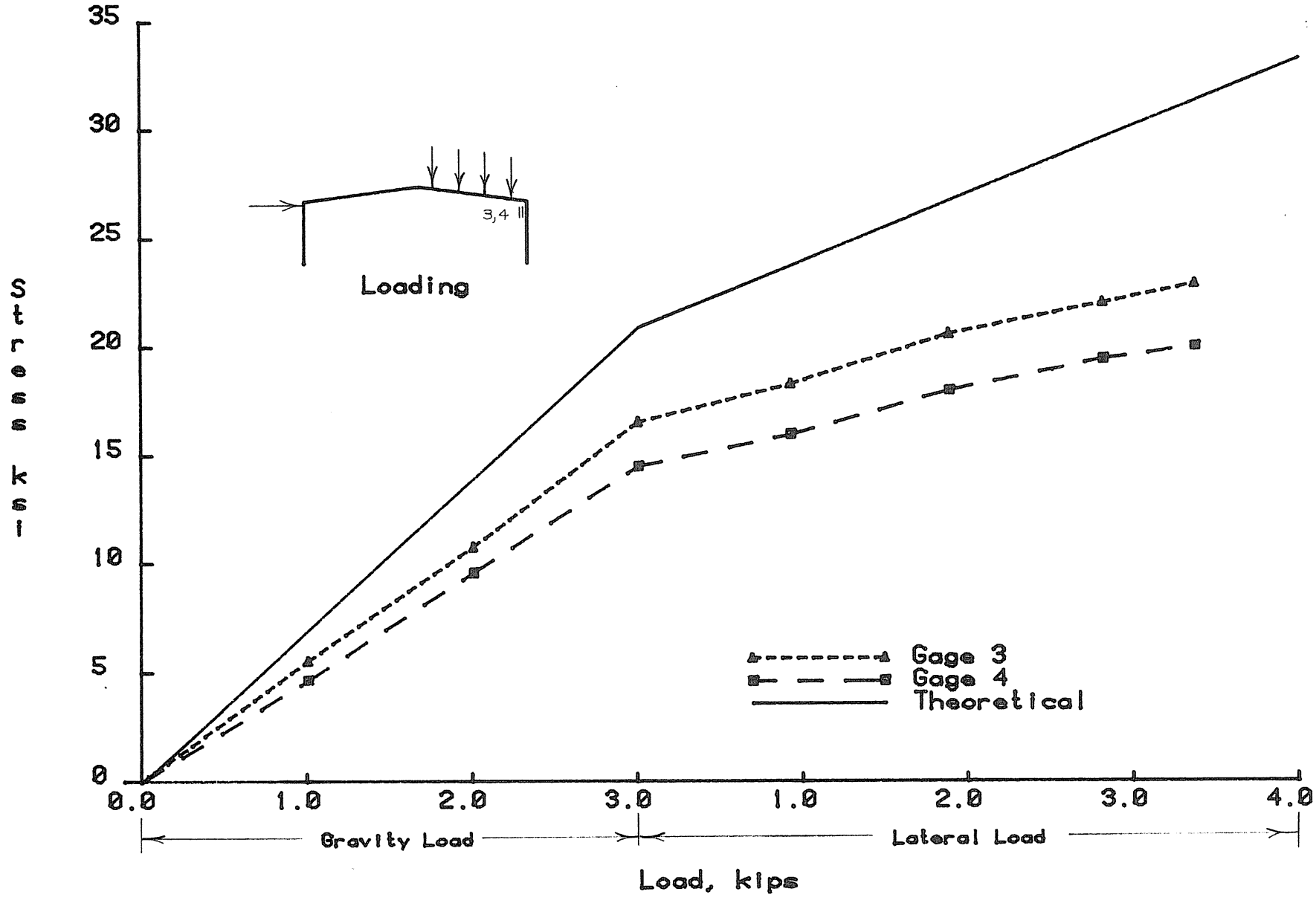


Figure F.7 Load vs. Stress, Northeast Column at Knee

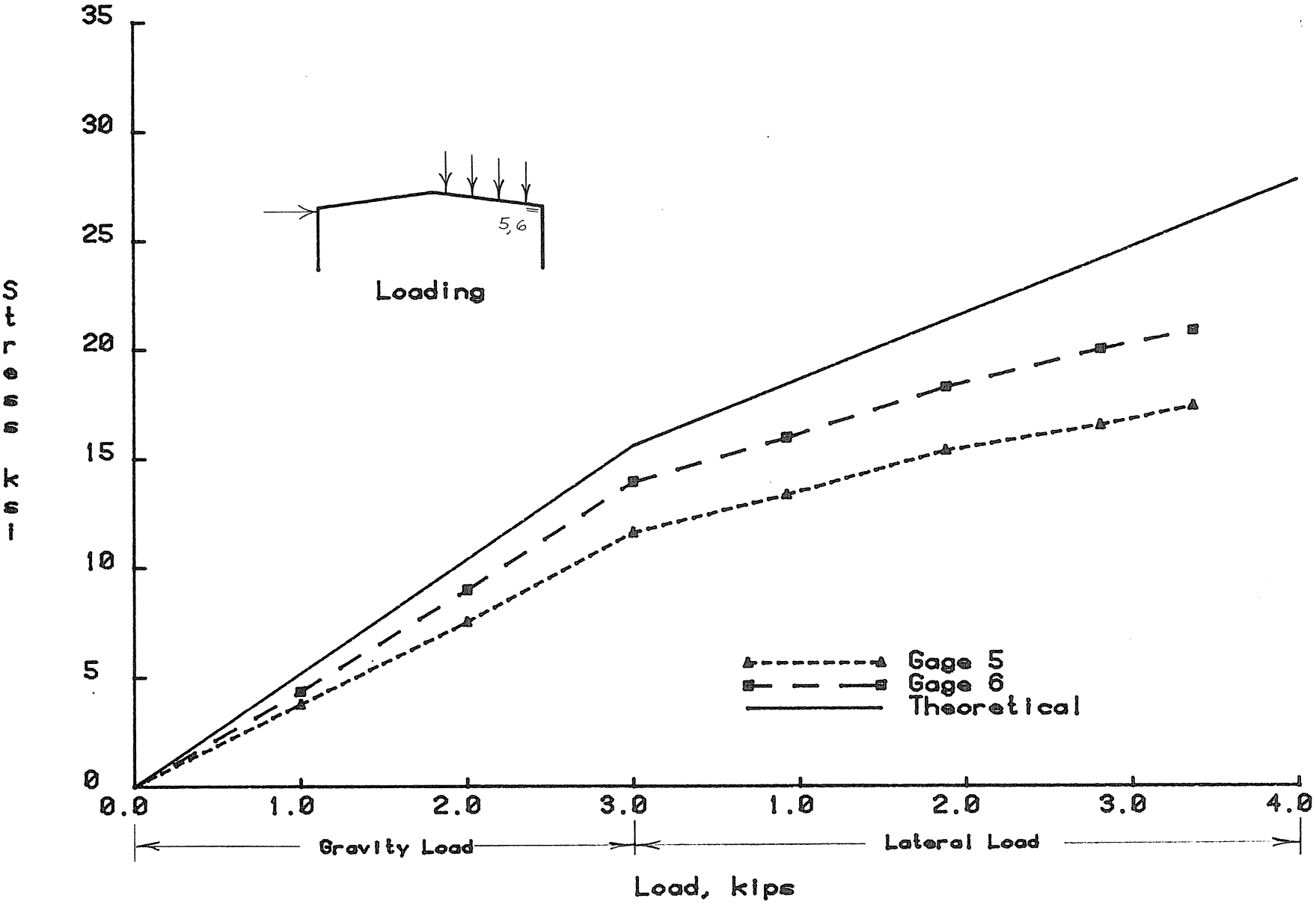


Figure F.8 Load vs. Stress, Northeast Rafter at Knee

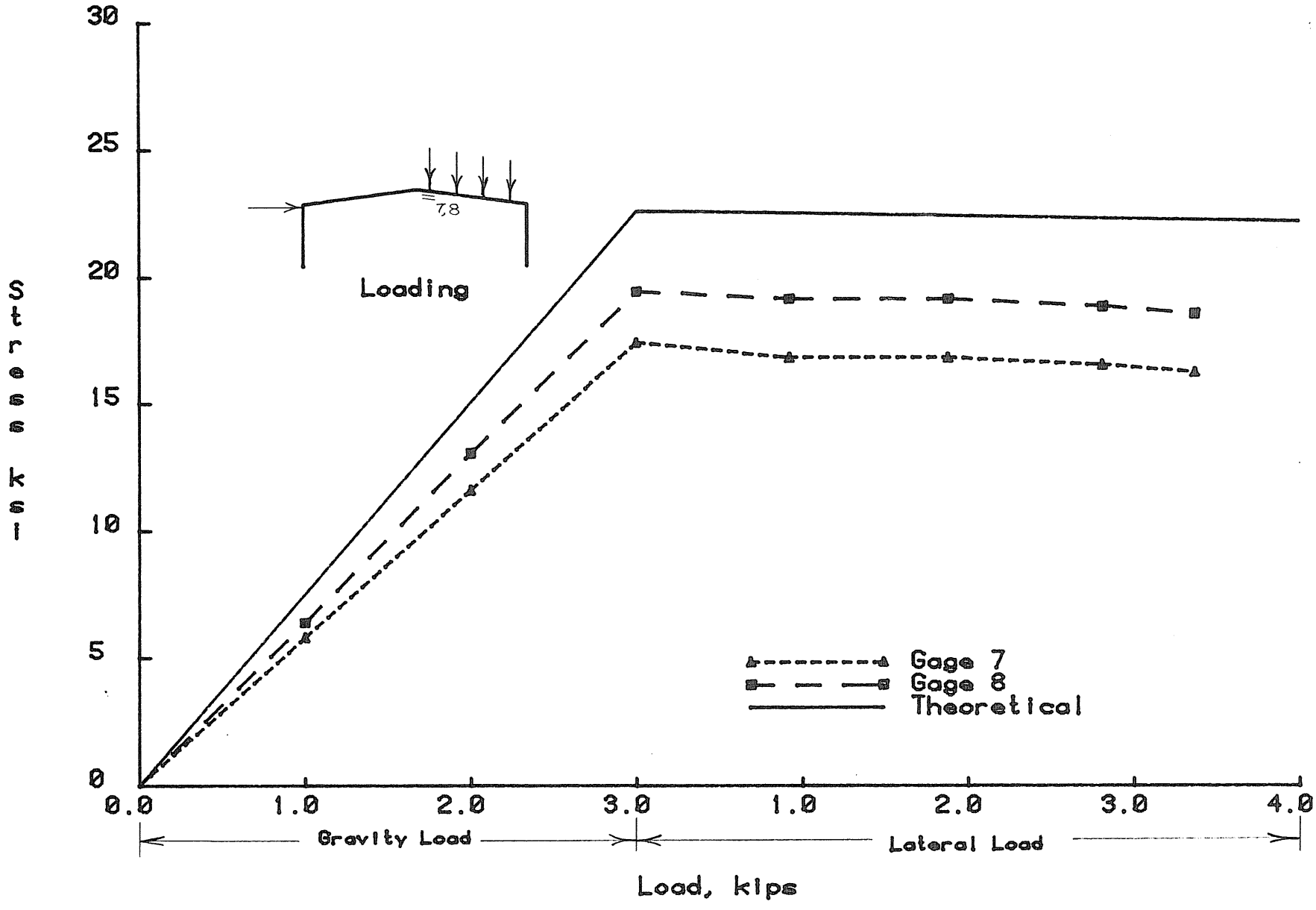


Figure F.9 Load vs. Stress, Northeast Rafter at Peak

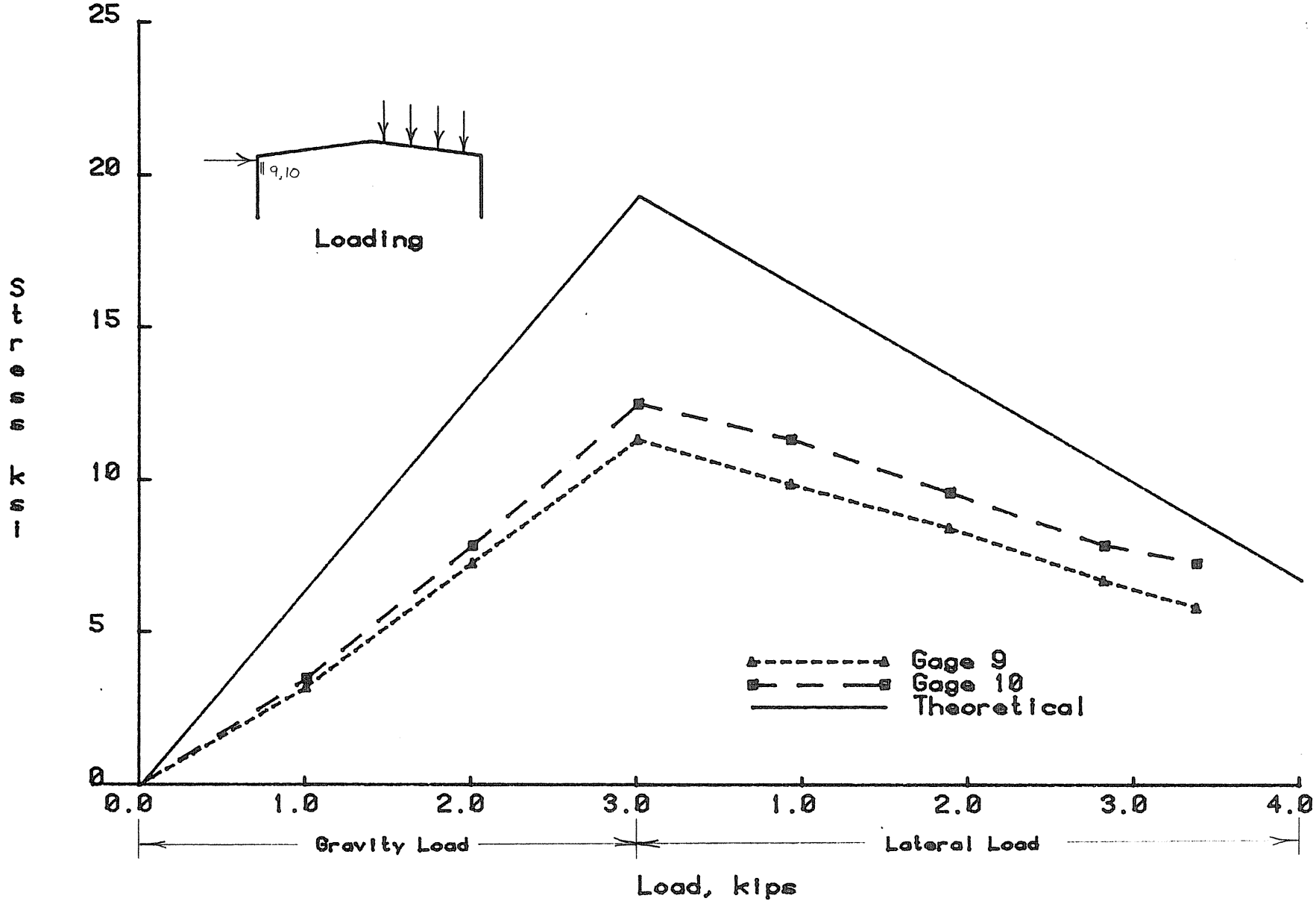


Figure F.10 Load vs. Stress, Southwest Column at Knee

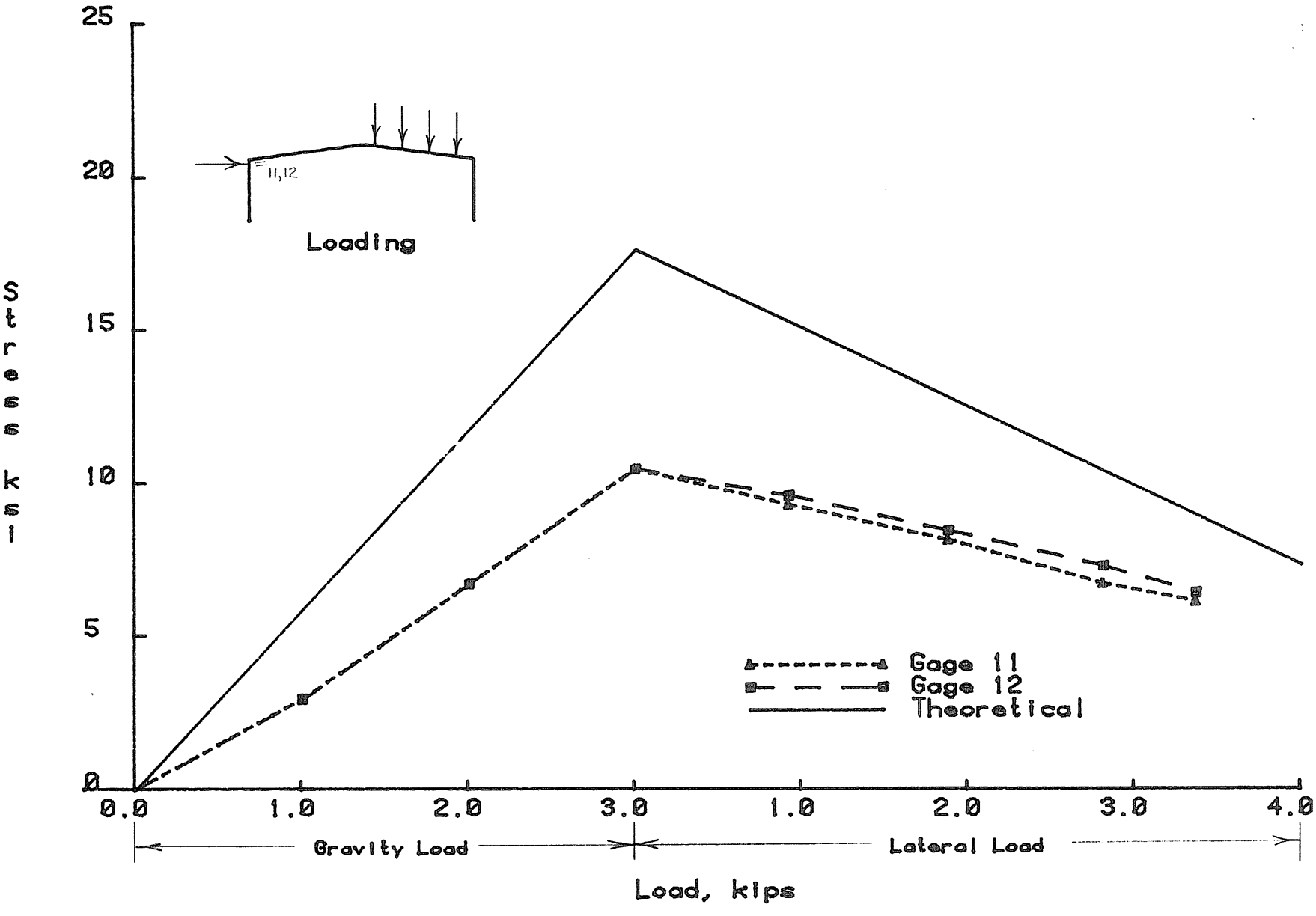


Figure F.11 Load vs. Stress, Southwest Rafter at Knee

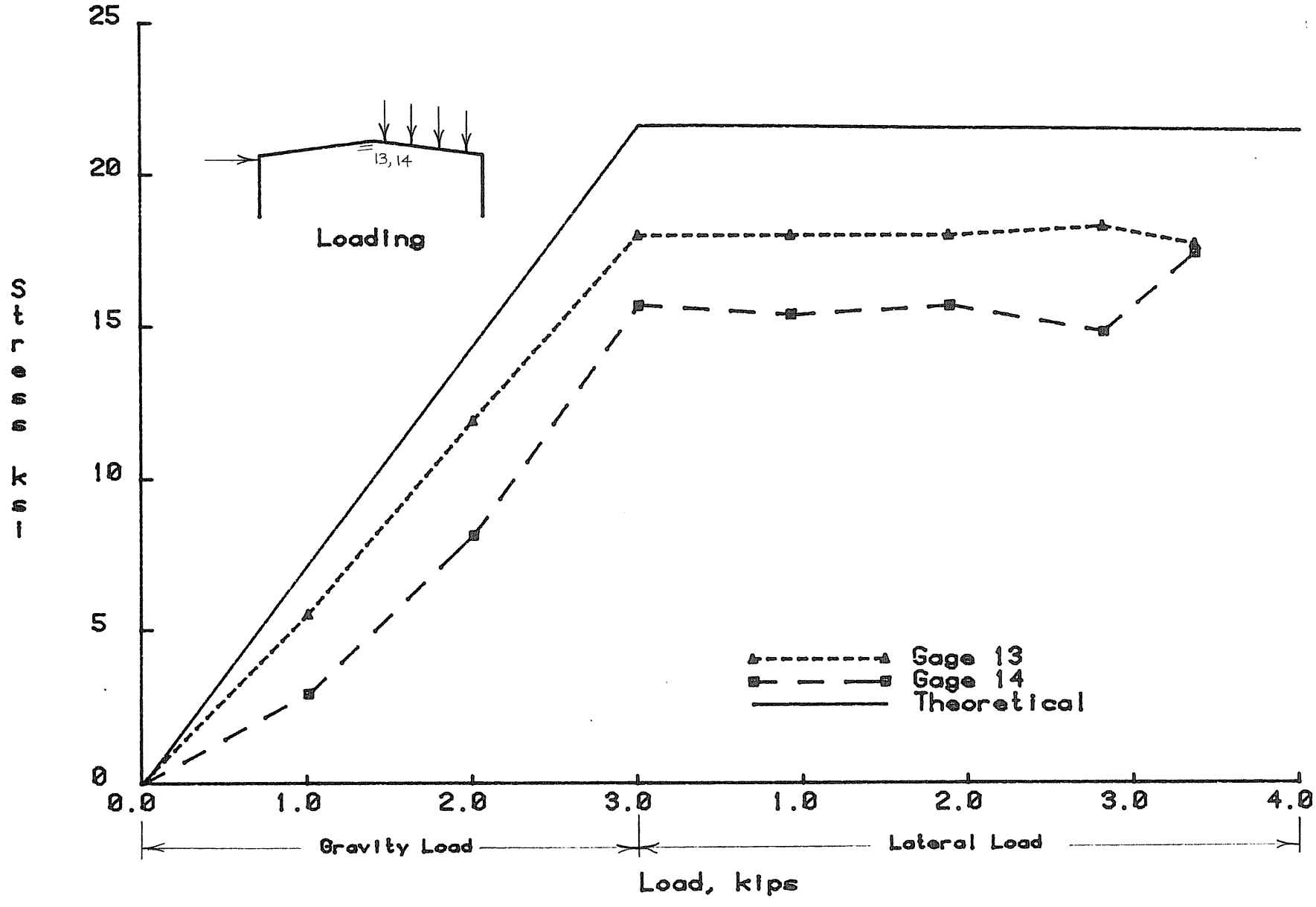


Figure F.12 Load vs. Stress, Southwest Rafter at Peak

APPENDIX G

ANALYSIS RESULTS FROM PROPOSED PROCEDURE FOR SINGLY SYMMETRICAL TAPERED MEMBERS

DIMENSIONS OF CROSS SECTION

B1 = .0000 IN T1 = .0000 IN

B2 = 5.0300 IN T2 = .2490 IN

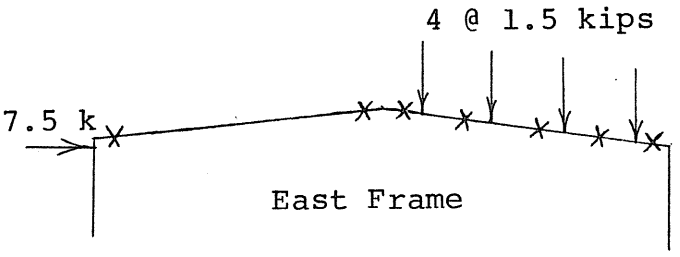
B3 = 16.0140 IN T3 = .1263 IN

B4 = 5.0100 IN T4 = .2470 IN

LENGTH = 240.00 IN

ALPHA = .0135

FY = 55.00 KSI



LEFT END SECTION PROPERTIES

RO = 46.1010 IN.

YO = .0535 IN.

YBAR = 7.9804 IN. FROM TOP

YBAR = 8.0336 IN.FROM BOTTOM

AREA = 4.5157 IN**2

IX = 202.9368 IN**4

IY = 5.2291 IN**4

CW = 335.2150 IN**6

J = .0619 IN**4

BX = .1475 IN.

SEC. MOD. = 25.4294 IN**3 TOP

SEC. MOD. = 25.2610 IN**3 BOTTOM

MOMENT = 312.00 K-IN.

RIGHT END SECTION PROPERTIES

RO = 63.1946 IN.

YO = .0670 IN.

YBAR = 9.5977 IN. FROM TOP

YBAR = 9.6563 IN. FROM BOTTOM

AREA = 4.9256 IN**2

IX = 306.0180 IN**4

IY = 5.2291 IN**4

CW = 484.5802 IN**6

J = .0640 IN**4

BX = .1771 IN.

SEC. MOD. = 31.8846 IN**3 TOP

SEC. MOD. = 31.6910 IN**3 BOTTOM

MOMENT = -360.00 K-IN.

Figure G.1 Results from Proposed Analysis Procedure, Unbalanced Live Load on Leeward Side and Lateral Load, Nonstandard Flange Brace Spacings

STRESS AND MOMENT RESULTS

STRESS AT LEFT TOP =	-12.27 KSI	STRESS AT LEFT BOTTOM =	12.35 KSI
STRESS AT RIGHT TOP =	-11.29 KSI	STRESS AT RIGHT BOTTOM =	11.36 KSI

NODE WITH MAX. COMPR. STRESS = 1

MAX. COMP. STRESS = -12.27 KSI

CRITICAL MOMENT BASIC CASE = 256.82 K-IN.

MODULAR RATIO REF. FLANGE = 1.25

STRESS RATIO REF. FLANGE = .9202

CA = .9679 CB = 1.0350

GOVERNING STRESS AT FAILURE = 10.12 KSI C

LOCATION OF GOVERNING STRESS = 1

STRESSES AT FAILURE

LOCATION 1	10.12 KSI C	LOCATION 3	9.31 KSI C
LOCATION 2	10.19 KSI T	LOCATION 4	9.37 KSI T

CRITICAL MOMENTS AT FAILURE

SMALL END	257.29 IN-K	LARGE END	-296.87 IN-K

Figure G.1 Results from Proposed Analysis Procedure, Unbalanced Live Load on Leeward Side and Lateral Load, Nonstandard Flange Brace Spacings Continued

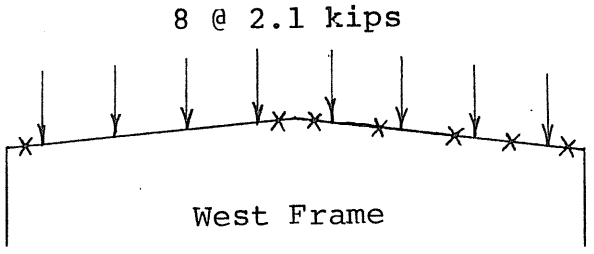
DIMENSIONS OF CROSS SECTION

B1 =	.0000 IN	T1 =	.0000 IN
B2 =	4.9100 IN	T2 =	.2460 IN
B3 =	16.0140 IN	T3 =	.1260 IN
B4 =	5.0100 IN	T4 =	.2470 IN

LENGTH = 240.00 IN

ALPHA = .0135

FY = 55.00 KSI



LEFT END SECTION PROPERTIES		RIGHT END SECTION PROPERTIES	
RO =	45.9544 IN.	RO =	63.0008 IN.
YO =	-.2052 IN.	YO =	-.2521 IN.
YBAR =	8.0601 IN. FROM TOP	YBAR =	9.6855 IN. FROM TOP
YBAR =	7.9539 IN.FROM BOTTOM	YBAR =	9.5685 IN. FROM BOTTOM
AREA =	4.4631 IN**2	AREA =	4.8713 IN**2
IX =	199.8959 IN**4	IX =	301.5734 IN**4
IY =	5.0150 IN**4	IY =	5.0150 IN**4
CW =	321.1864 IN**6	CW =	464.3008 IN**6
J =	.0602 IN**4	J =	.0624 IN**4
BX =	-.4885 IN.	BX =	-.5879 IN.
SEC. MOD. =	24.8006 IN**3 TOP	SEC. MOD. =	31.1365 IN**3 TOP
SEC. MOD. =	25.1319 IN**3 BOTTOM	SEC. MOD. =	31.5174 IN**3 BOTTOM
MOMENT =	262.00 K-IN.	MOMENT =	948.00 K-IN.

Figure G.2 Results from Proposed Analysis Procedure, Full Live Load, West Frame, Nonstandard Flange Brace Spacings

STRESS AND MOMENT RESULTS

STRESS AT LEFT TOP = -10.56 KSI STRESS AT LEFT BOTTOM = 10.43 KSI

STRESS AT RIGHT TOP = 30.45 KSI STRESS AT RIGHT BOTTOM = -30.08 KSI

NODE WITH MAX. COMPR. STRESS = 4

MAX. COMP. STRESS = -30.08 KSI

CRITICAL MOMENT BASIC CASE = 238.62 K-IN.

MODULAR RATIO REF. FLANGE = 1.25

STRESS RATIO REF. FLANGE = -.3466

CA = .9677 CB = 2.6569

GOVERNING STRESS AT FAILURE = 24.41 KSI C

LOCATION OF GOVERNING STRESS = 4

STRESSES AT FAILURE

LOCATION 1 8.57 KSI C LOCATION 3 24.71 KSI T

LOCATION 2 8.46 KSI T LOCATION 4 24.41 KSI C

CRITICAL MOMENTS AT FAILURE

SMALL END 212.65 IN-K LARGE END 769.42 IN-K

Figure G.2 Results from Proposed Analysis Procedure, Full Live Load, West Frame, Nonstandard Flange Brace Spacings Continued

APPENDIX H

FINAL TEST, UNBALANCED LIVE LOAD ON LEEWARD SIDE AND LATERAL LOAD, WITH NONSTANDARD FLANGE BRACE SPACINGS

Test Date May 18, 1981

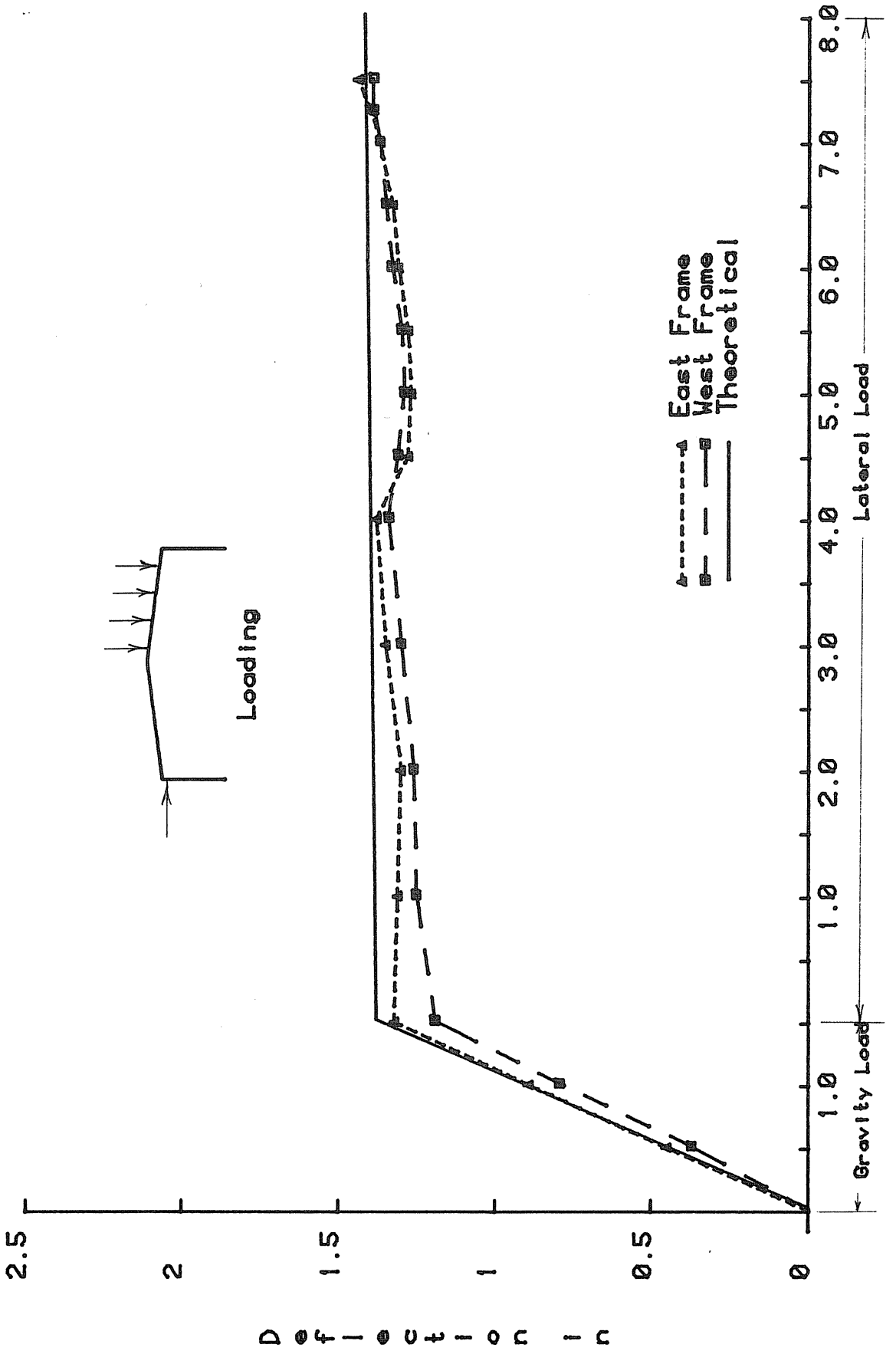


Figure H.1 Load vs. Centerline Vertical Deflection

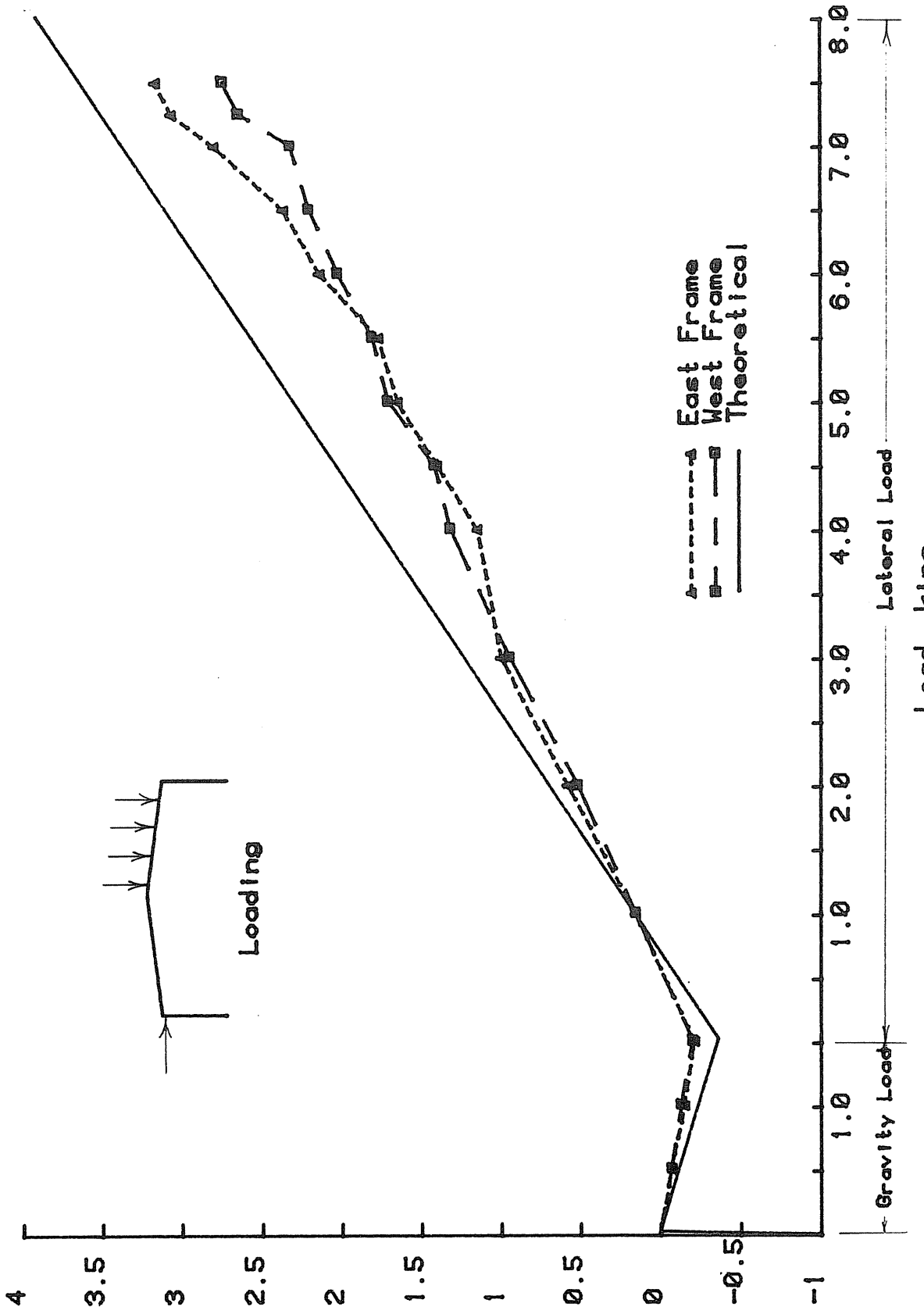


Figure H.2 Load vs. Sidesway Deflection

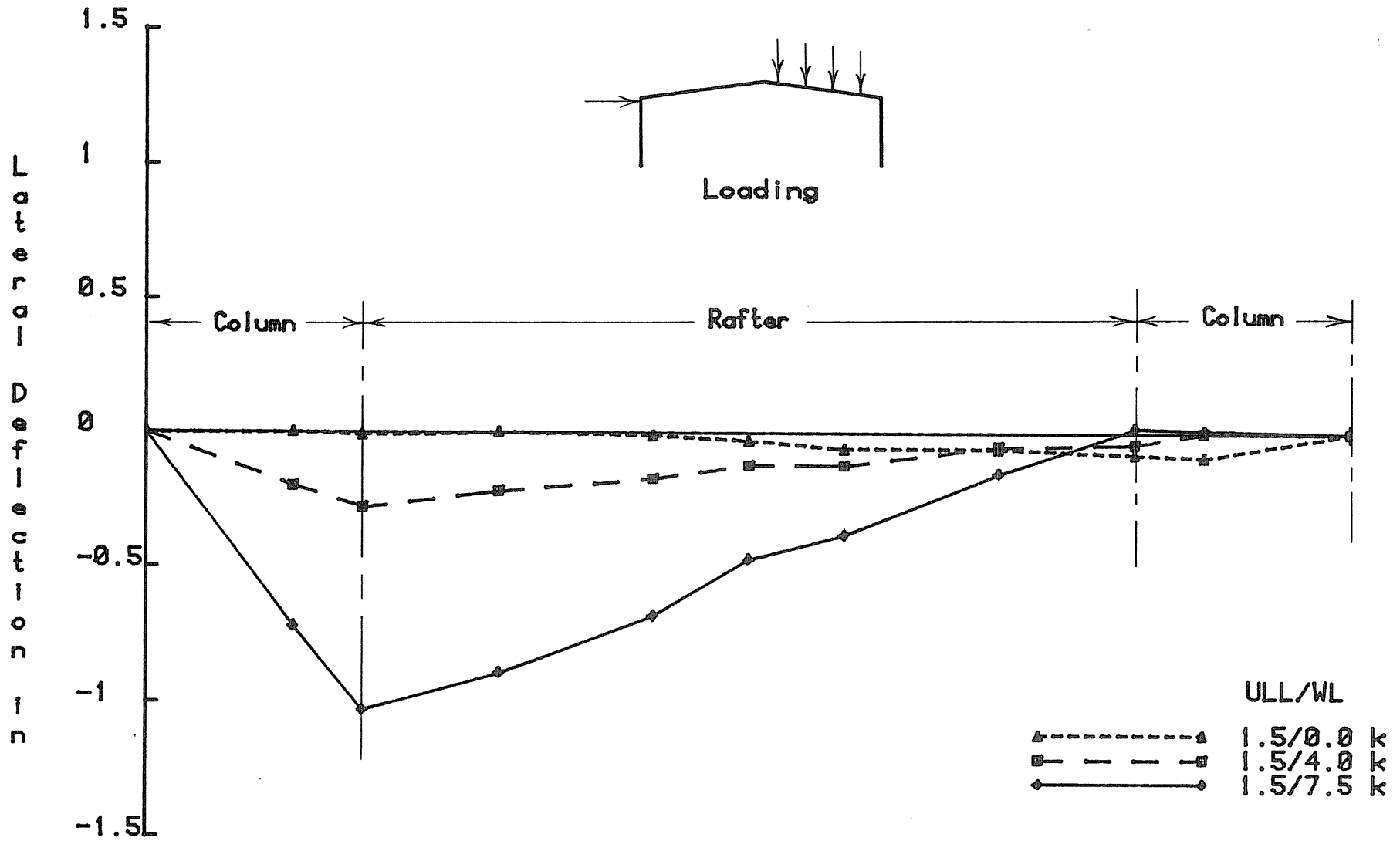


Figure H.3 Load vs. Lateral Deflection of Outside Flange, East Frame

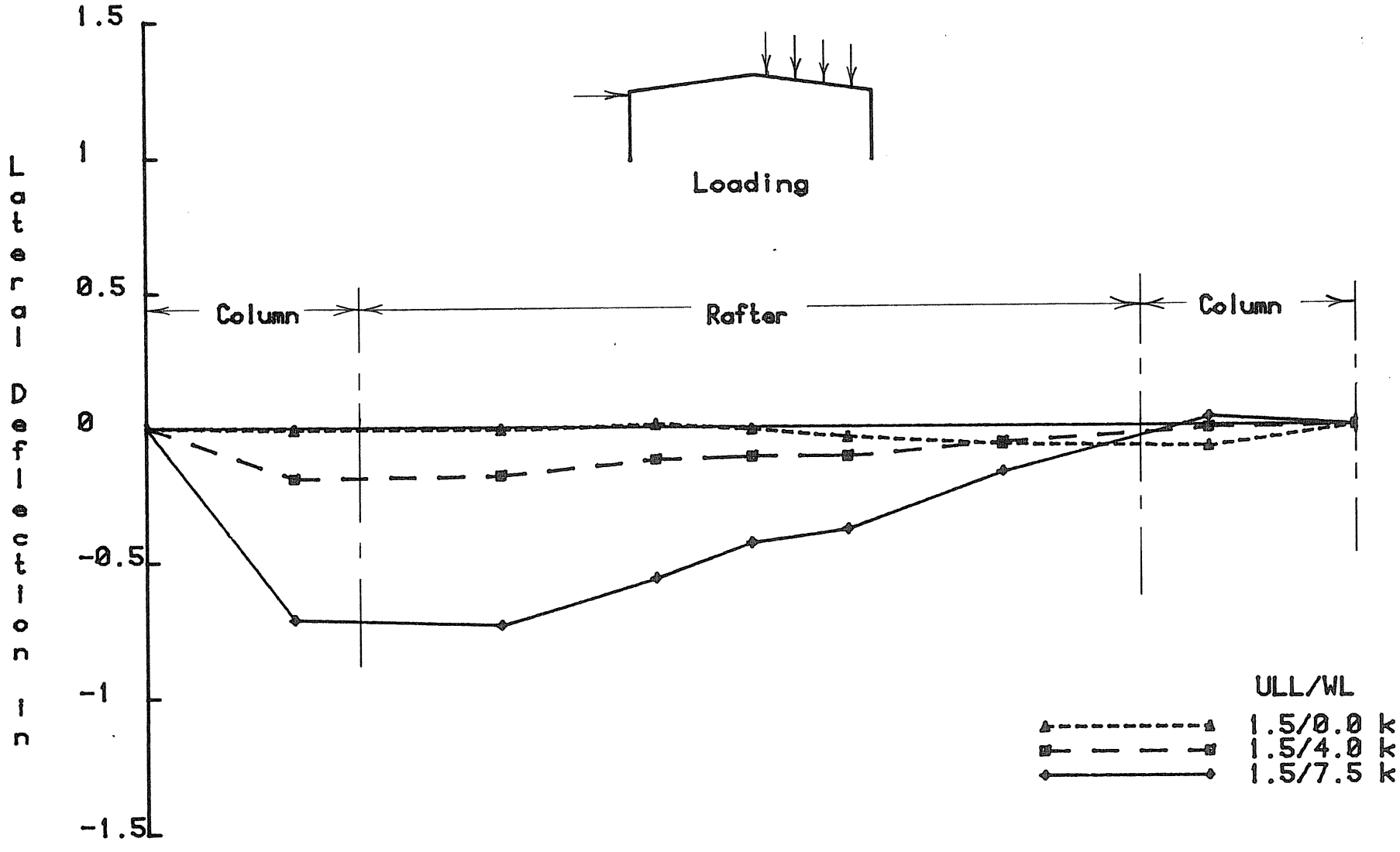


Figure H.4 Load vs. Lateral Deflection of Inside Flange, East Frame

APPENDIX I

FINAL TEST, FULL LIVE LOAD, WEST FRAME WITH NONSTANDARD FLANGE BRACE SPACINGS

Test Date June 20, 1981

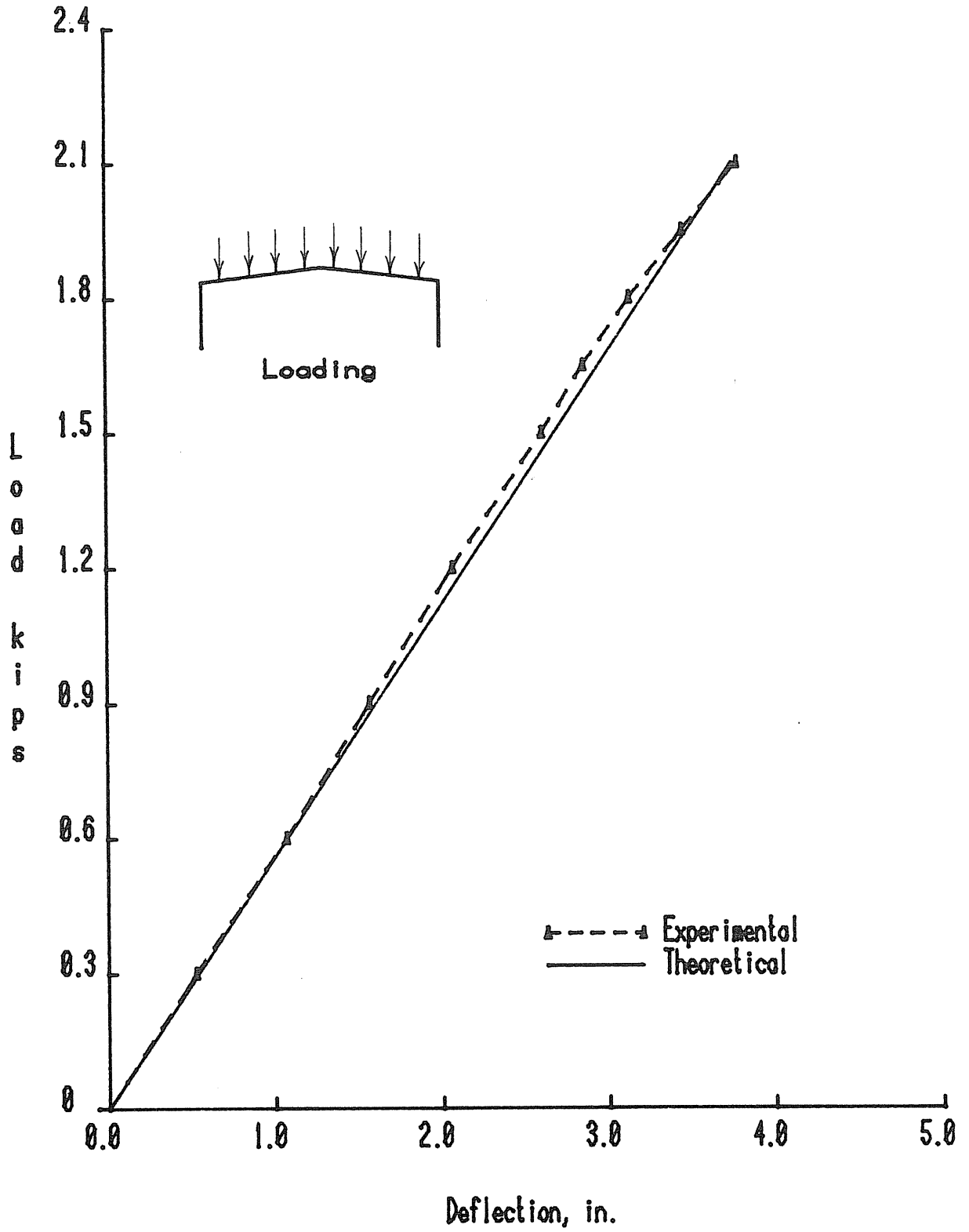


Figure I.1 Load vs. Centerline Vertical Deflection

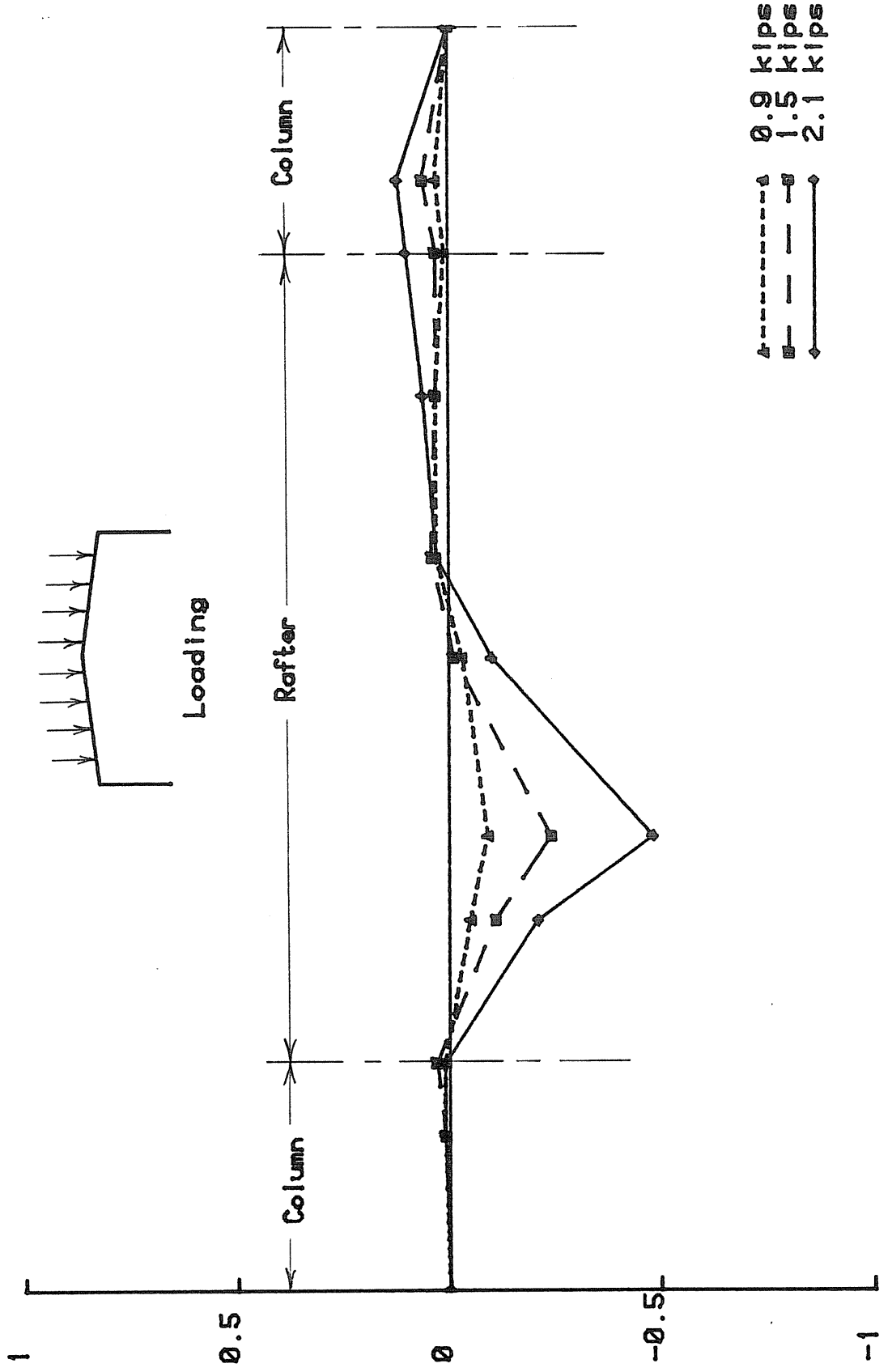


Figure I.2 Load vs. Lateral Deflection of Outside Flange, West Frame

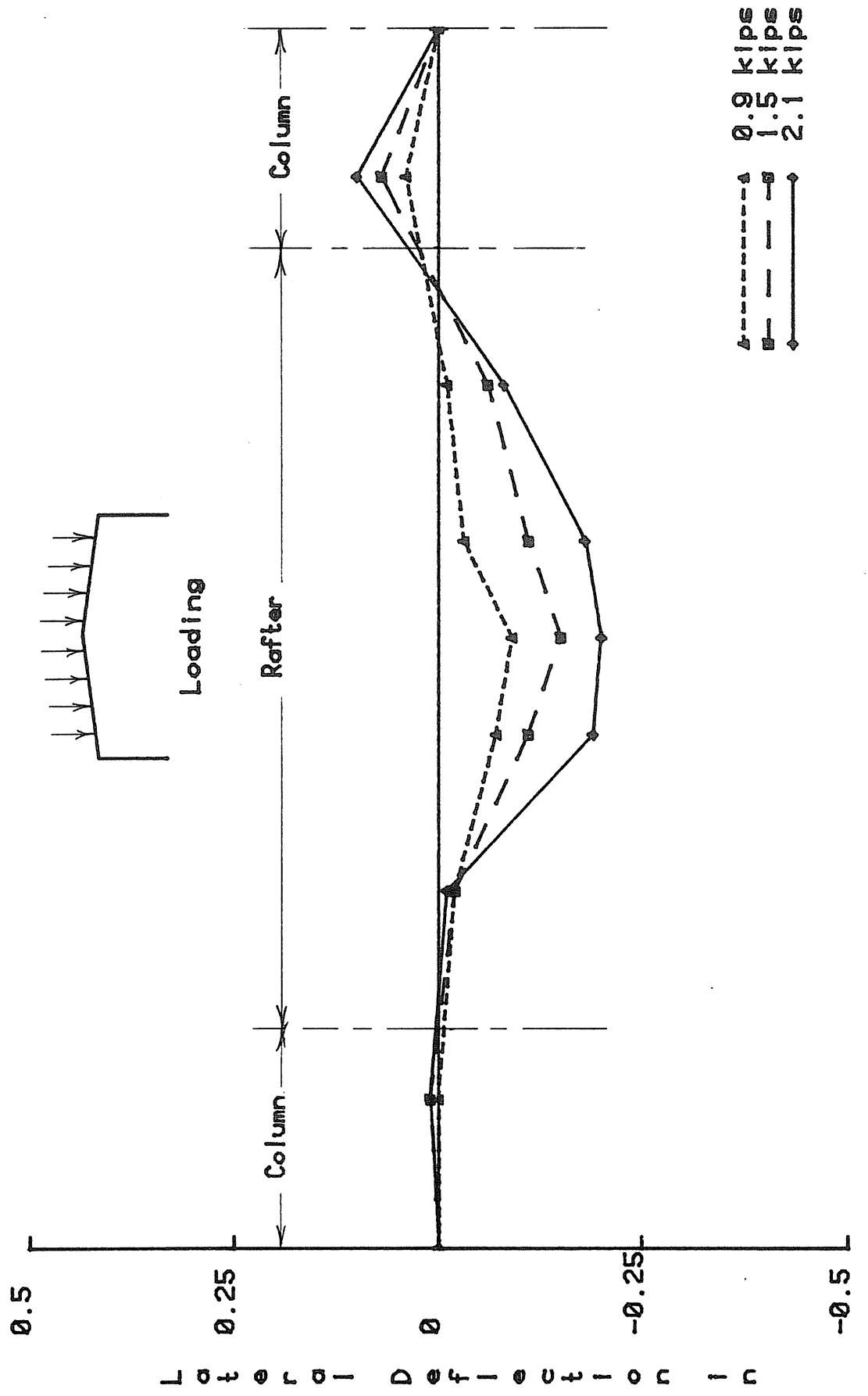


Figure I.3 Load vs. Lateral Deflection of Inside Flange, West Frame

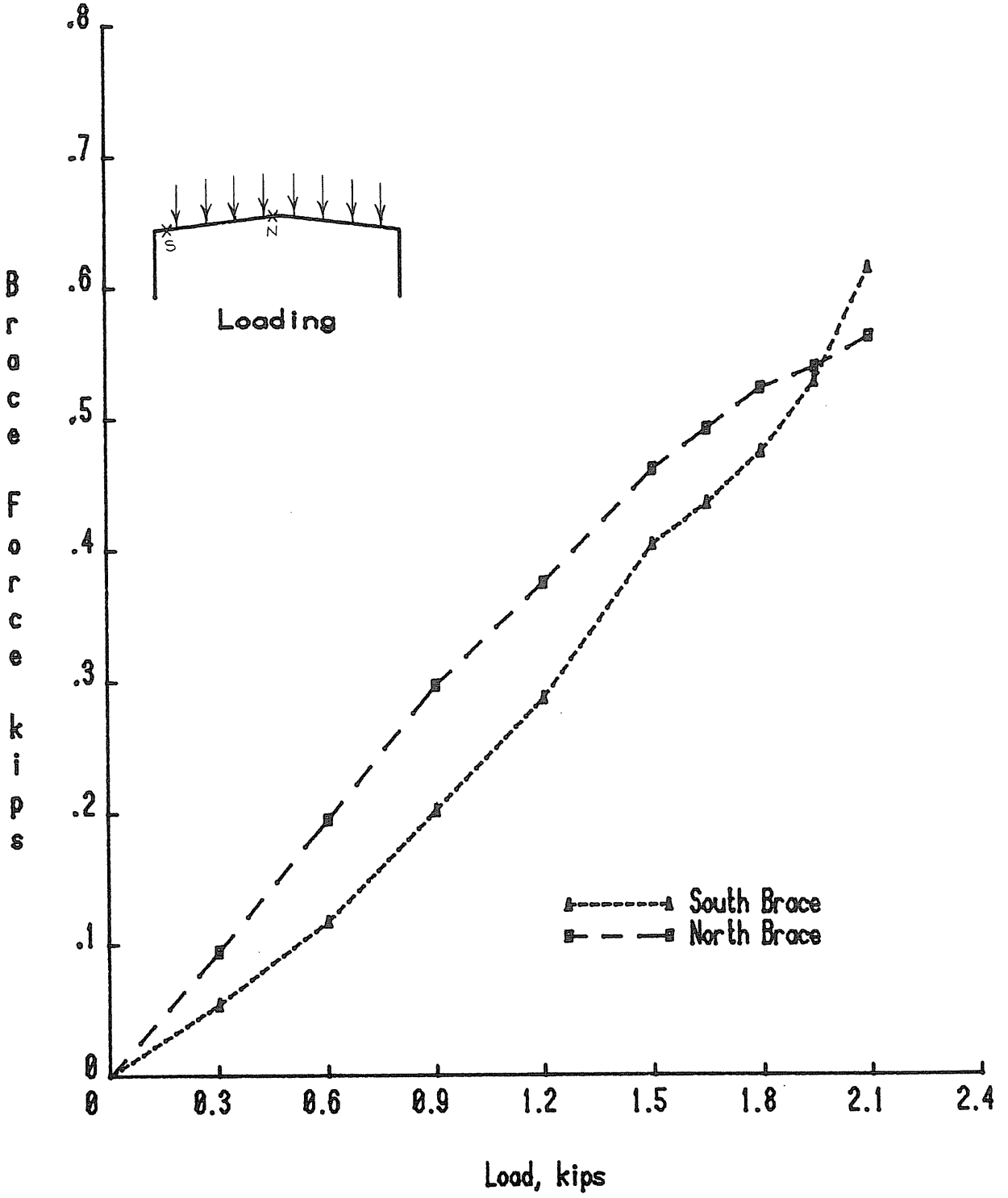


Figure I.4 Load vs. Brace Force

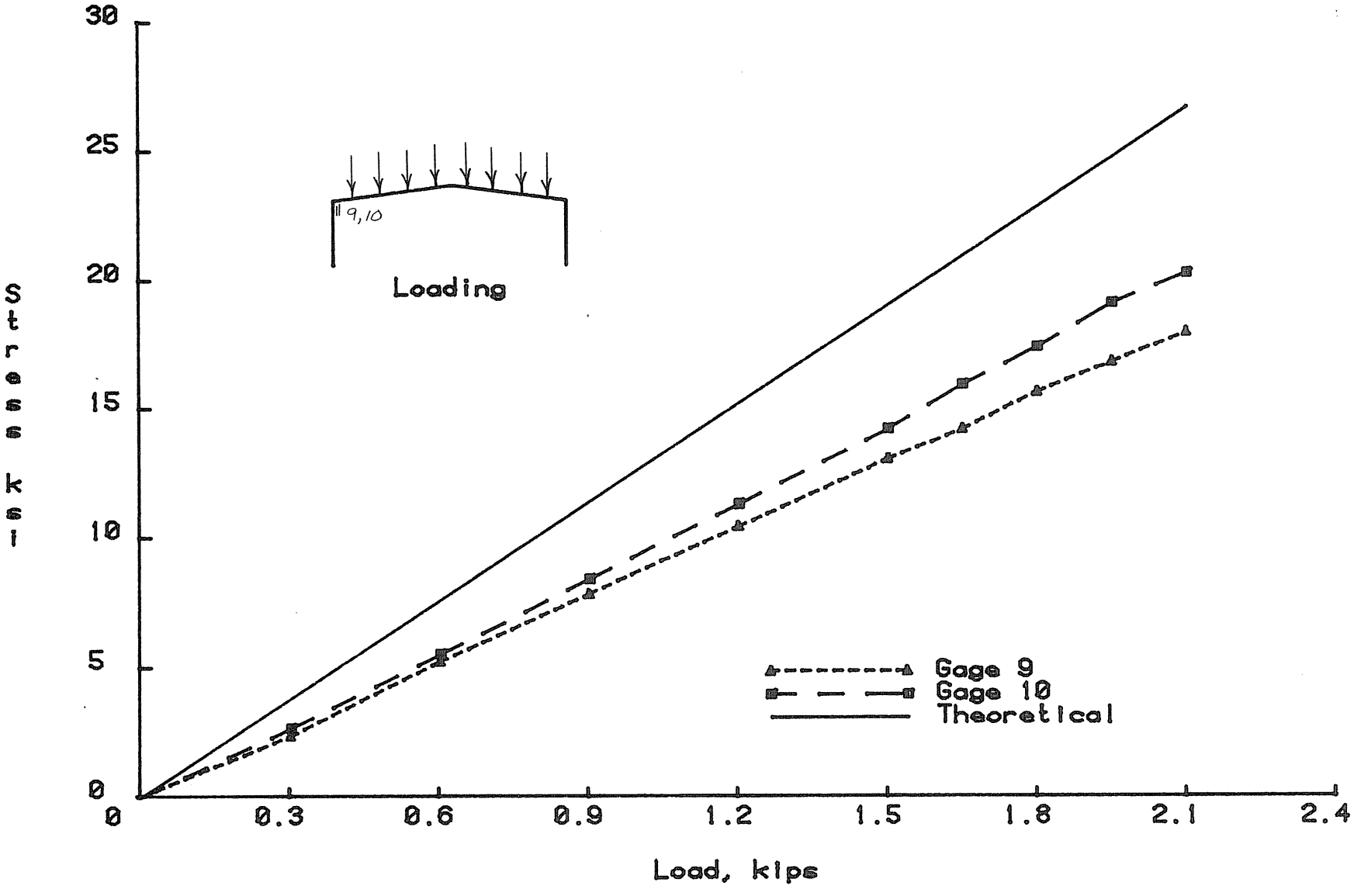


Figure I.5 Load vs. Stress, South Column at Knee

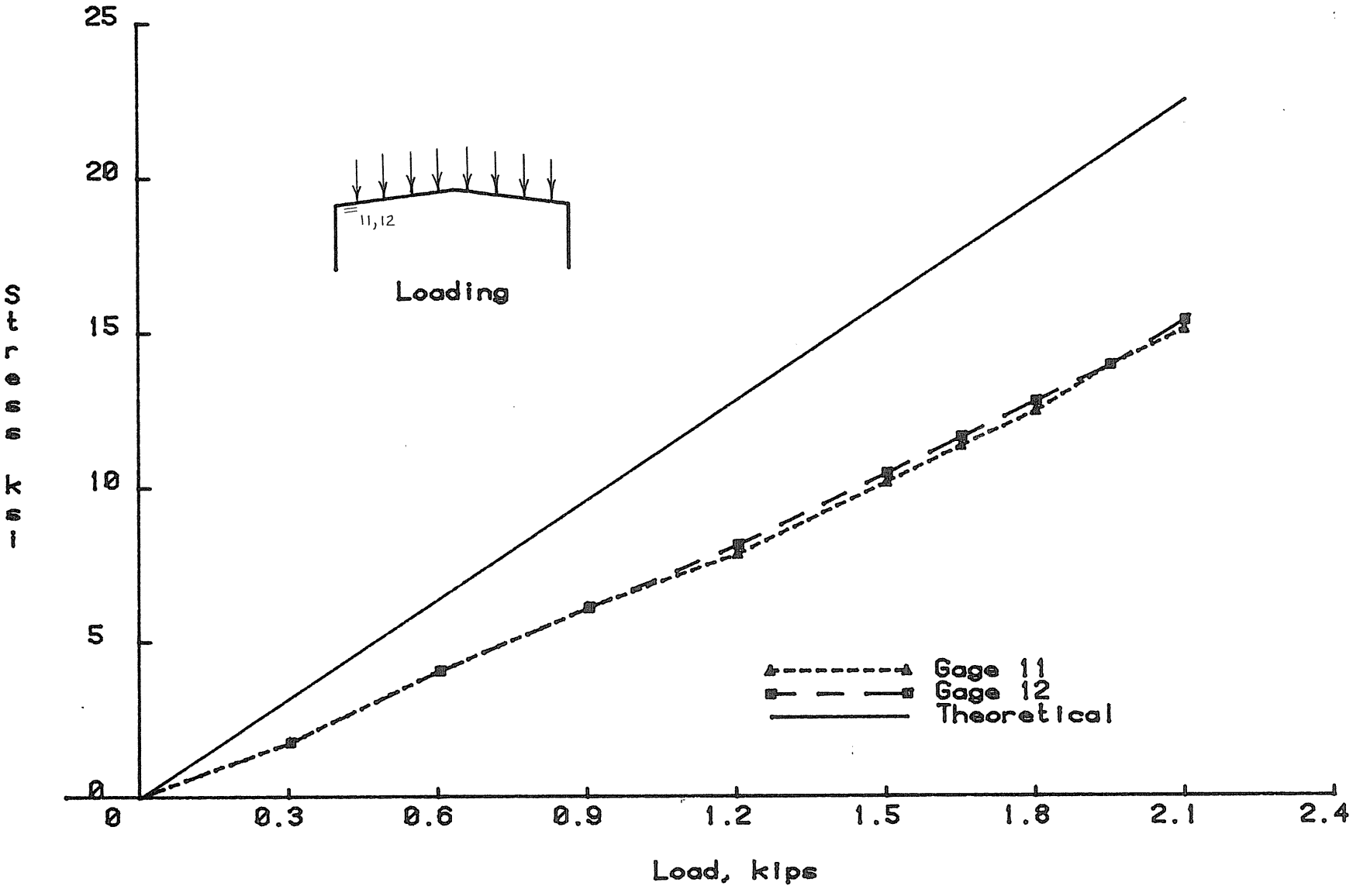


Figure I.6 Load vs. Stress, South Rafter at Knee

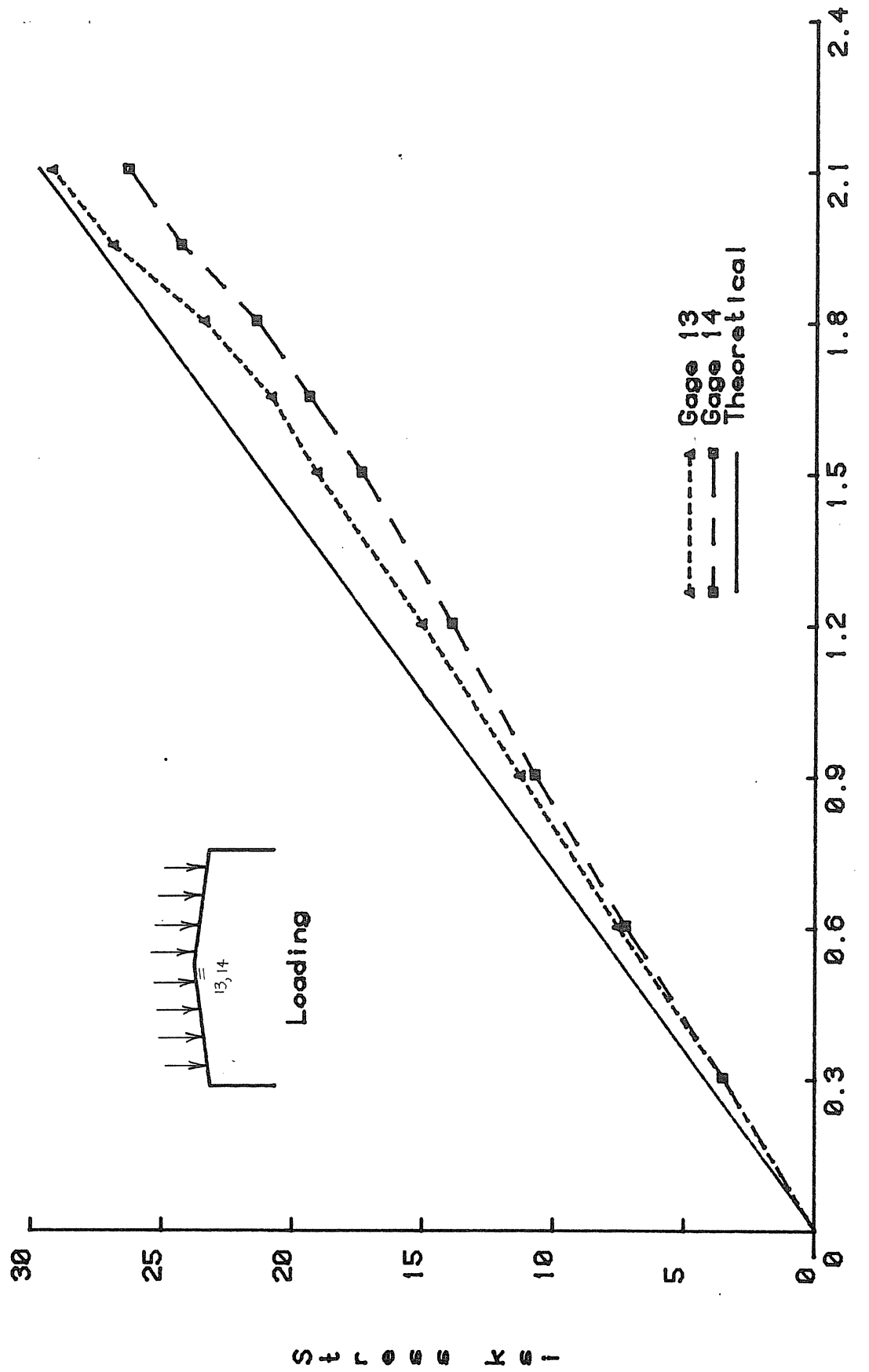


Figure I.7 Load vs. Stress, South Rafter at Peak