EXPERIMENTAL INVESTIGATION OF RIGID FRAMES INCLUDING KNEE CONNECTION STUDIES -FRAME FR2 TESTS-

by

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CHAPTER I

INTRODUCTION

A series of full scale tests was conducted in Fears Structural Engineering Laboratory, School of Civil Engineering and Environmental Science, University of Oklahoma, using standard rigid frames produced by MESCO Metal Buildings Corporation, hereafter referred to as MESCO. The objectives of these tests were to determine the structural strength and stiffness of the rigid frames as well as the adequacy of the analysis and design procedures currently employed by MESCO.

MESCO fabricates the frame components using plate material having a nominal yield strength of 50 ksi. Welding of the rafter and column flange-to-web connection is done only on one side of the web plate using the submerged arc process. A325 bolts are used in the rafter-to-column connections. The frames are designed using a computer program developed by MESCO. Applicable provisions of the AISC Specification are checked by the programs.

The frames, designated FR2, were constructed using two different types of columns commonly used in pre-engineered buildings. This variation was employed in order to obtain information relating to frames composed of either type of column. The columns differed in that one, designated FC2, had an extended top plate supporting the eave strut so that the steel line was formed beyond the exterior column flange. The

column at the opposite end, designated FC1, had no top plate extension resulting in the steel line being formed at the exterior column flange. The rafter, designated type LRF, tapered from a maximum depth at the column connection to a minimum depth at midspan and was symmetrical with respect to the centerline of the span.

The test specimens were fabricated as part of standard production runs. The test set-up consisted of two frames spaced 24'-0" center-to-center connected by simple span purlins and girts and braced by tension rods as shown in FigureS 1.1 and 1.2. Gravity loads were simulated using combinations of gravity load simulators. Lateral loads were applied using hydraulic cylinders attached to the reaction columns. The tests conducted were designed to simulate the action of unbalanced live load, lateral load only, combined unbalanced live and lateral loads as well as full dead plus live load.

Simulated live loads were applied as concentrated loads at eight locations, four on each rafter slope of one frame, for the full live load tests. For the tests involving unbalanced live loads, four concentrated loads were applied to the same slope of each frame. Simulated wind loading was applied as single concentrated loads to the outside leeward column flange of each frame at the elevation of the knee reentrant corner.

MESCO provided the working live and wind load levels used in the tests -- 2.50 kips per simulated live load application point and 7.70 kips at each simulated wind load application point. These loads, when combined with the dead load due to weight of the frames and roof system, produce a combined stress ratio (AISC interaction equation value) near

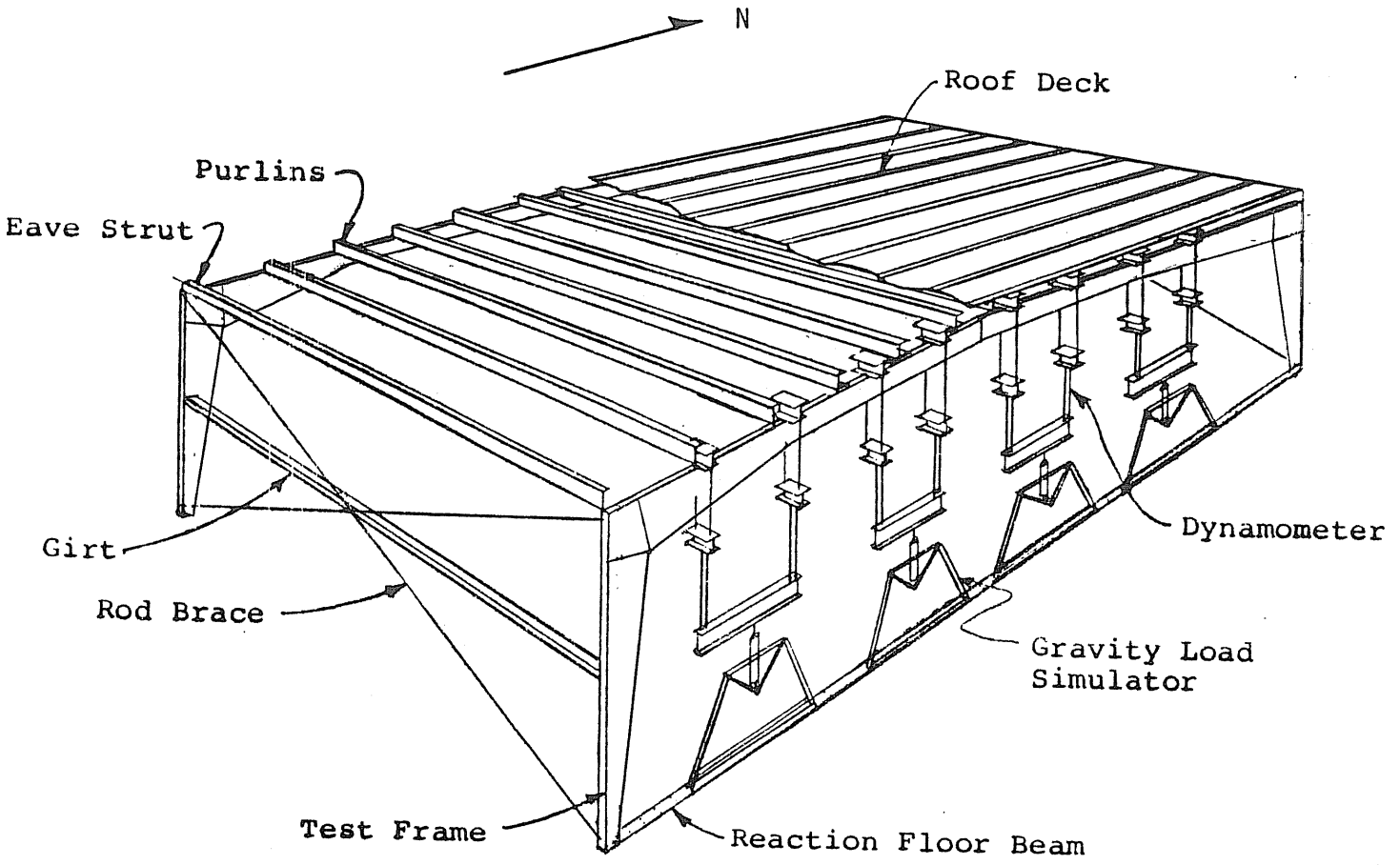
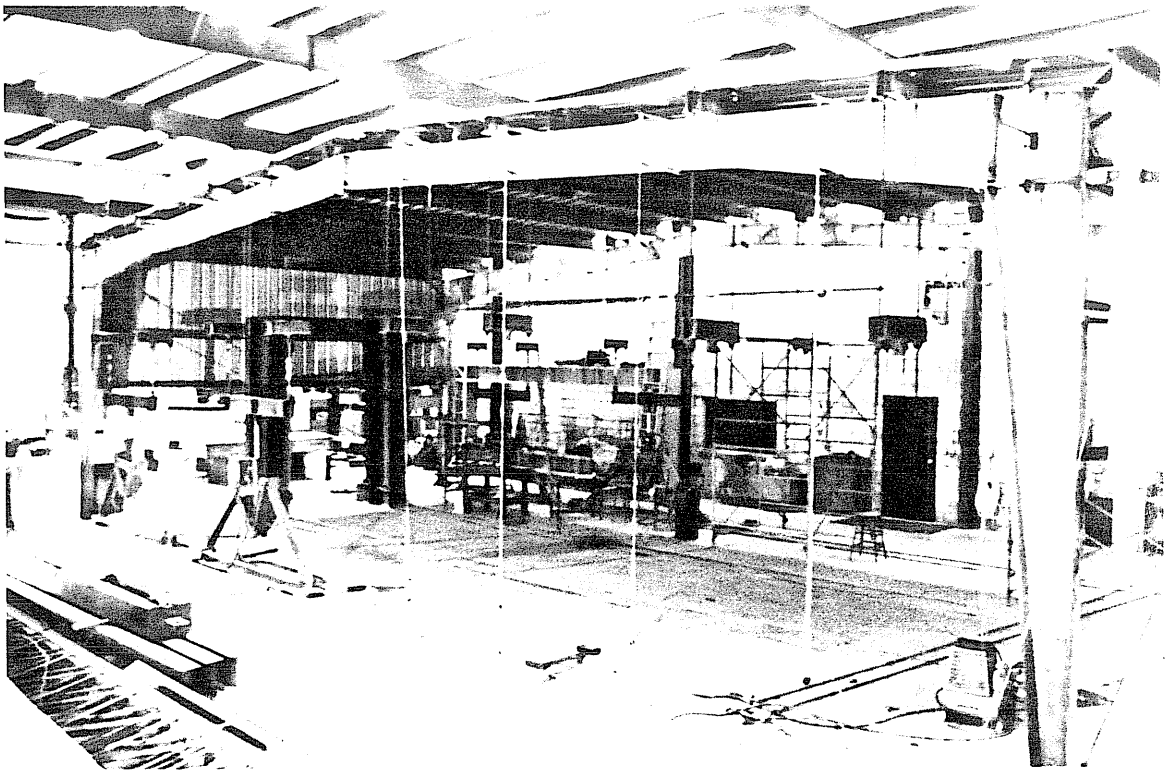
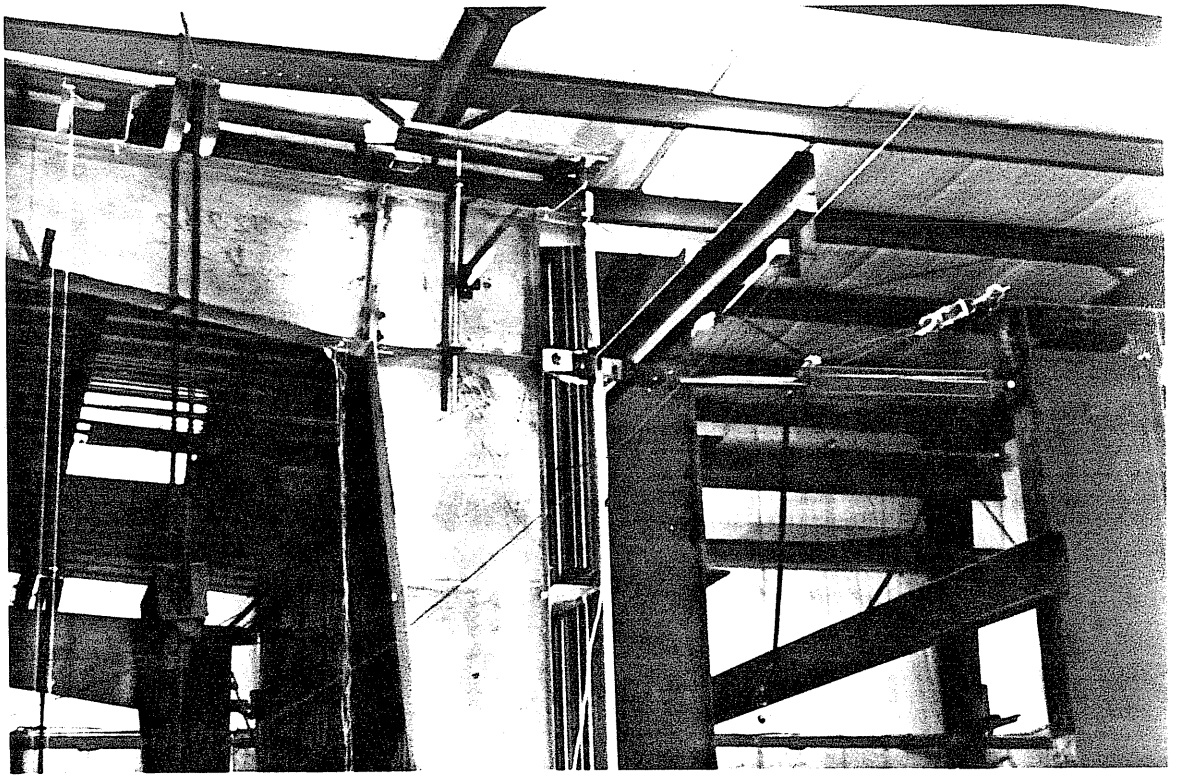


FIGURE 1.1 OVERALL VIEW OF TEST SET-UP

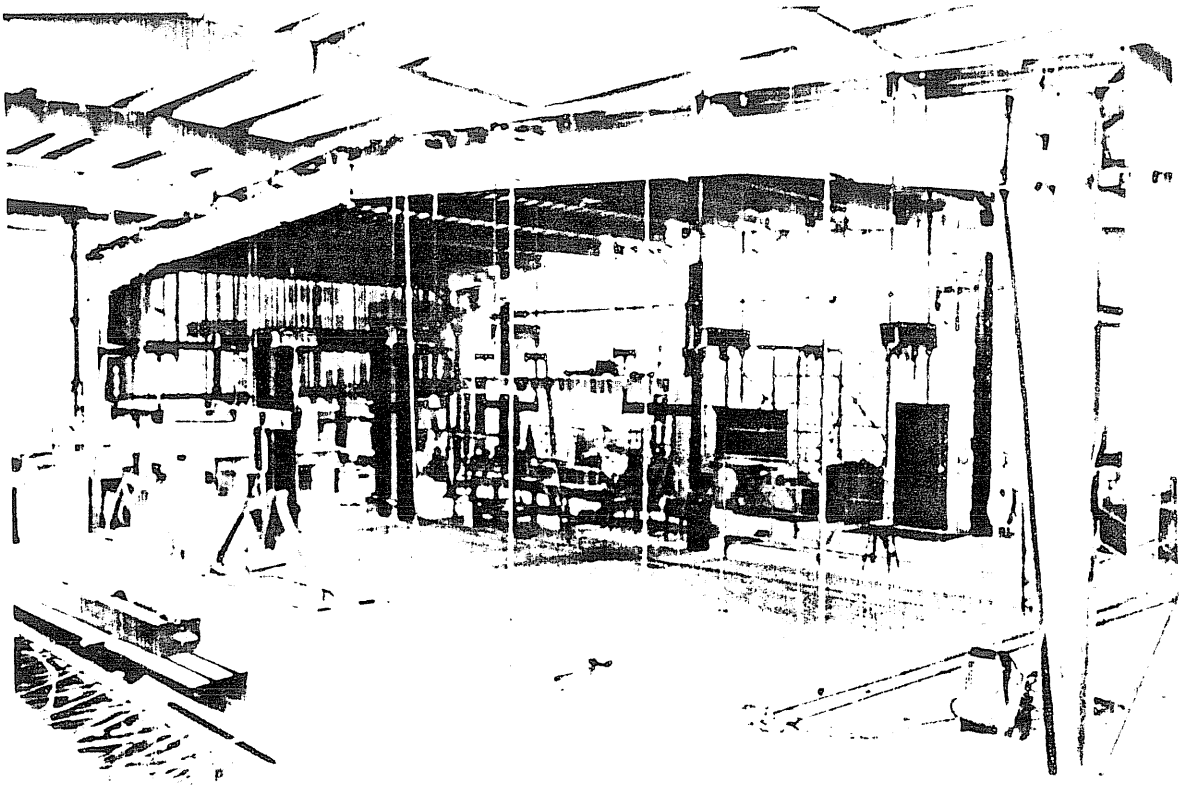


a) Overview

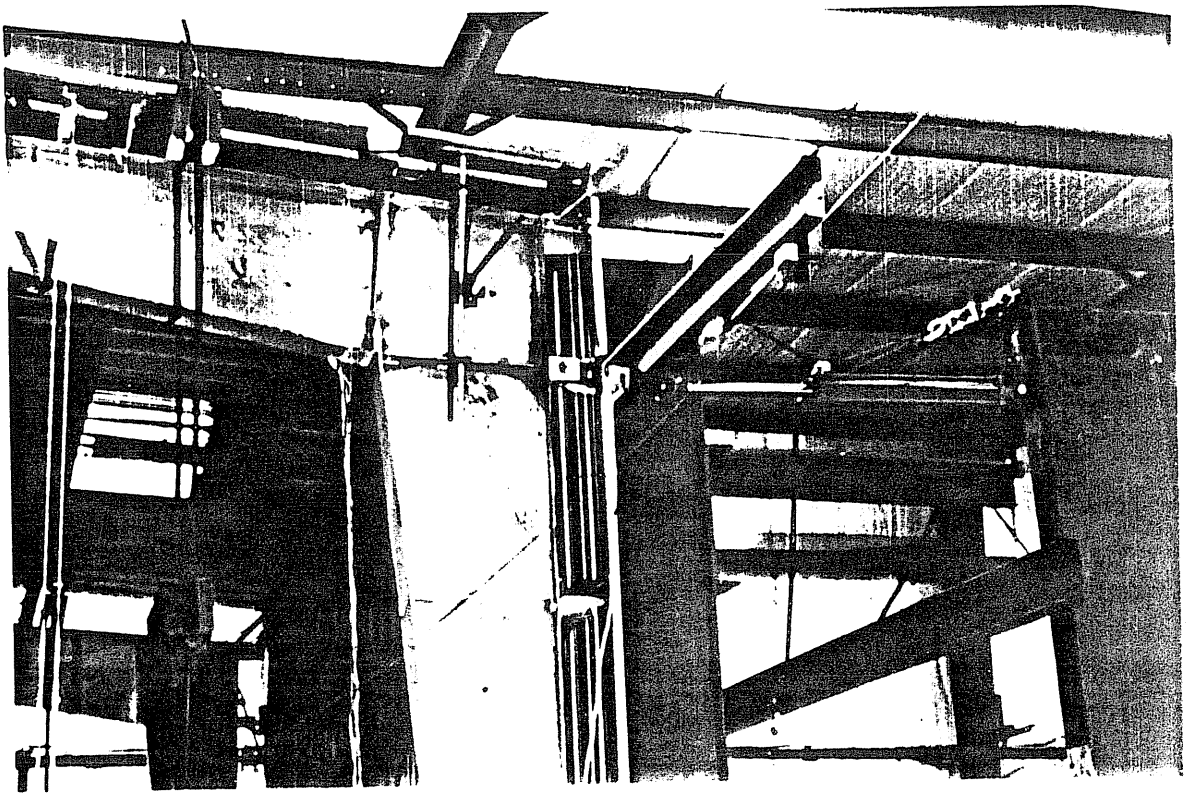


b) Lateral Loading Details

FIGURE 1.2 PHOTOGRAPHS OF TEST SETUP



a) Overview



b) Lateral Loading Details

FIGURE 1.2 PHOTOGRAPHS OF TEST SETUP

1.0. Appendix H contains analyses based on nominal dimensions and 50 ksi yield stress. After all testing was completed, coupon tensile tests were conducted using material removed from the frame. New analyses were then performed using the mearured yield stresses. Appendix I contains analyses based on measured dimensions and actual yield strength. The basis of the failure load calculations found in Appendix A is the results found in Appendix I.

CHAPTER II

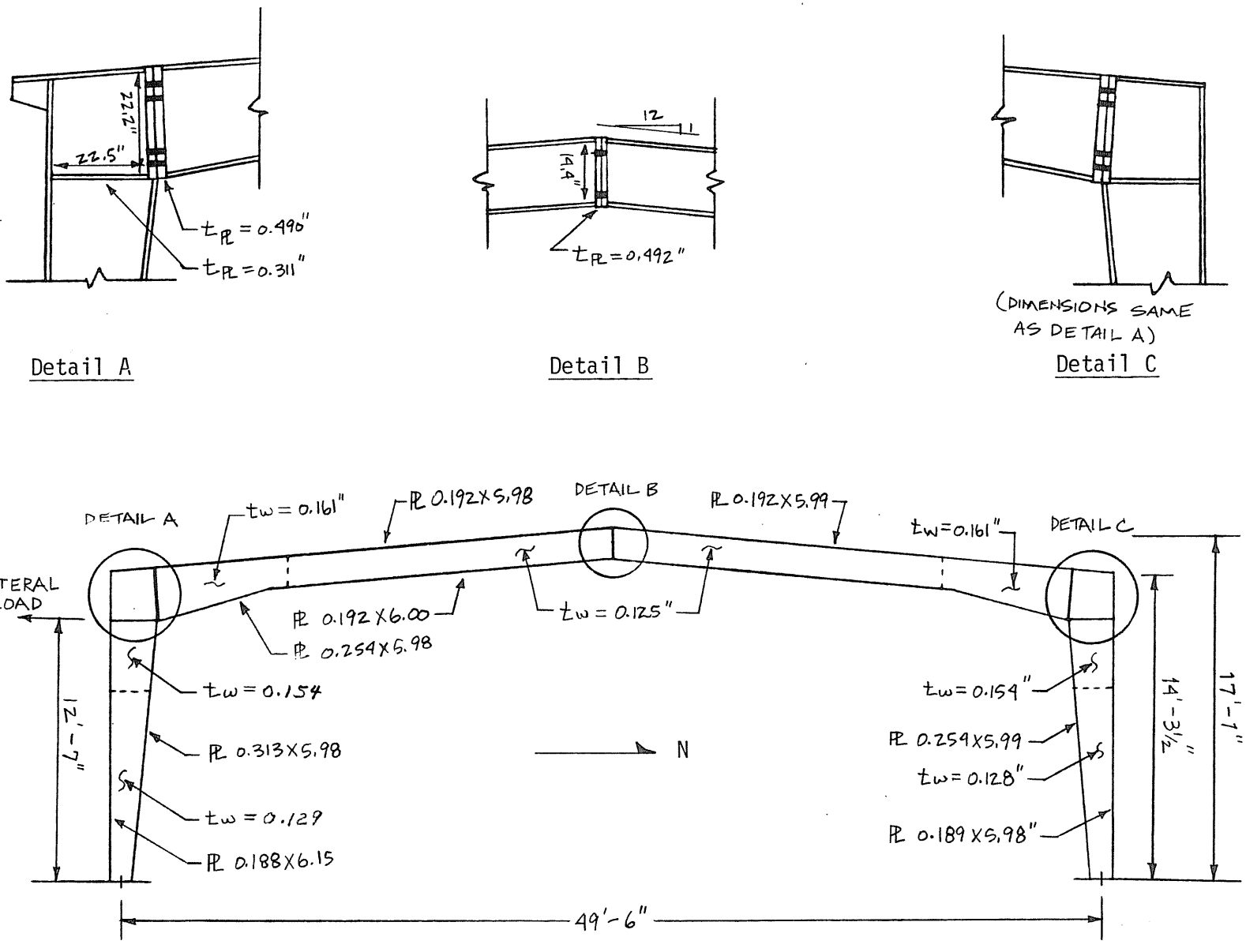
TEST DETAILS

2.1 Test Structure

The test structure consisted of two rigid frames connected by a roofing system and partial side walls. The roofing system consisted of simple span cold formed C-purlins decked with steel ribbed panels as shown in Figure 1.1. In addition, channel section eave struts and girts formed the steel line on the sides of the building. Steel ribbed panels were attached to these channels to construct partial side walls extending down eight feet from the roof to within three feet of the floor. X-bracing made of steel rods was placed in the side walls to provide lateral resistance in the direction transverse to the frames.

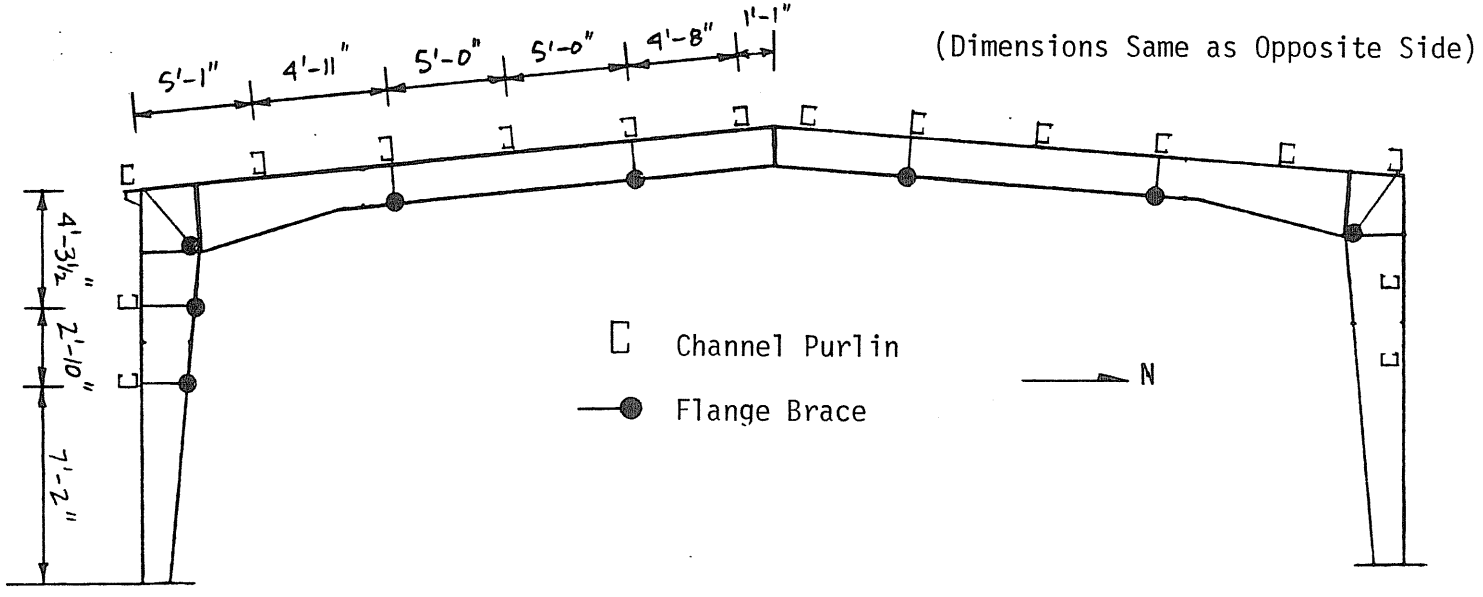
The frames consisted of a Mesco type LRF rafter spanning 48 ft. 11 in. between columns. The rafter was symmetrical with respect to the centerline of the span and tapered from a maximum depth of 22.6 in. at the column connection to 14.8 in. at the centerline. These and other relevant dimensions are shown in Figure 2.1. The bottom flange of each rafter was braced laterally at four points by braces extending diagonally from the flange to the purlins as shown in Figure 2.1.

The columns on opposite ends of the rafter differed in that one had an extended top plate while the other did not.



a) Frame Dimensions

FIGURE 2.1 FRAME DETAILS AND LATERAL BRACE LOCATIONS



b) Lateral Brace Locations

FIGURE 2.1 FRAME DETAILS AND LATERAL BRACE LOCATIONS (CONTINUED)

The extended top plate resulted in the steel line being one channel section depth (7 in.) beyond the column exterior flange. This required that the end girt be attached to the outside of the columns at 7 ft. 2 in. above base line. Using the flush top plated columns at the opposite end of the rafter created a steel line at the column exterior flange and required that the girt be placed between the column flanges at 7 ft. 2 in. Otherwise, the columns were identical.

2.2 Test Set-up

The frames were erected inside the Fears Structural Engineering Laboratory on the laboratory reaction floor. The floor is a reinforced 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 brace spacings were connected between the frames along with standard rod bracing in both side walls as previously indicated. Compression flange braces at the standard locations were connected between the purlins and the bottom flanges of the rafters. Ribbed steel decking covered the roof and upper 7 ft. 6 in. of the side walls.

The column base plates were bolted to the reaction floor beams as shown in Figure 2.2. Eight 3/4 in. diameter, A325 bolts were used at the rafter-to-column connection and four such bolts were used at the rafter midspan connection. The erection procedure was as near as possible to standard practice. One or more of the bolts on the tension side of column-to-rafter end-plate connection were instrumented so that correct pre-tensioning of bolts could be accomplished and

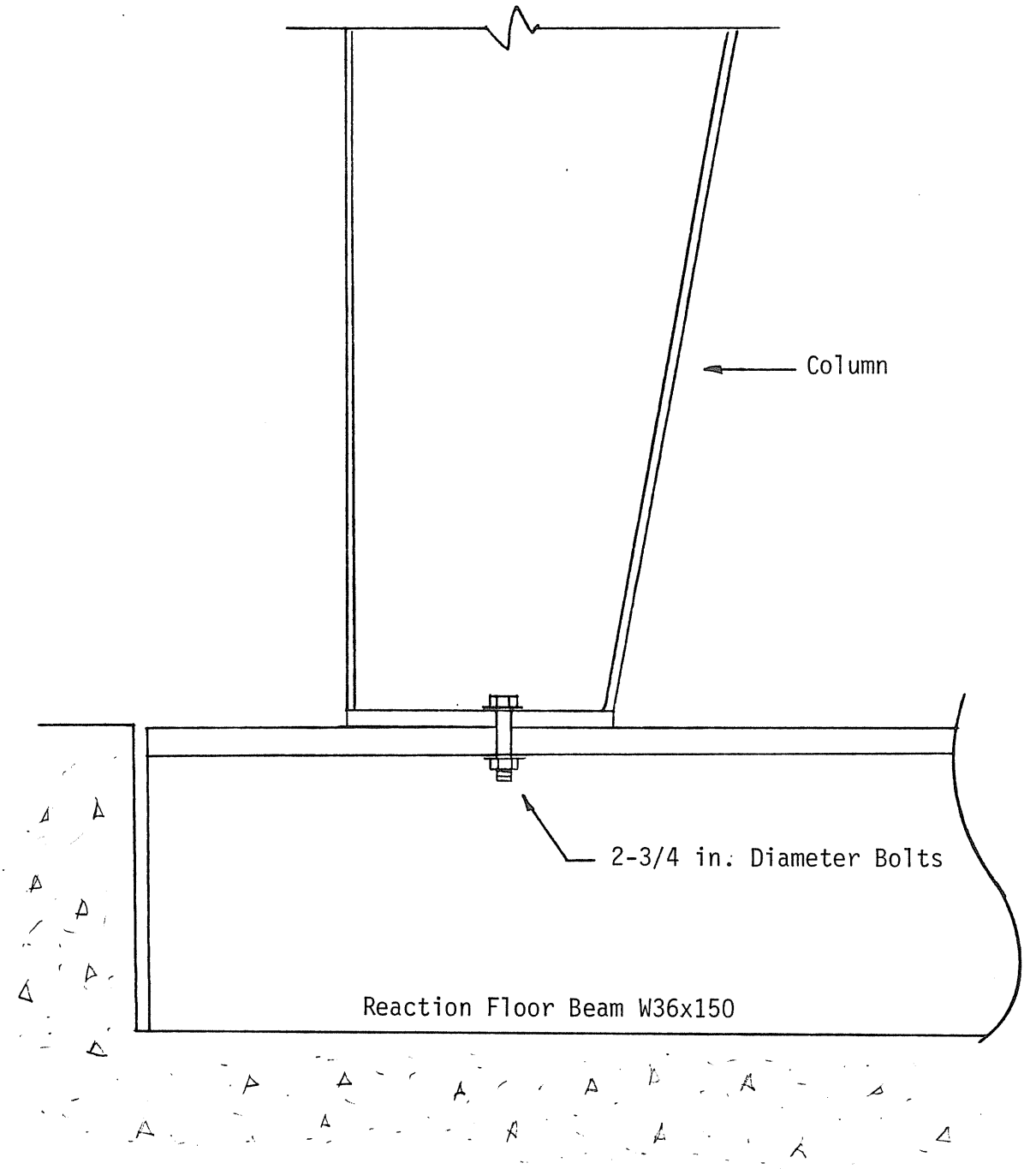


FIGURE 2.2 DETAILS OF COLUMN-TO-REACTION FLOOR CONNECTION

changes in bolt force could be monitored during the tests.

2.3 Load Applications

Simulated live load was applied using the loading apparatus shown in Figure 2.3. The loading apparatus consists of a gravity load simulator (Figure 2.4), 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 a reaction column constructed adjacent to the frame with hydraulic cylinders and calibrated load cells positioned as shown in Figure 2.5. For all lateral load applications, load was applied to both frames simultaneously using two identical hydraulic cylinders connected in series to an electric hydraulic pump.

Four loading schemes were used as shown in Figure 2.6. Figure 2.6(a) shows full gravity loading applied to one frame. For this loading condition, four hydraulic cylinders were connected in series to the electric pump. Figure 2.6(b) shows gravity load being applied to one half of the span to simulate unbalanced live load. For this loading, both frames were loaded simultaneously with the four hydraulic rams connected in series. Figure 2.6(c) is lateral load only, applied as described above. Figure 2.6(d) shows combined lateral load with unbalanced live load applied on the windward side.

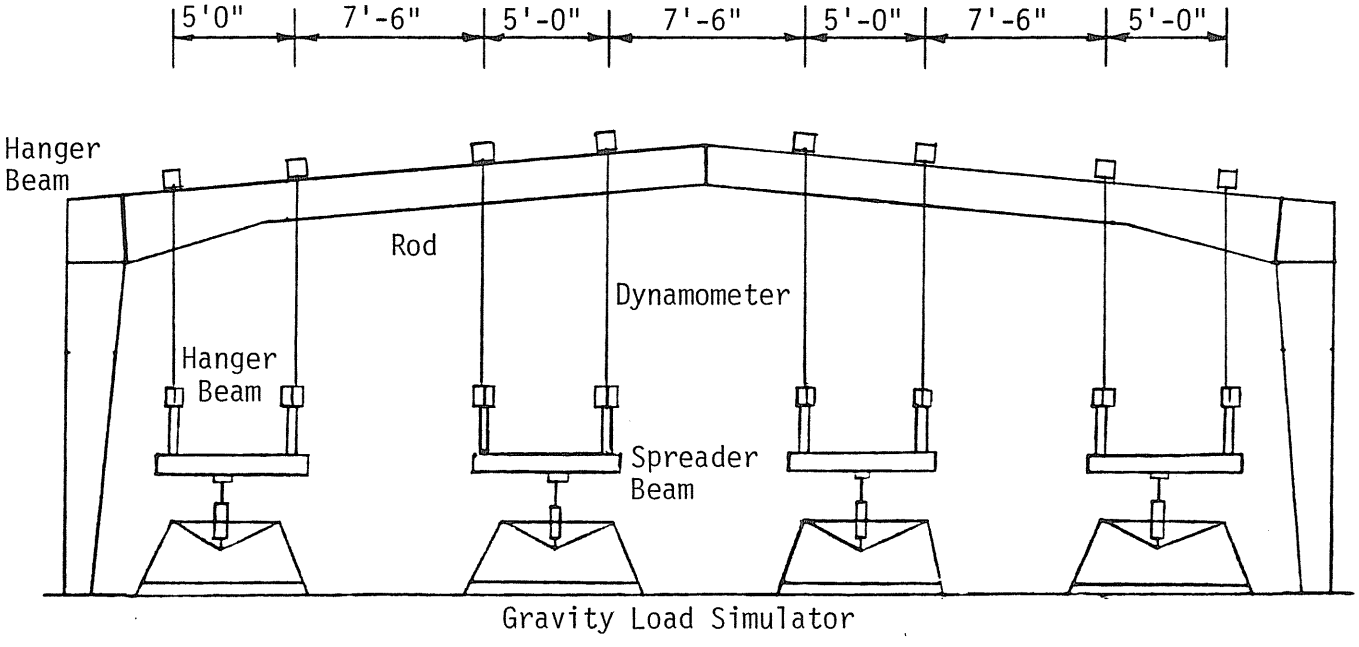


FIGURE 2.3 SIMULATED LIVE LOADING TEST SETUP

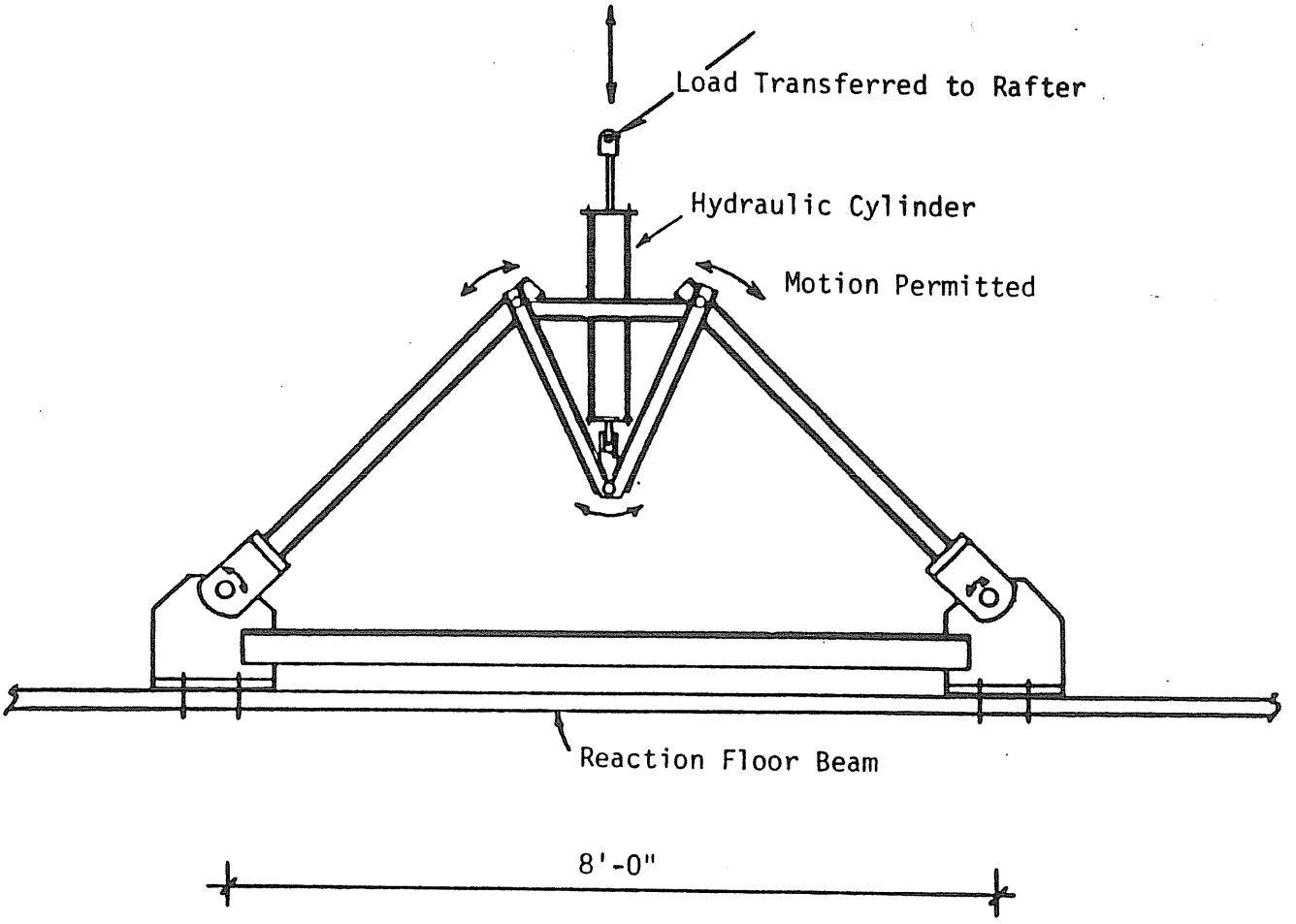


FIGURE 2.4 GRAVITY LOAD SIMULATOR

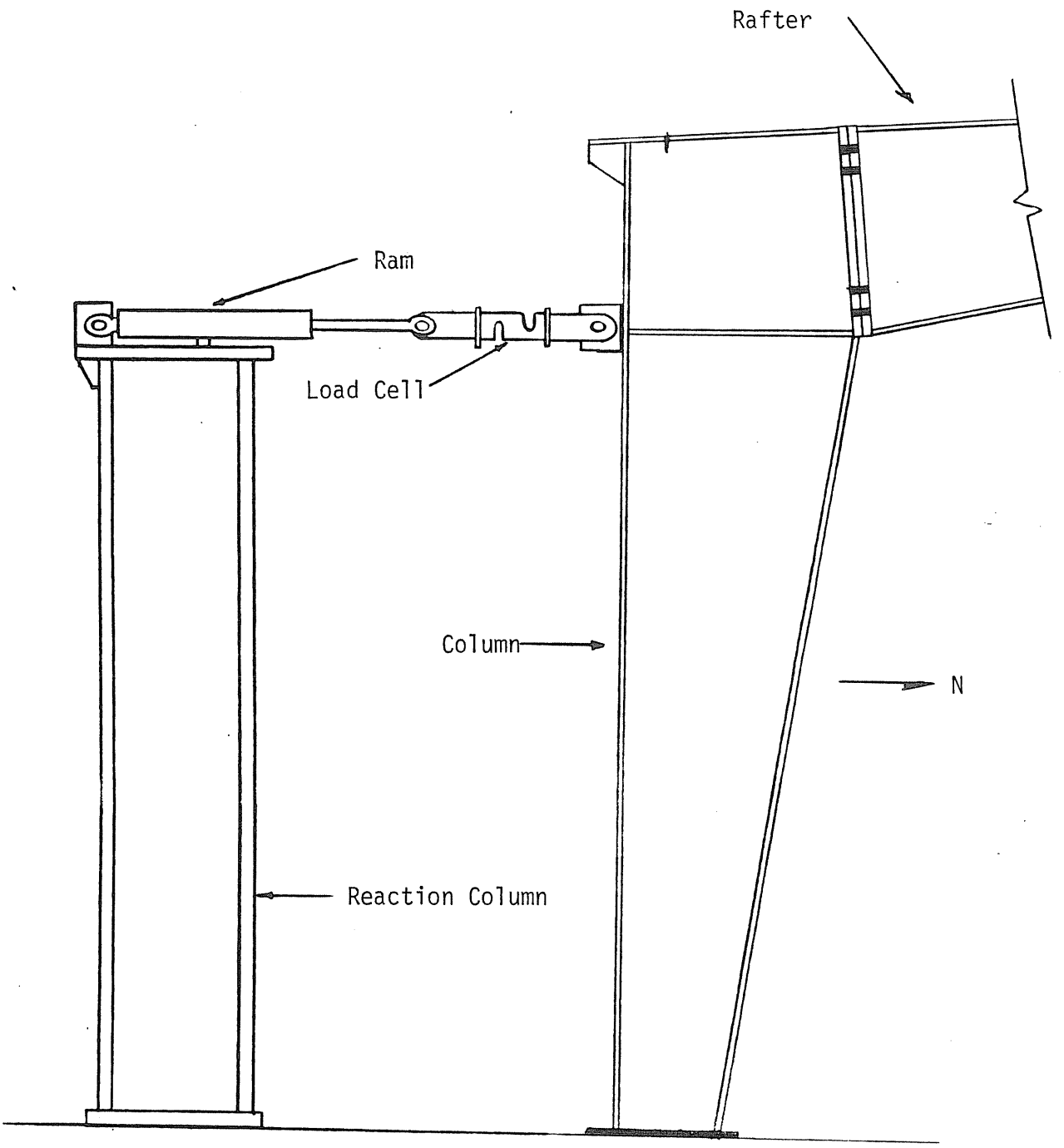
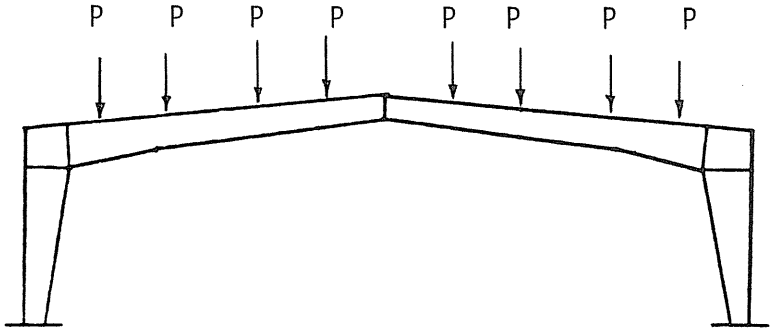
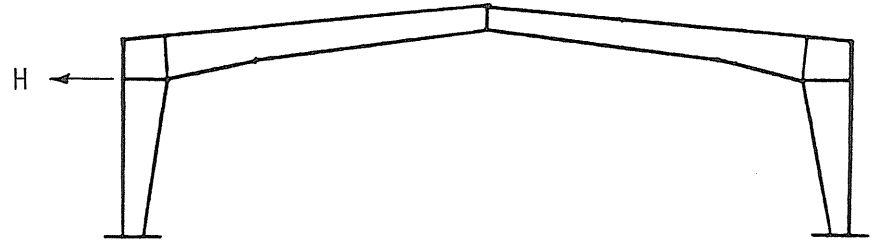


FIGURE 2.5 METHOD OF LATERAL LOAD APPLICATION



a) Full Live Load



b) Lateral Load Only

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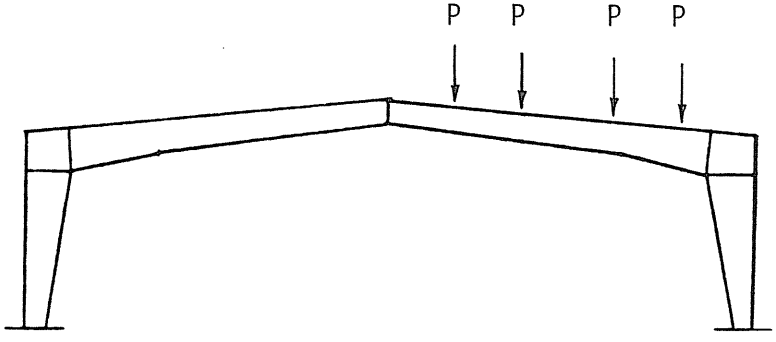
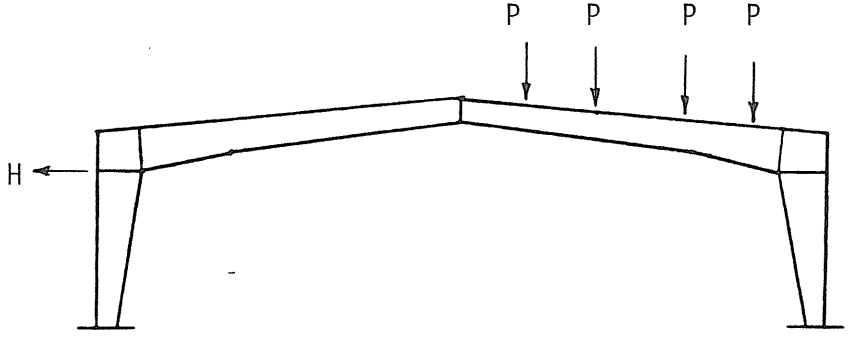


c) Unbalanced Live Load



d) Combined Unbalanced Live (Windward Side) and Lateral Load

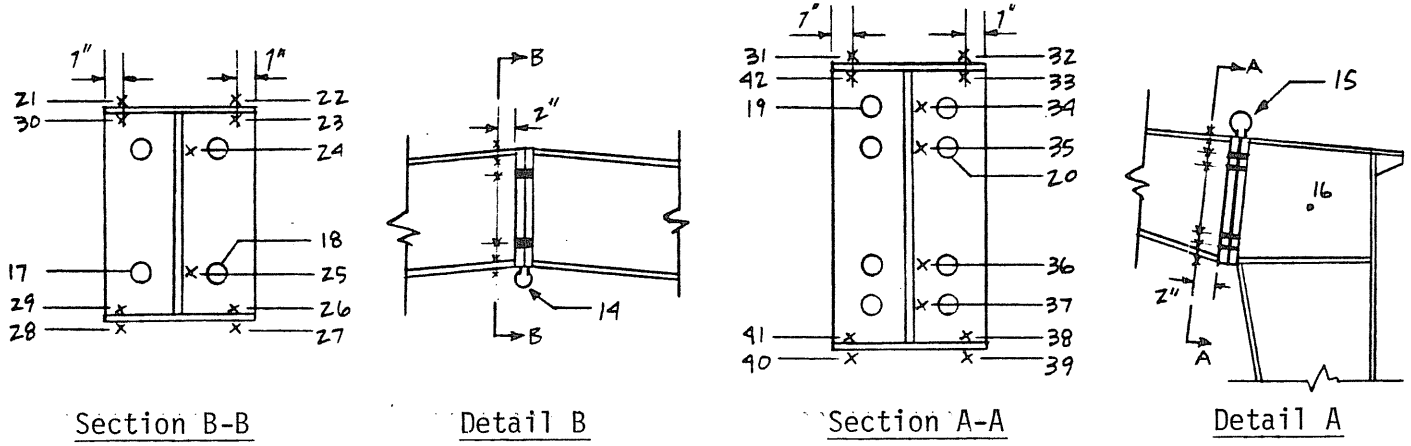
FIGURE 2.6 LOADING CONDITIONS

2.4 Instrumentation

Instrumentation consisted of calibrated dynamometers, load cells, calipers, displacement transducers and linear strain gages. Gravity loads wre measured using the dynamometers as positioned in Figure 2.3. Lateral loads were measured by placing the load cells in series with the hydraulic cylinders as in Figure 2.5. Vertical deflections at the centerline and quarterpoints of the frames were measured by the wire transducers as shown in Figures 2.7 and 2.8. In addition, the calibrated calipers were positioned to measure connection plate separations at various locations.

Linear strain gages were placed at several locations on the frame. Both frames had gages on the rafter near one column-rafter connection. On the east rafter near the north connection four gages were mounted on the tension flange and four on the compression flange, as well as one gage on the rafter web adjacent to each bolt. A similar configuration of gages was placed at the south rafter connection of the west rafter. In addition to the gages at the rafter-column connection, gages were mounted on the east frame adjacent to the centerline connection. As with the rafter-column connections the configuration consisted of gages on the flanges and on the web adjacent to the connection bolts.

To determine bolt forces, a small hole was first drilled thru the head of the bolt into the unthreaded shank. A special strain gage was then inserted into the hole and the hole filled with epoxy. After curing of the epoxy, the bolt was calibrated using a universal testing machine. The instrumented bolts were placed at various locations during the test series.



Legend

Number	Description
1-8	Dynamometers
9	Load Cell
10-13	Displacement Transducers
14-15	Clip Gages
16	Probe Transducer
17-20	Instrumented Bolts
21-42	Strain Gages

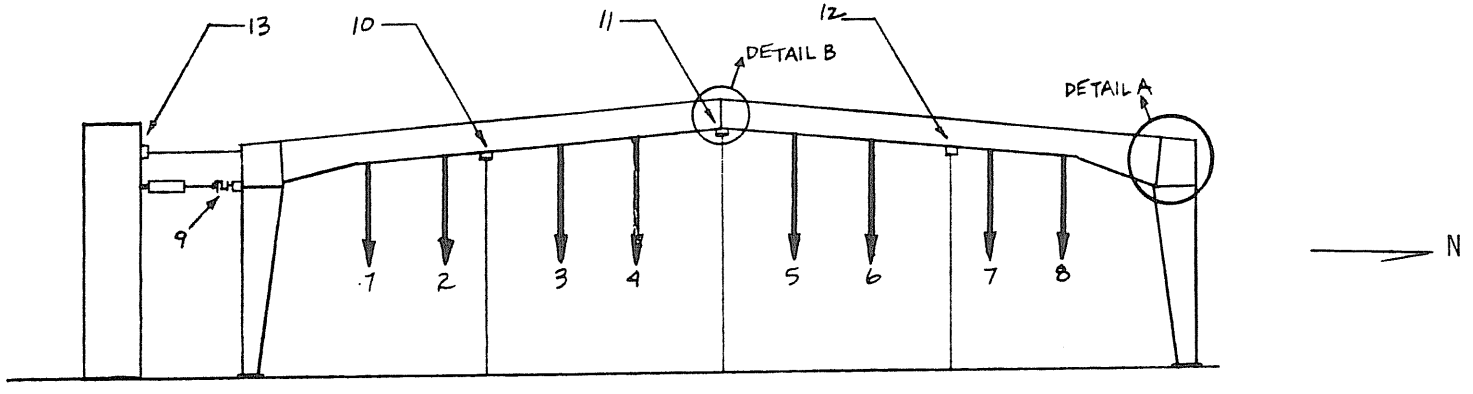
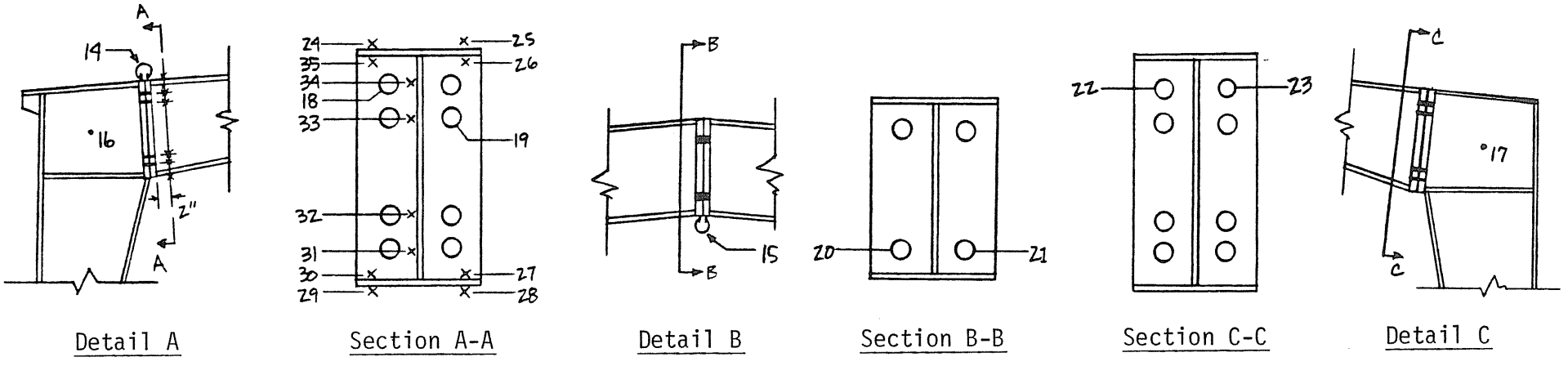
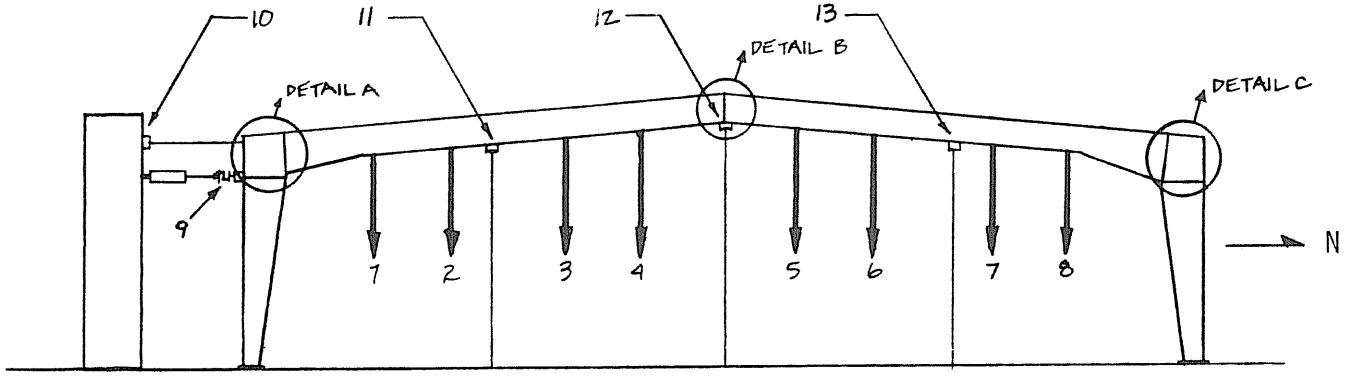


FIGURE 2.7 VIEW OF EAST FRAME INSTRUMENTATION



Detail A | Section A-A | Detail B | Section B-B | Section C-C | Detail C



Legend

Number	Description
1-8	Dynamometers
9	Load Cell
10-13	Displacement Transducers
14-15	Clip Gages
16-17	Probe Transducers
18-23	Instrumented Bolts
24-35	Strain Gages

FIGURE 2.8 VIEW OF WEST FRAME INSTRUMENTATION

Lateral (out-of-plane) movements of the frame were measured by using weighted strings suspended from angles attached to the flanges of the frame rafter and columns. A taut wire running the length of the frame provided a fixed reference for measurements. Scales were used to measure the relative movements between the strings and wire or, equivalently, the lateral movements of the frames flanges.

2.5 Test Procedures

Prior to actual testing an overall check of the testing apparatus and instrumentation was performed. The instrumented bolts were first pretensioned to 28 kips. Zero readings for the instrumentation were then recorded. Following this, an initial test was performed by applying a load equivalent to approximately 30% of the design load. The data gathered from this test was then compared to the corresponding values predicted by the stiffness analysis. Large deviations of the data from the theoretical analysis were regarded as signs of potential malfunctioning of the data acquisition system and corrective action was taken. Once the instrumentation was yielding acceptable data actual testing commenced.

In general, loading was applied in increments ranging from 0.2 to 0.5 kips. After each load increment, deflection and strain gage readings were taken and the specimen was checked for signs of yielding. Yielding was detected by the flaking of the mill scale under the whitewash. When testing to failure, the load was increased until the specimen could sustain no further increases. This was recorded as the maximum load and the load was then removed in an incremental manner.

2.6 Loading Cases

The following six loading cases were applied:

a) Full live load on east frame, Figure 2.5(a); maximum load was 2.50 kips each application point (working level live load).
b) Simultaneous lateral load on both frames, Figure 2.5(b); maximum load was 5.38 kips on each frame.
c) Unbalanced live load on north slopes of both frames simultaneously, Figure 2.5(c); maximum load was 4.18 kips at application point (1.67 x working level full live load).
d) Unbalanced live load on windward slopes followed by lateral load on both frames, Figure 2.5(d); maximum live load 2.50 was kips at each load point and maximum lateral load was 5.60 kips per frame.
e) Full live load to failure on west frame, Figure 2.5(a).
f) Full live load to failure on east frame, Figure 2.5(a).

For the case of unbalanced live load with lateral load, the similated live load was applied until the maximum test load was reached. The gravity load was then maintained at that level while the lateral load was applied in 1 kip increments.

2.7 Supplementary Tests

Upon completion of all testing, sections of undamaged flange and web plate were cut from the specimens. Standard ASTM E8 rectangular tension test specimens were machined from the plate and tensile tests conducted in a universal testing machine. Results are found in Section 3.8.

CHAPTER III

TEST RESULTS

3.1 General

Test results consists of load versus deflection curves, load versus plate separation curves, load versus bolt force and load versus stresses at critical points. In addition, photographic record and description of behavior of test specimens during the tests are included. Each of the loading cases explained earlier in Section 2.6 is designated as one test.

Experimental results are compared to theoretical or predicted results obtained from the results of analyses provided by MESCO, as found in Appendix H of Volume II. The effects of distributed dead load were removed from these results for comparison to results obtained from the laboratory applied loads. Theoretical flange and web stresses at a cross-section were calculated using the standard flexure and axial load formula ($f_b = M_y/I$ and $f_a = P/A$).

Detailed results for each test are found in Appendices B to G. Each appendix contains a test summary sheet and above mentioned plots. The following sections describe each test.

3.2 Test 1 - Working Level Live Load on East Frame.

The first test performed on specimen FR2 consisted of working full level live loading on the west frame (2.5 kips per application point). The effect of live loading was produced by using gravity load simulators to apply vertical forces to eight locations along the frame (see Figure 2.6(a)). These vertical loads were increased incrementally with strain gage and deflection data being taken after each increase. Failure of the instrumentation prevented the accumulation of plate separation data. The remaining data is presented graphically in Appendix B and discussed in the subsequent text.

The load deflection data indicates that the frame had a constant stiffness throughout most of the working load range. The observed stiffness, however, was less than that anticipated by the theoretical analysis. As shown in Figure B.1, the rate of centerline deflection remained constant with load application up to a load of 2.1 kips. The 2.09 in. deflection observed at this load exceeds the theoretically predicted value by 29%. At 2.1 kips of test load the centerline deflection plot indicates a sudden large increase in deflection corresponding to a small increase in load. Subsequently, the specimen regained its previous stiffness. The sudden increase in deflection at 2.1 kips of test load was accompanied by a loud noise originating from the south end of the frame. Examination of Figure B.4 shows that the panel zone of the south knee sustained a large sudden increase in lateral deflection at this same load but regained its lateral stiffness at a slightly higher load. It is quite probable that the loud noise recorded is attributable to this panel zone behavior as is the large centerline deflection.

The deflections recorded at the quarterpoints did not reflect the large lateral displacements of the panel zone at the 2.1 kips load level as did the centerline deflections. Figures B.2 and B.3 show that the quarterpoint deflections are fairly consistent with the application of load throughout the test. The stiffnesses displayed at these locations, however, are less than predicted. For example, at the working load level of 2.5 kips, the 1.63 in. deflection observed at the south quarterpoint and the 1.62 in. deflection at the north quarterpoint exceed the theoretical prediction by 49%. Upon removal of the load a permanent deflection of 0.171 in. was observed at the south quarterpoint and a 0.142 in. deflection remained at the north quarterpoint. In addition, a 0.479 in. deflection remained at the centerline after the load was removed.

As depicted in Figures B.4 and B.5, both panel zones began to deflect with the initial loading. The south panel zone, which had an initial out-of-straightness of 0.3 in., had a large sudden increase in deflection at the 2.0 kips level. As the load was increased from 2.1 to 2.2 kips the lateral deflection of this panel zone increased from 0.021 in. to 0.061 in. Like the south panel, the north panel zone, which had initial out-of-straightness of 0.4 in., experienced an increase in lateral deflection as the test load reached 1.1. This 1.1 kips test load corresponds closely to the 1.128 kips test load which was predicted to cause initial buckling in the panel zone (see Appendix A). The lateral deflection continued to increase as the load was increased.

Bolt force data gathered from the tension bolts in the two knees indicates a linear bolt force increase with load application. Figure B.6 shows the force in the outer tension bolt at the north knee increasing steadily with load

application from the pretension force of 28.0 kips to a maximum value of 34.1 kips at 2.5 kips of test load. The increase in force in the inner bolt at this location was more gradual with 30.0 kips being registered at the maximum test load. Similar behavior was observed in the tension bolts of the south knee connection prior to a test load of 2.1 kips, Figure B.7. The outer bolt increased to 33.0 kips at 2.1 kips oftest load while the inner bolt increased 28.2 kips at this load. At 2.1 kips there was a deviation from the previously linear force increase. At this load a slight decrease in the bolt forces was registered. The outer bolt force decreased from 33.0 kips to 32.7 kips and then resumed its previous rate of increase to register a final force of 33.5 kips at the maximum test load. Likewise, the force in the inner tension bolt decreased from 28.2 kips to 27.5 kips as the test load exceeded 2.1 kips. Unlike the outer bolt, however, the inner bolt remained at this lower load level with a final force of 27.4 kips being recorded in the bolt at the maximum test load.

Figure B.8 shows the relationship of bolt force and load for the two tension bolts at the ridge connection. Both bolts increased above the pretension level upon application of load. The inside bolt increased at a more rapid rate and reached a maximum force of 34.5 kips. The maximum force measured in the outside bolt was 31.9 kips.

The overall increase in the stresses monitored at the south knee appeared to be fairly consistent throughout the loading sequence although they were somewhat erratic between increments. Furthermore, all of the stresses deviated from their theoretical values with the web stresses being significantly larger than expected and the flange stresses being smaller. Figure B.9 shows that the compression flange stresses at the south knee connection are approximately 19%

less than the theoretical value at the maximum test load of 2.50 kips. similarly, Figure B.10 shows the maximum tension flange stress to also be considerably less than predicted. In contrast to the flange stresses, Figure B.11 indicates that the stresses in the rafter web adjacent to the outside compression bolt (Figure B.11) exceeded their anticipated values by 107% while those adjacent to the inside compression bolt were 76% greater than predicted (Figure B.12). Similarly, the stresses in the tension area of the web exceeded those predicted. The stress derived from the strain gage adjacent to the outside tension bolt exceeded its theoretical value by 125% (Figure B.13) and that adjacent to the inside bolt was 246% greater than predicted (Figure B.14).

3.3 Test 2 - Factored Wind Load on Both Frames

Test 2 was designed to determine the behavior of the frames under the action of the factored wind loads. However, due to uncertainty involving the strength of the panel zones, the maximum load to be applied was adjusted to insure that the behavior of the frame remained in the elastic range. The working wind load as supplied by MESCO was 7.70 kips per frame; the maximum load applied in the test was 5.38 kips per frame. The wind loads were simulated by simultaneously pulling both frames southward at the level of the reentrant corner using hydraulic rams (see Figure 2.6(b)). These loads were applied in an incremental manner with displacement and strain gage data being taken after each increment. This data, which indicates that the frame behavior remained elastic under this loading, is depicted graphically in Appendix C.

In general, the observed vertical deflections of the frames remained linear with respect to load increases although their magnitudes deviated slightly from the theoretical

predictions. Figure C.1 shows that the centerline of the west frame deflected vertically slightly to a maximum value of 0.10 in. despite the fact that essentially no deflection was expected from the theoretical analysis. Similarly, Figures C.2 and C.3 show that the quarterpoint deflections of the west frame were less than predicated; the maximum downward deflection of the northwest quarterpoint of 0.40 in. is 18% less than predicted while the maximum upward deflection of 0.31 in. at the southwest quarterpoint is 30% less than anticipated. Figure C.4 shows that a slight initial deflection at the northeast quarterpoint during the first load increment caused the deflections at this location to be less than those predicted throughout the loading sequence. If this initial increment is neglected, however, the resulting vertical stiffness of the frame is very nearly that predicted.

In contrast to the vertical deflections, the lateral deflections of both frames were closely predicted by the theoretical analysis. Figure C.5 indicates that the lateral deflections of the west frame increased linearly with load application. At the maximum test load, the observed deflection of this frame deviated from the prediction by 6%. The behavior of the east frame was even closer to that predicted with the final lateral deflection matching the prediction nearly exactly, Figure C.6.

Figures C.7 and C.8 show that lateral displacements of the center of the northwest and southwest panel zones were insignificant during the tests. Maximum deflections were less than 0.01 in.

The elastic behavior of the west frame was also reflected in other data. Figures C.9 and C.10 show that the forces monitored in the tension bolts in both the ridge and

knee connections of the west frame experienced little change during this loading sequence. The plate separations monitored at the ridge and south knee connections also remained very slight (Figures C.11 and C.12).

Linearly elastic behavior was further indicated by the strain gage data taken at the southwest knee. Both the tension and compression flange stresses were less than anticipated with the maximum values being only 50% to 60% of its theoretical value (Figures C.13 and C.14). Figures C.15 and C.16 show the stresses in the compression area of the rafter web adjacent to the connection bolts increasing linearly with load application. The magnitudes of these stresses were fairly close to those of the theoretical analysis near the compression bolts; the deviation was very slight for the outer bolt while the maximum stress near the inner bolt was 11% higher than predicted. Figures C.17 and C.18 show the stress adjacent to the outer tension bolt exceeding the theoretical value by 43% and at the inner bolt by 122%.

3.4 Test 3 - Unbalanced Live Load on Both Frames

To simulate unbalanced live loading gravity load simulators were used to apply vertical loads at four locations on the north rafters of both frames (see Figure 2.6(c)). As before, this load was applied in increments with strain gage and displacement data being taken after each increment. The load was increased until the factored live load was attained. The factored live load was 1.67 times the working live load level of 2.5 kips or 4.18 kips per application point. The resulting data, which is graphically presented in Appendix D indicates that the behavior of the frame was linearly elastic throughout the test.

Although the load-deflection relationship remains linear throughout the loading sequence, the magnitude of the deflections demonstrates that the frames had less vertical stiffness than anticipated. As shown in Figures D.1 and D.2, the centerline deflections of the west and east frames exceeded the theoretical prediction by 20% and 23%, respectively, at the maximum test load of 4.16 kips. The theoretical values are based on linear elastic stiffness analysis of the frame. Similarly, Figures D.3 and D.4 show the deflections at the northeast and southwest quarterpoints exceed theoretical values by 15% and by 156%, respectively. No permanent deflection was observed upon removal of the load.

Panel zone displacement at the southwest knee did not exceed 0.01 in. and at the northeast knee the displacements were less than 0.035 in., Figures D.5 and D.6.

Forces in the tension bolts at the ridge and the two instrumented knee connections increased gradually with applied loading. At the ridge connection, the bolt on the inside of the rafter increased to 34.3 kips and the bolt on the outside of the rafter increased to 32.8 kips (Figure D.7). At the west frame, south knee connection, the force in the inner bolt increased to a modest value of 28.9 kips while that of the outer bolt increased to 34.0 kips (Figure D.8). Figure D.9 shows the variation of the bolt force in the inner row of tension bolts at the north knee of the west frame. The bolt forces increased slightly to a final value of 28.7 kips at 4.16 kips of test load. The tension force in the bolt of the outer row at this location increased at a greater rate with load application. This bolt attained a maximum tension force of 37.1 kips.

Instrumentation failure prevented the gathering of plate separation data from the centerline. Figure D.10 shows that the plate separation at the north knee of the east frame increased linearly with load application up to 2.5 kips of test load. With an additional load increment a large increase in the separation occurred. Subsequently, the plate separation resumed its steady, linear increase to a final value of .021 in. at the maximum test load.

Stress increases remained linear with respect to load increases throughout the loading sequence at most of the instrumented locatins. In fact, all of the stresses monitored at the north knee of the east frame increased linearly. Figure D.12 shows the stress in the compression flange at this location to be consistently less than predicted. At the maximum test load of 4.16 kips this stress was 33% less than predicted. A similar pattern of stress increase was observed in the tension flange with the maximum stress being 21% less than predicted (Figure D.11). Conversely, stresses in the web at this location are substantially larger than predicted. The stresses adjacent to the inside and outside compression bolts exceeded their theoretical values by 72% and 124%, respectively (Figures D.13 and D.14). Figure D.15 and D.16 show the stresses in the web adjacent to the inner and outer tension bolts exceeded their predicted values at maximum load by 63% and 83%, respectively.

Tension and compresssion flange stresses at the ridge connection versus load are shown in Figures D.17 and D.18. The average stress on the tension flange was considerably less than predicted, in the order of 50%, while those on the compression flange were much closer to the predictions. The web stresses at the two measured locations both exceeded predictions with the compression web stress being

significantly greater than the tension web stress (Figures D.19 and D.20).

3.5 Test 4 - Unbalanced Live Load Plus Wind Load on Both Frames

The combined effect of wind and unbalanced live load was simulated in Test 4 with loads located as shown in Figure 2.6(d)). Simulated gravity load was first applied to four points on the north rafters of both frames. This load was increased in increments with strain gage and displacement data being collected after each increase. Once a live load of 2.5 kips was reached, lateral loads were applied to each frame such that the live load was on the windward rafter of the frames. The live load was maintained at 2.5 kips throughout the lateral loading sequence. The resulting data, Appendix E, indicates that the frames behaved in a linear elastic manner throughout the loading sequences.

In the following paragraphs, frame behavior due to the unbalanced gravity loading is first discussed, followed by the effects of lateral loading.

Figure E.1 shows that the centerline deflections of the west frame during the gravity loading sequence slightly exceeded the theoretical prediction. For example, at the final gravity load of 2.5 kips, the 1.20 in. observed deflection exceeds the predicted value by 8%. Closer correlation with the theoretical values was observed at the centerline of the east frame. The 1.08 in. deflection at this location agrees well with the anticipated value of 1.11 in. at 2.5 kips of test load (Figure E.2). The deflections of the quarterpoints of both frames, however, exceeded their theoretical values; the south quarterpoint of the west frame

exceeded its theoretical value by 67% (Figure E.3), while the north quarterpoint of the east frame exceeded its theoretical value by only 9% at 2.5 kips of gravity load (Figure E.4). The displacements of the north quarterpoint of the east frame was virtually identical to the theoretical prediction throughout most of the gravity loading sequence.

The lateral deflections of the frames due to gravity loads, measured at the south end at the level of the reentrant corner, were only slightly less than predicted. Figure E.5 shows that the lateral displacement of the west frame is only 3% less than predicted at 2.5 kips of gravity load. Similarly, Figure E.6 shows the lateral displacement of the east frame being 5% less than anticipated.

The lateral displacements of the panel zones also progressed in a linear manner with gravity load application. Figure E.7 shows the deflection of the south panel of the west frame beginning with the first application of load and increasing linearly to 0.0063 in. at 2.5 kips of test load. Similarly, Figure E.8 shows the deflection of the north panel of the west frame increasing linearly to 0.0183 in. at the 2.5 kip load level.

Bolt forces increased at a slight but steady rate upon application of gravity loads. Figure E.9 shows the relationship at the west frame ridge connection. Maximum bolt froces of 30.1 kips and 31.6 kips were recorded at the 2.5 kips load level for the inside and outside tension bolts, respectively. Figure E.10 depicts the forces in the two instrumented tension bolts in the south knee connection of the west frame. As shown, the bolt in the outer row steadily increased with load application to 31.2 kips while the bolt in the inner row increased to 28.3 kips with 2.5 kips of test

load.

With the application of 2.5 kips of test load, the plate separation at the west frames midspan (Figure E.11) had increased to .0095 in. Plate separation was also monitored at the top of the north connection of the east frame. This separation, however, was less than the accuracy of the instrumentation throughout the loading sequence (Figure E.12).

The stresses indicated by the strain gages on the east frame displayed a linear rate of increase with load application during the entire gravity loading sequence. Their observed magnitudes differed, however, from those predicted by the theoretical analysis. Figures E.13 and E.14 show the stresses in the rafter's compression and tension flanges being 61% and 40% less than predicted, respectively. Conversely, the stesses in the rafter's web adjacent to the knee were larger than predicted under the gravity load. Figure E.15 and E.16 show the stresses adjacent to the outer and inner rows of compression bolts exceeding their theoretical values by 34% and 10%, respectively. The stresses in the tension area of the web differed from their predicted values to a greater degree than those in the compression area. The stress near the outer tension bolts exceeded the theoretical value by 63% while the stress near the inner row exceeded its anticipated value by 41% (Figures E.17 and E.18).

At the ridge connection of the east rafter, the tension flange at this location experienced less stress than predicted (Figure E.19). The 5.41 ksi stress recorded at 2.5 kips is 39% less than its theoretical value. The stress in the compression flange, however, agreed more closely to the prediction as shown in Figure E.20. At 2.5 kips of vertical load this compressive stress exceeded its theoretical value by

only 4%. The web stresses also exceeded their theoretical values under the action of the simulated gravity load. The stress adjacent to the tension bolts (Figure E.21) was 43% greater than its corresponding theoretical stress while the stress near the compression bolts was 148% greater than anticipated at the maximum gravity load (Figure E.22).

Once the 2.5 kip unbalanced live load level was reached, application of lateral load commenced. The vertical deflections resulting from this loading agreed well with the theoretical prediction. Likewise, the frames displayed a lateral stiffness which was very close to that predicted, Figures E.1 thru E.6.

The application of lateral load caused a change in the rate of displacement in both panel zones of the west frame. The south panel zone displacements continued increasing but at a lesser rate. The deflection at this location increased from 0.0036 in. to 0.012 in. during the lateral load sequence (Figure E.7). The deflections of the panel in the north column began to reverse under the action of lateral load. This deflection decreased from 0.184 in. at the initiation of lateral load to 0.00254 in. at the maximum lateral load of 5.8 kips (Figure E.8).

The application of lateral loads also produced a slight change in the bolt force behavior. Both of the tension bolts at the ridge connection of the west frame continued their steady force increase but at a slightly lower rate than for the gravity portion of the loading (Figure E.9). The force in the bolt on the inside of the rafter increased from 31.2 kips to 32.5 kips and the bolt force on the outside increased from 28.2 to 30.84 kips under the action of the lateral loading (Figure E.9). Figure E.10 shows that the force in the inner

tension bolt of the south connection plates in the west frame sustained a sudden increase from 28.22 kips to 31.37 kips with the first increment of lateral load. This bolt force increased very little with the subsequent lateral loading; a force of 32.56 kips was registered at the maximum lateral load of 5.81 kips. The force in the tension bolt in the outer row at this location did not undergo a similar sudden increase but, rather, began a pattern of gradual increase until it reached a final force of 35.82 kips.

Plate separation also increased with the application of lateral loads. The plate separation at the ridge connection of the east frame increased from 0.0095 in. to 0.0253 in. during the lateral loading sequence (Figure E.11). As before, the separation at the northeast knee remained too small to accurately be recorded (Figure E.12).

Lateral loads produced flange stress changes in close agreement with the theoretical prediction while those produced in the rafters web differed substantially from the anticipated values. Figure D.13 and D.14 show that the magnitude of the stresses in the east rafter flanges at the north knee connection (windward rafter) began to decline with lateral load application. This rate of decrease was accurately predicted for both the compression (Figure F.13) and tension (Figure F.14) flanges. In contrast to the flange stresses, the magnitude of the web stresses at this knee connection declined much more rapidly than predicted (Figures E.15 thru E.18).

At the midspan of the east rafter, the changes in the stresses of both the flanges and webs due to lateral loads were very slight, as predicted (Figures E.19 thru E.22).

3.6 Test 5 - Live Load on East Frame to Failure

Gravity load simulators were used to apply vertical loads at eight points along the east frame see Figure 2.6(a)). These loads were increased in increments until the frame could sustain no further increase. Data from displacement transducers and strain gages were collected after each increment. No bolt force data was gathered during this test and instrumentation failure prevented acquisition of the plate separation data for the knee connections. The data collected indicates that the behavior of the frame was generally linear elastic during the first half of the loading sequence. At the higher loads, several signs of nonlinear behavior were observed. In particular, panel zone displacements became so severe that they prevented the frame from withstanding any further load increases. The maximum load applied to the frame was 4.16 kips or 1.67 times the nominal working load.

Within the first 2.0 kips interval of load application, the vertical deflections of the frame increased linearly with respect to load increases. As shown in Figure F.1, the centerline deflections indicate a constant frame stiffness in this interval. The value of this stiffness, however, is slightly less than predicted. For example, at 2.0 kips of test load the 1.82 in observed deflection exceeds the anticipated value of 1.55 in. by 17%. Similar load-deflection relationships were found for the quarterpoint locations as shown in Figures F.2 and F.3.

The data giving panel zone displacements indicates divergent behavior between the two panel zones. As shown in Figure F.4 the south panel zone experienced virtually no deflection prior to a test load of 3.0 kips. In contrast, the

north panel zone began deflecting with the initiation of loading as shown in Figure F.5. This deflection incresed linearly with load applications until a load level of 2.0 kips was reached. At this load level, the rate of panel zone deflection began to significantly increase.

The measured load versus plate separation relationship at the ridge connection is shown in Figure F.6. The rate of increase of separation significantly increased after the 2.0 kips load level was reached.

Below 2.0 kips of applied load, the stress at most of the monitored locations increased linearly with load application. Figure F.8 shows the load-stress relationship for the compression flange at the north knee connection. The stresses deviate significantly from the theoretical values which are based on a perfectly rigid connection. Figure F.8 shows the load-stress relationship for the tension flange at the same cross-section. Here, the measured stresses are significantly less than the predicted values. Figures F.9 thru F.12 are plots of load versus web stresses. At all four locations, the stresses were significantly greater than predicted prior to failure. After failure, stress reversals occurred at three of the four locations. Figures F.14 thru F.15 show the load-stress relationships at the ridge connection. The measured stresses on both the flange and the web were greater than predicted, especially near failure.

Beginning at the 2.0 kips level, several indications of nonlinear behavior were observed. At this load, the vertical deflections of the rafter began to increase at a greater rate with load application. The previously linear load-deflection relationships at the centerline and quarterpoints began to soften. The connection plate separation measured at the

tension flange of the rafter at midspan also began to increase more rapidly. Conversely, the stresses in the tensile region of the rafter web at this connection began to increase at a much lesser rate.

As the load was increased to 3.5 kips various indications of yielding were observed. Flaking of the whitewash around the outer row of tension bolts at the north knee indicated yielding in this area. Whitewash flaking was also observed on the tension flange of the rafter at this location. Additionally, strain gage data shows that stresses in the rafter web adjacent to the knee compression bolts reached yield. Also, the stress adjacent to the inner compressive bolts began to decrease with further load application. Strain gages at midspan indicate that the stresses in the rafter webs adjacent to the tension bolts began a substantial rate of increase at this load.

At the slightly higher load of 3.75 kips, additonal signs of inelastic behavior were observed. Flaking of the whitewash indicated yielding in the connection plates around the tension bolts at the south knee, as well as on the rafter compression flange near this connection. Furthermore, diagonal yield lines appeared in the whitewash of both panel zones.

As the load was increased to 4.16 kips extensive flaking of the whitewash appeared around the tension bolts, as well as on the rafter's compression flange at midspan. In addition, flaking of the whitewash indicated yielding of the north columns base plate at this load. Finally, severe buckling in the panel zones prevented any further increase in load beyond 4.16 kips.

3.7 Test 6 - Live Load on West Frame to Failure

Gravity load was applied at eight points along the west frame to simulate full live loading (see Figure 2.6(a)). The load was increased incrementally until the frame could resist no further increases. Data collected after each loading increment indicates that the frame behaved in a linear elastic manner throughout most of the loading sequence. Eventually, buckling of the panel zones of the knees caused a degradation of the frame stiffness and ultimate failure. The maximum applied load was 4.18 kips or 1.67 times the nominal working load.

The vertical deflections of the frame maintained a linear relationship with load increases prior to approximately 3.0 kips of test load. The centerline deflections depicted in Figure G.1 indicate that the frame had a constant stiffness prior to 3.0 kips of test load. This stiffness, however, was slightly less than the theoretical prediction. At 3.0 kips of test load the 2.87 in. observed centerline deflection exceeded the predicted value of 2.68 in. by 7%. Likewise, deflection data from both quarterpoints indicates a linear increase with respect to load application, but less stiffness than anticipated (Figures G.2 and G.3). At 3.0 kips, the north and south quarterpoint deflections exceeded their predicted values by 24% and 21%, respectively.

Lateral deflections of the panel zones underwent linear increases with respect to load throughout most of this loading interval. Figures G.4 and G.5 indicate that lateral deflections began with the first application of load. These deflections increased proportionately with load increases until substantial load had been applied. At 2.6 kips, however, an increased rate of deflection began to occur in the

north panel zone. This accelerated increase is large enough to indicate the initiation of buckling. This 2.6 kip test load is slightly less than the 2.85 kip load predicted to cause buckling by using adapted tension field action equations (see Section 4.1 and Appendix A). Likewise, a substantial increase in the rate of deflections was observed in the south knee at the slightly higher load of 3.1 kips. Figure G.6 shows that the force in the inside and outside tension bolts at the ridge connection steadily increased with load application from the pretension force of 28 kips to 38.3 kips and 36.5 kips at 3.0 kips of test load, respectively. Figures G.7 and G.8 show that the forces in the tension bolts in the outermost row of the connection plates at both knee connections increased substantially during loading. At the 3.0 kips level, these bolts registered 40.3 and 38.3 kips in the north and south knees, respectively. Conversely, the forces in the inner row of tension bolts remained fairly constant. Forces of 28.2 and 29.6 kips were recorded at 3.0 kips of test load for the north and south connections, respectively.

Figures G.9 and G.10 indicate that the separation measured at the tension side of the connectin plates at the south knee and ridge connections increased in a linear manner for the first 3.0 of applied load and then began to increase at a very rapid rate.

The stresses monitored during this loading interval also increased in a linear manner although they differed from their predicted values. Figures G.11 and G.12 indicate that the stresses in the rafter's flanges immediately adjacent to the knee connection were less than predicted. The 19.8 ksi compressive stress and the 12.3 ksi tension stress recorded at 3 kips of test load level are 10% and 44% less than their

theoretical values, respectively. Conversely, the stress in the rafter's web adjacent to the knee were significantly larger than predicted (Figures G.13 thru G.16). The stress recorded in the web adjacent to the outside row of compression bolts (Figure G.13) is 93% greater than its predicted value at 3.0 kips of test load. Similarly, the stresses in the web adjacent to the inside and outside tension bolts exceeded their predicted values by 35 and 65%, respectively (Figure G.15 and G.16).

With the buckling of the south panel zone, the overall behavior of the frame changed. A degradation of the frames stiffness was indicated at this load level by increased rates of deflections at the centerline and quarterpoints. The load deflection relationships are curvilinear subsequent to this load. In addition, some flaking of the whitewash (indicating yielding) was observed on the plates at the centerline around the tension bolts at 3.25 kips. As the load was further increased to 3.5 kips, flaking was observed on the compression flange of the north column adjacent to the column web splice. In addition, visual inspection indicated the development of a buckled shape in the web of the south column at this load.

Nonlinear behavior was also indicated by the strain gages. The stresses near the south knee began a greater rate of increase as the panel zones began to buckle. Also, with the application of 4.0 kips of load, the flaking of the whitewash was continuous along the compression flange of the north column from the web splice to the knee. Eventually, the buckling of the panel zone became so severe that the frame could resist no further load increases. This was considered to be failure and the corresponding load of 4.18 kips was considered to be the ultimate load of the frame.

Figure 3.1 is photographs of the frames under maximum

loading.

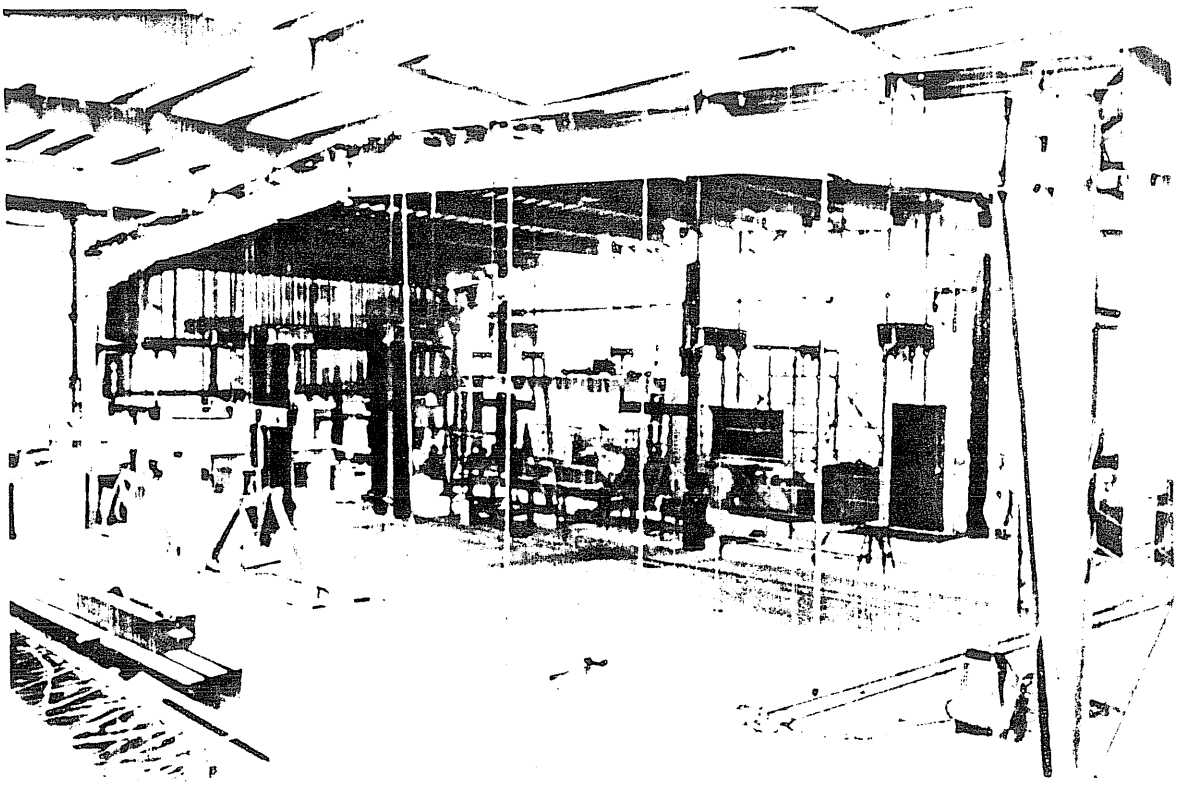
3.8 Results of Supplementary Tests

Results of the tensile coupon tests are given in Table 3.1. The average yield stress for all samples was 67.5 ksi.

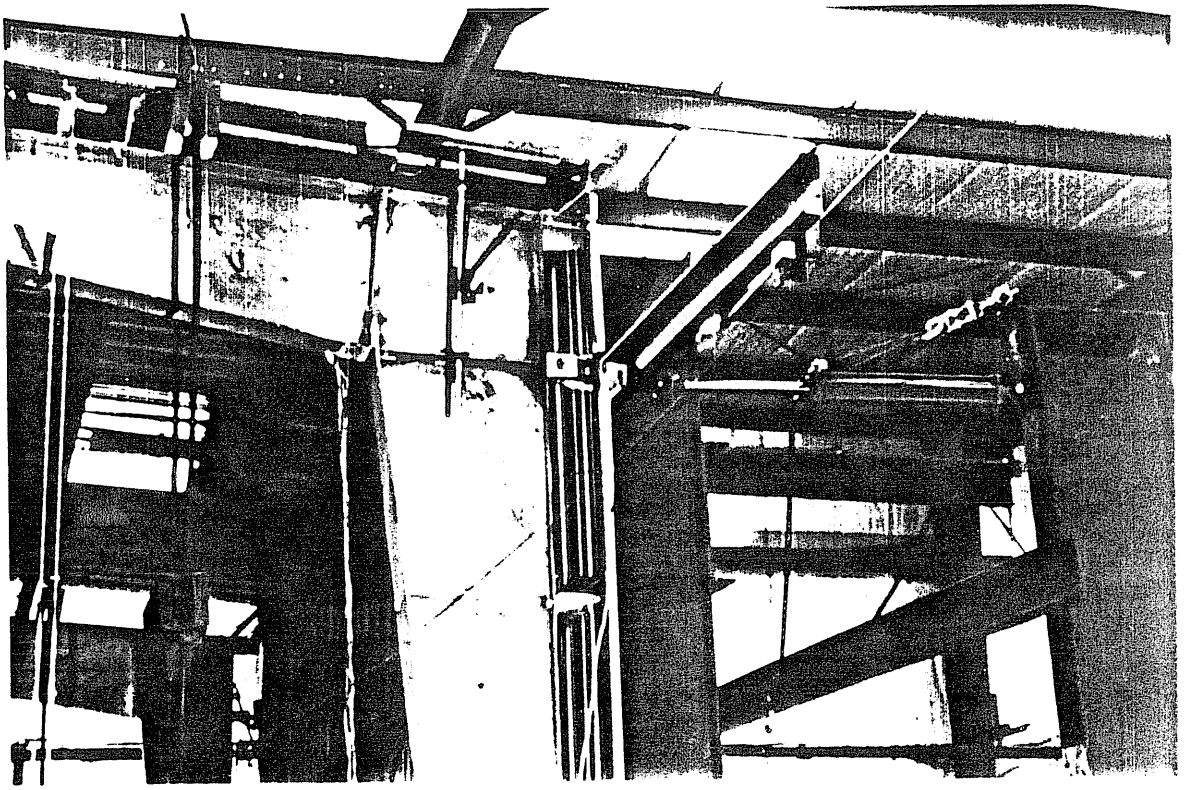
Table 3.1

Coupon Test Results

Frame	Location	Yield Stress (ksi)	Ultimate Strength (lsi)	Elongation (%)
East	Column Web	66.0	92.0	NA
West	Column Web	68.4	94.7	NA
East	Rafter Flange	67.9	89.2	37.0
West	Rafter Flange	67.7	89.1	35.3

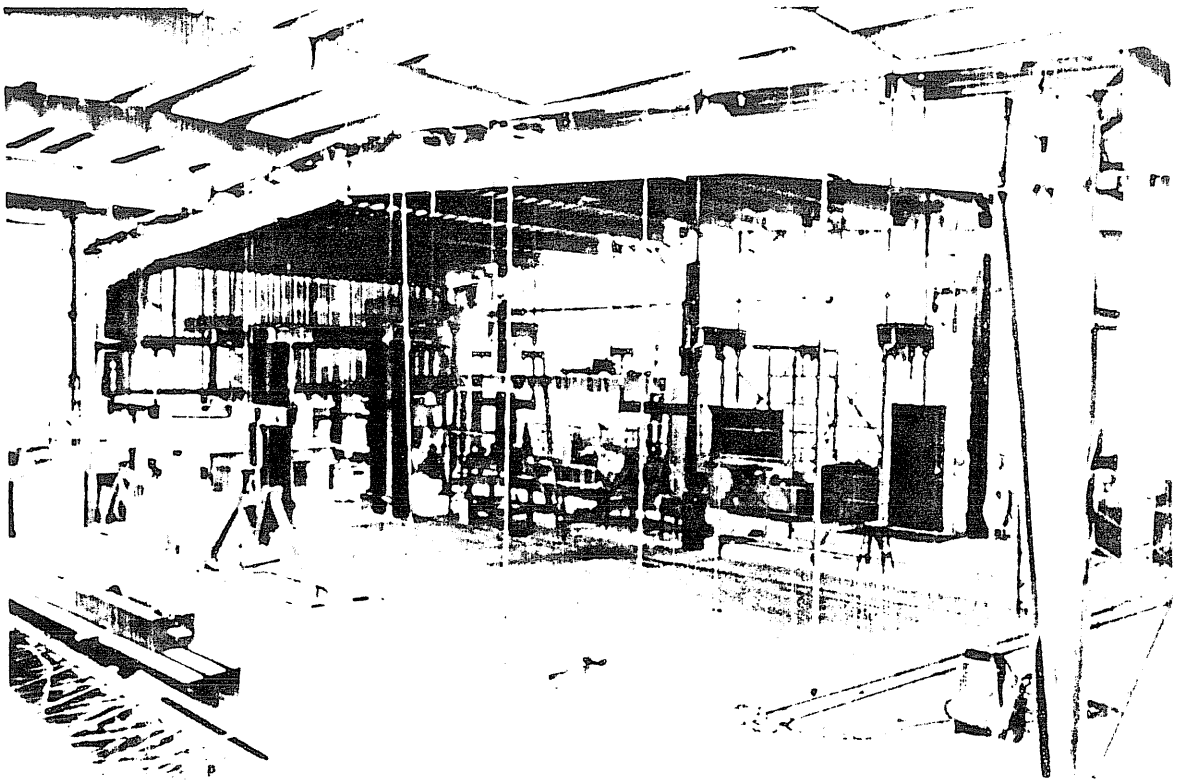


a) Overview



b) Lateral Loading Details

FIGURE 1.2 PHOTOGRAPHS OF TEST SETUP



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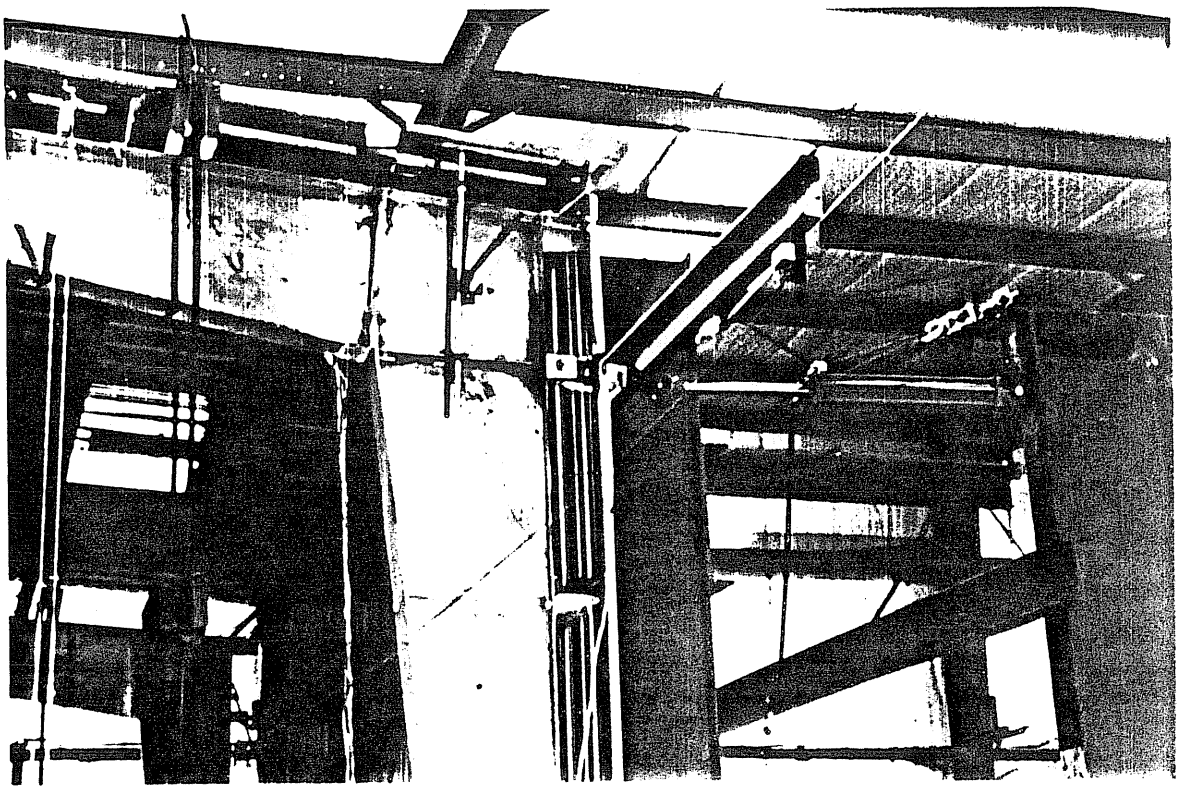
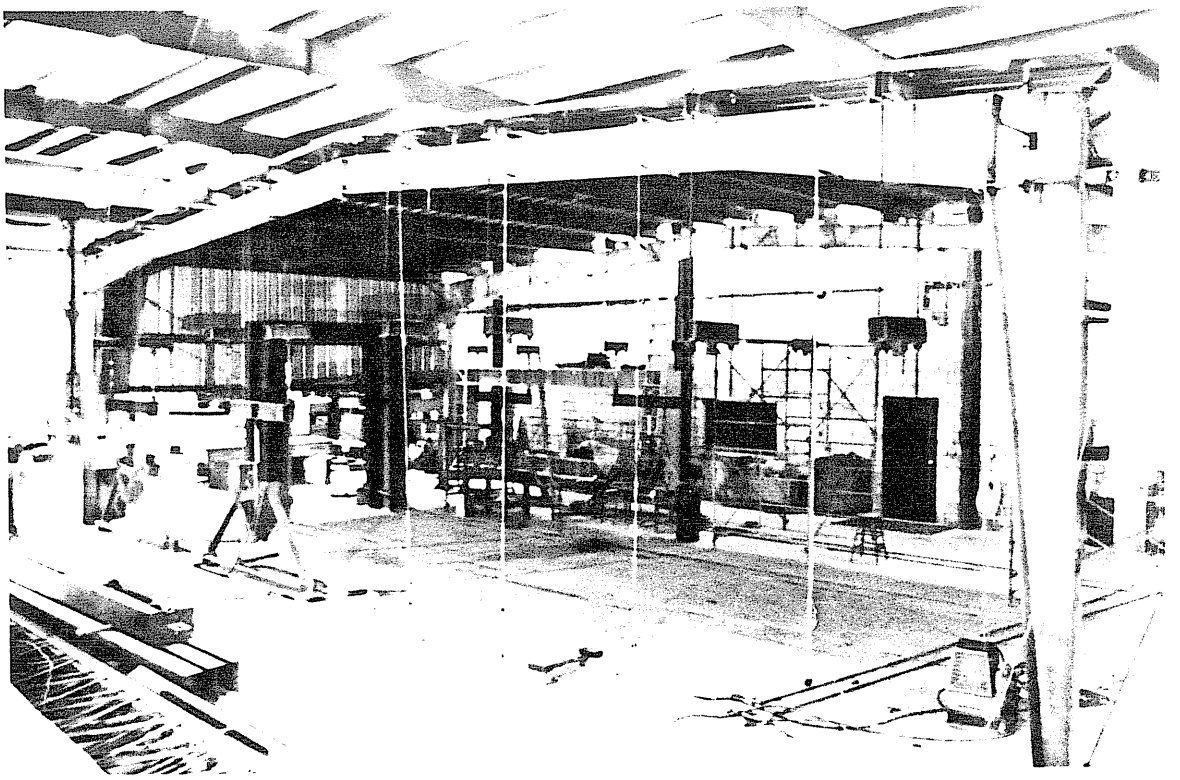
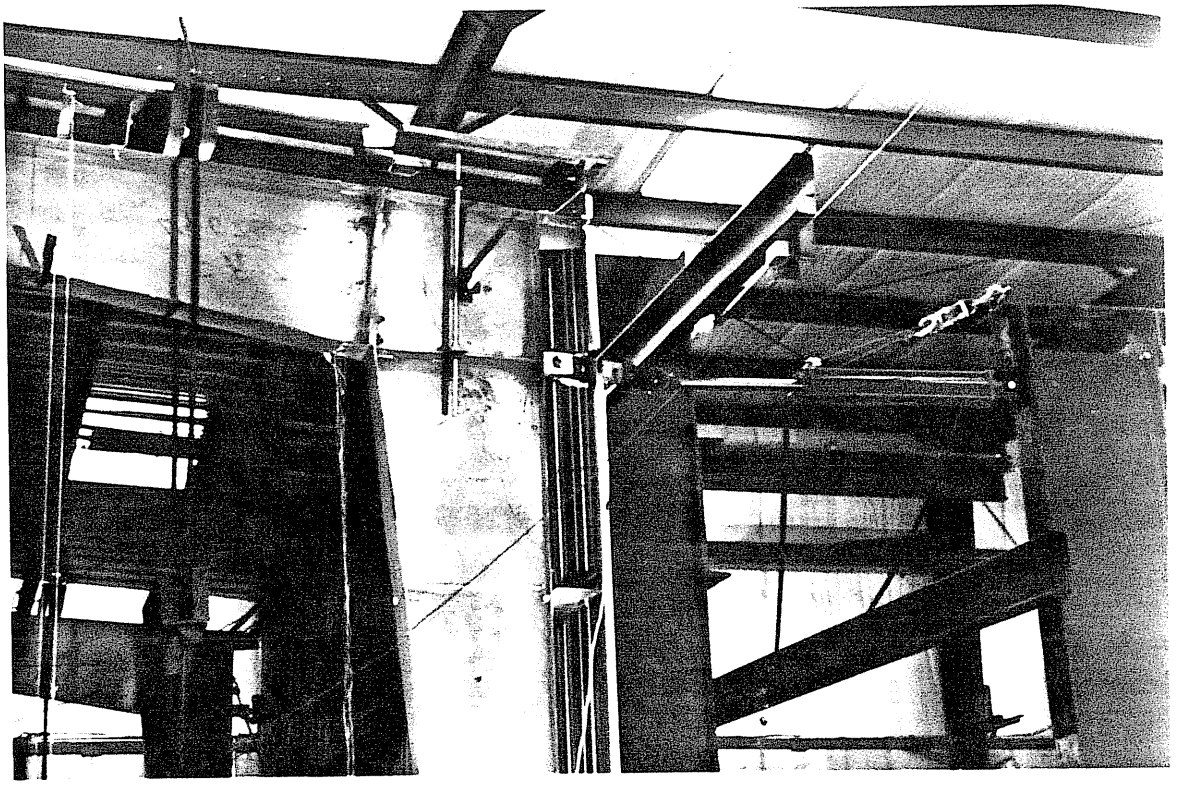


b) Lateral Loading Details

FIGURE 1.2 PHOTOGRAPHS OF TEST SETUP

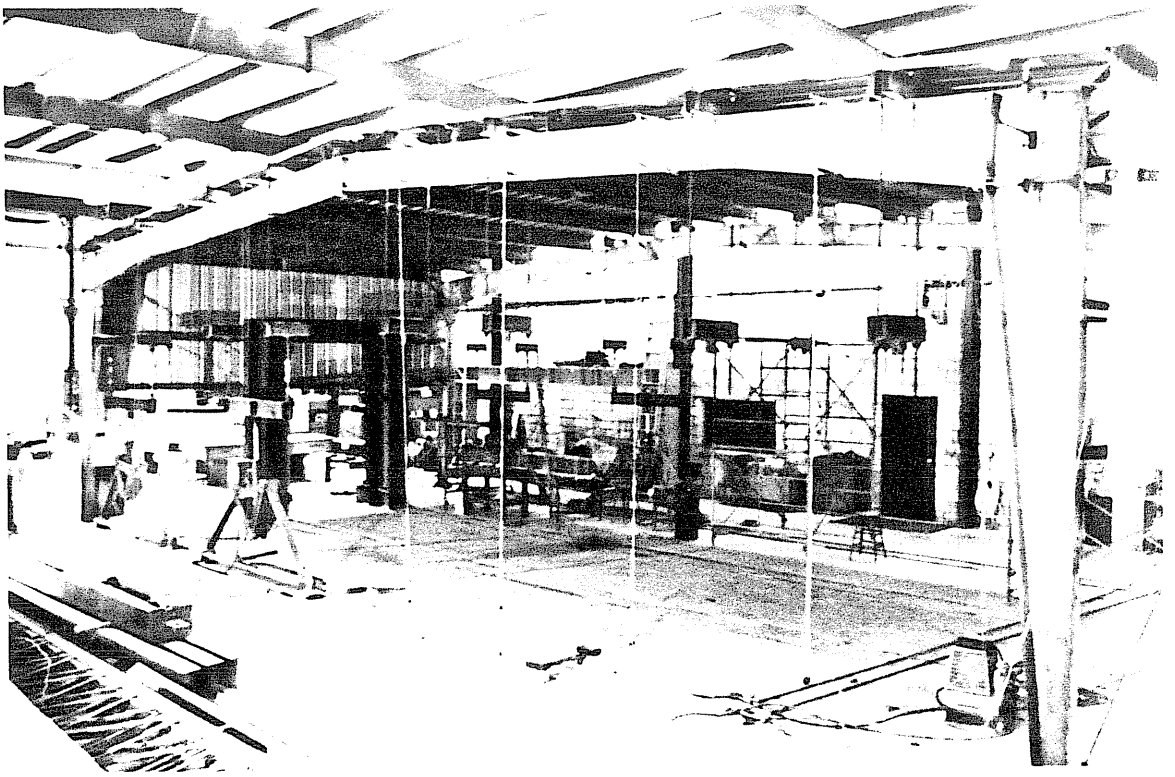


a) Overview

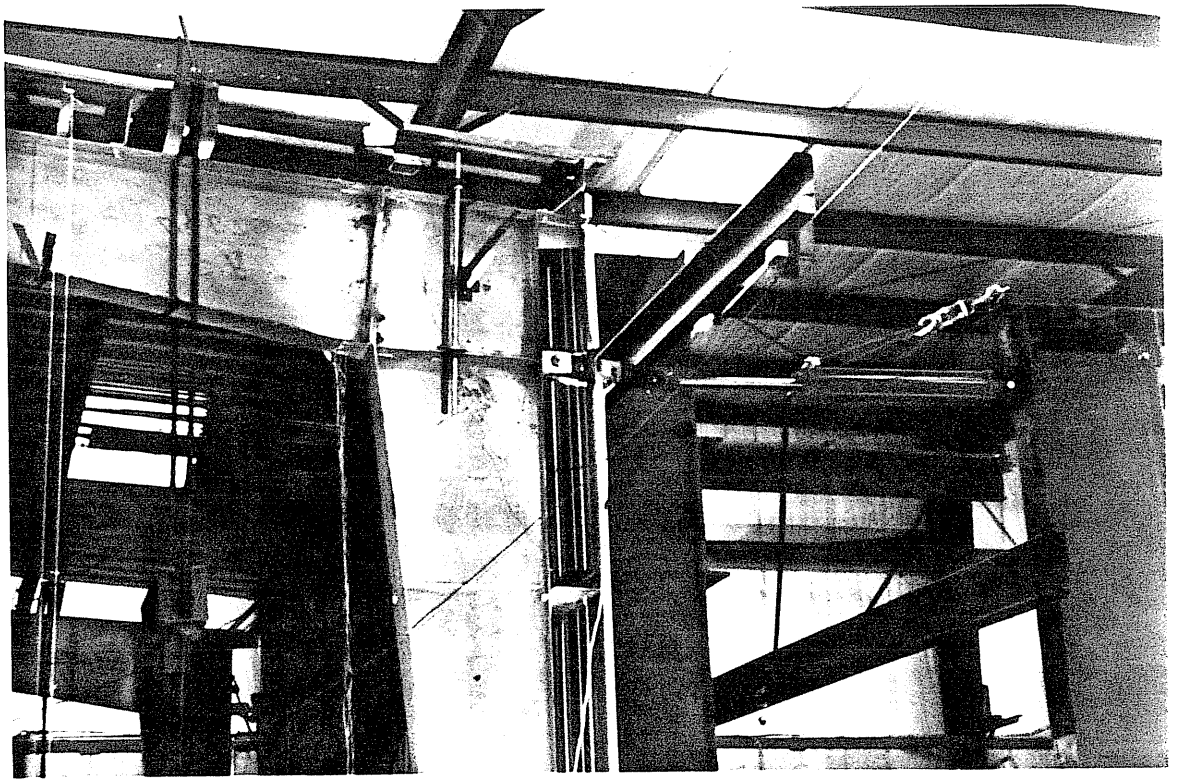


b) Lateral Loading Details

FIGURE 1.2 PHOTOGRAPHS OF TEST SETUP



a) Overview



b) Lateral Loading Details

FIGURE 1.2 PHOTOGRAPHS OF TEST SETUP

EXPERIMENTAL INVESTIGATION OF RIGID FRAMES INCLUDING KNEE CONNECTION STUDIES -FRAME FR2 TESTS-

by

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and
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Submitted to

MESCO Metal Buildings Corporation
Grapevine, Texas

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August 1985

FEARS STRUCTURAL ENGINEERING LABORATORY
School of Civil Engineering and Environmental Science
University of Oklahoma
Norman, Oklahoma 73019

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FRAME TESTS FR2

CHAPTER I

INTRODUCTION

A series of full scale tests was conducted in Fears Structural Engineering Laboratory, School of Civil Engineering and Environmental Science, University of Oklahoma, using standard rigid frames produced by MESCO Metal Buildings Corporation, hereafter referred to as MESCO. The objectives of these tests were to determine the structural strength and stiffness of the rigid frames as well as the adequacy of the analysis and design procedures currently employed by MESCO.

MESCO fabricates the frame components using plate material having a nominal yield strength of 50 ksi. Welding of the rafter and column flange-to-web connection is done only on one side of the web plate using the submerged arc process. A325 bolts are used in the rafter-to-column connections. The frames are designed using a computer program developed by MESCO. Applicable provisions of the AISC Specification are checked by the programs.

The frames, designated FR2, were constructed using two different types of columns commonly used in pre-engineered buildings. This variation was employed in order to obtain information relating to frames composed of either type of column. The columns differed in that one, designated FC2, had an extended top plate supporting the eave strut so that the steel line was formed beyond the exterior column flange. The

column at the opposite end, designated FC1, had no top plate extension resulting in the steel line being formed at the exterior column flange. The rafter, designated type LRF, tapered from a maximum depth at the column connection to a minimum depth at midspan and was symmetrical with respect to the centerline of the span.

The test specimens were fabricated as part of standard production runs. The test set-up consisted of two frames spaced 24'-0" center-to-center connected by simple span purlins and girts and braced by tension rods as shown in FigureS 1.1 and 1.2. Gravity loads were simulated using combinations of gravity load simulators. Lateral loads were applied using hydraulic cylinders attached to the reaction columns. The tests conducted were designed to simulate the action of unbalanced live load, lateral load only, combined unbalanced live and lateral loads as well as full dead plus live load.

Simulated live loads were applied as concentrated loads at eight locations, four on each rafter slope of one frame, for the full live load tests. For the tests involving unbalanced live loads, four concentrated loads were applied to the same slope of each frame. Simulated wind loading was applied as single concentrated loads to the outside leeward column flange of each frame at the elevation of the knee reentrant corner.

MESCO provided the working live and wind load levels used in the tests -- 2.50 kips per simulated live load application point and 7.70 kips at each simulated wind load application point. These loads, when combined with the dead load due to weight of the frames and roof system, produce a combined stress ratio (AISC interaction equation value) near

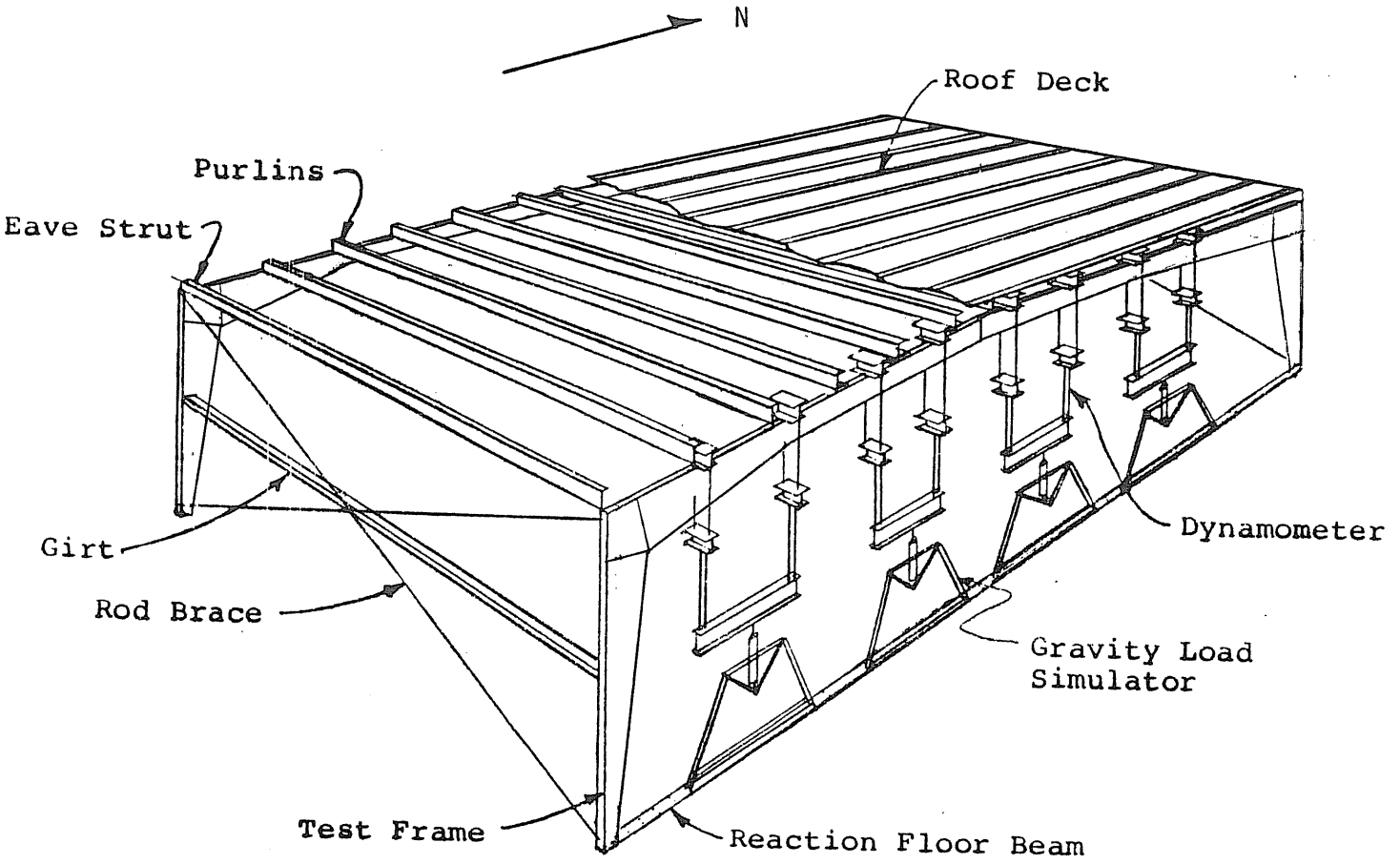

FIGURE 1.1 OVERALL VIEW OF TEST SET-UP

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by

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Simulated live loads were applied as concentrated loads at eight locations, four on each rafter slope of one frame, for the full live load tests. For the tests involving unbalanced live loads, four concentrated loads were applied to the same slope of each frame. Simulated wind loading was applied as single concentrated loads to the outside leeward column flange of each frame at the elevation of the knee reentrant corner.

MESCO provided the working live and wind load levels used in the tests -- 2.50 kips per simulated live load application point and 7.70 kips at each simulated wind load application point. These loads, when combined with the dead load due to weight of the frames and roof system, produce a combined stress ratio (AISC interaction equation value) near

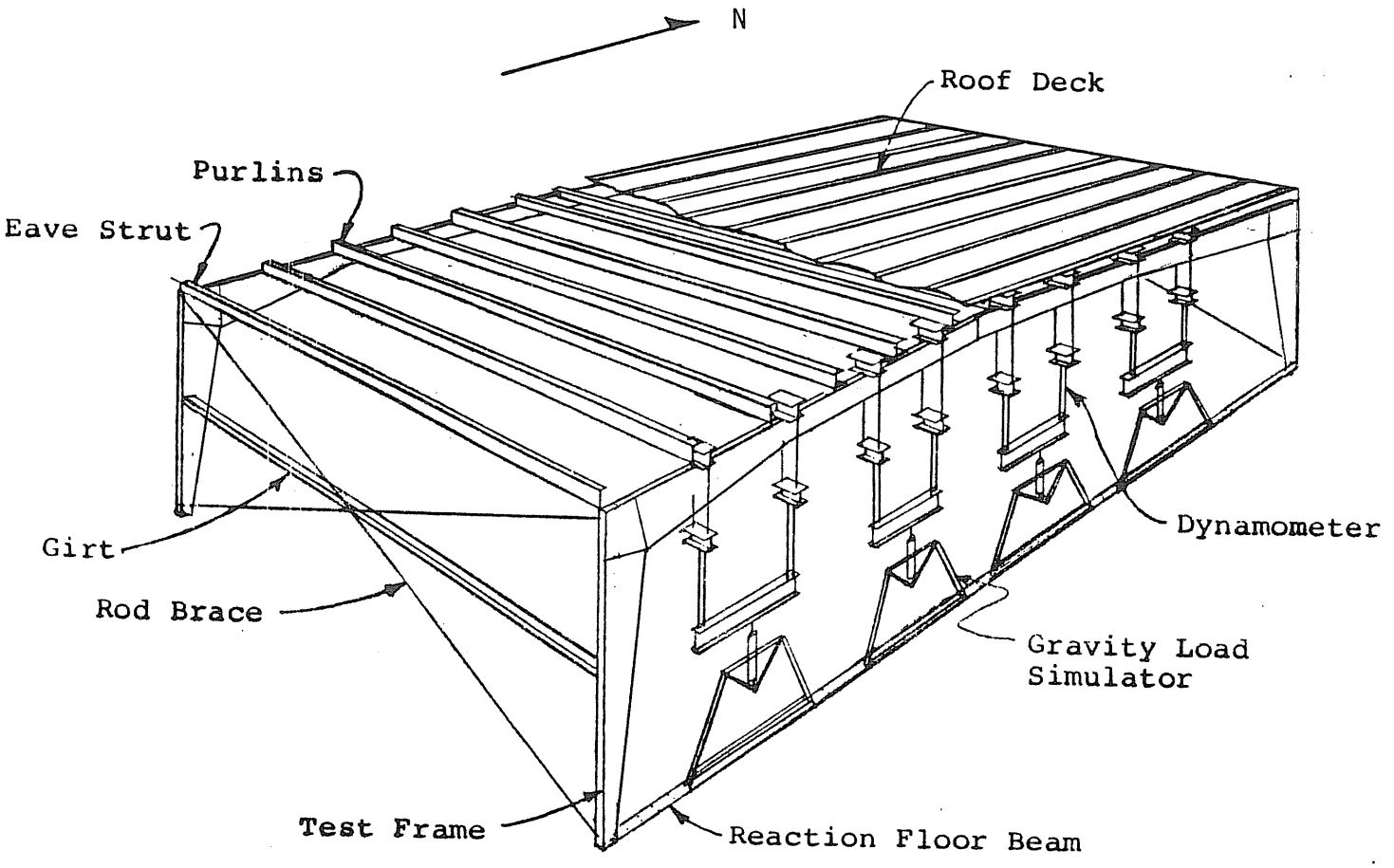
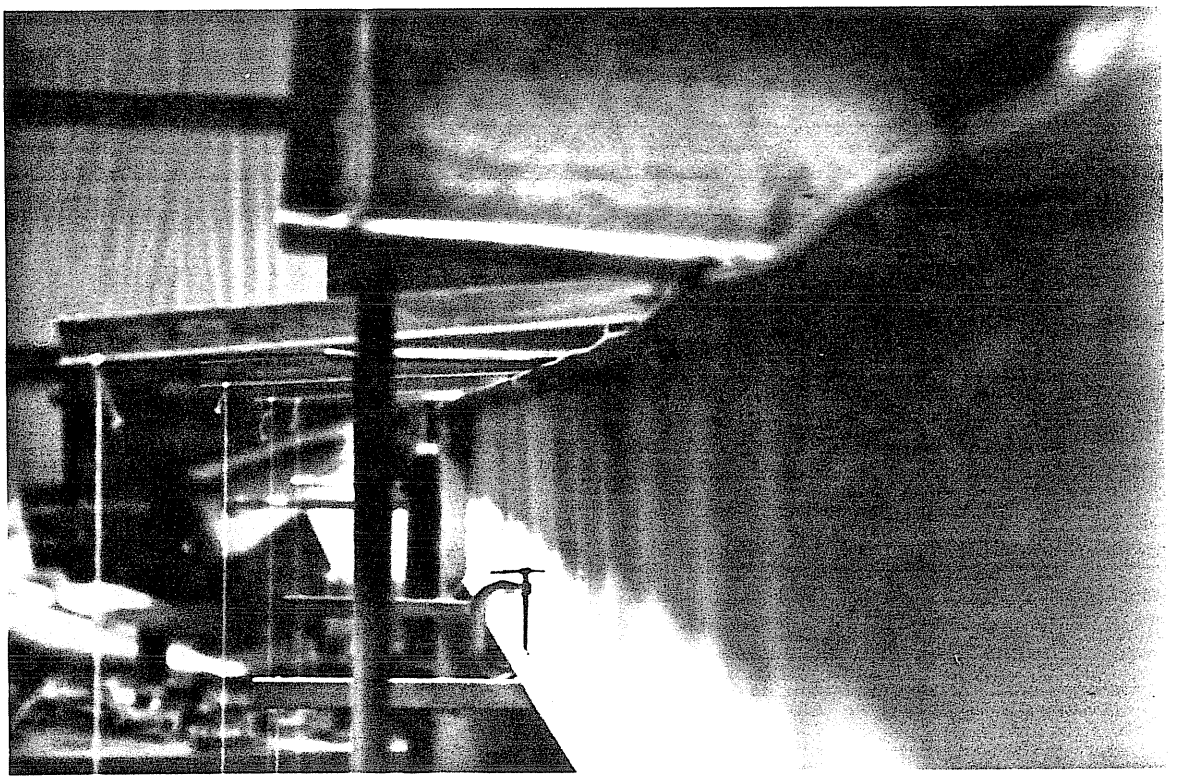
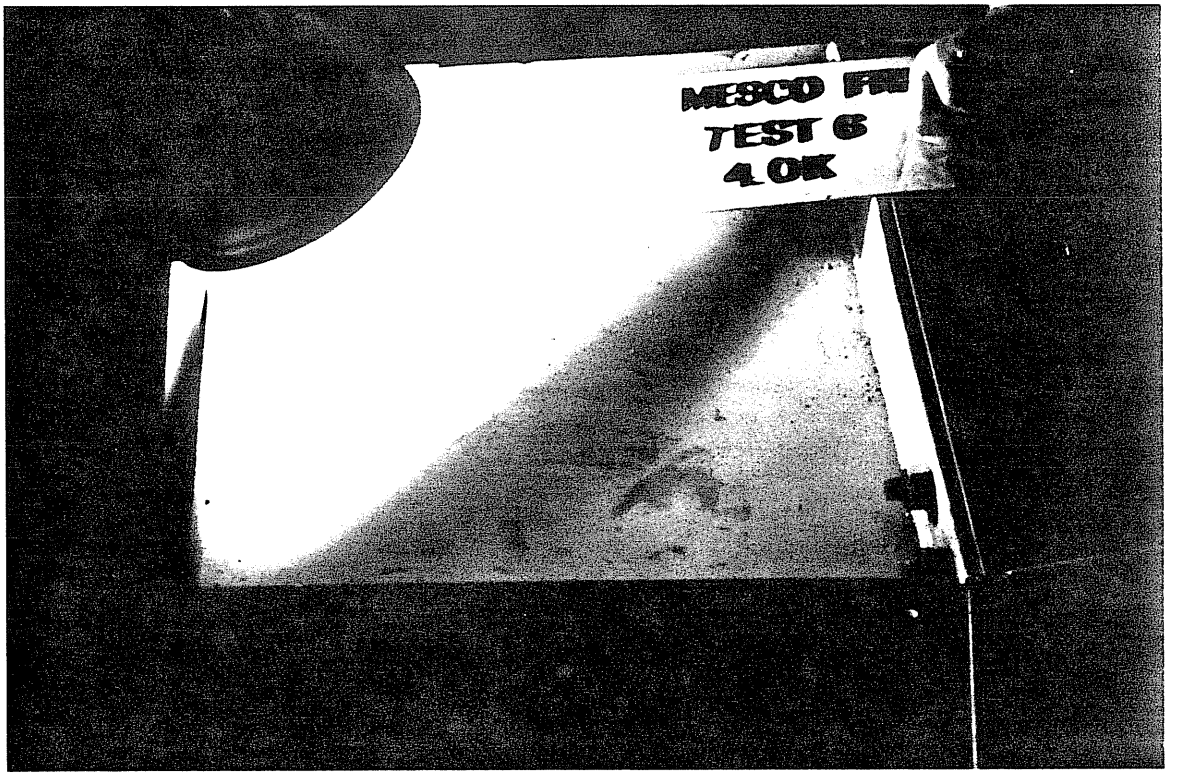


FIGURE 1.1 OVERALL VIEW OF TEST SET-UP



a) Compression Rafter Flange



b) Panel Zone

FIGURE 3.1 PHOTOGRAPHS OF FRAMES UNDER LOAD

CHAPTER IV

FAILURE LOAD COMPARISONS AND RECOMMENDATION

4.1 Failure Load Comparisons

To determine the adequacy of the frames with request to strength, comparisons between the experimental and predicted failure loads were made. The experimental failure load due to simulated live load for each frame was calculated as the sum of the maximum applied load, the weight of the loading apparatus (0.3 kips per application point), and an equivalent concentrated load at each application point due to the weight of the frames, purlins and roof panel.

The predicted failure loads were determined using MESCO's computer program. The magnitude of the concentrated load at each application point which caused a combined stress ratio of 1.0 was first found by manual iteration. The average measured yield stress (67.5 ksi) and measured frame dimensions (Figure 2.1) were used to make the calculations. Computer output is found in Appendix I. The equivalent weight of the frame, purlins and roof panel was then added to this value and the result multiplied by 1.67 to obtain the predicted failure load. The calculations are summarized in Appendix A.

Manual calculations, which are also included in Appendix A, were made to determine failure loads based on panel zone plate yielding, plate buckling or tension field failure.

The predicted failure load for the east frame, determined from member behavior considerations (MESCO's program), is 5.72 kips per application point and that considering panel zone strength, including tension field action, is 7.91 kips per application point. The corresponding experimental failure load is 4.70 kips per application point. The corresponding experimental-to-controlling predicted failure load ratio is 4.70/5.72 = 0.82.

For the west frame the corresponding predicted loads per application point were 5.72 kips from member behavior and 7.91 kips from panel zone considerations. The experimental failure load was 4.72 kips per application point. The corresponding experimental-to-controlling predicted failure load ratio is 4.72/5.72 = 0.83.

Figures 4.1 and 4.2 are plots showing load versus centerline deflections and panel zone out-of-plane displacements for Tests 5 and 6 (full gravity loading to failure), respectively. It is evident from these plots that the vertical deflections of the frame are influenced to a significant degree by the strength of the panel zone. The out-of-plane panel zone displacements began to increase at an increasing rate very near the predicted plate buckling load (2.90 kips per application point). A corresponding increase in vertical deflections also occurred above this load. The frames failed before the tension field action capacity of the panel zone plates was reached.

Thus, is it concluded that the apparent undercapacity of the frames, as reflected in the above predicted-to-experimental ratios being greater than unity, is due to knee area flexibility which causes redistribution of moments within the frames.

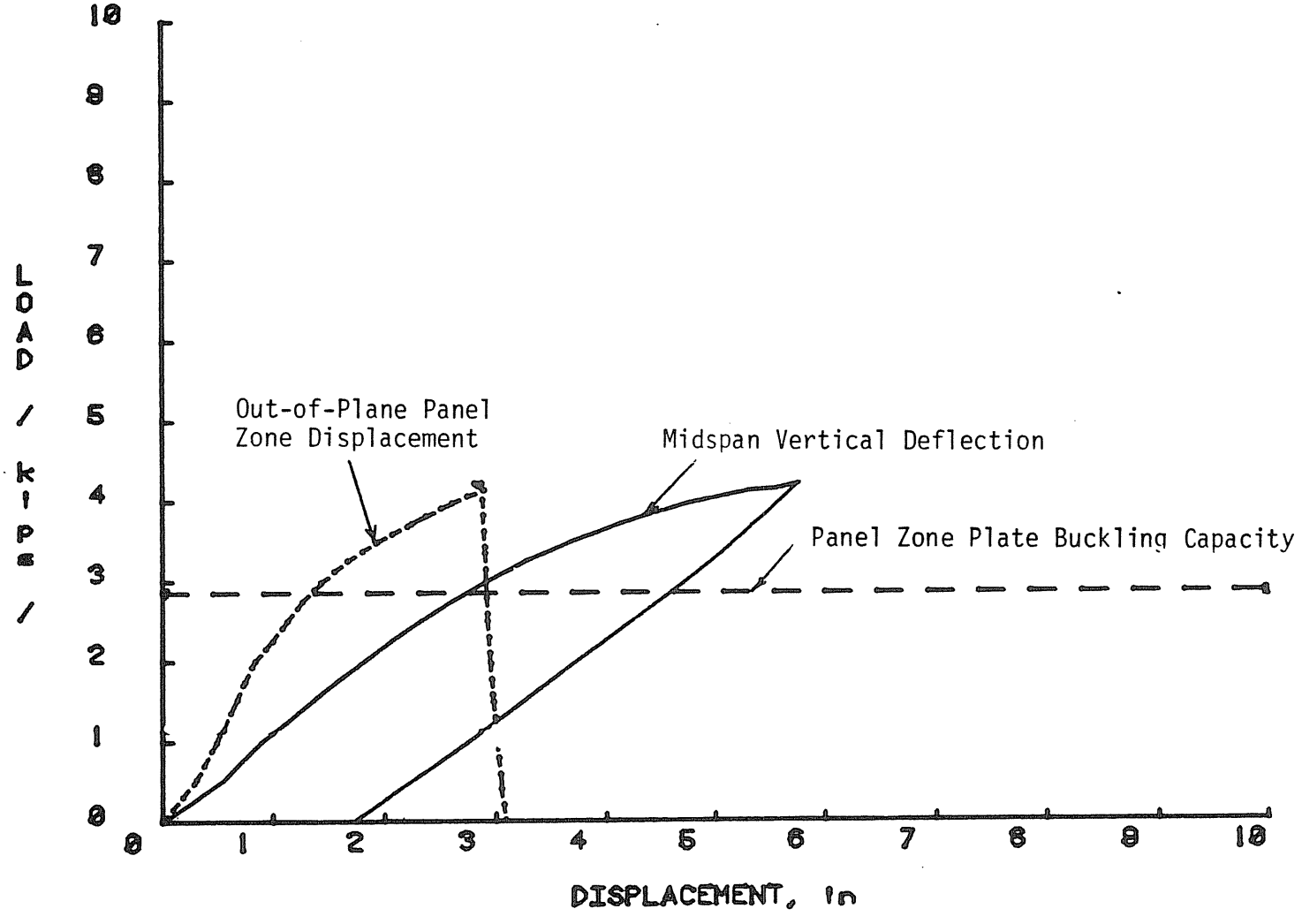


FIGURE 4.1 LOAD VS. CENTERLINE AND PANEL ZONE DEFLECTIONS, TEST 5

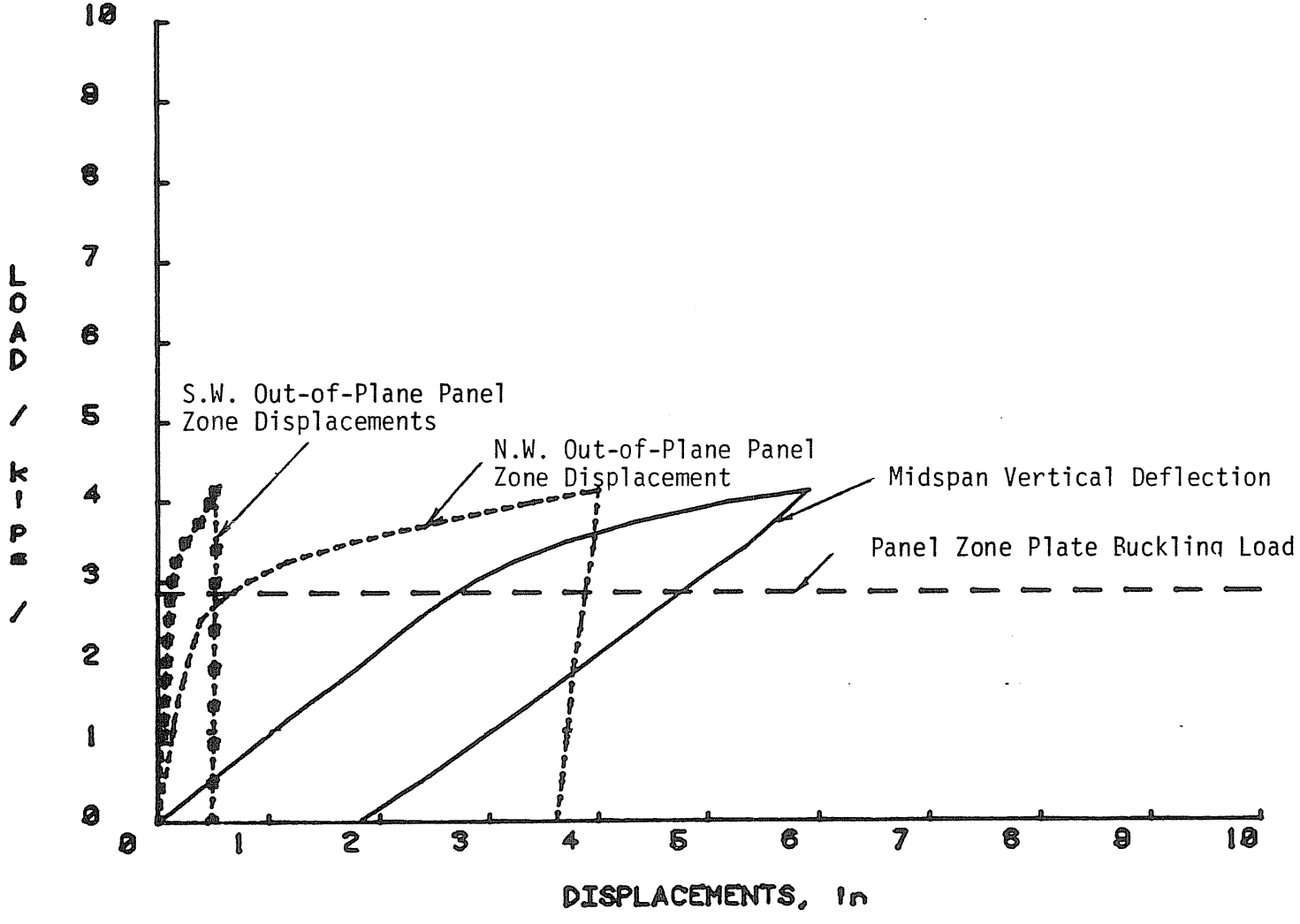


FIGURE 4.2 LOAD VS. CENTERLINE AND PANEL ZONE DISPLACEMENTS, TEST 6

4.2 Summary of Observations and Recommendations

A total of six tests were conducted, using a test setup which consisted of two frames. The loadings were combinations of gravity and wind load, as described in previous chapters. The final test on each frame was full gravity loading (simulated uniform live load) to failure.

A linear rate of increase with respect to load was observed for all deflections in the working range for all the loading cases. However, the centerline vertical deflections were consistently larger than predicted by the stiffness analyses. Likewise, the observed quarterpoint deflections due to gravity loads slightly exceeded the predictions. Under wind, and wind and gravity load combinations, the lateral stiffness of the frames were closely predicted by the stiffness analyses.

A linear, although occasionally erratic, rate of strain (stress) increase with load application was observed at the instrumented locations throughout the entire loading range for all loading cases.

The strains (stresses) at the strain gaged cross-sections near the ridge and knee connections differed substantially from predictions based on the stiffness analyses and the elastic flexure formula. The transfer of moment across the connection through the action of the bolt groups caused strains in the adjacent web to greatly exceed those predicted. The strains in the flanges were correspondingly reduced.

The frames failed at loads approximately 17% below predicted values determined using measured cross-section

data, tensile coupon test results and MESCO computer based analyses. This apparent undercapacity is due to knee area flexibility which causes adverse redistribution of moments in the frames. It is recommended that thicker panel zone plates be used as a means of stiffening the knee area. All other aspects of the performance of the frames were acceptably predicted by MESCO computer based analyses.

APPENDIX A
FAILURE LOAD ANALYSES

A.1 East Frame

Full Live Load, Test 5

Maximum Applied Load	4.16 kips
Weight of Loading Apparatus	0.30
Weight of Frame Assembly	0.24
Pu =	4.70 kips

Predicted Loads

Applied Load	3.19 kips
Weight of Frame Assembly	0.24
P =	3.43 kips

Predicted Failure Load = 1.67P 5.72 kips

This applied load results in a combined stress ratio of 1.0 at location 1. The three largest combined stress ratios in the frame are:

Location	f_a	F_a	f_b	F_b	CSR
1	2.24	23.61	21.20	22.42	1.001
2	2.61	24.84	23.63	30.97	0.827
3	1.49	28.14	22.44	33.21	0.712

Predicted-to-Failure Load Ratio

$$\frac{1.67P}{P_u} = \frac{5.72}{4.70} = 1.217$$

A.2 West Frame

Full Live Load, Test 6

Maximum Applied Load	4.18 kips
Weight of Loading Apparatus	0.30
Weight of Frame Assembly	0.24
Pu =	4.72 kips

Predicted Loads

Applied Load	3.19 kips
Weight of Frame Assembly	0.24
P =	3.43 kips
Predicted Failure Load = 1.67P	5.72 kips

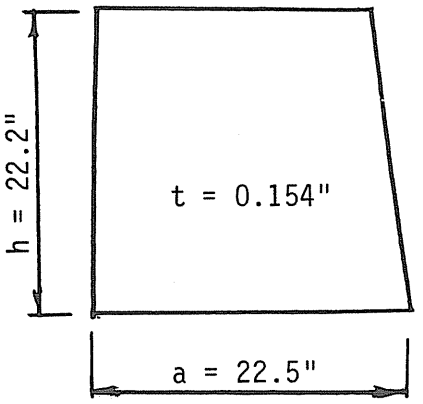
This applied load results in a combined stress ratio of 1.0 at location 1. The three largest combined stress ratios in the frame are:

Location	f_a	F_a	f_b	F_b	CSR
1	2.24	23.61	21.20	22.42	1.001
2	2.61	24.84	23.63	30.97	0.827
3	1.49	28.14	22.44	33.21	0.712

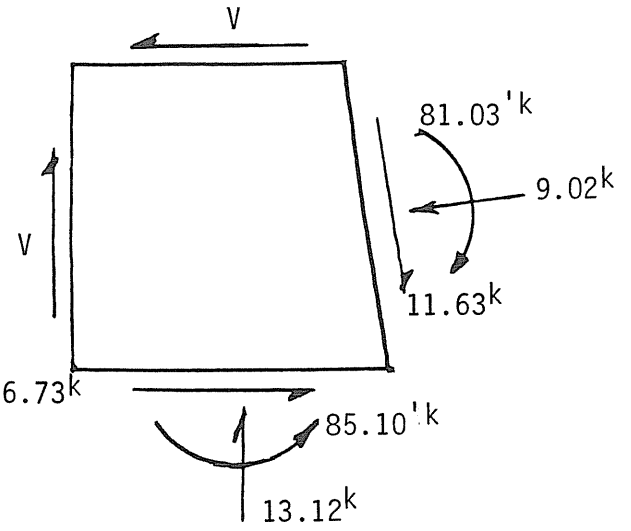
Predicted-to-Failure Load Ratio

$$\frac{1.67P}{P_u} = \frac{5.72}{4.72} = 1.212$$

A.3 Panel Zone Plate Stability Analysis



a) Geometry



b) Forces and Moments from Appendix I Analysis

Panel Zone Shear

$$V = M/h - p/2 = (81.03)\ (12/22.2) - 9.02/2$$

$$= 39.29 \text{ kips}$$

Plate Buckling (AISC Formula 1.10-1 with factor of safety removed.)

$$\tau = \sigma_y\ C_v/\sqrt{3} \leq \sigma_y/\sqrt{3}$$

$$a/h = 22.5/22.2 = 1.01 > 1$$

$$h/t = 22.2/0.154 = 144.2$$

$$k = 5.34 + 4/(1.01)^2 = 9.23$$

$$C_v = \frac{45000k}{\sigma_y\ (h/t)^2} = \frac{45000\ (9.23)}{67.5\ (144.2)^2}$$

$$= 0.296 < 0.8$$

$$\tau = 67.5\ (0.296)/\sqrt{3}$$

$$= 11.54 \text{ ksi} < 67.5/\sqrt{3} = 38.97 \text{ ksi}$$

Capacity V = 11.54 (22.2 x 0.154) = 39.45 kips

Corresponding applied load:

$$\frac{39.45}{39.29}\ (3.19 + 0.24) - 0.24 - 0.30 = 2.90 \text{ kips/application point}$$

Post-Buckling (AISC Formula 1.10-2 with factor of safety removed.)

$$\tau_u = \frac{\sigma_y\ C_v}{\sqrt{3}} + \frac{(1 - C_v)\ \sigma_y/\sqrt{3}}{1.15\ \sqrt{1 + (a/h)^2}} \leq \sigma_y/\sqrt{3}$$

$$= \frac{67.5(0.296)}{\sqrt{3}} + \frac{(1 - 0.296)\ (67.5)/\sqrt{3}}{1.15\ \sqrt{1 + (1.01)^2}}$$

$$= 28.32 \text{ ksi}$$

Capacity V = 28.32 (22.2 x 0.154) = 96.82 kips

Corresponding applied load:

$$\frac{96.82}{39.29}\ (3.19 + 0.24) - 0.24 - 0.30 = 7.91 \text{ kips/application point}$$

APPENDIX B

WORKING LEVEL FULL LIVE LOAD

TEST 1

MESCO FRAME TEST SUMMARY

Project: Mesco FR2

Test No.: Test 1

Test Date: January 18, 1985

Purpose: Test of working level live load on West Frame

Bolt Diameter: 3/4" **Pretension Force per Bolt:** 28^{k}

Maximum Test Load: 2.5 kips

Discussion:

- Linear elastic behavior was observed prior to 2.1 kips of test load. The vertical stiffness in this interval, however, was less than predicted by the theoretical analysis. A gradual increase in the bolt forces occurred in a linear manner with load application.

- At 2.1 kips of test load the panel zone of the south knee sustained a sudden large increase in lateral deflections. This out-of-plane displacement was accompanied by a similarly large increase in the vertical deflections at the midspan. In addition, the tension bolts at this connection underwent a sudden decrease in force.

- With further increases in test loads the frame regained its previous vertical stiffness. The lateral panel zone deflections also returned to their previous rate of increase.

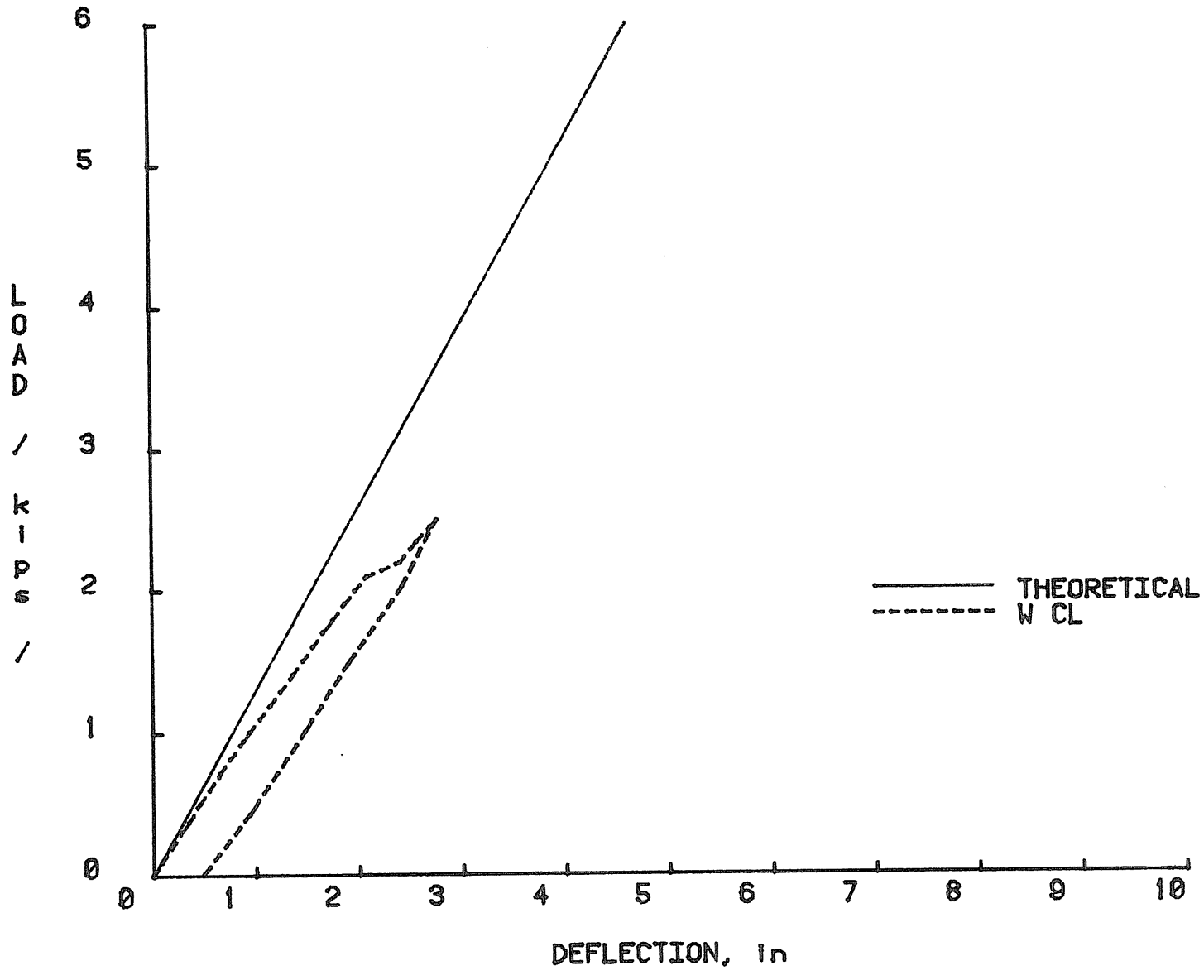


FIGURE B.1 LOAD VS. CENTERLINE DEFLECTION, WEST FRAME, TEST 1

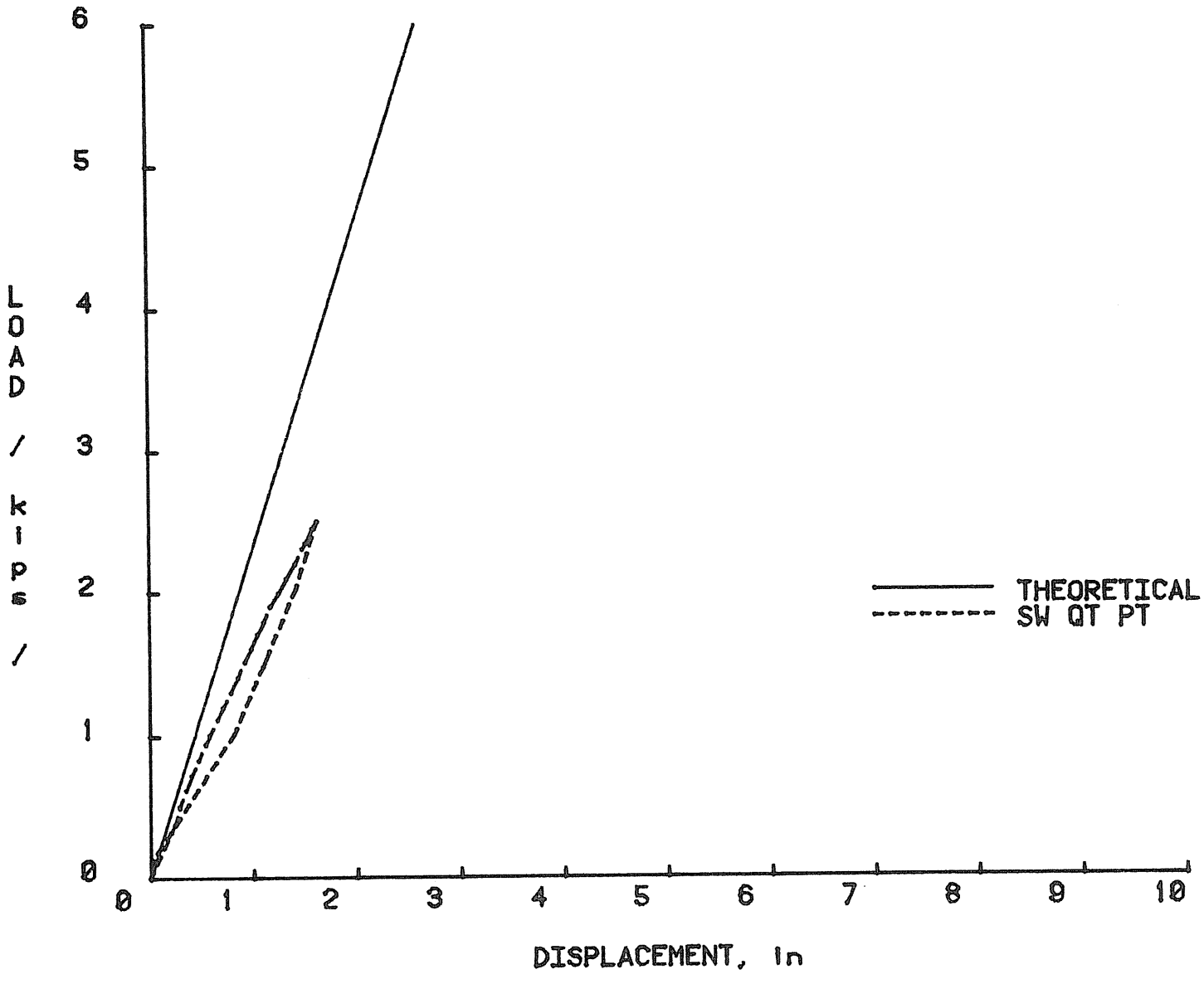


FIGURE B.2 LOAD VS. SOUTH QUARTERPOINT DEFLECTION, TEST 1

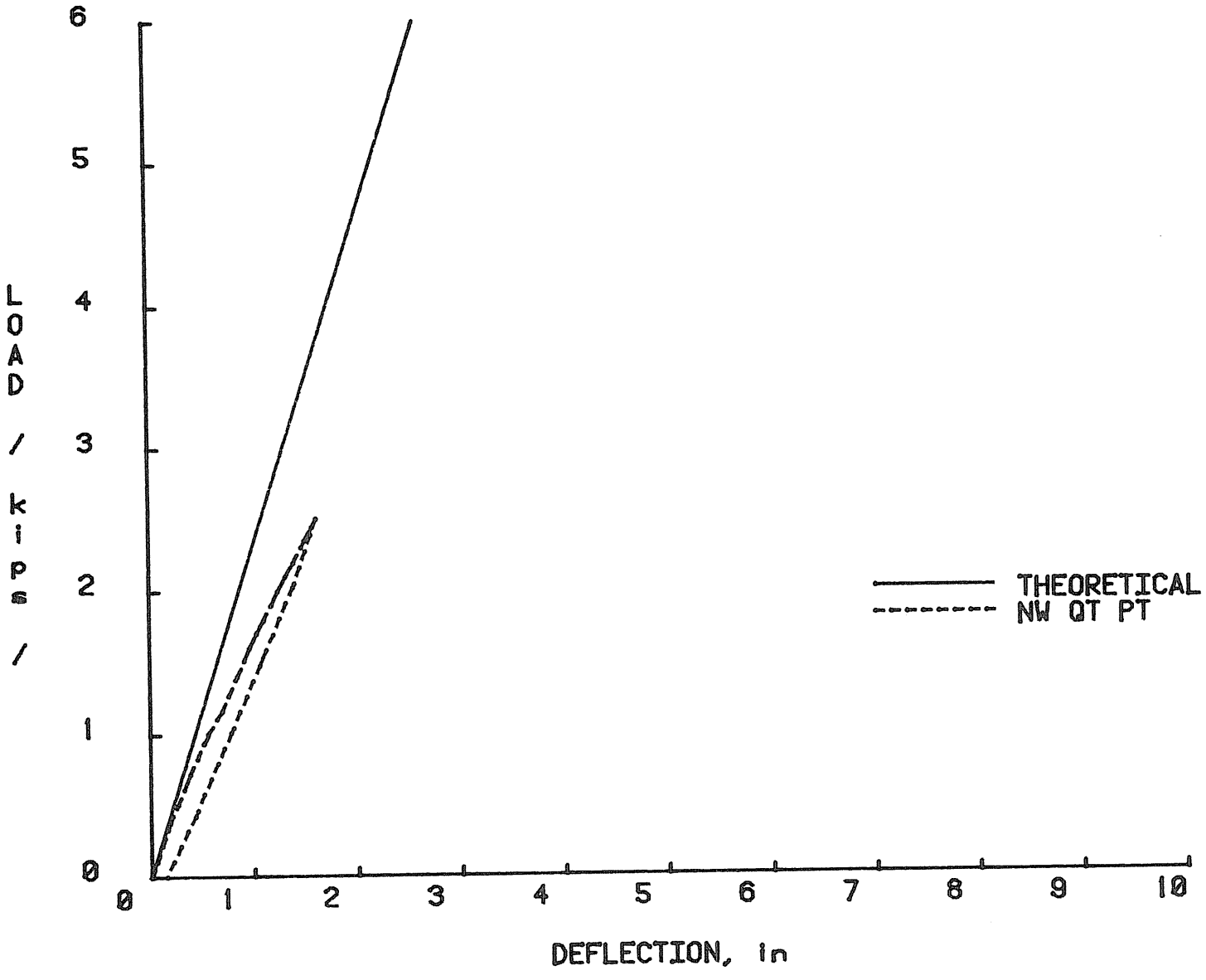


FIGURE B.3 LOAD VS. NORTH QUARTERPOINT DEFLECTION, TEST 1

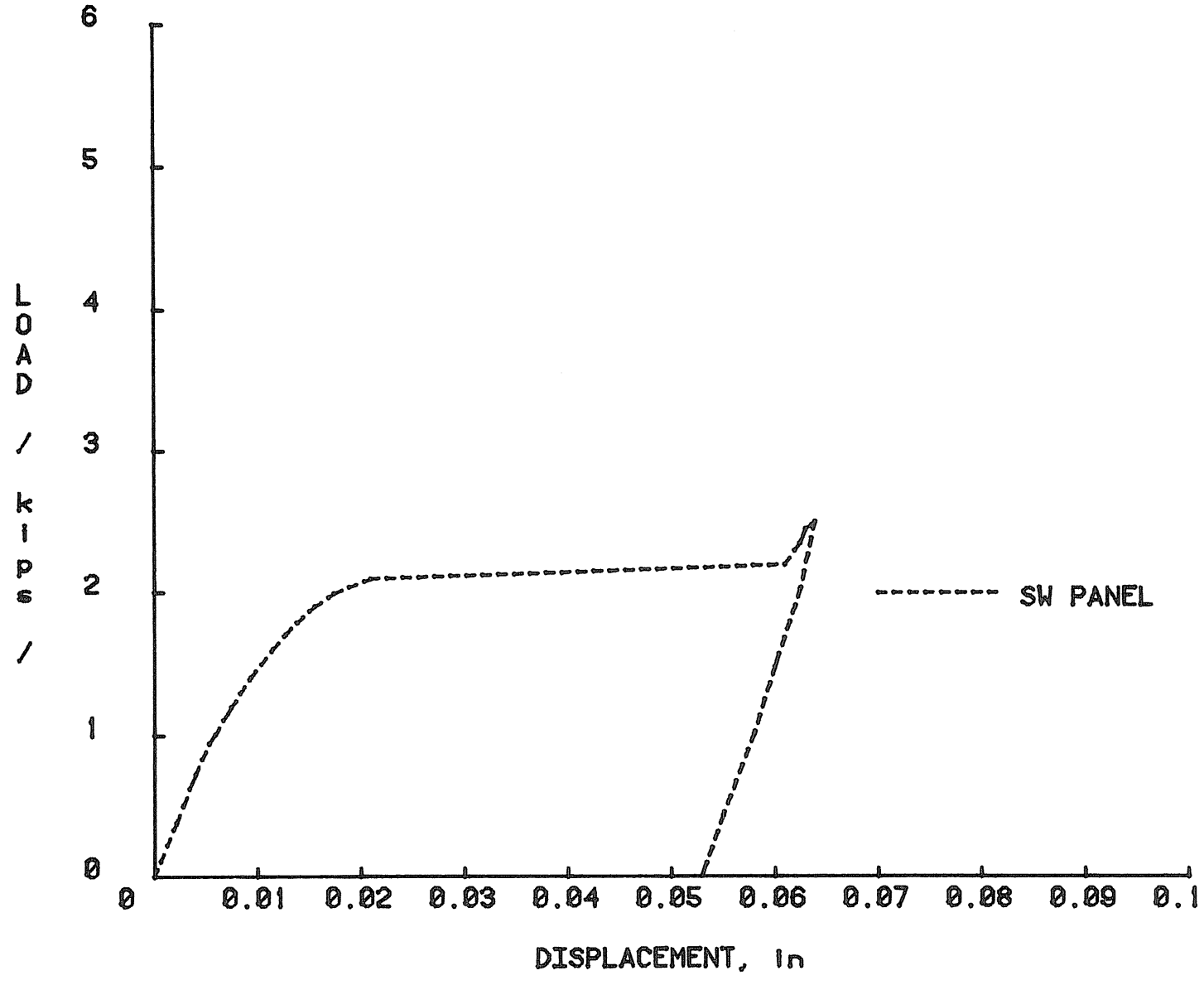


FIGURE B.4 LOAD VS. SOUTH PANEL ZONE DISPLACEMENT, TEST 1

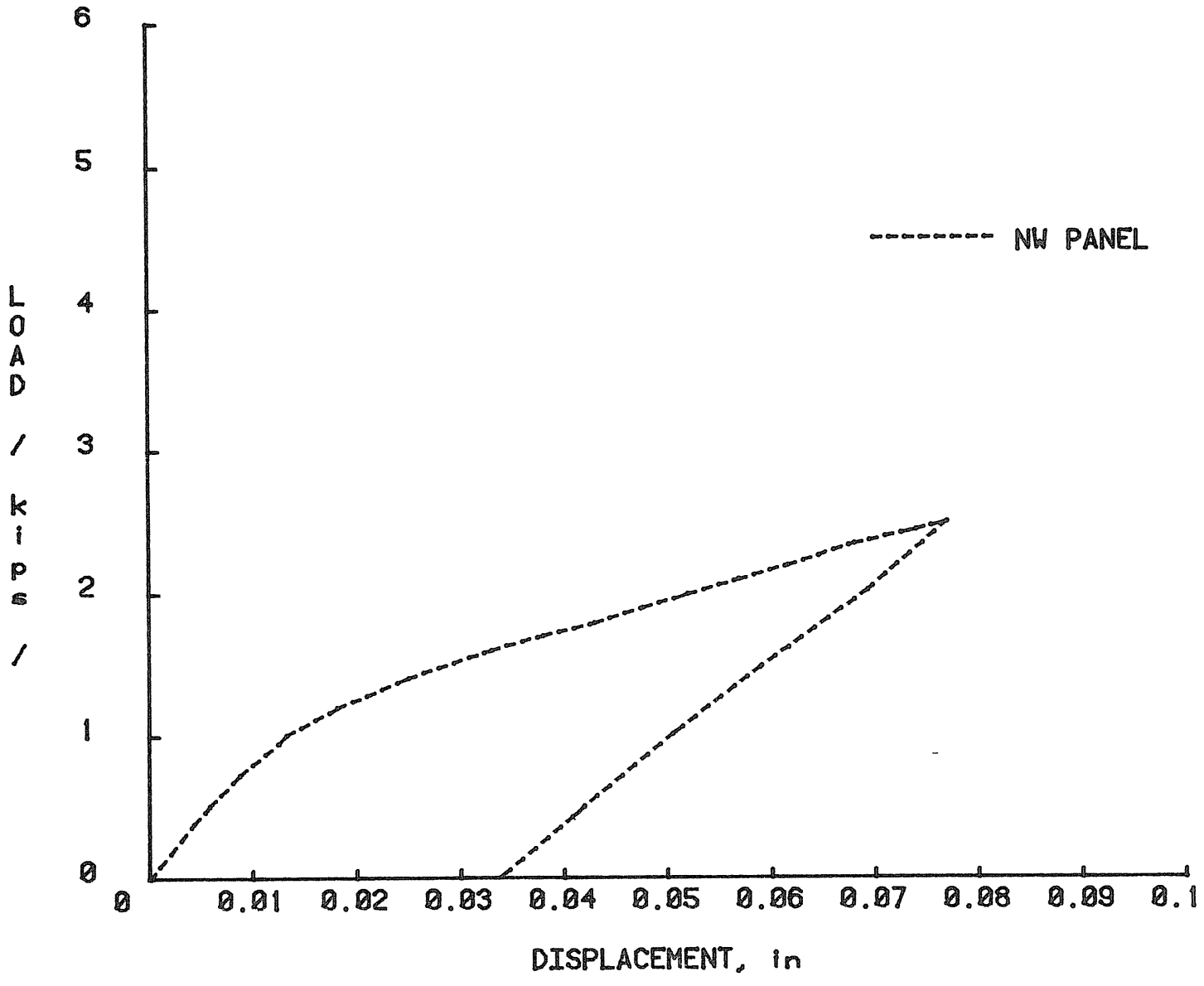


FIGURE B.5 LOAD VS. NORTH PANEL ZONE DISPLACEMENT, TEST 1

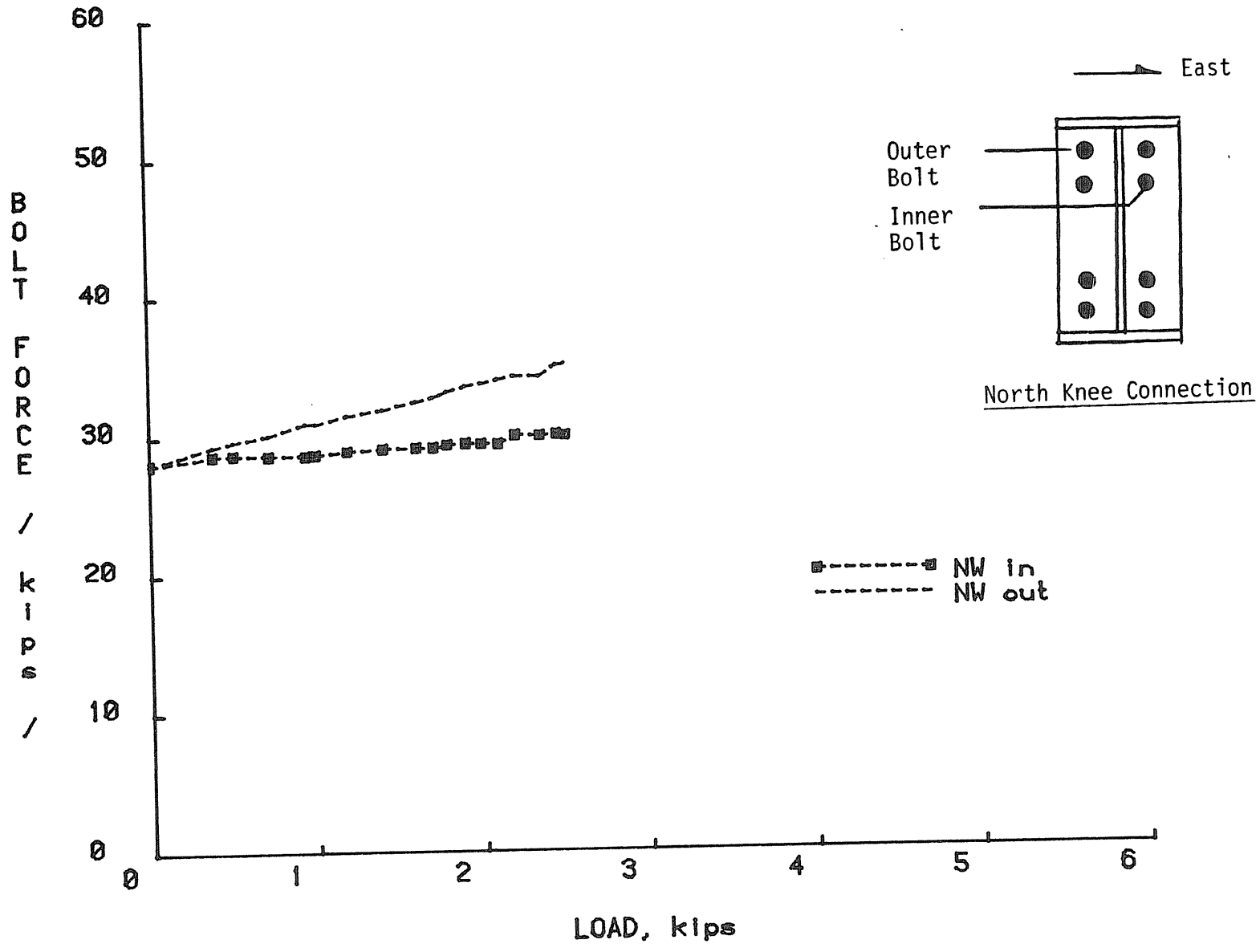


FIGURE B.6 N. CONNECTION BOLT FORCES VS. LOAD, TEST 1

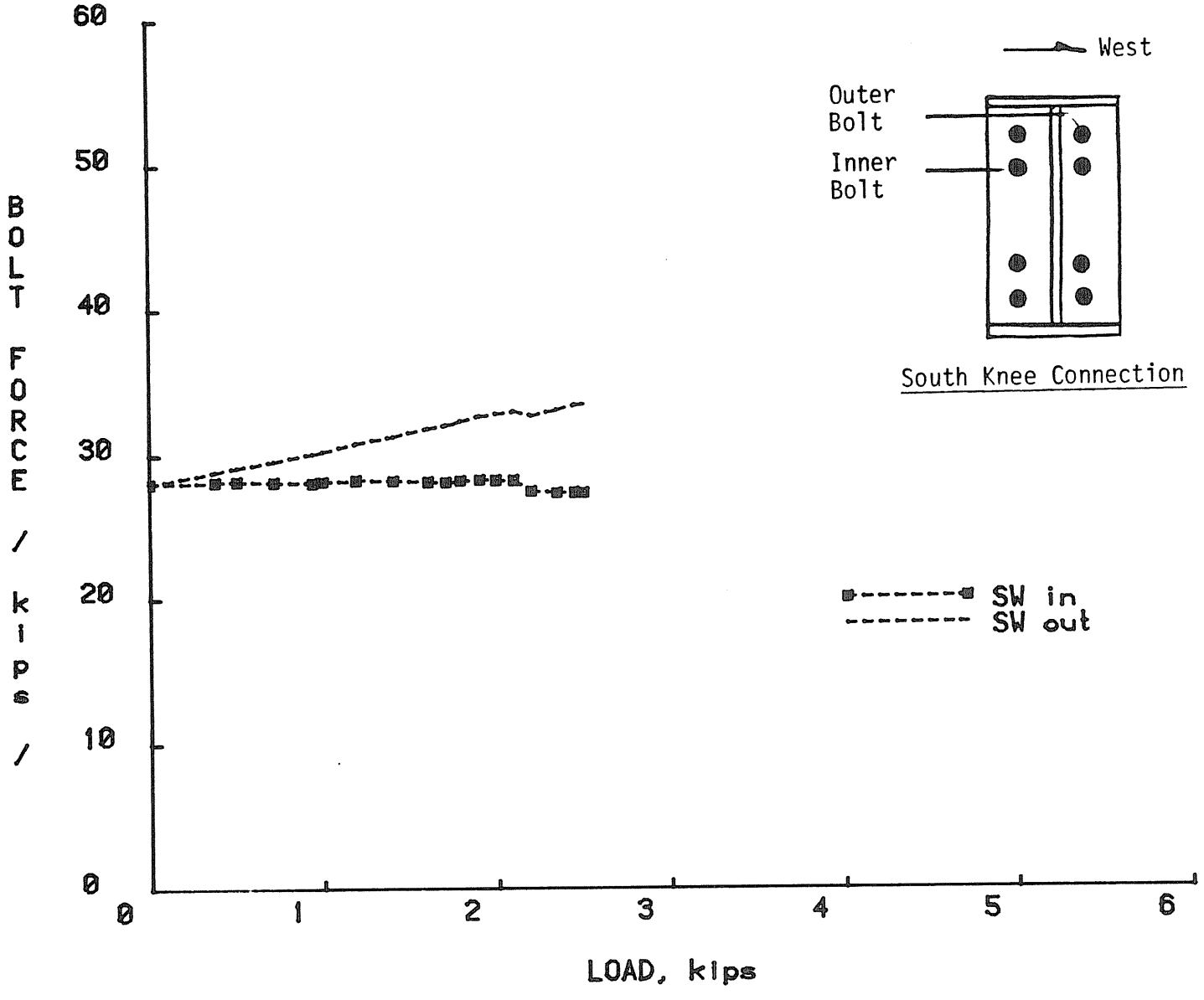


FIGURE B.7 S. CONNECTION BOLT FORCES VS. LOAD, TEST 1

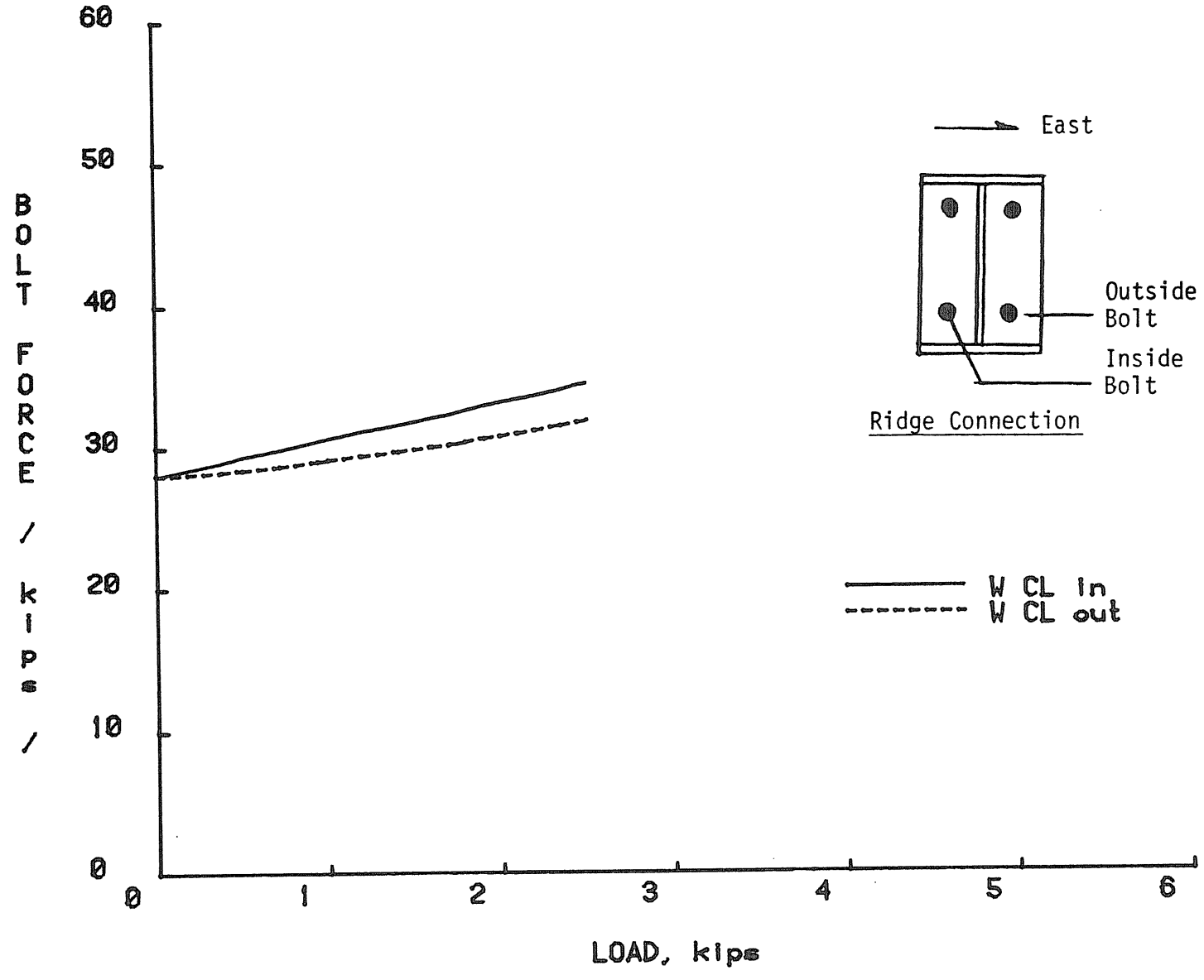


FIGURE B.8 RIDGE CONNECTION BOLT FORCES VS. LOAD, TEST 1

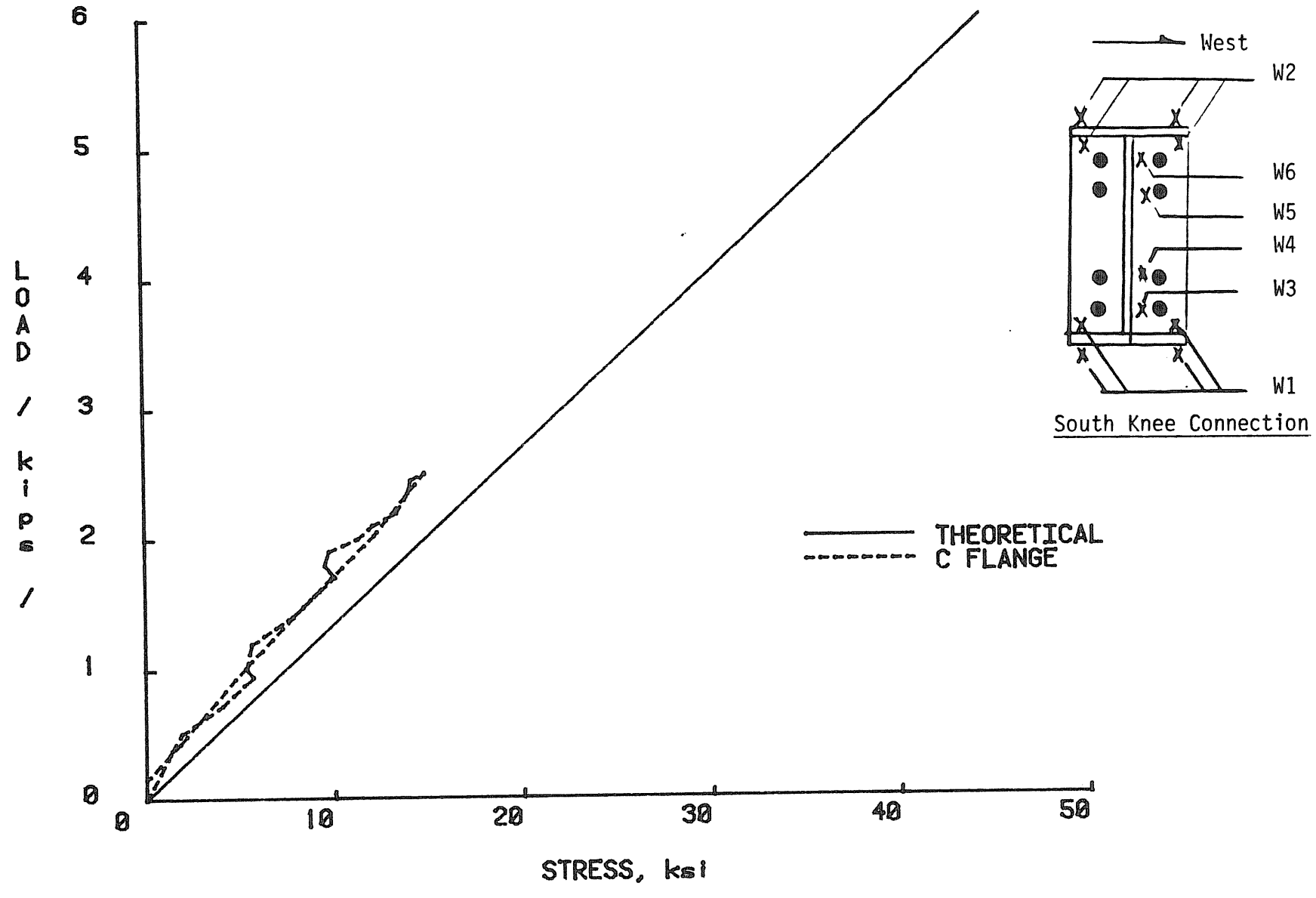


FIGURE B.9 LOAD VS. FLANGE STRESS AT LOCATION W1, TEST 1

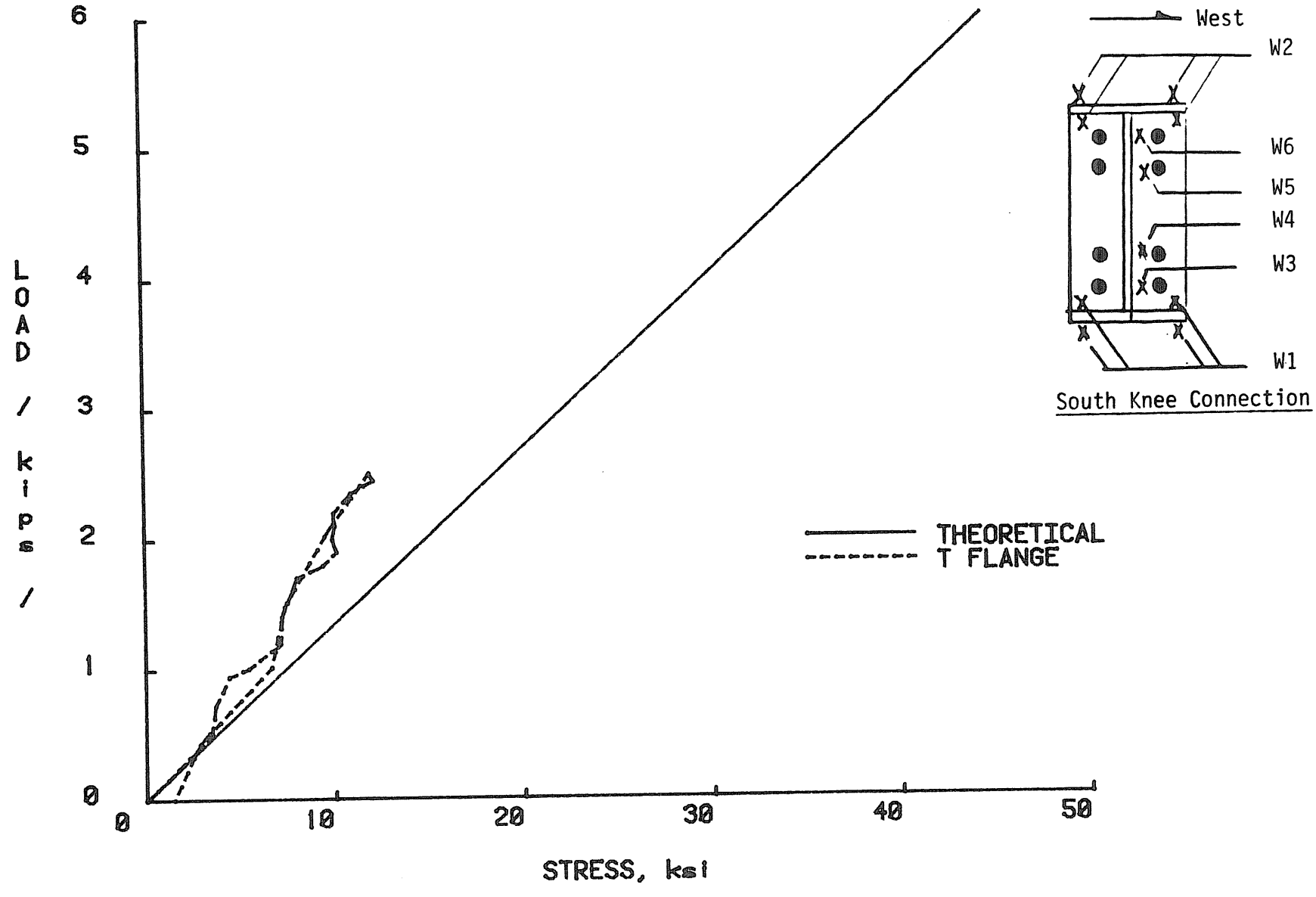


FIGURE B.10 LOAD VS. FLANGE STRESS AT LOCATION W2, TEST 1

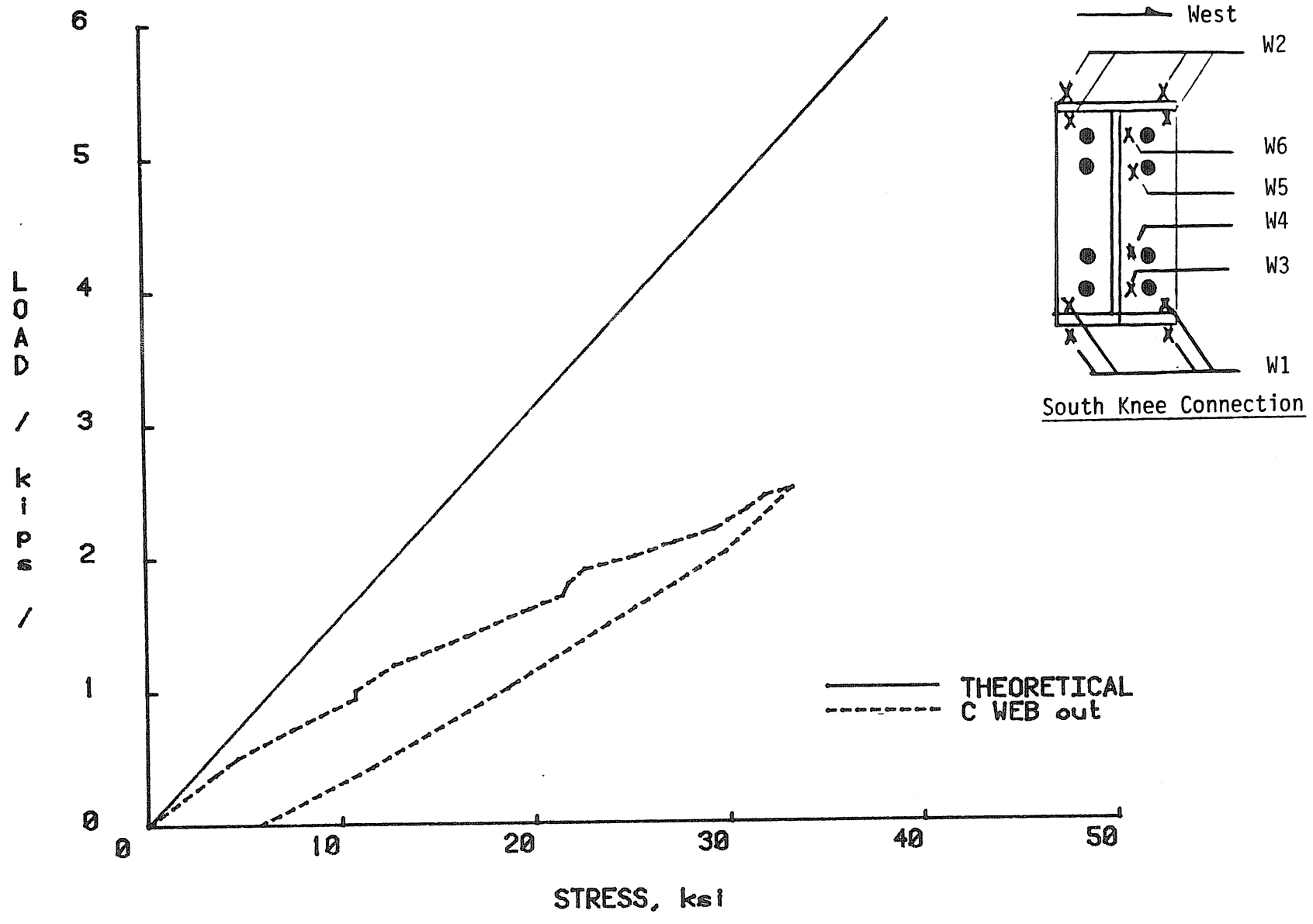


FIGURE B.11 LOAD VS. WEB STRESS AT LOCATION W3, TEST 1

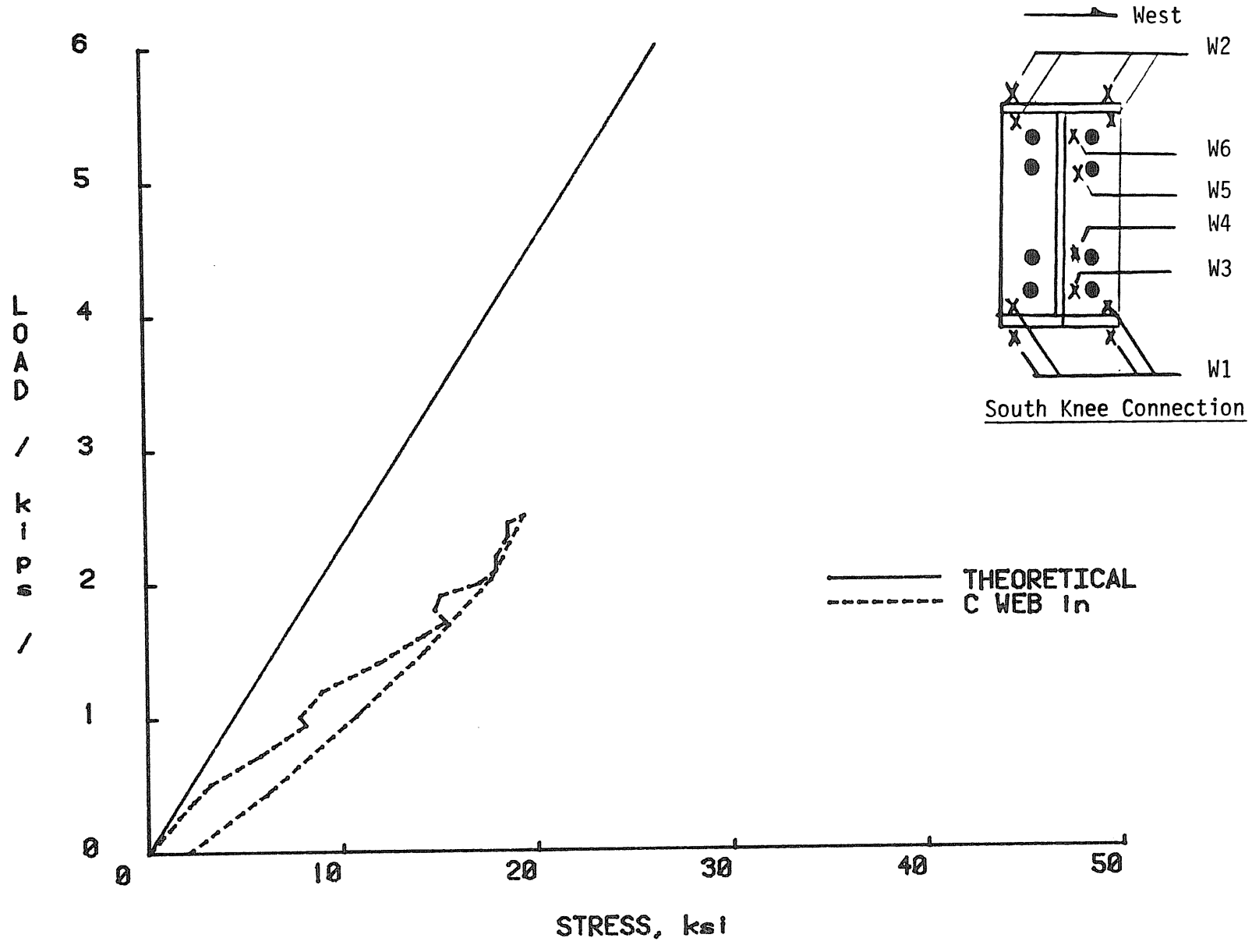


FIGURE B.12 LOAD VS. WEB STRESS AT LOCATION W4, TEST 1

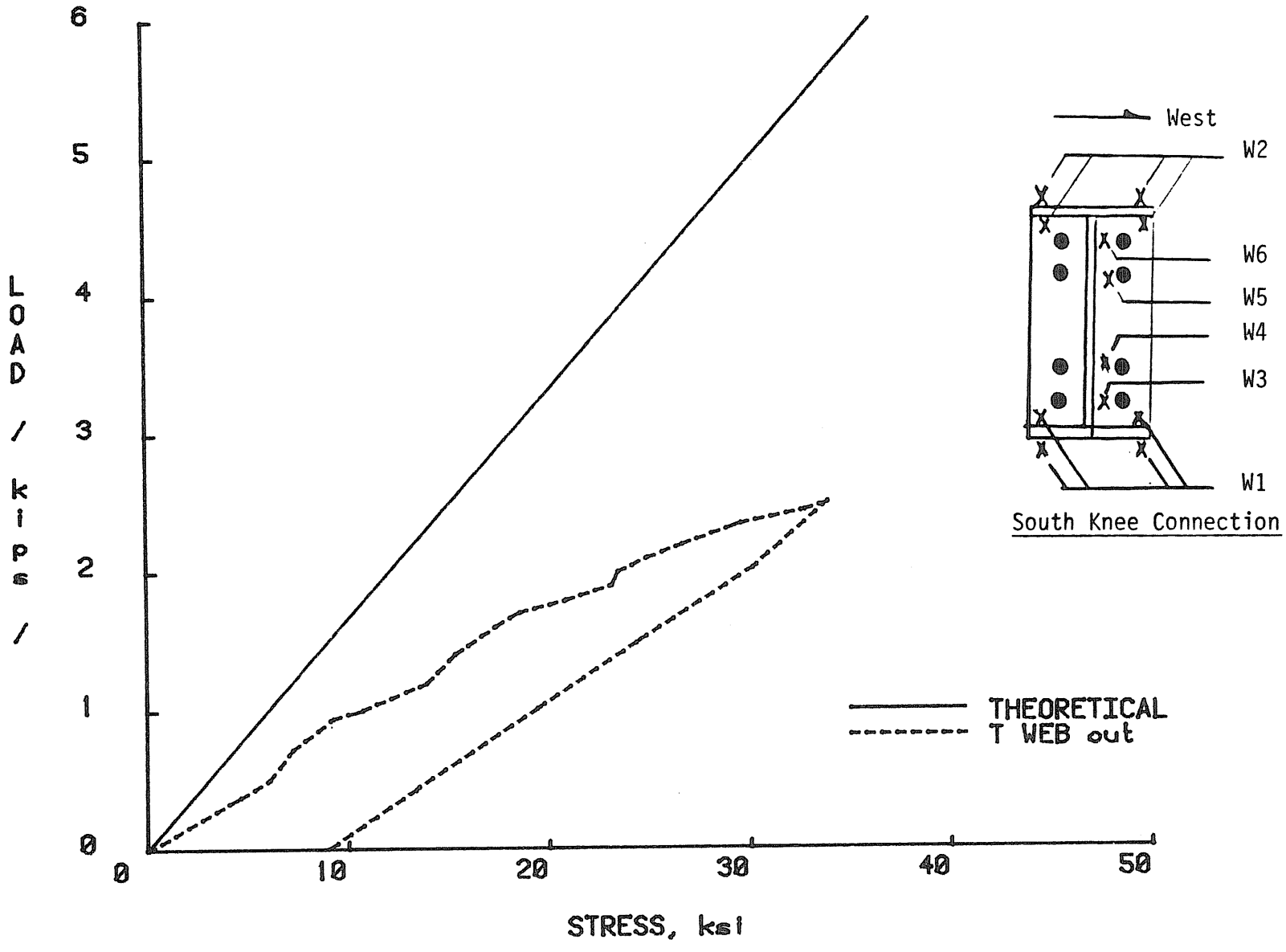


FIGURE B.13 LOAD VS. WEB STRESS AT LOCATION W6, TEST 1

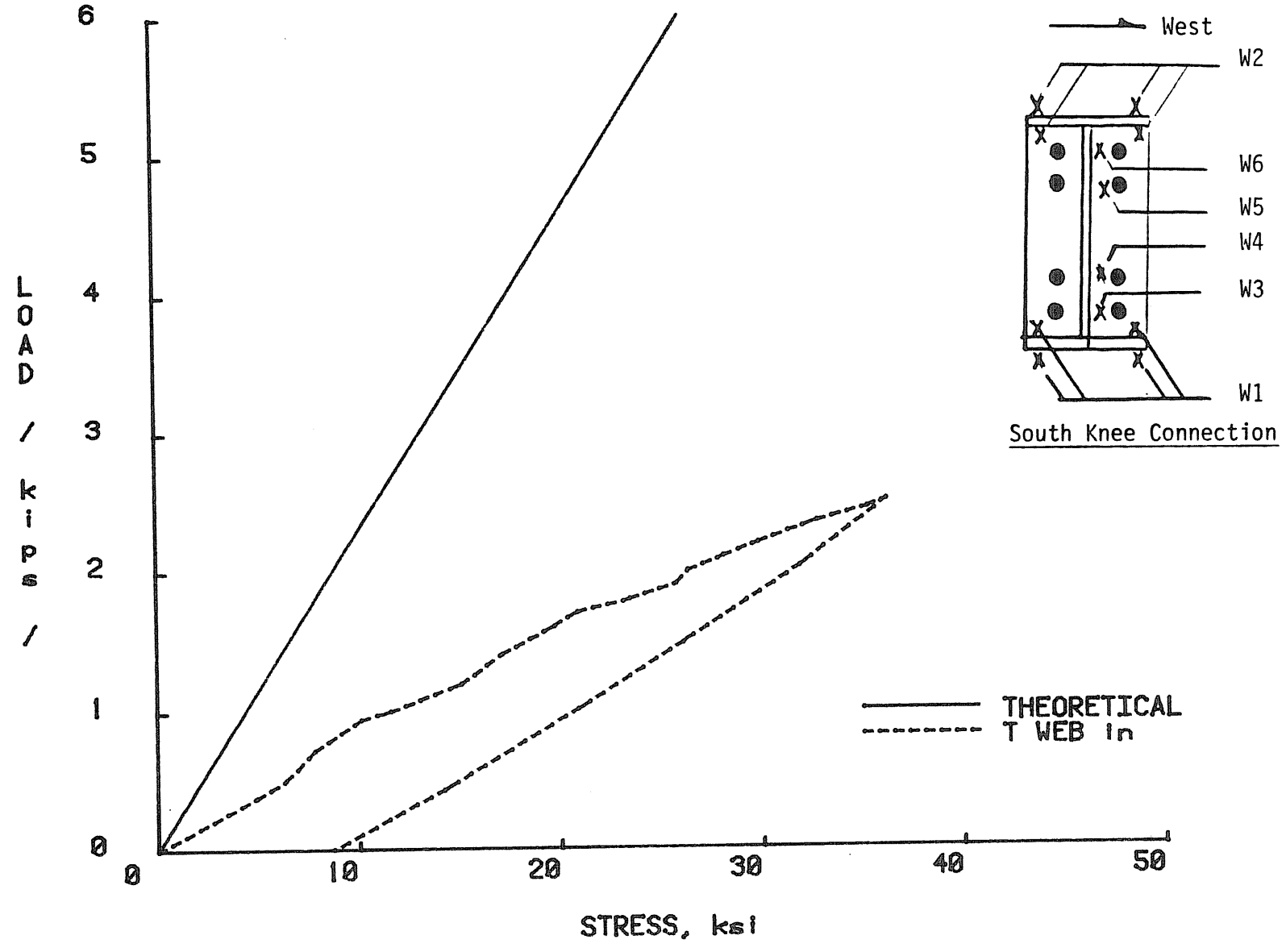


FIGURE B.14 LOAD VS. WEB STRESS AT LOCATION W5, TEST 1

APPENDIX C

FACTORED WIND LOAD

TEST 2

MESCO FRAME TEST SUMMARY

Project: Mesco FR2

Test No.: Test 2

Test Date: January 22, 1985

Purpose: 1.25 x working wind load on both frames

Bolt Diameter: 3/4" **Pretension Force per Bolt:** 28^{k}

Maximum Test Load: 5.38 kips

Discussion:

- Due to uncertainty involving the strength of the panel zones the maximum load to be applied (1.25 x working level wind load) was adjusted to insure that the behavior of the frame remained in the elastic range.

- Lateral deflections of the frames occurred in a linear manner with load application. The magnitude of these deflections agrees closely with the theoretical prediction.

- Bolt forces remained constant throughout the test.

- Panel zone deflections increased linearly with load application.

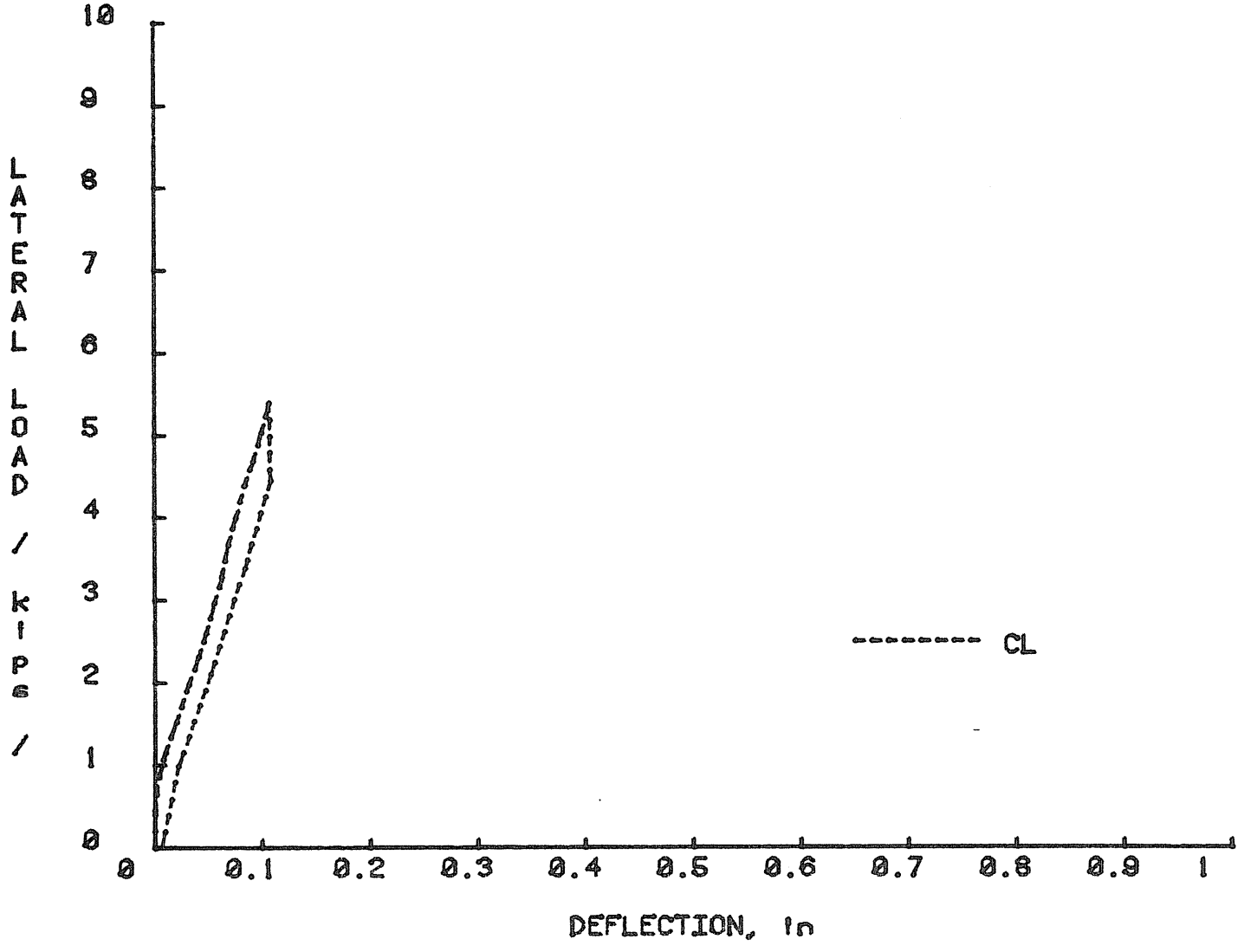


FIGURE C.1 LOAD VS. CENTERLINE DEFLECTION, TEST 2

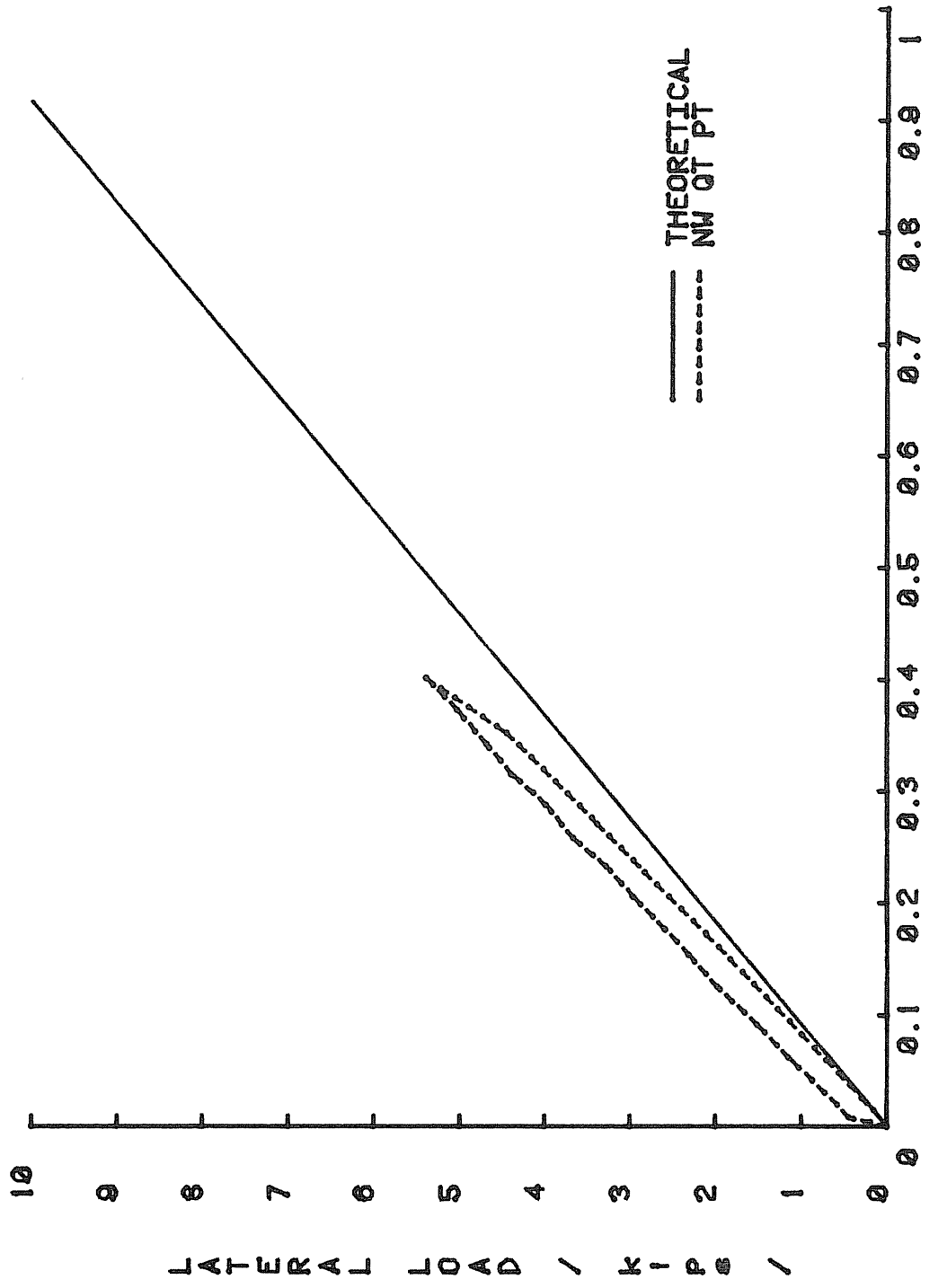


FIGURE C.2 LOAD VS. N.W. QUARTERPOINT DEFLECTION, TEST 2

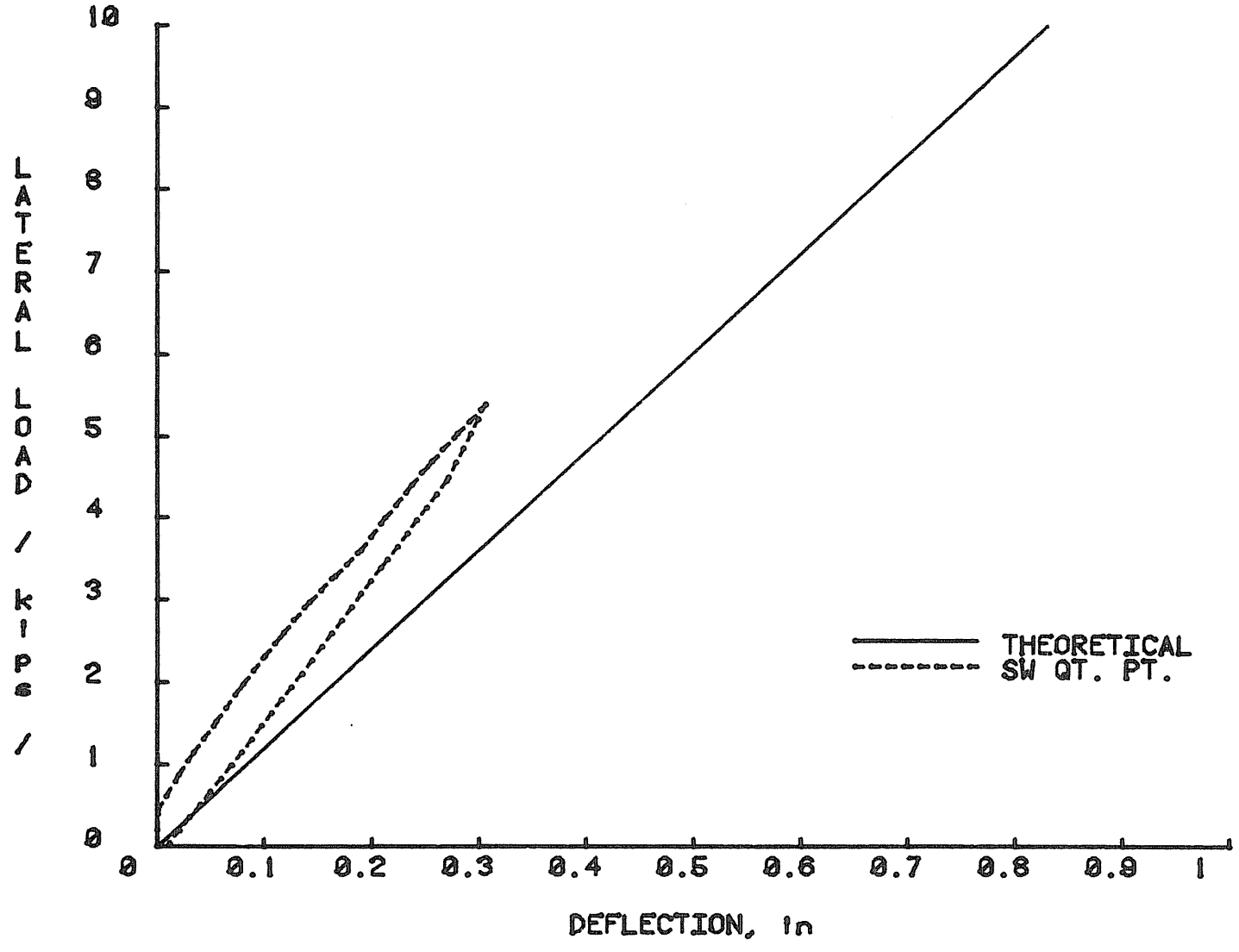


FIGURE C.3 LOAD VS. S.W. QUARTERPOINT DEFLECTION, TEST 2

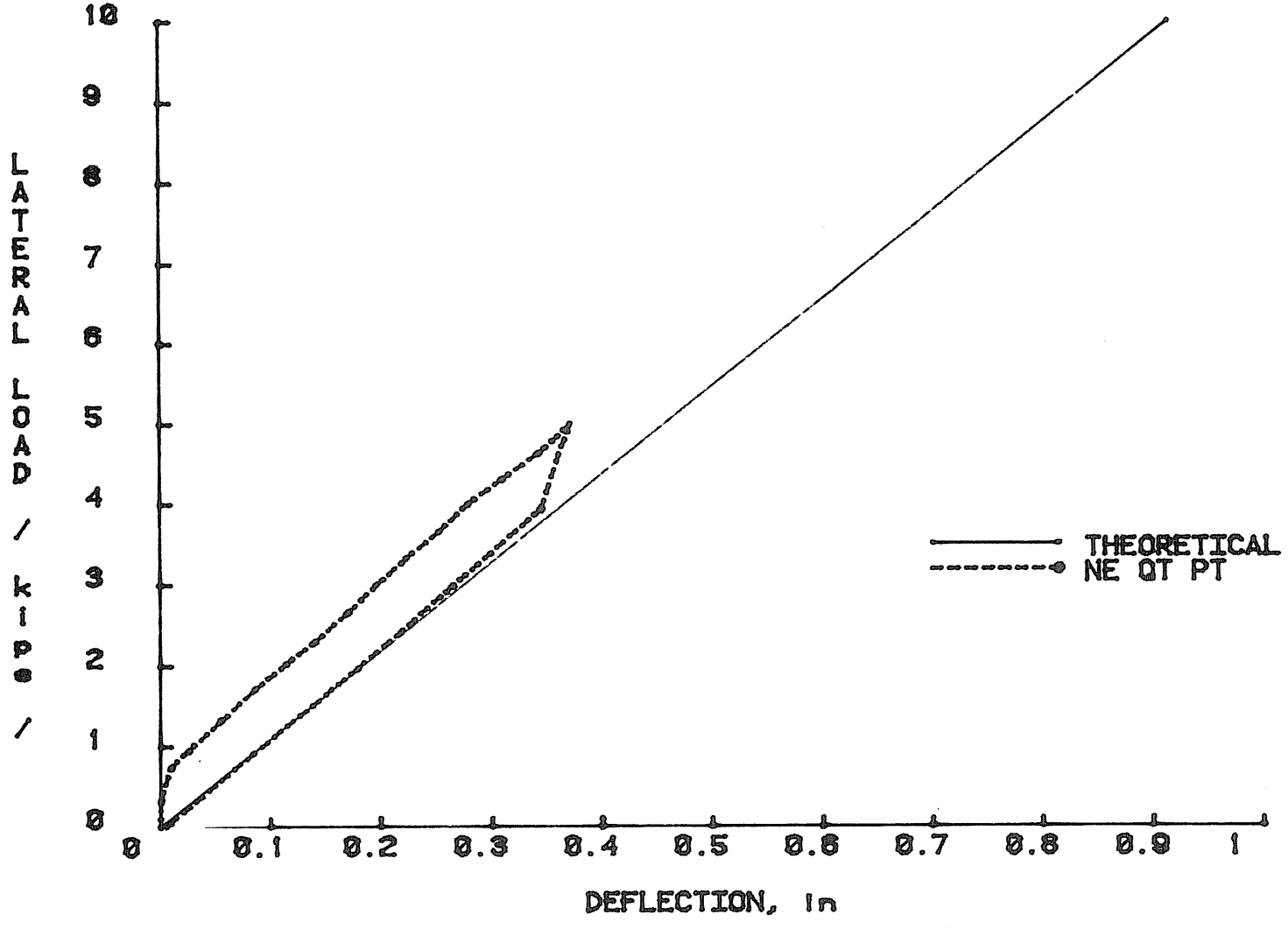


FIGURE C.4 LOAD VS. N.E. QUARTERPOINT DEFLECTION, TEST 2

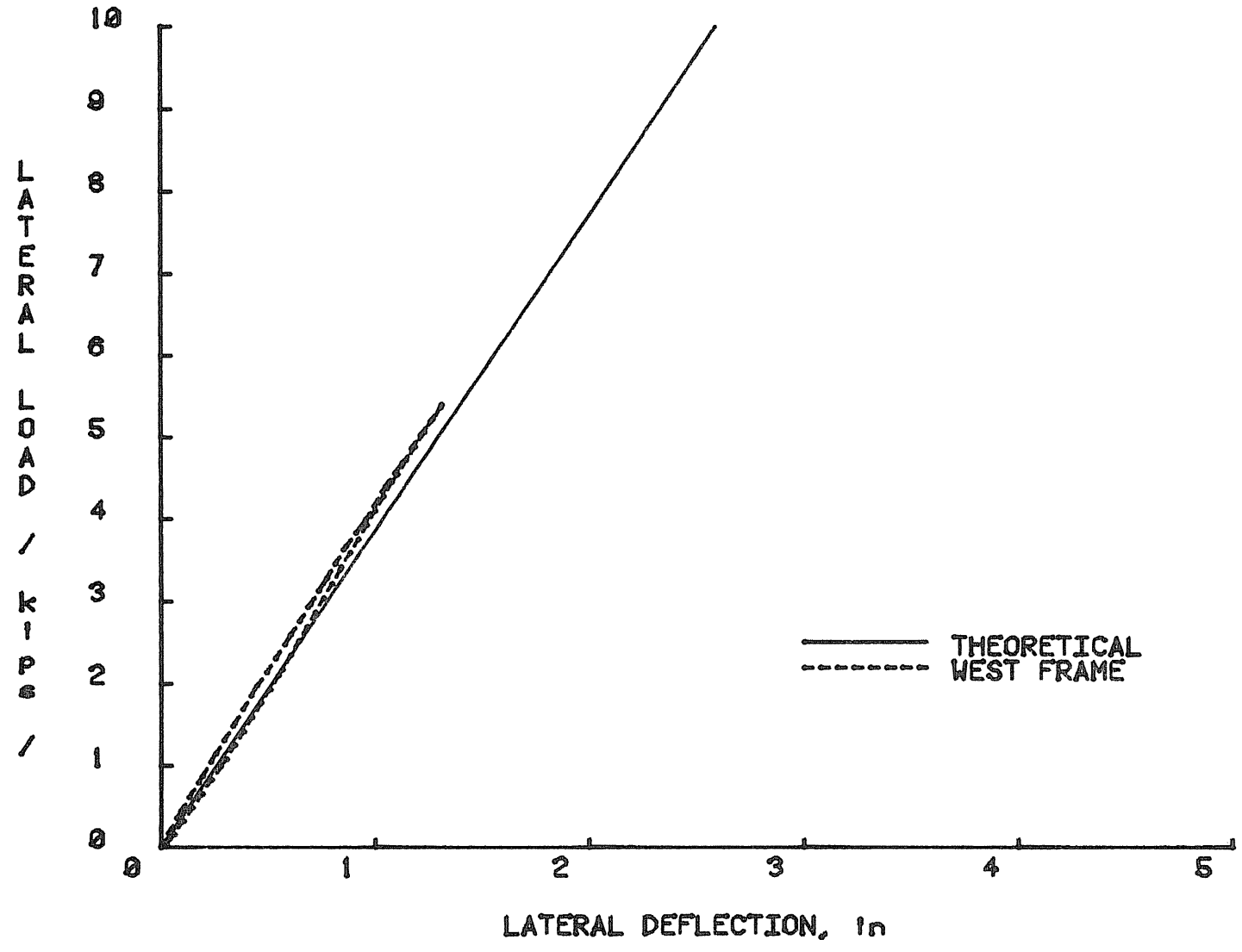


FIGURE C.5 LOAD VS. LATERAL DEFLECTION, WEST FRAME, TEST 2

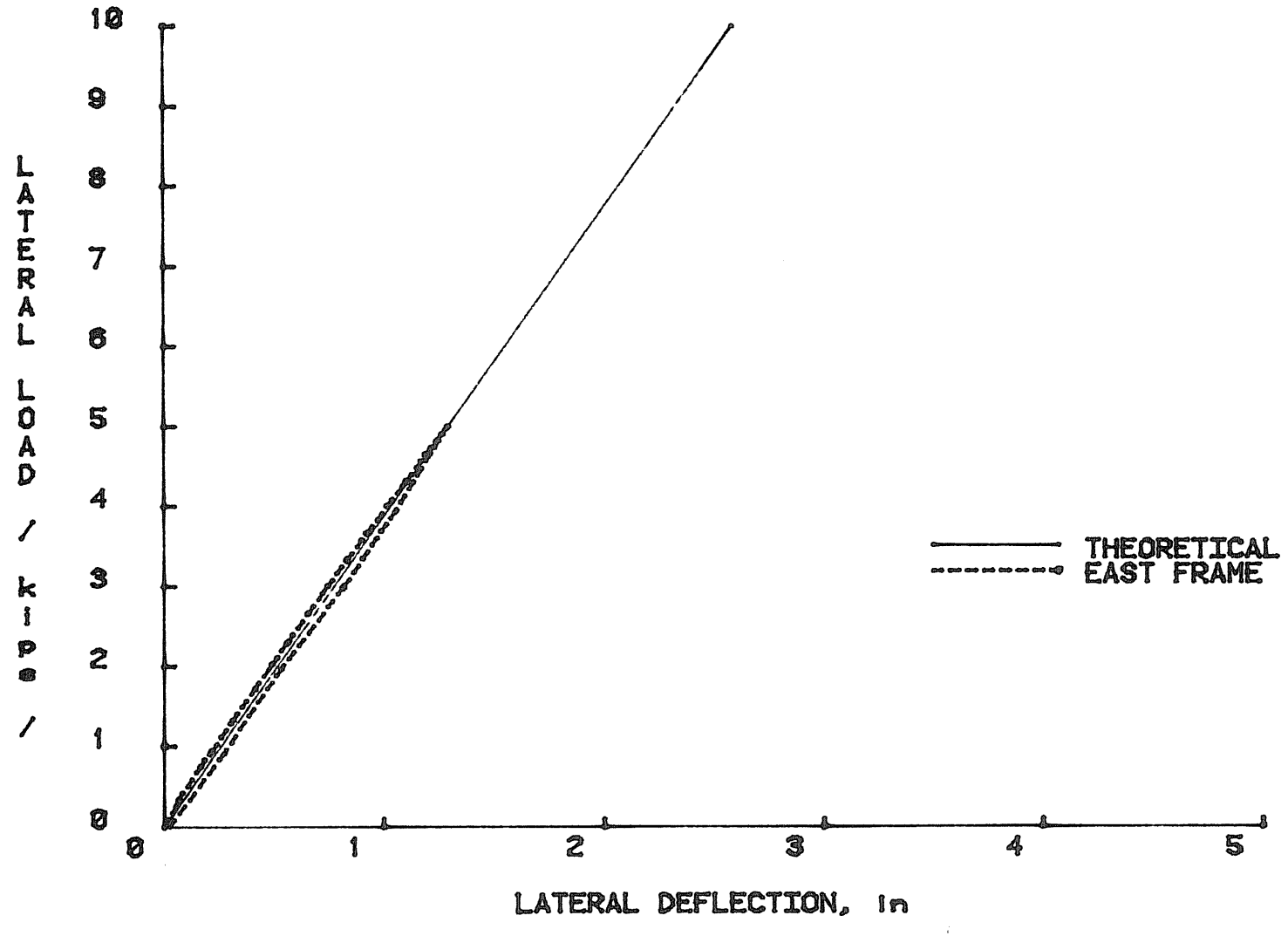


FIGURE C.6 LOAD VS. LATERAL DEFLECTION, EAST FRAME, TEST 2

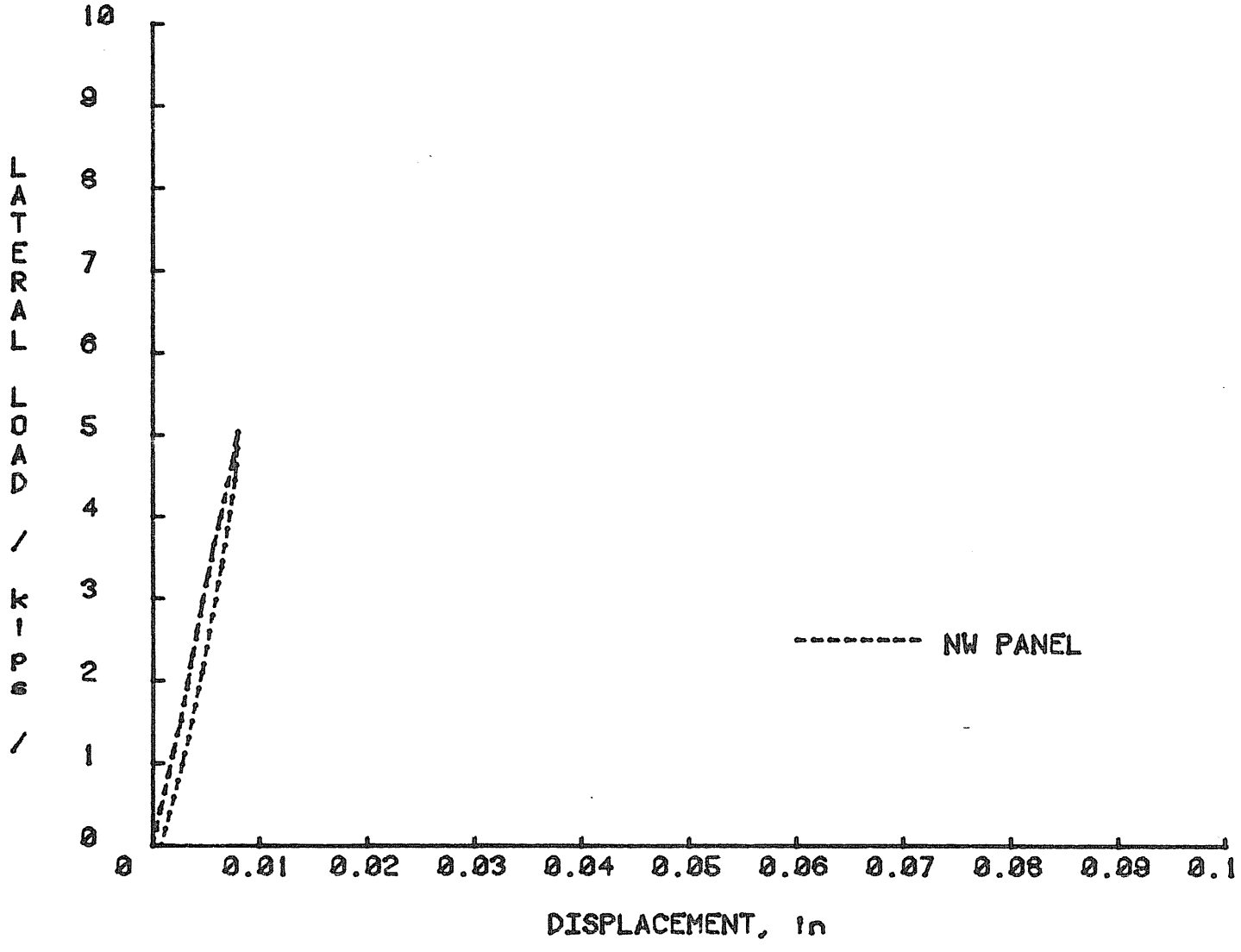


FIGURE C.7 LOAD VS. N.W. PANEL ZONE DISPLACEMENT, TEST 2

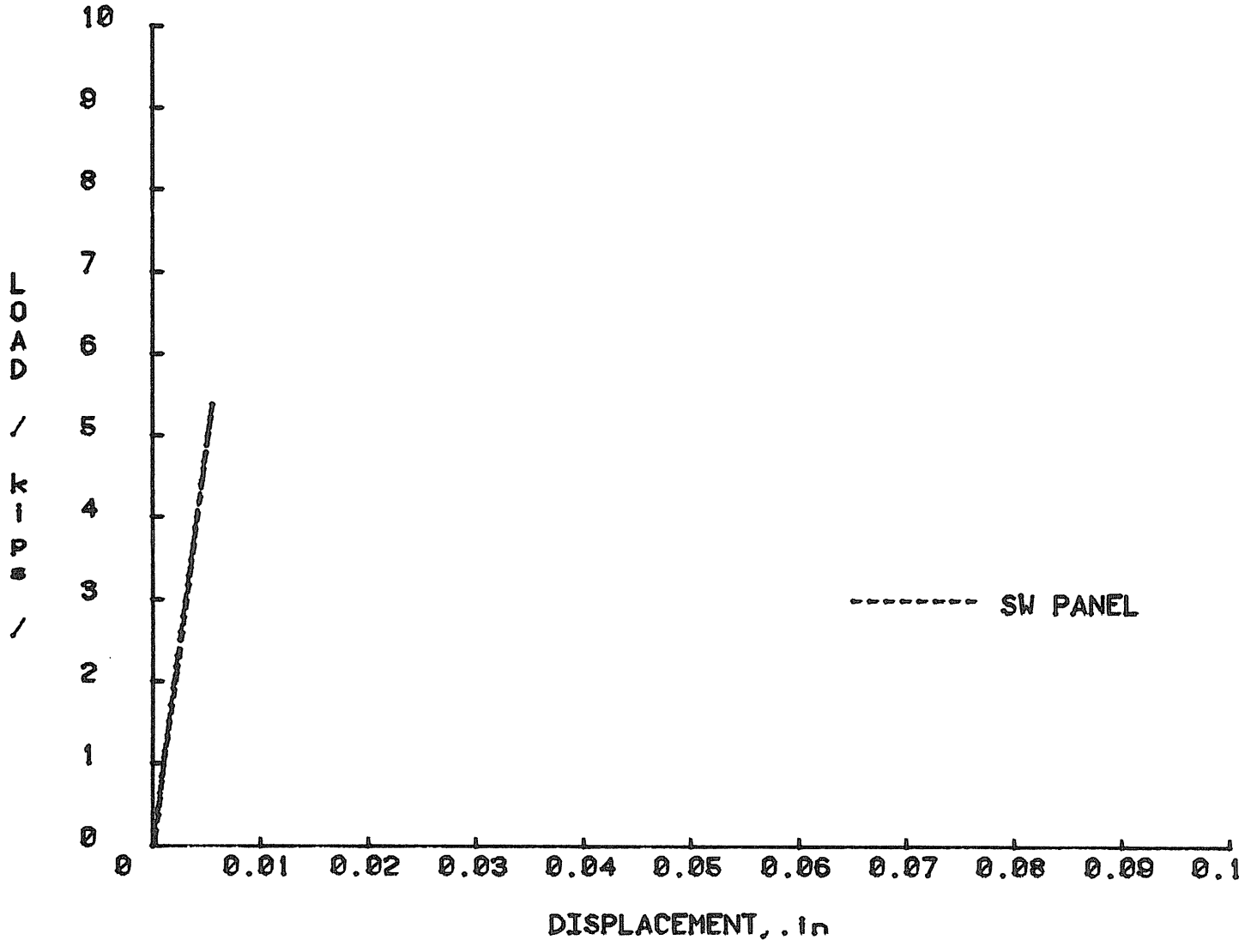


FIGURE C.8 LOAD VS. S.W. PANEL ZONE DEFLECTION, TEST 2

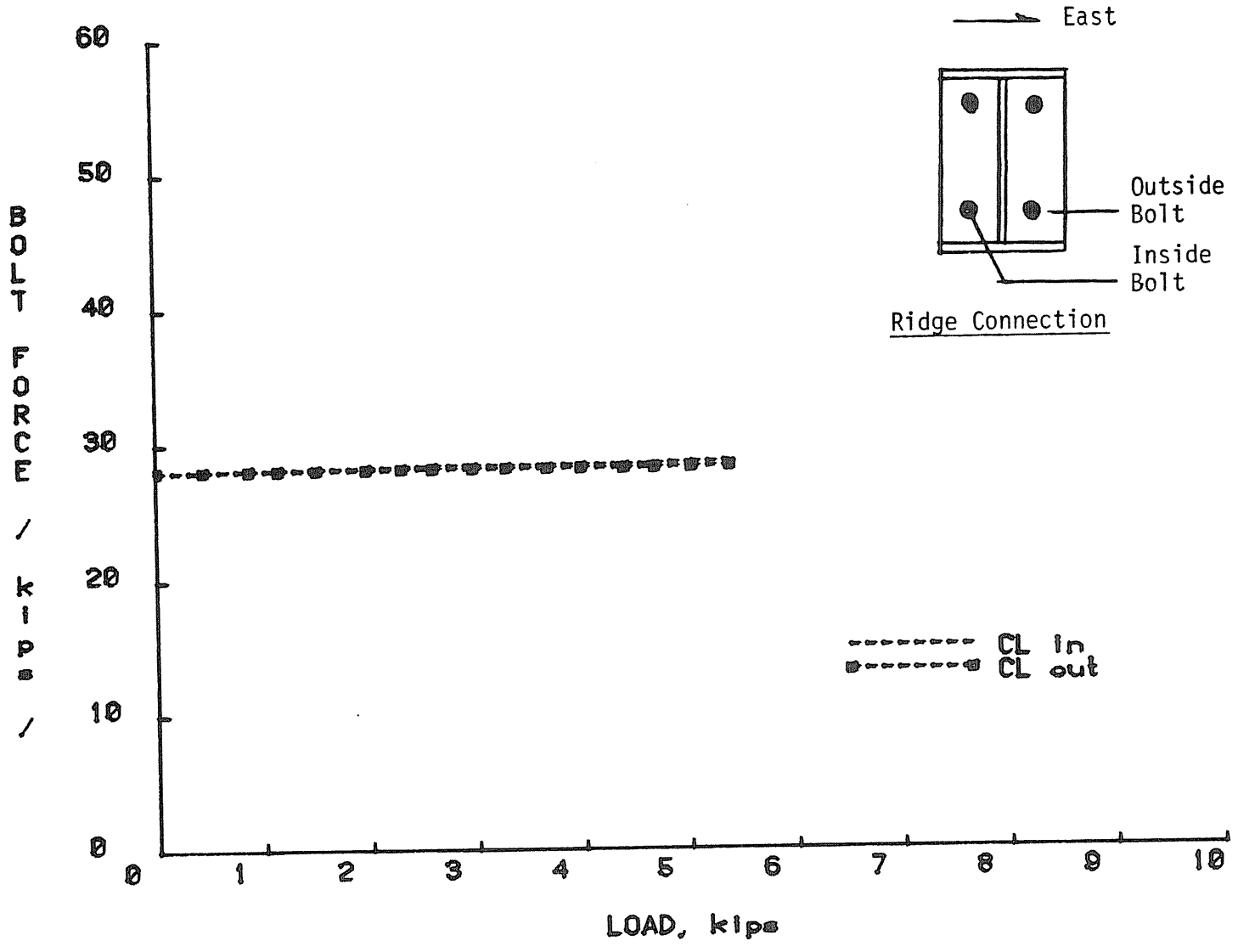


FIGURE C.9 RIDGE CONNECTION BOLT FORCES VS. LOAD, TEST 2

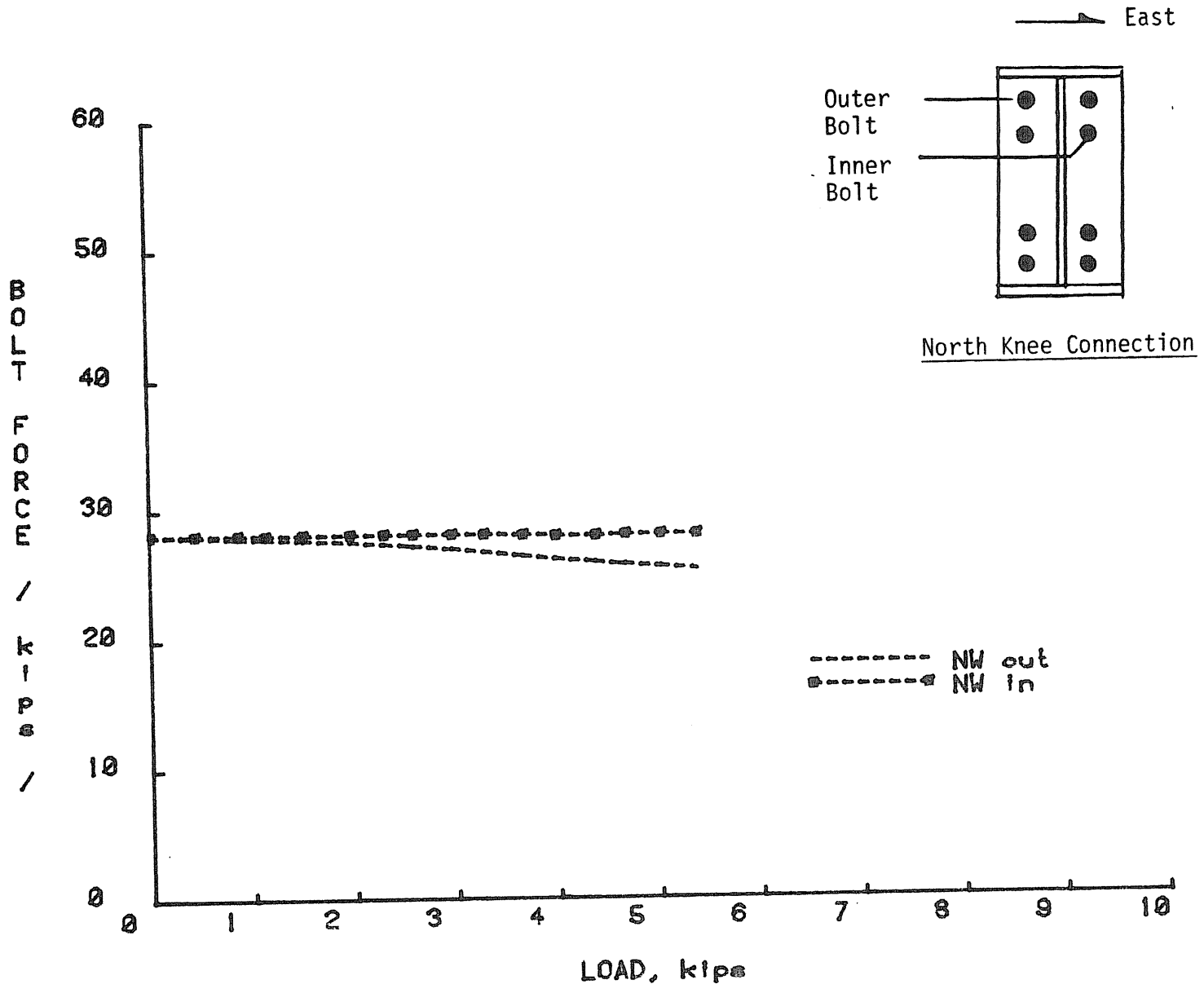


FIGURE C.10 N.W. KNEE CONNECTION BOLT FORCES VS. LOAD, TEST 2

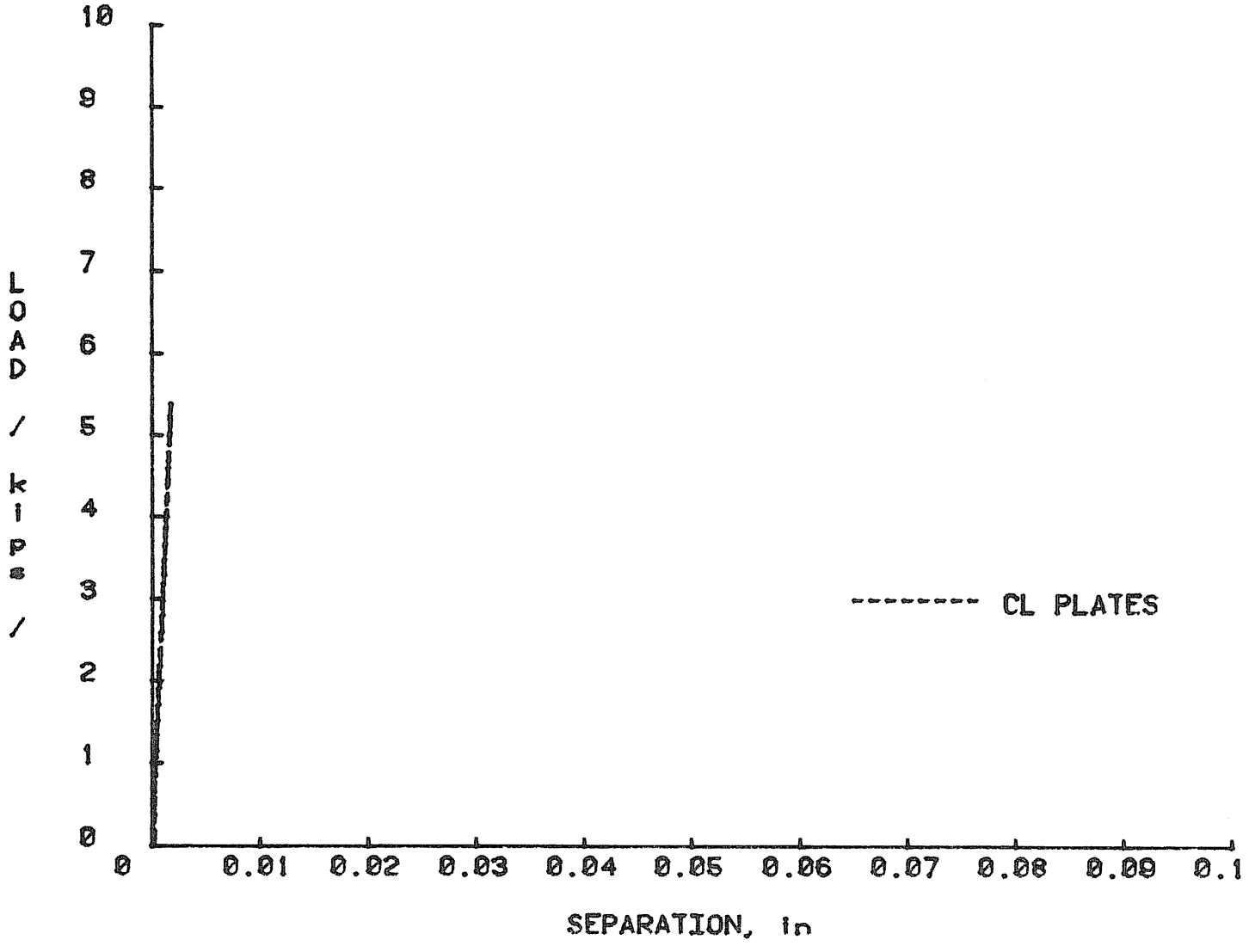


FIGURE C.11 LOAD VS. PLATE SEPARATION AT RIDGE CONNECTION, TEST 2

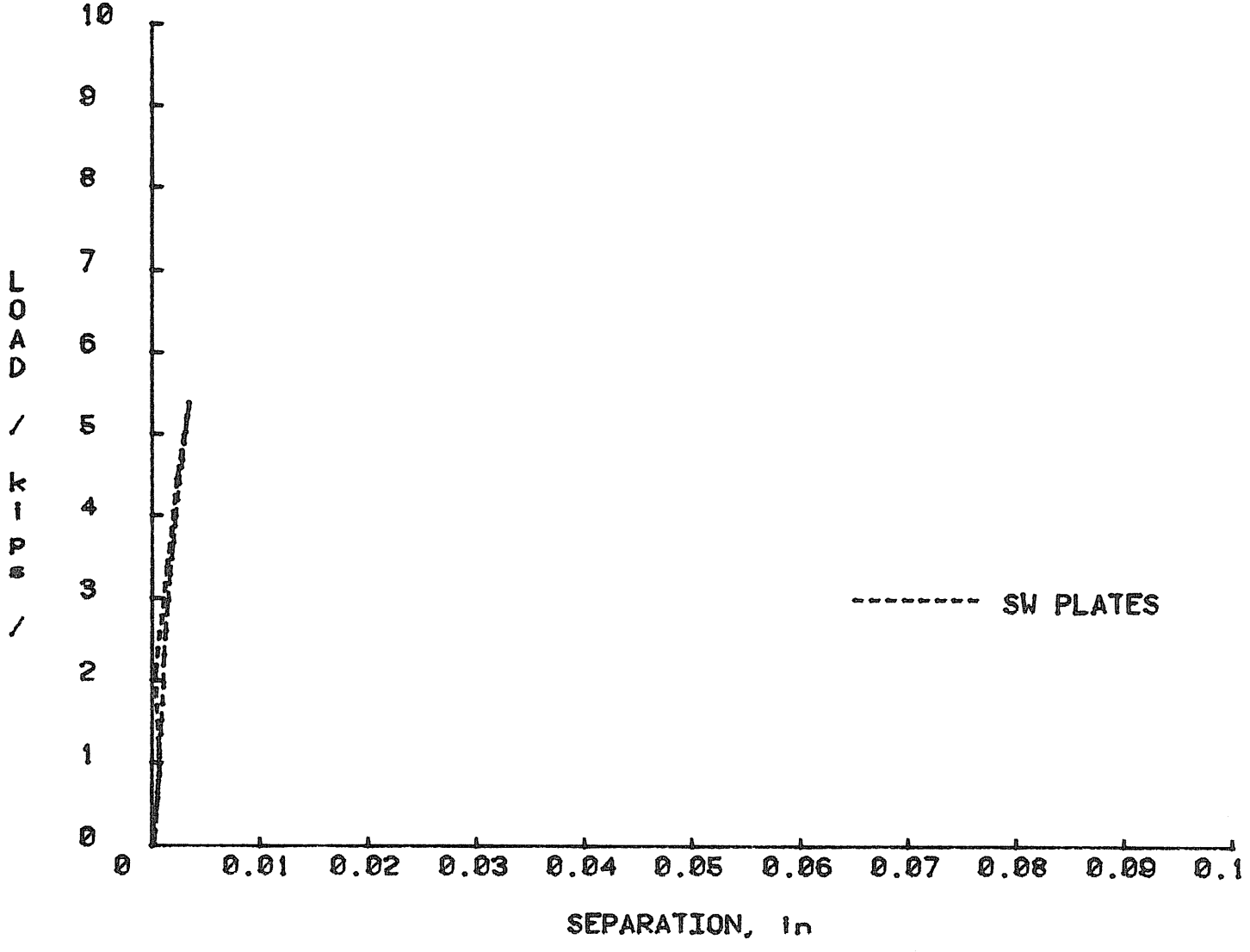


FIGURE C.12 LOAD VS. PLATE SEPARATION AT S.W. KNEE CONNECTION, TEST 2

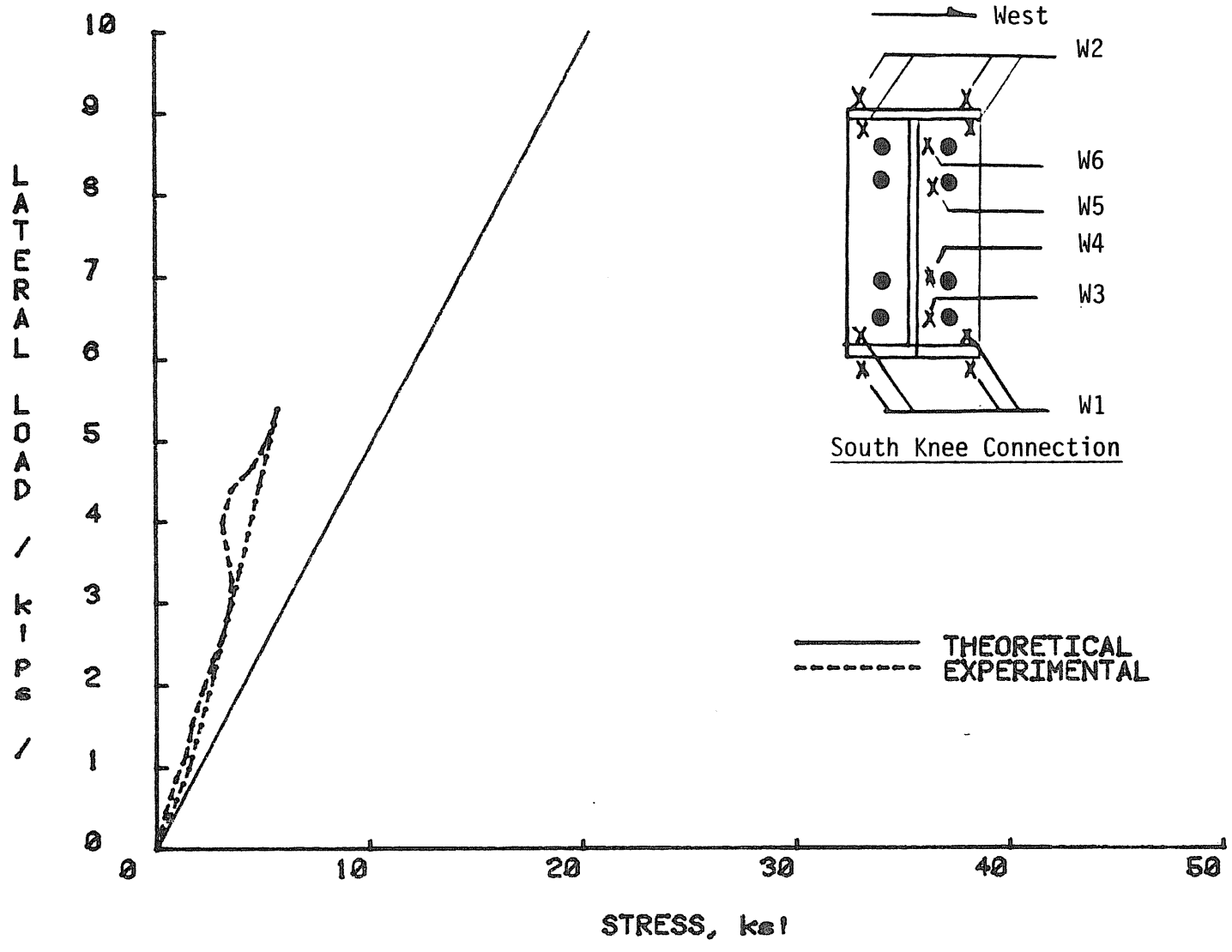


FIGURE C.13 LOAD VS. FLANGE STRESS AT LOCATION W1, TEST 2

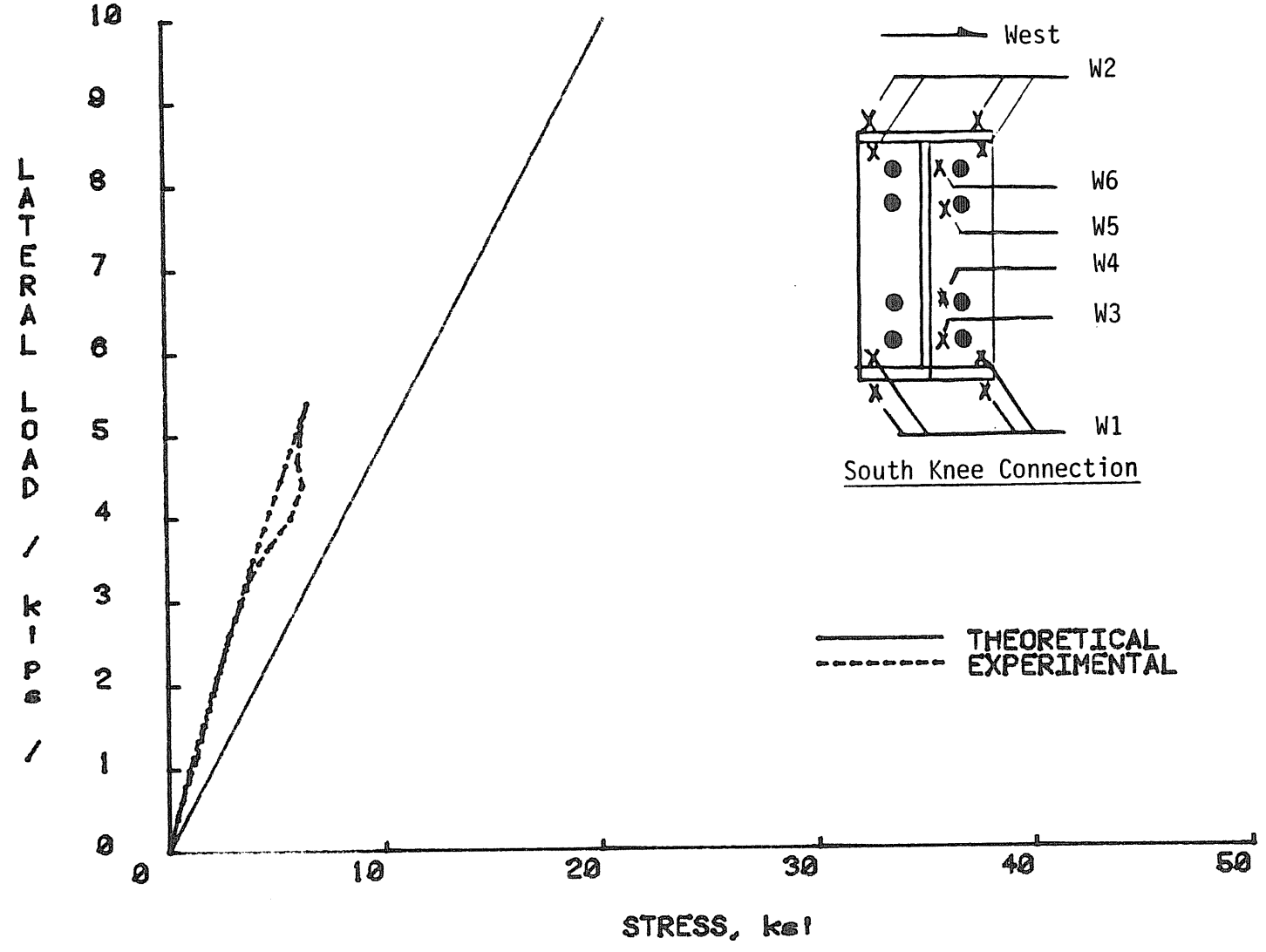


FIGURE C.14 LOAD VS. FLANGE STRESS AT LOCATION W2, TEST 2

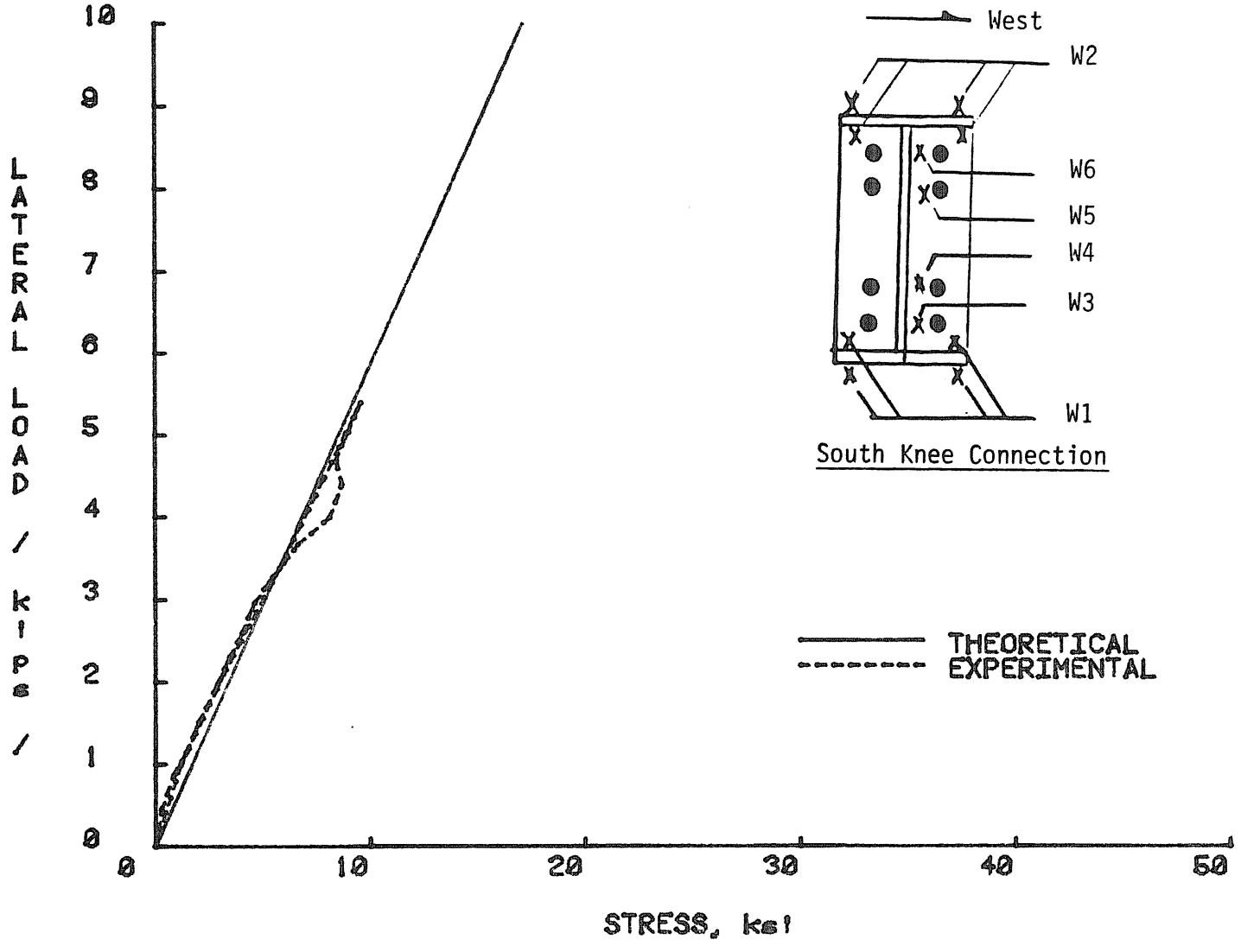


FIGURE C.15 LOAD VS. WEB STRESS AT LOCATION W3, TEST 2

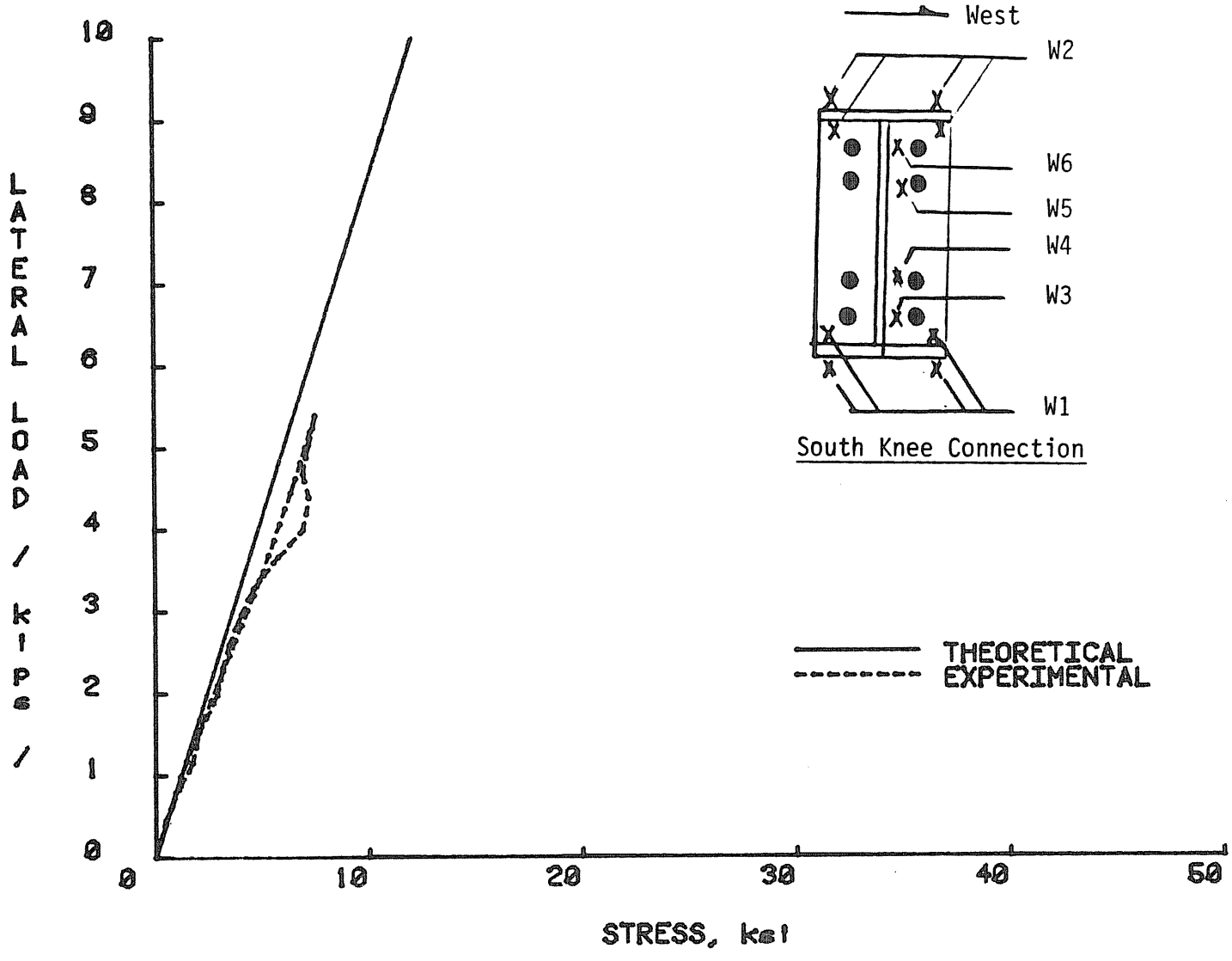


FIGURE C.16 LOAD VS. WEB STRESS AT LOCATION W4, TEST 2

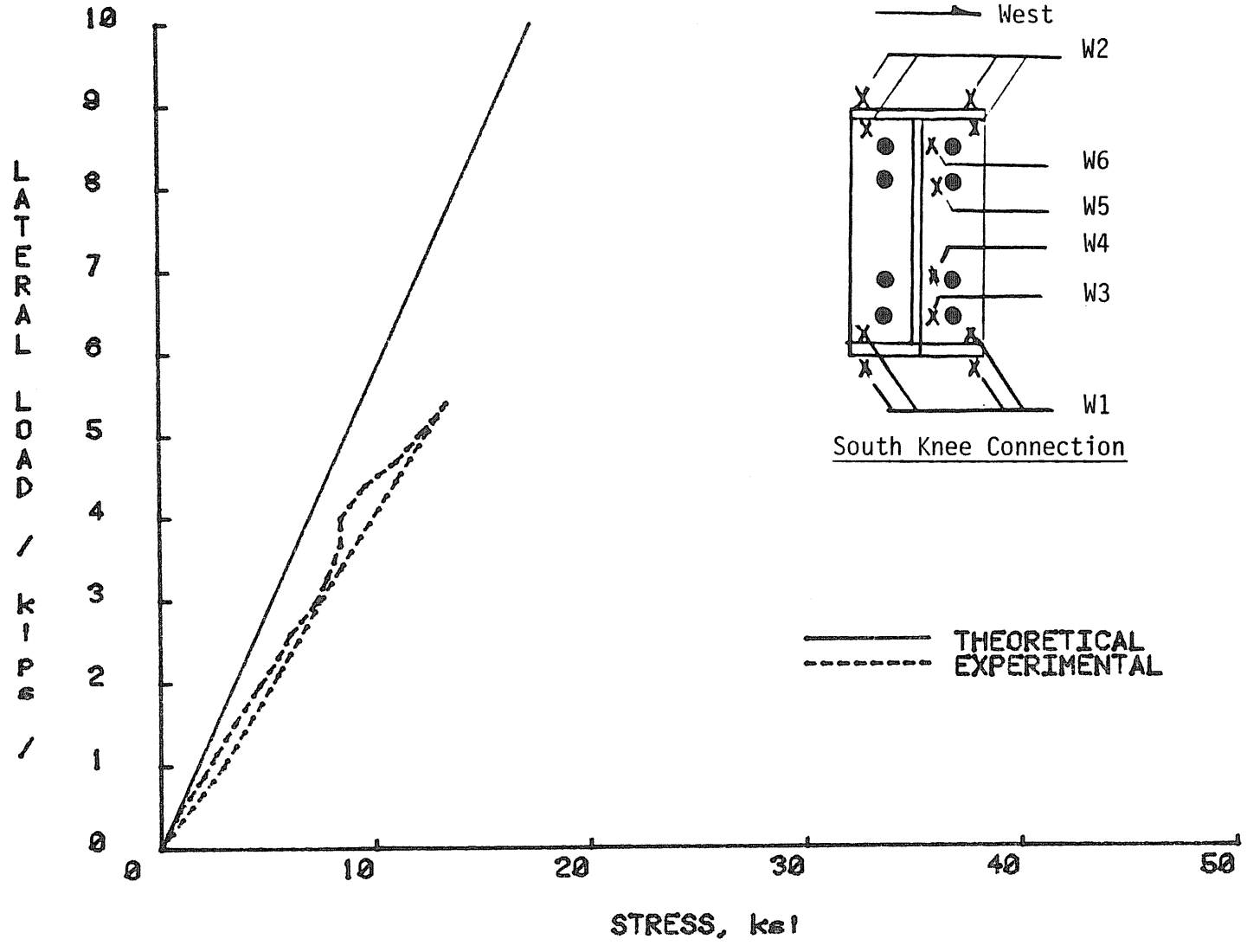


FIGURE C.17 LOAD VS. WEB STRESS AT LOCATION W6, TEST 2

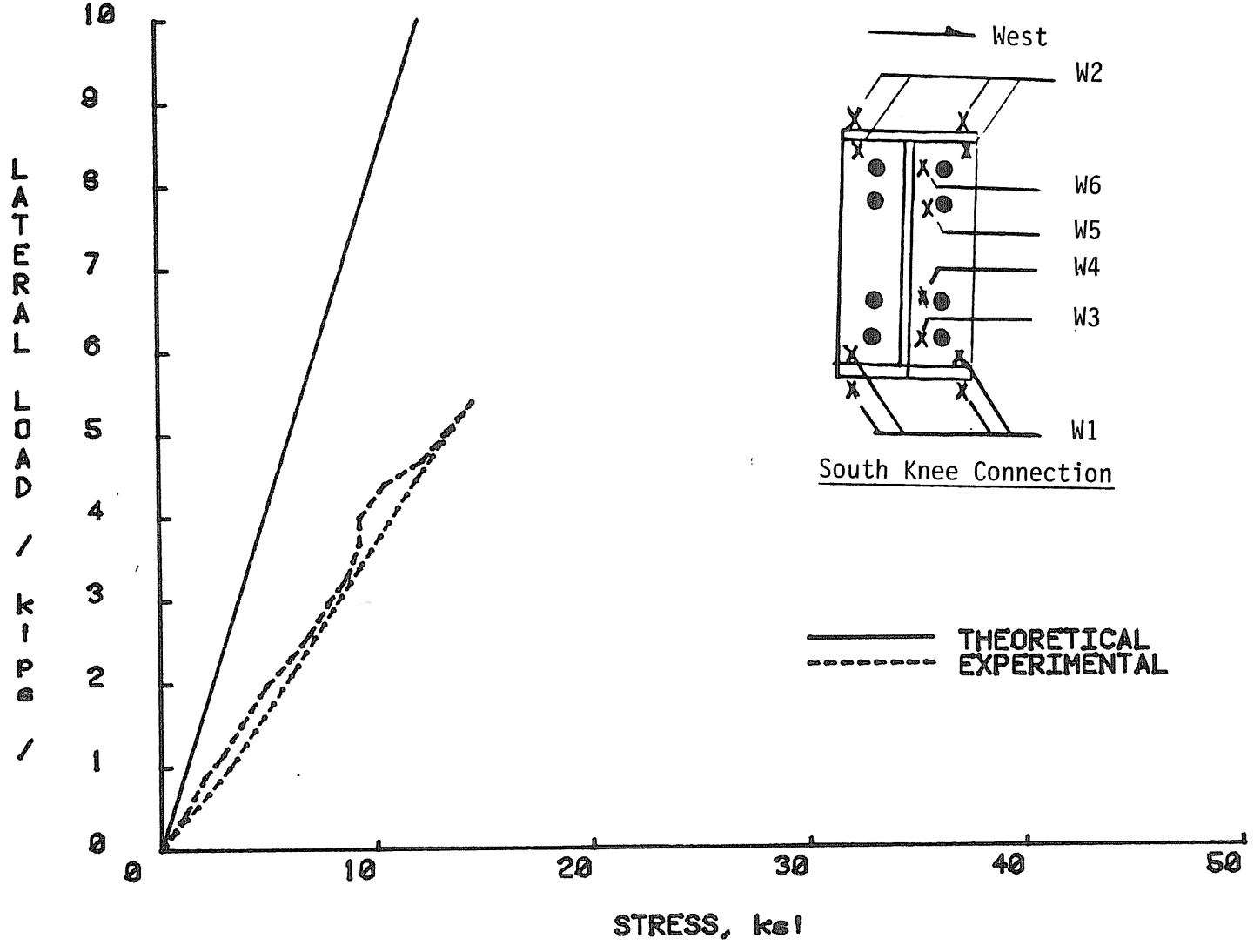


FIGURE C.18 LOAD VS. WEB STRESS AT LOCATION W5, TEST 2

APPENDIX D

FACTORED UNBALANCED LIVE LOAD

TEST 3

MESCO FRAME TEST SUMMARY

Project: Mesco FR2

Test No.: Test 3

Test Date: January 24, 1985

Purpose: Test of factored unbalanced live load

Bolt Diameter: 3/4" **Pretension Force per Bolt:** 28 kip

Maximum Test Load: 4.165 kips

Discussion:

- Deflection and strain gage data indicated linear elastic behavior throughout the test.

- Vertical deflections exceeded the theoretical values by 20% at the east centerline, 23% at the west centerline, 15% at the northeast (loaded rafter) quarter point and 156% at the southwest quarter point (unloaded rafter) at the maximum test load.

- Panel zone deflections increase linearly with load application and returned to the undeflected shape with load removal.

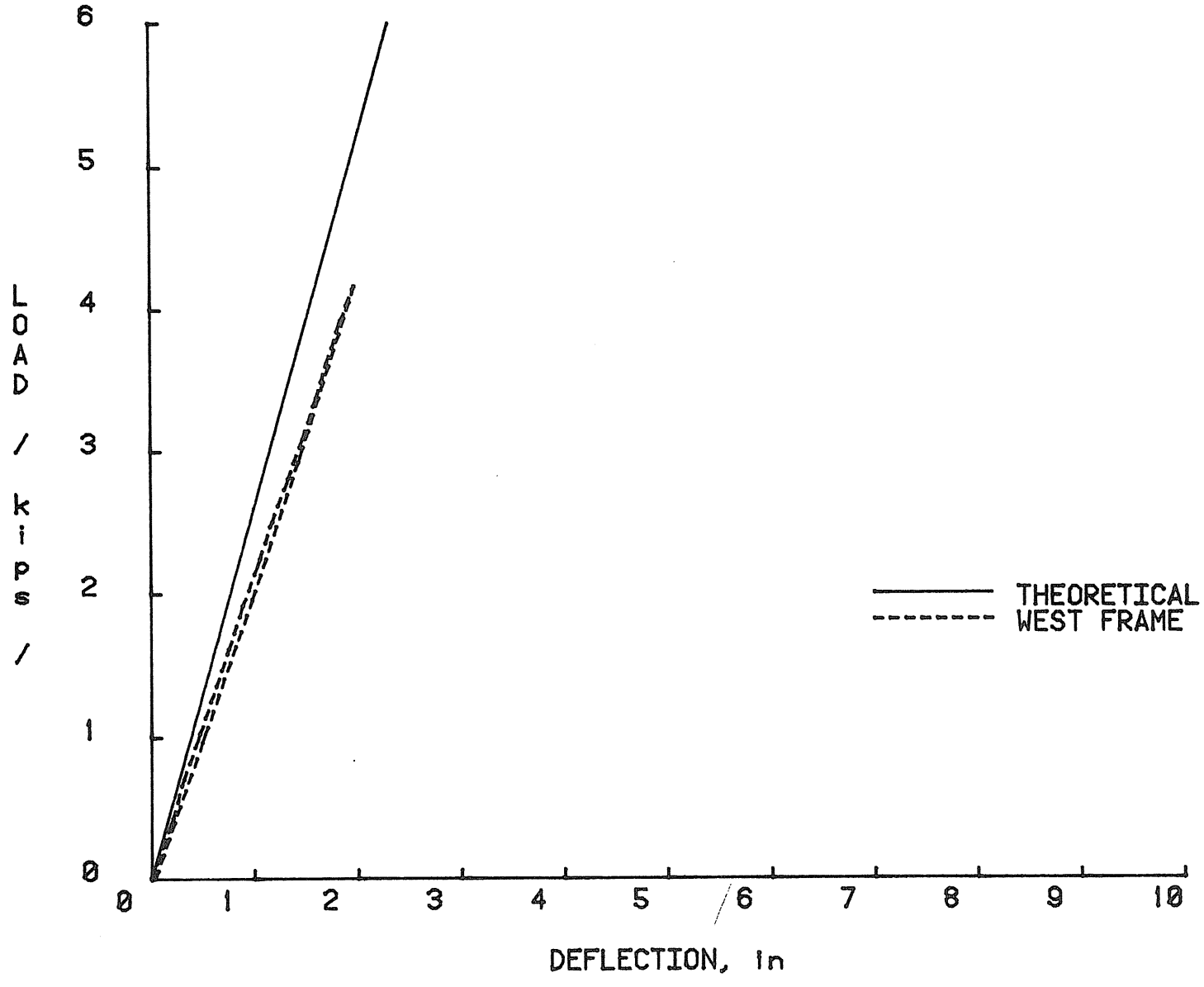


FIGURE D.1 LOAD VS. CENTERLINE DEFLECTION, WEST FRAME, TEST 3

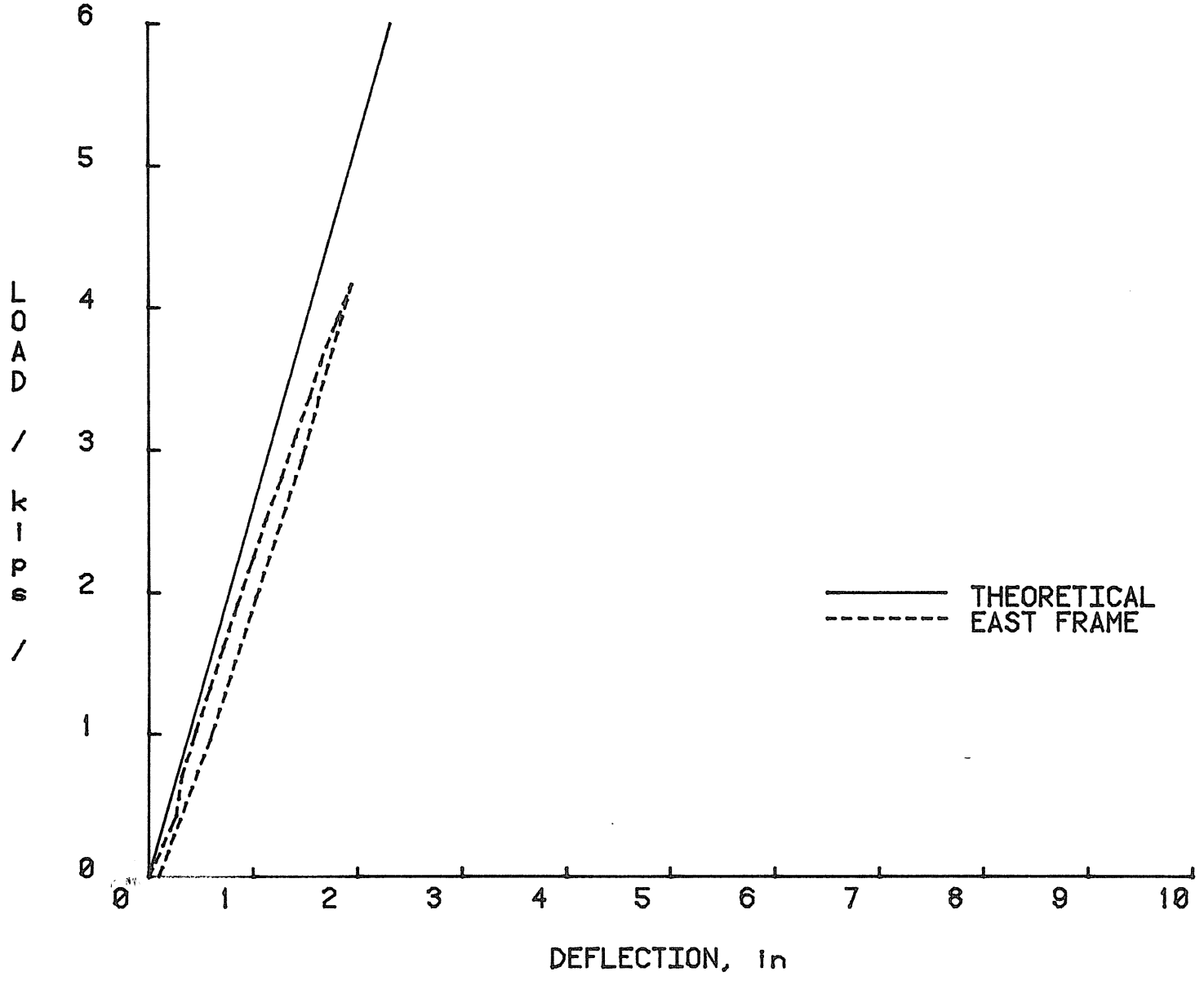


FIGURE D.2 LOAD VS. CENTERLINE DEFLECTION, EAST FRAME, TEST 3

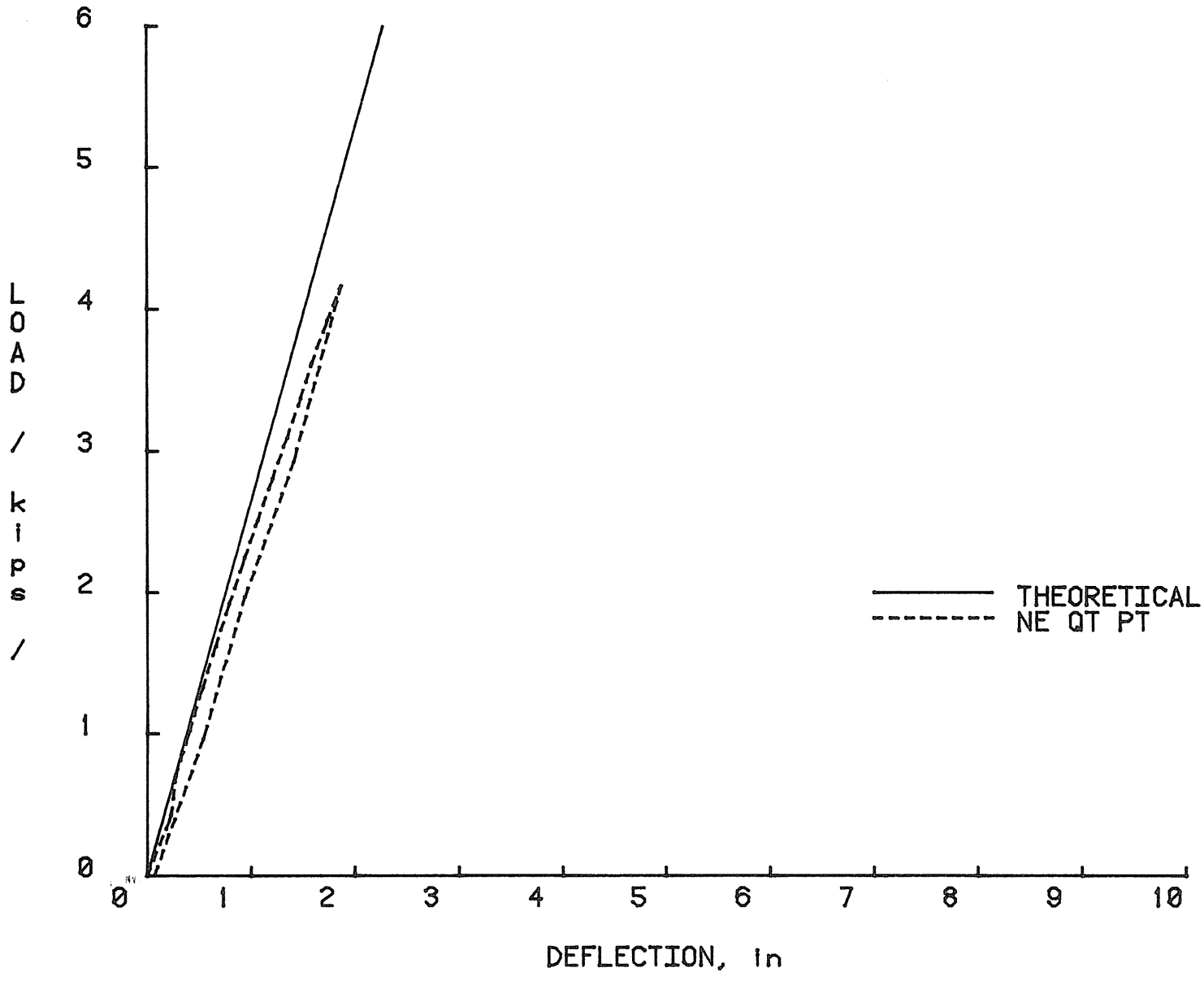


FIGURE D.3 LOAD VS. N.E. QUARTERPOINT DEFLECTION, TEST 3

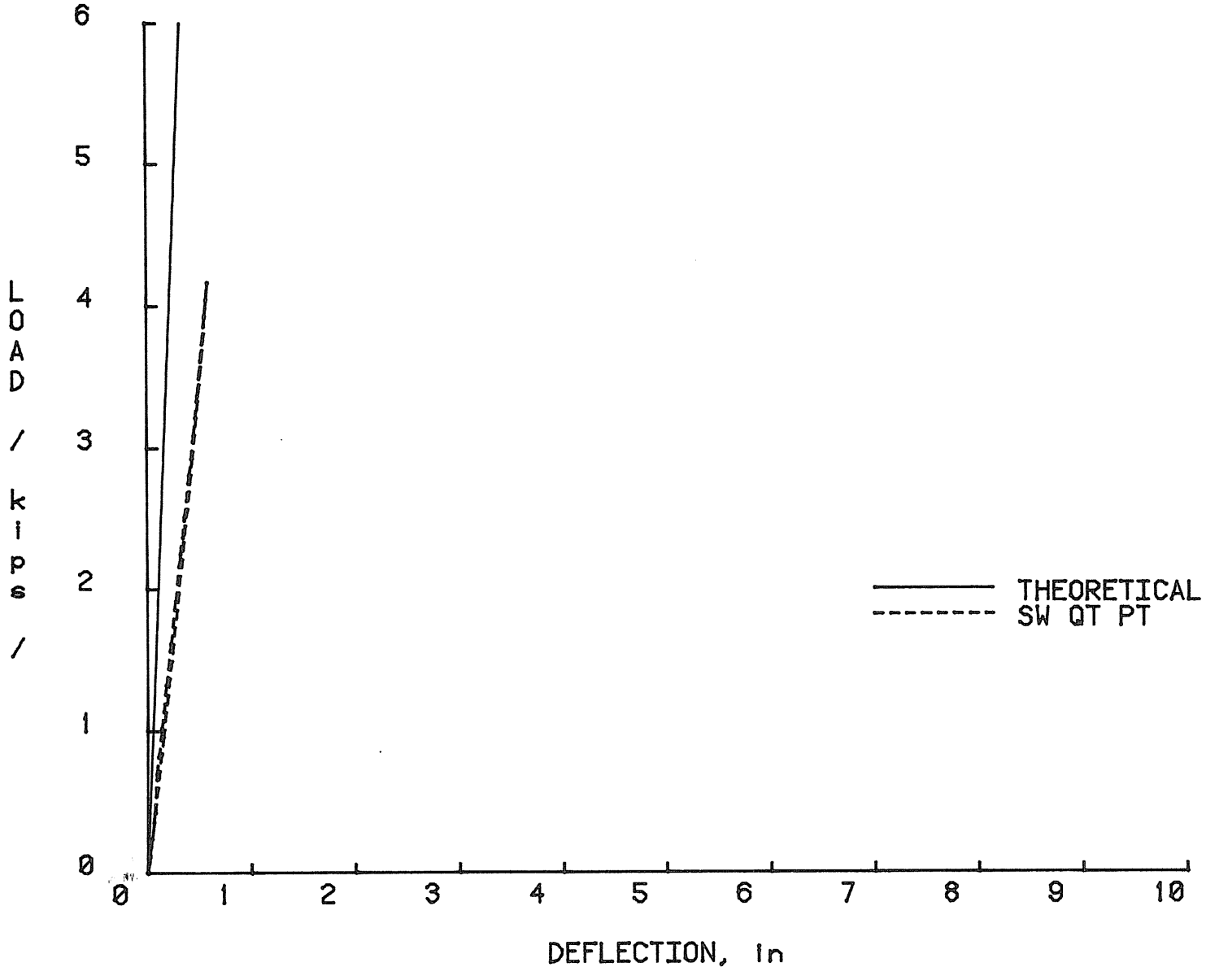


FIGURE D.4 LOAD VS. S.W. QUARTERPOINT DEFLECTION, TEST 3

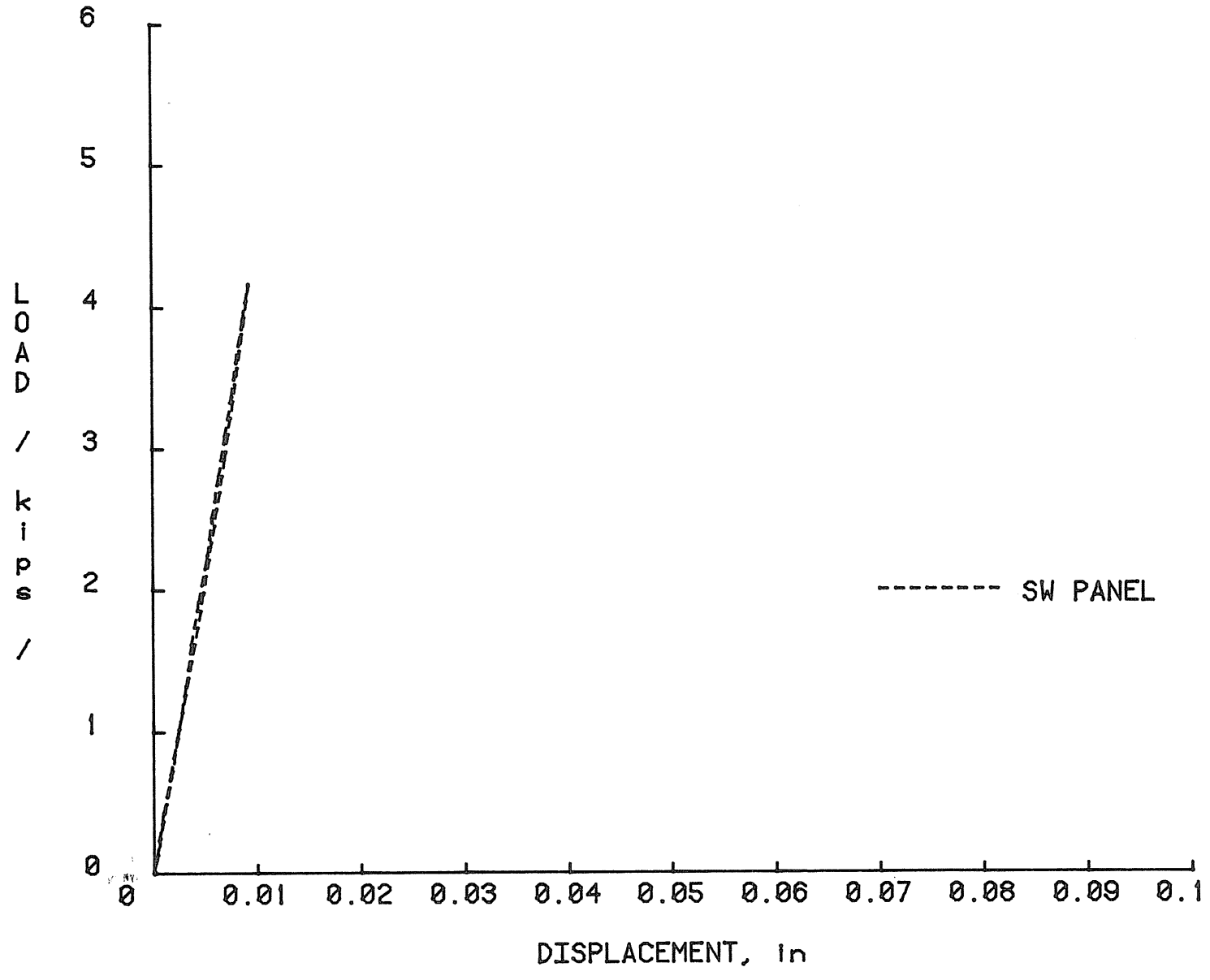


FIGURE D.5 LOAD VS. S.W. PANEL ZONE DISPLACEMENT, TEST 3

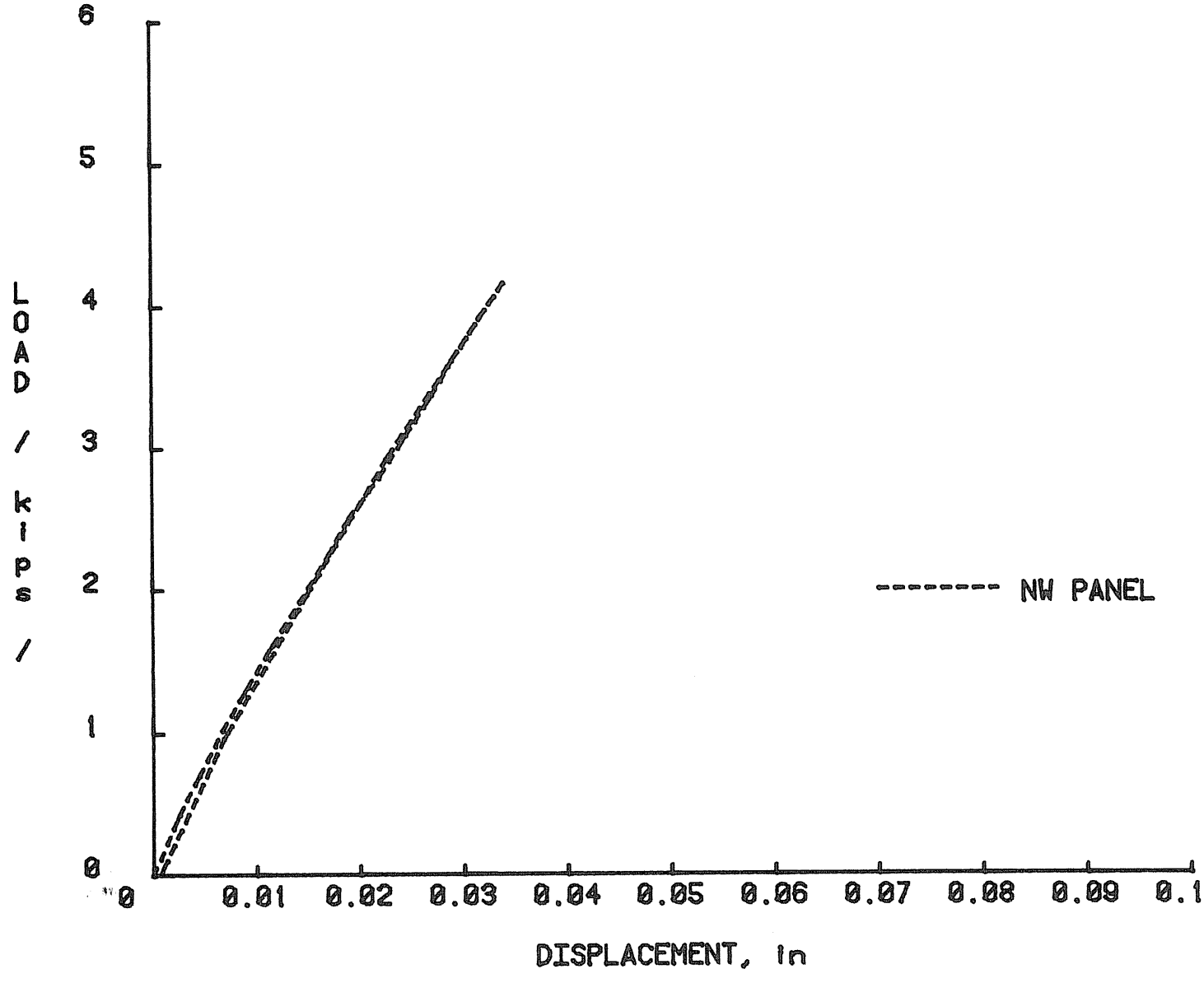


FIGURE D.6 LOAD VS. N.W. PANEL ZONE DISPLACEMENT, TEST 3

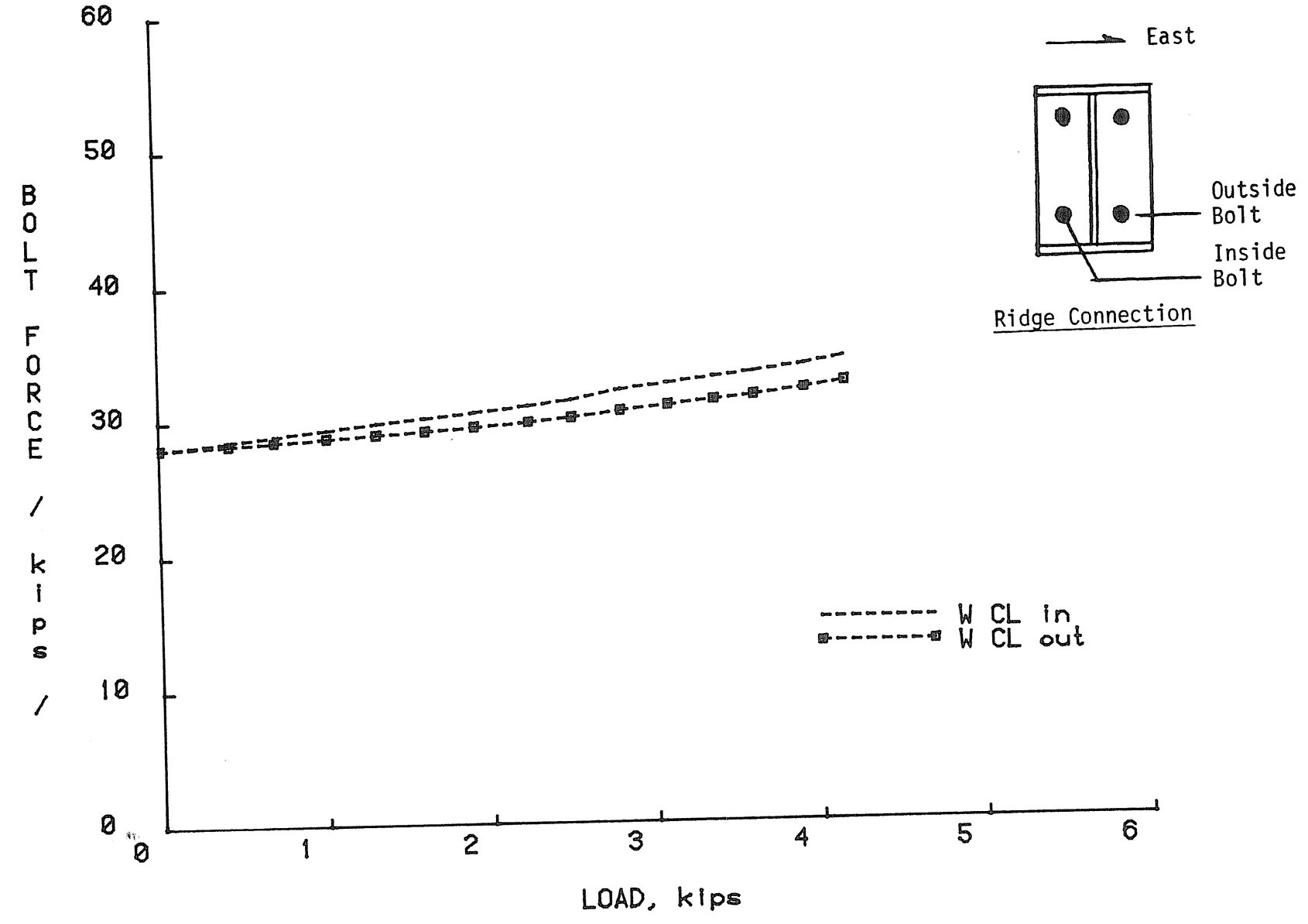


FIGURE D.7 RIDGE CONNECTION BOLT FORCES VS. LOAD, TEST 3

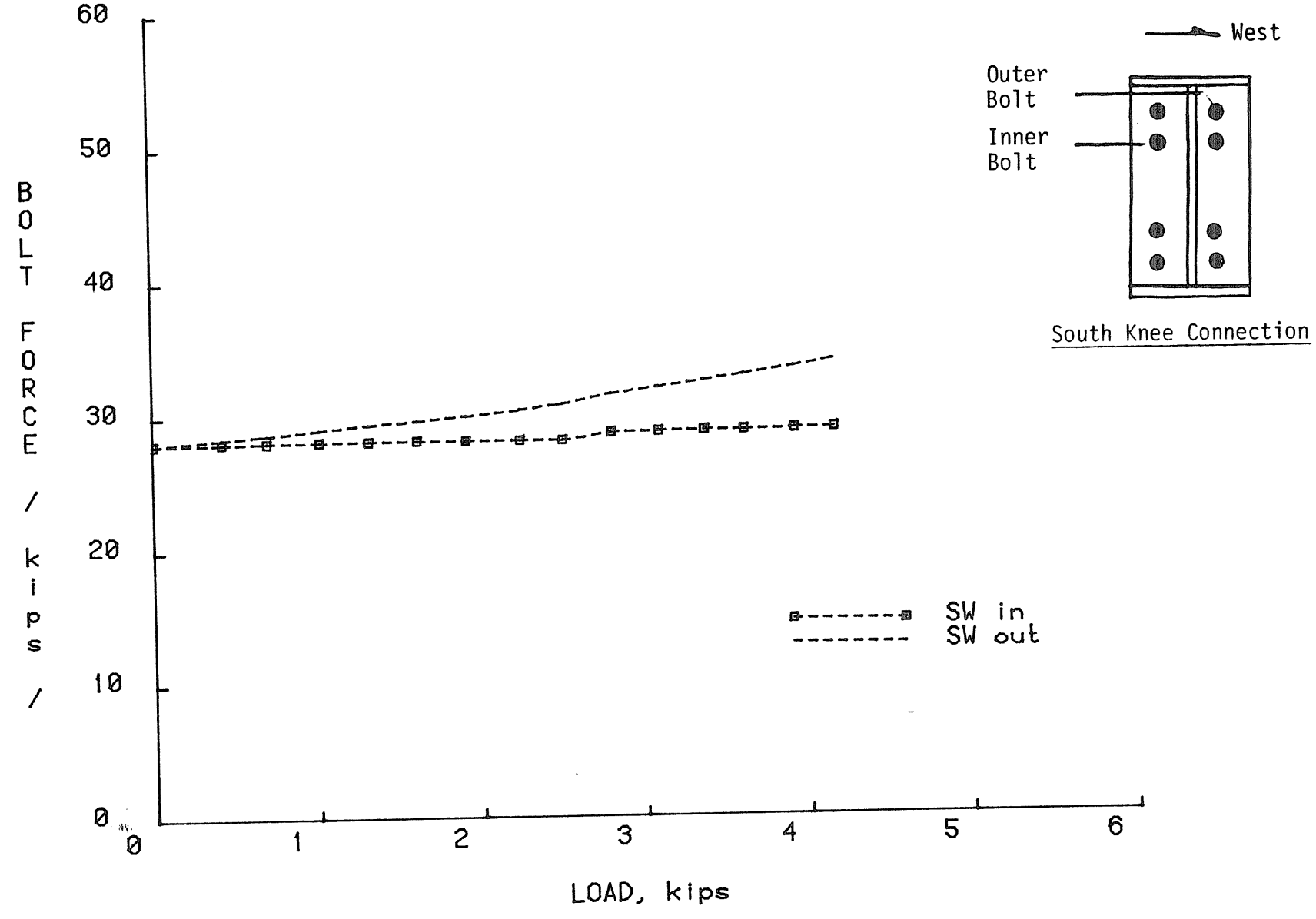


FIGURE D.8 S.W. KNEE CONNECTION BOLT FORCES VS. LOAD, TEST 3

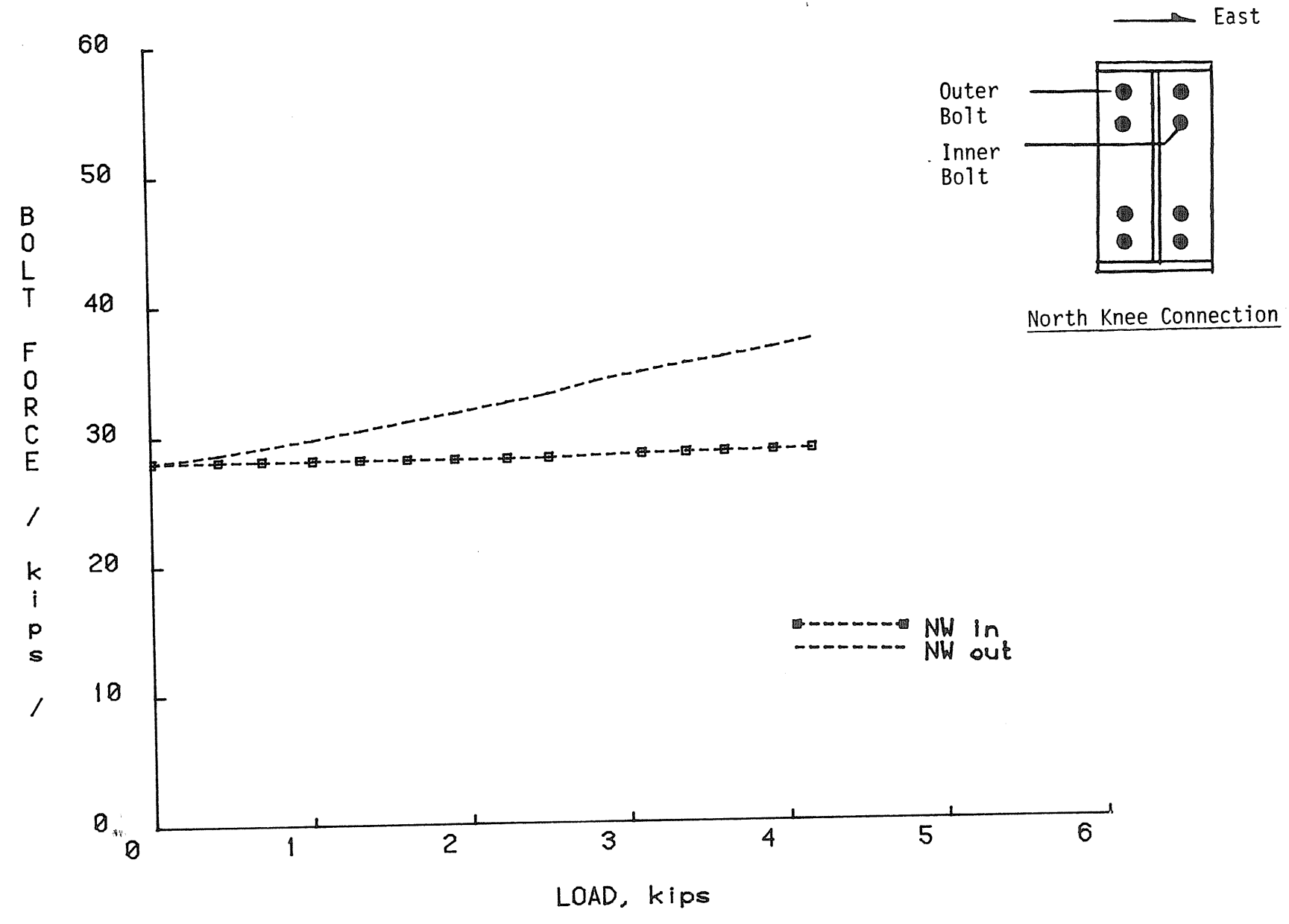


FIGURE D.9 N.E. RIDGE CONNECTION BOLT FORCES VS. LOAD, TEST 3

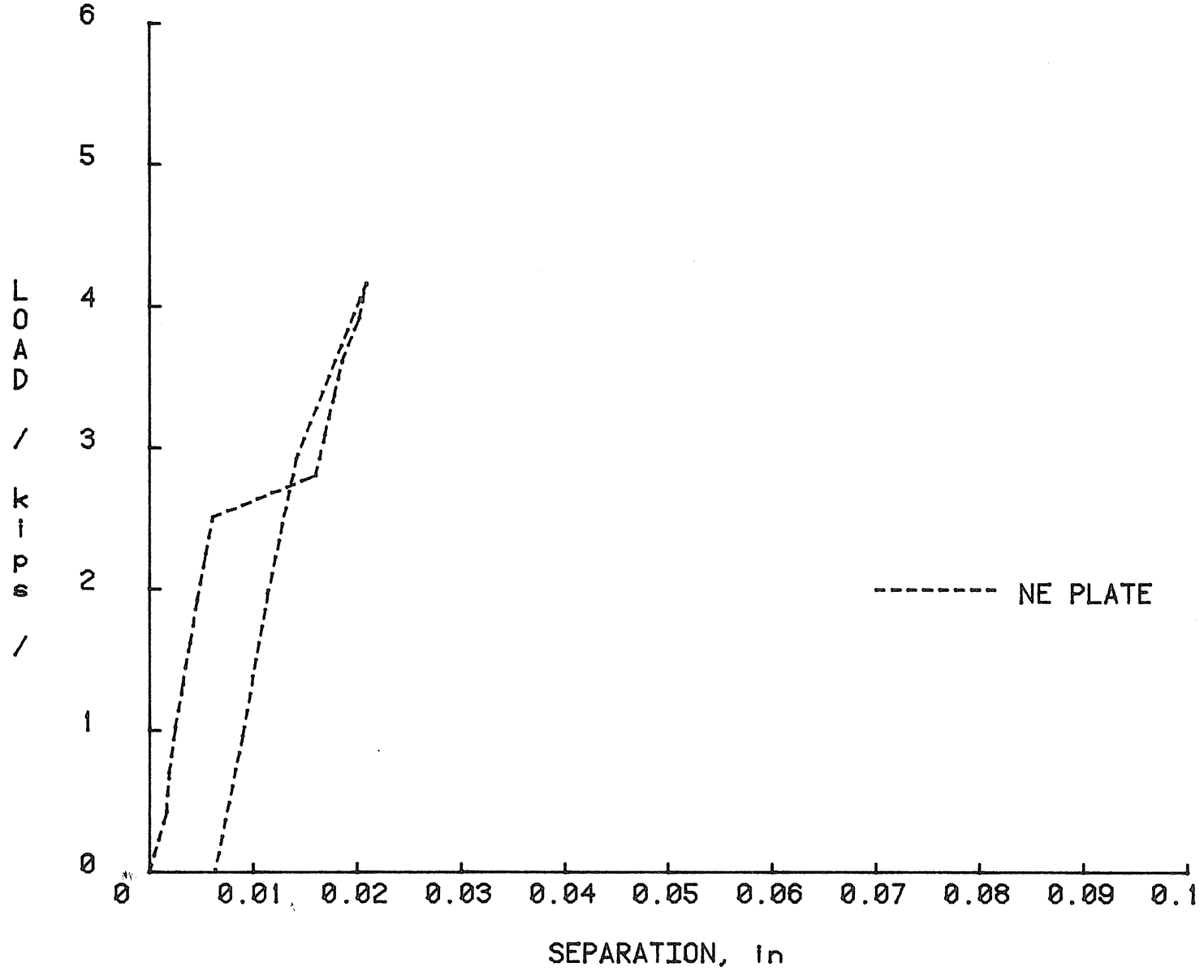


FIGURE D.10 LOAD VS. PLATE SEPARATION AT N.E. KNEE CONNECTION

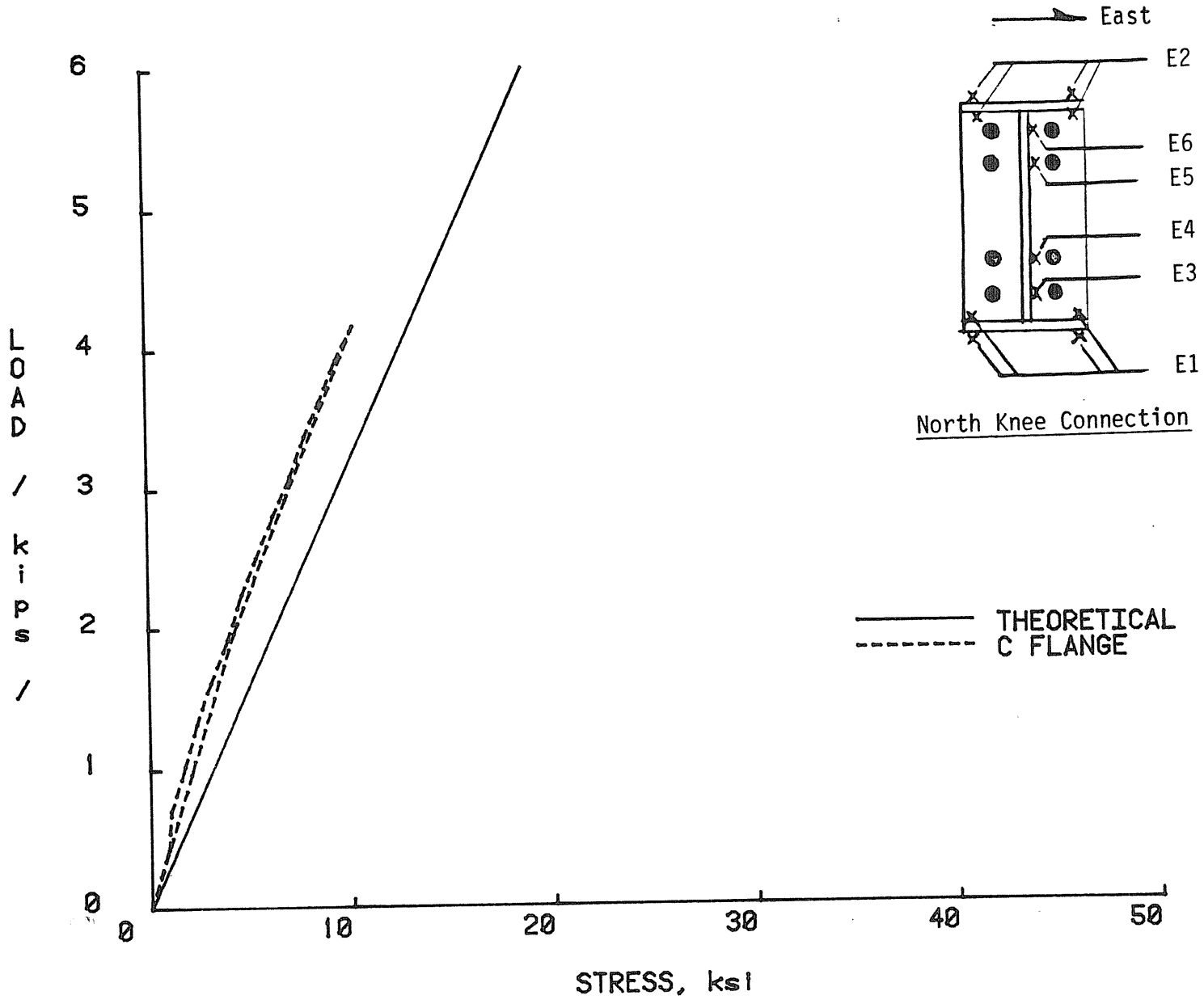


FIGURE D.11 LOAD VS. FLANGE STRESS AT LOCATION E1, TEST 3

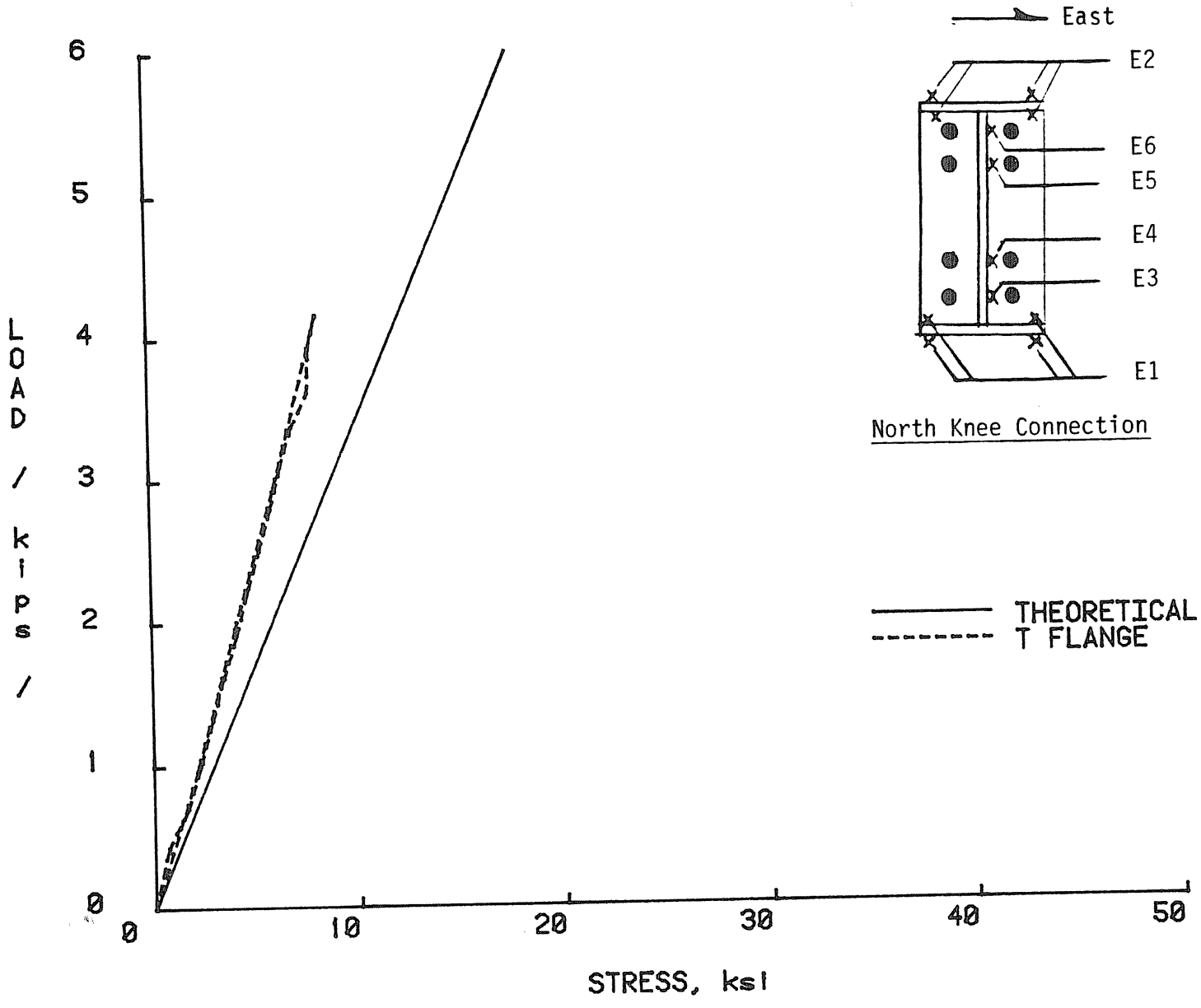


FIGURE D.12 LOAD VS. WEB STRESS AT LOCATION E2, TEST 3

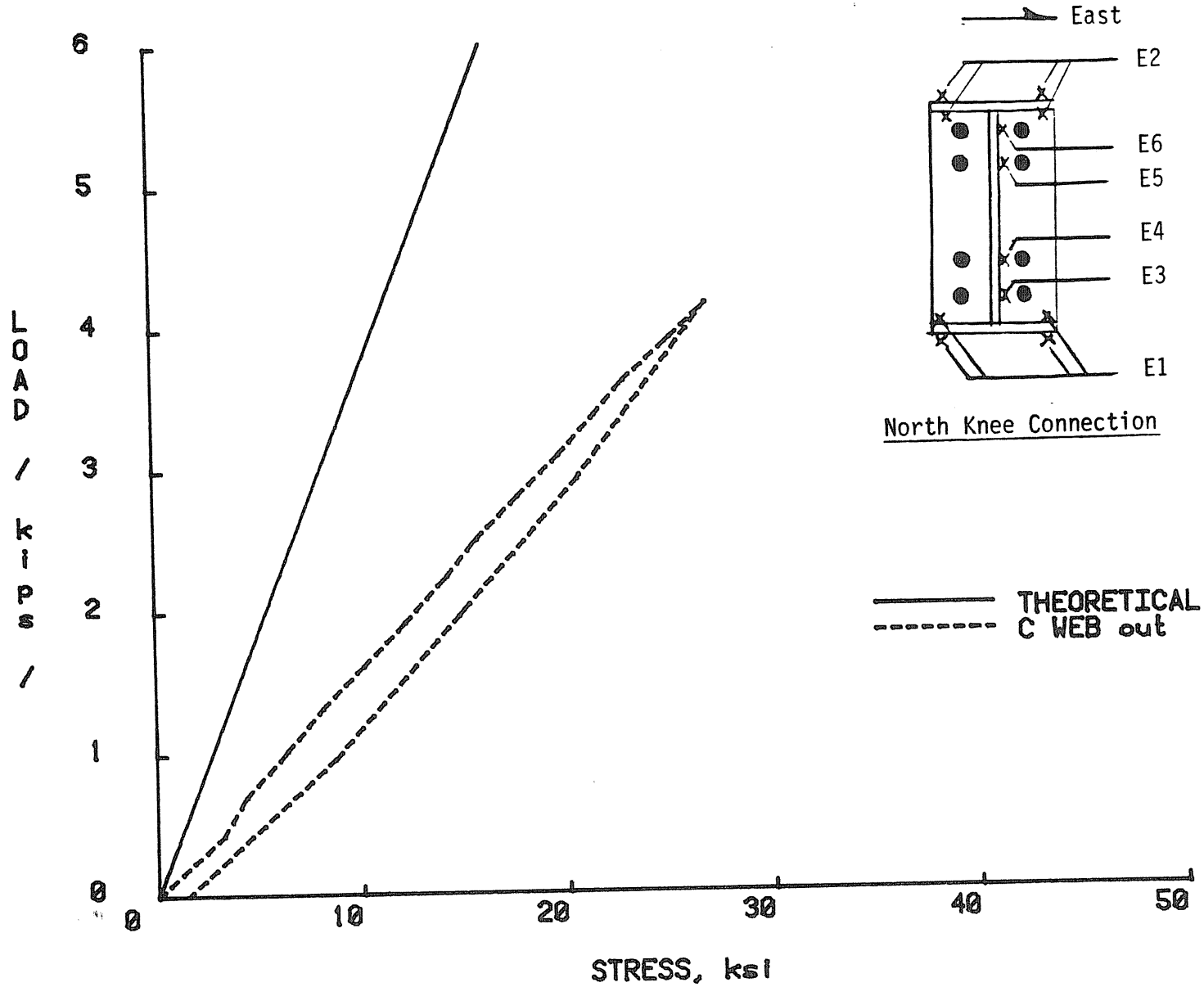


FIGURE D.13 LOAD VS. WEB STRESS AT LOCATION E3, TEST 3

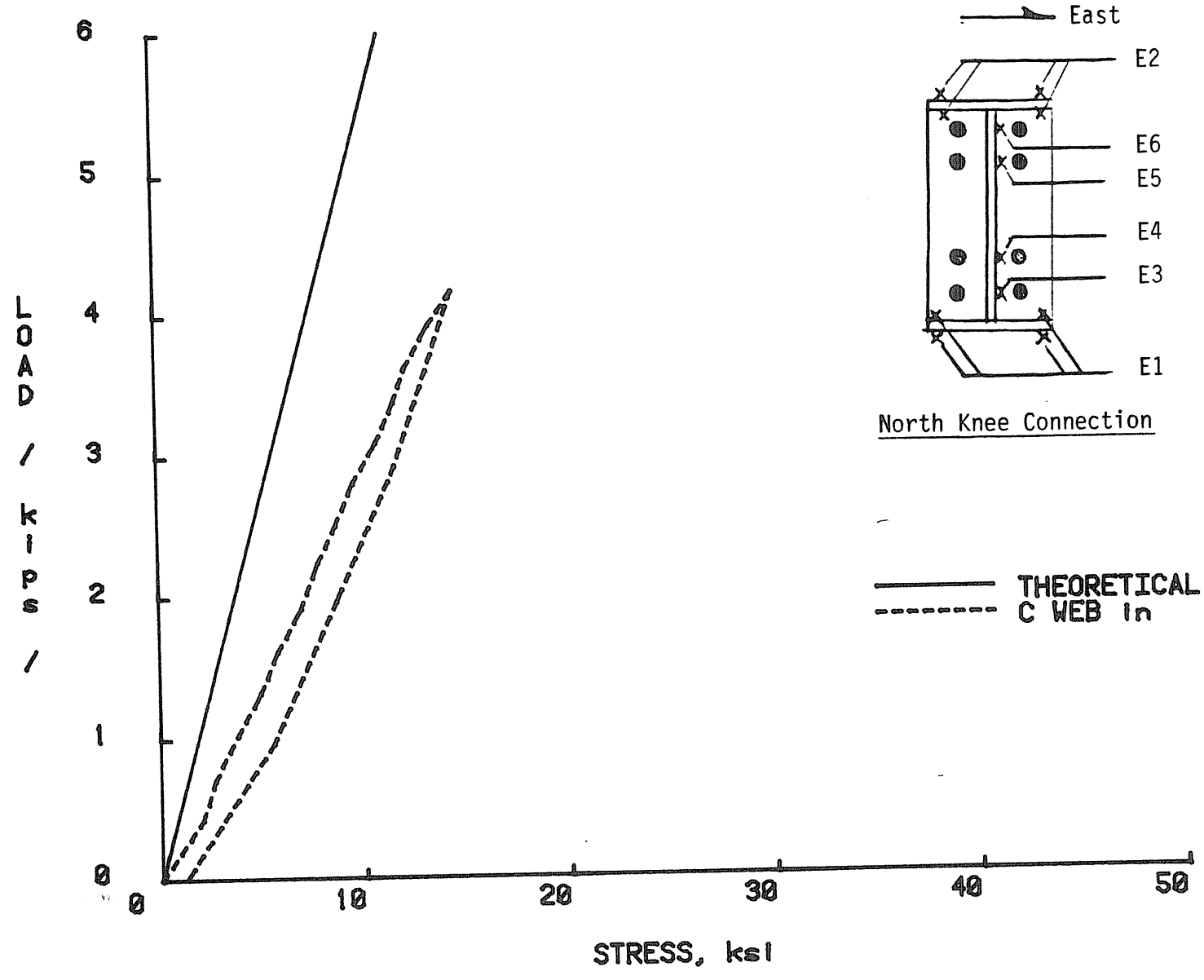


FIGURE D.14 LOAD VS. WEB STRESS AT LOCATION E4, TEST 3

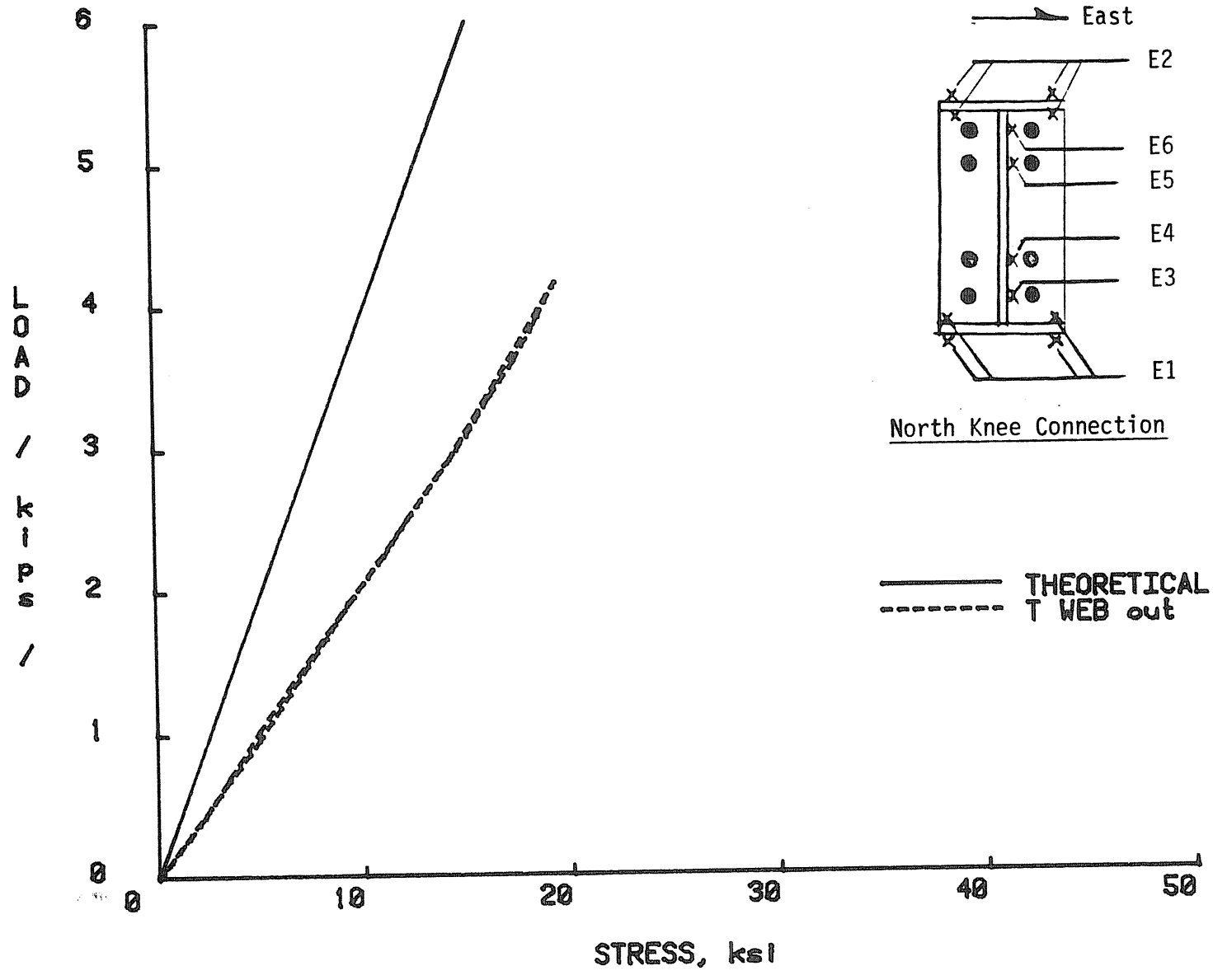


FIGURE D.15 LOAD VS. WEB STRESS AT LOCATION E6, TEST 3

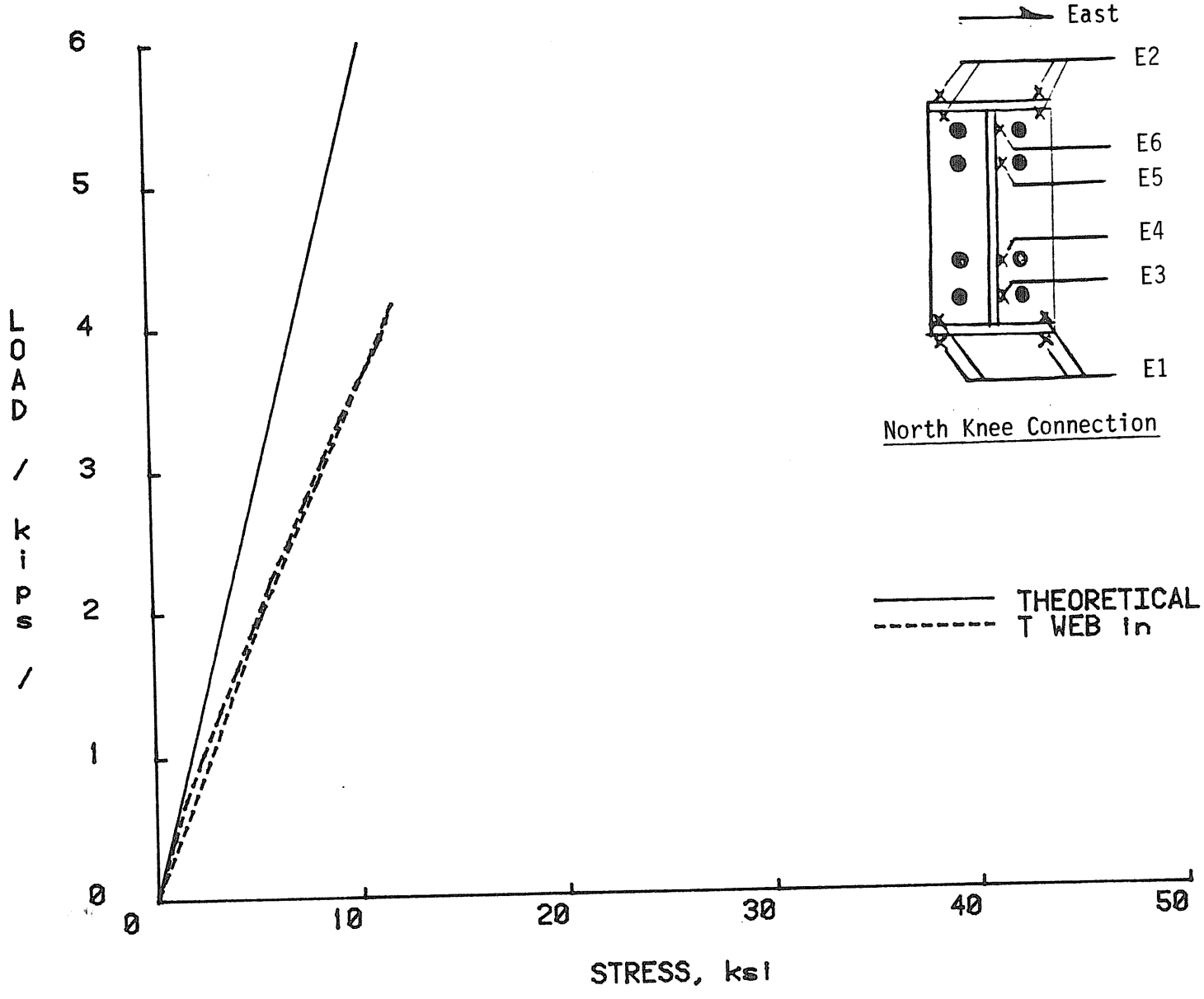


FIGURE D.16 LOAD VS. FLANGE STRESS AT LOCATION E5, TEST 3

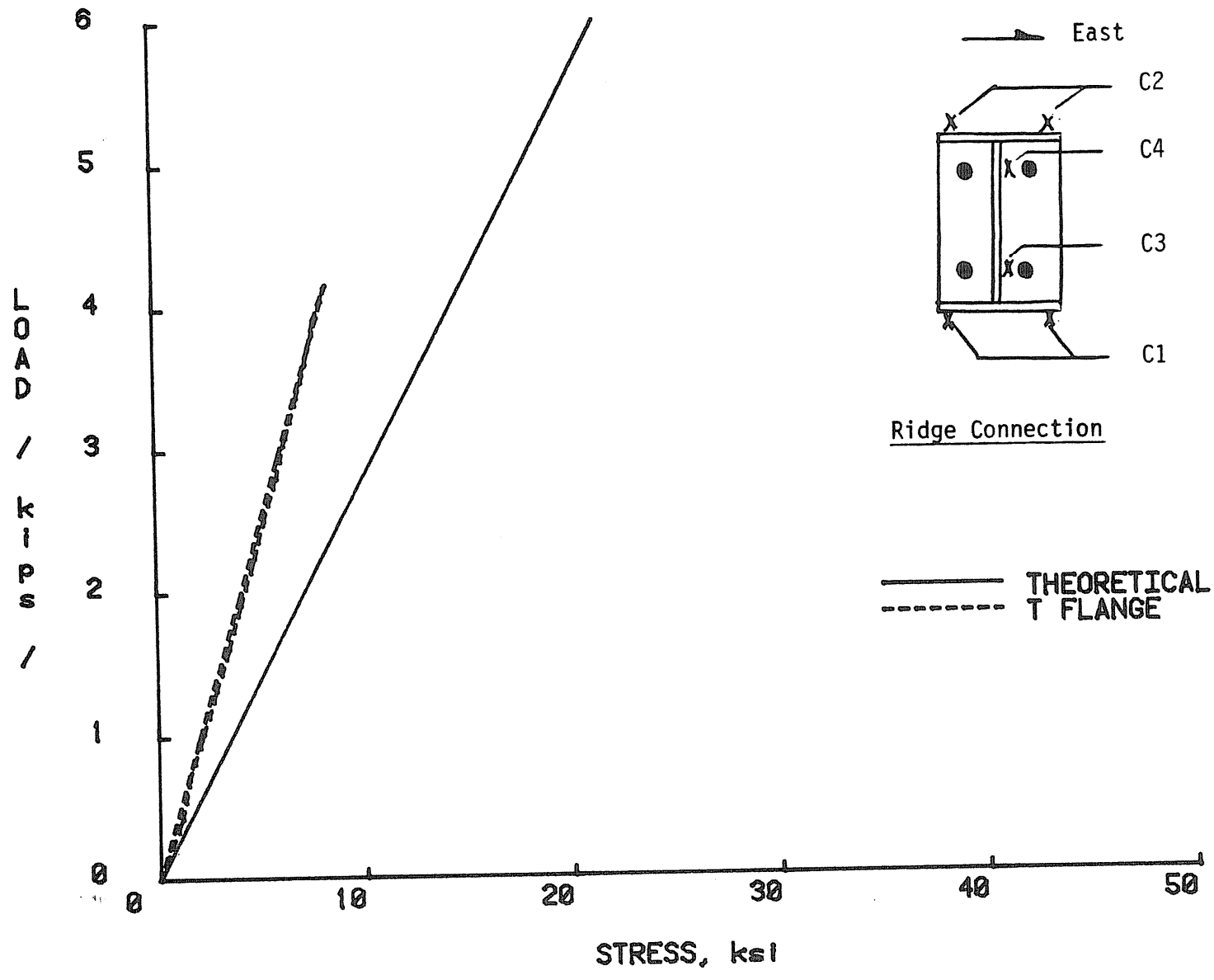


FIGURE D.17 LOAD VS. FLANGE STRESS AT LOCATION C1, TEST 3

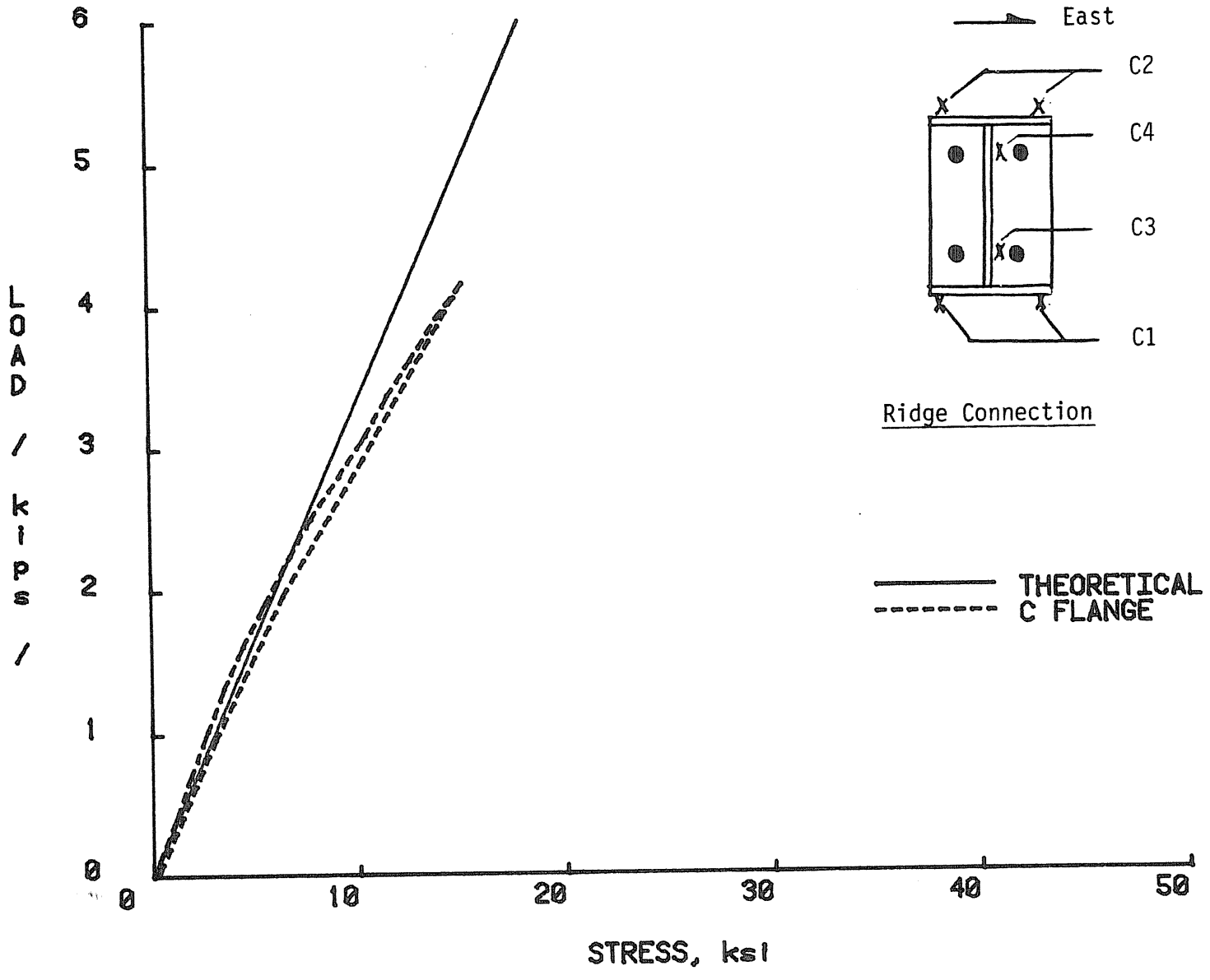


FIGURE D.18 LOAD VS. WEB STRESS AT LOCATION C2, TEST 3

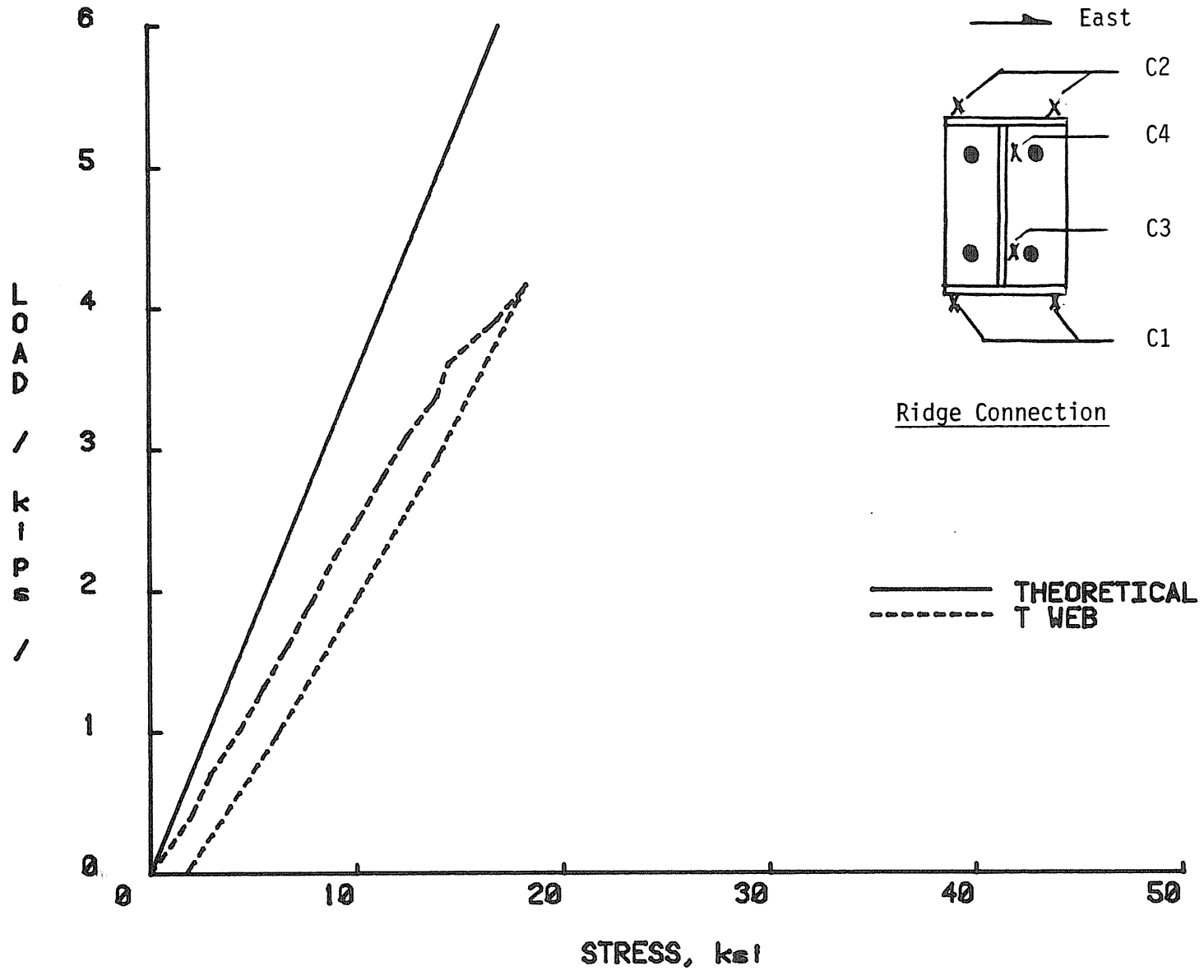


FIGURE D.19 LOAD VS. WEB STRESS AT LOCATION C3, TEST 3

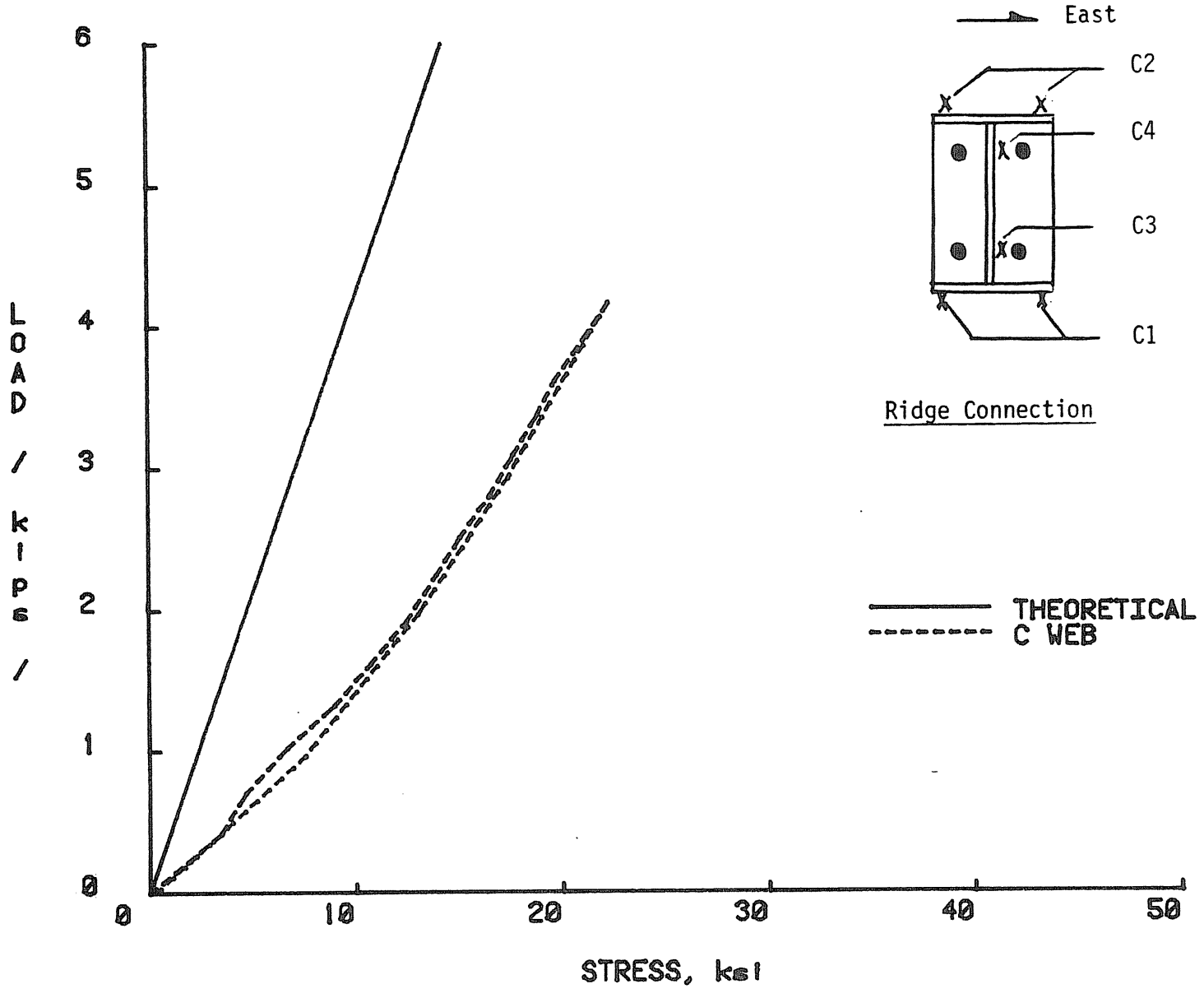


FIGURE D.20 LOAD VS. WEB STRESS AT LOCATION C4, TEST 3

APPENDIX E

WORKING LEVEL COMBINED WIND AND UNBALANCED LIVE LOAD

TEST 4

MESCO FRAME TEST SUMMARY

Project: Mesco FR2

Test No.: Test 4

Test Date: February 4, 1985

Purpose: Test of combined working level unbalanced live and wind loading

Bolt Diameter: 3/4" **Pretension Force per Bolt:** 28^{k}

Maximum Test Load: Gravity: 2.50^{k} lateral: 5.6^{k}

Discussion:

- Linear elastic behavior was observed throughout the loading sequence.
- Centerline vertical deflections agreed closely with the theoretical prediction for both gravity and wind loading.
- Quarter point vertical deflections of the gravity loaded runs were accurately predicted for both gravity and lateral loads while those of the unloaded run were underestimated for the gravity loading.
- Lateral displacements were reasonably predicted for the entire loading sequence.
- The northwest panel displacement underwent a reversal in the direction of lateral deflections with the application of wind load while the southwest panel continued its increase.

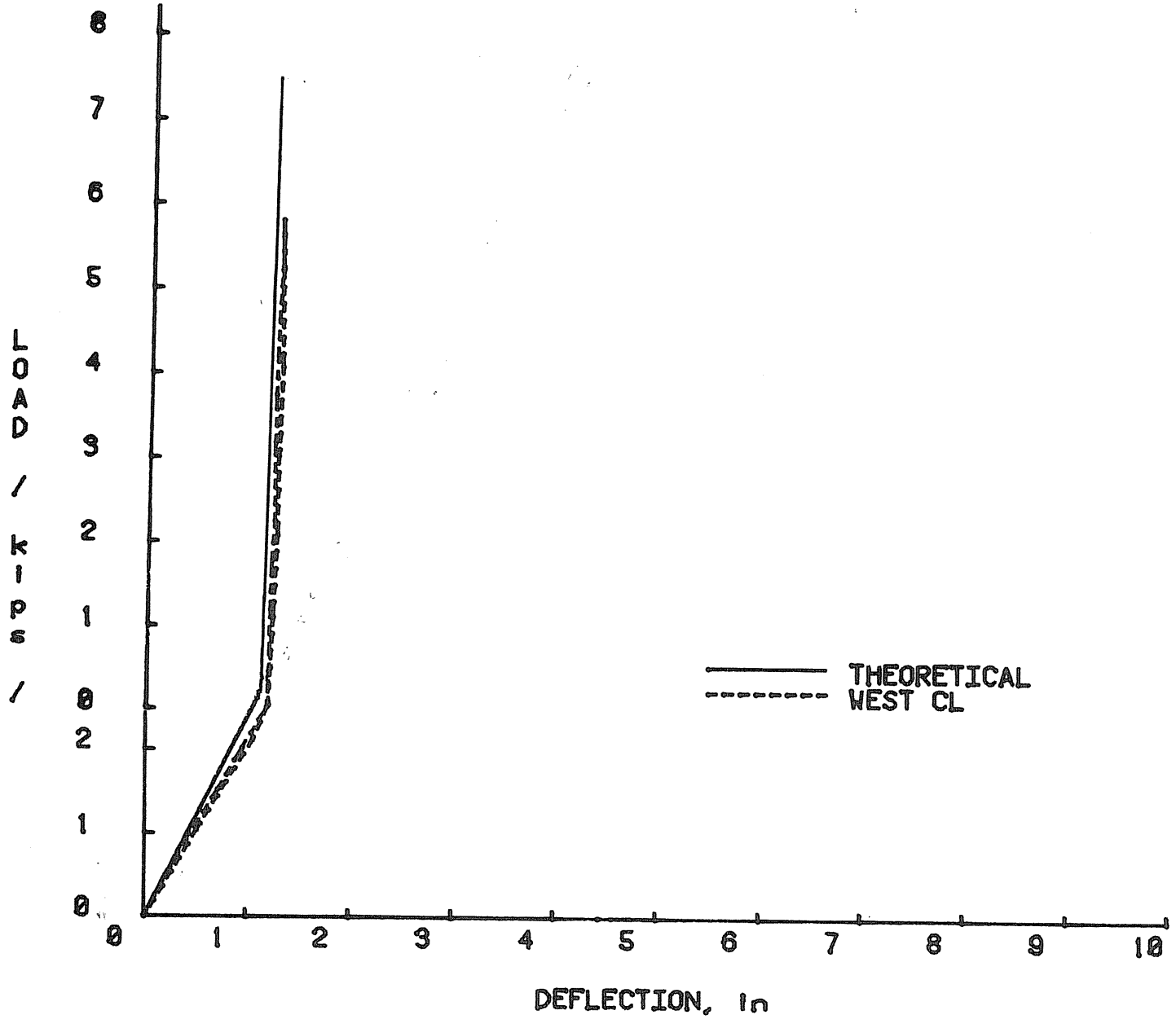


FIGURE E.1 LOAD VS. CENTERLINE DEFLECTION, WEST FRAME, TEST 4

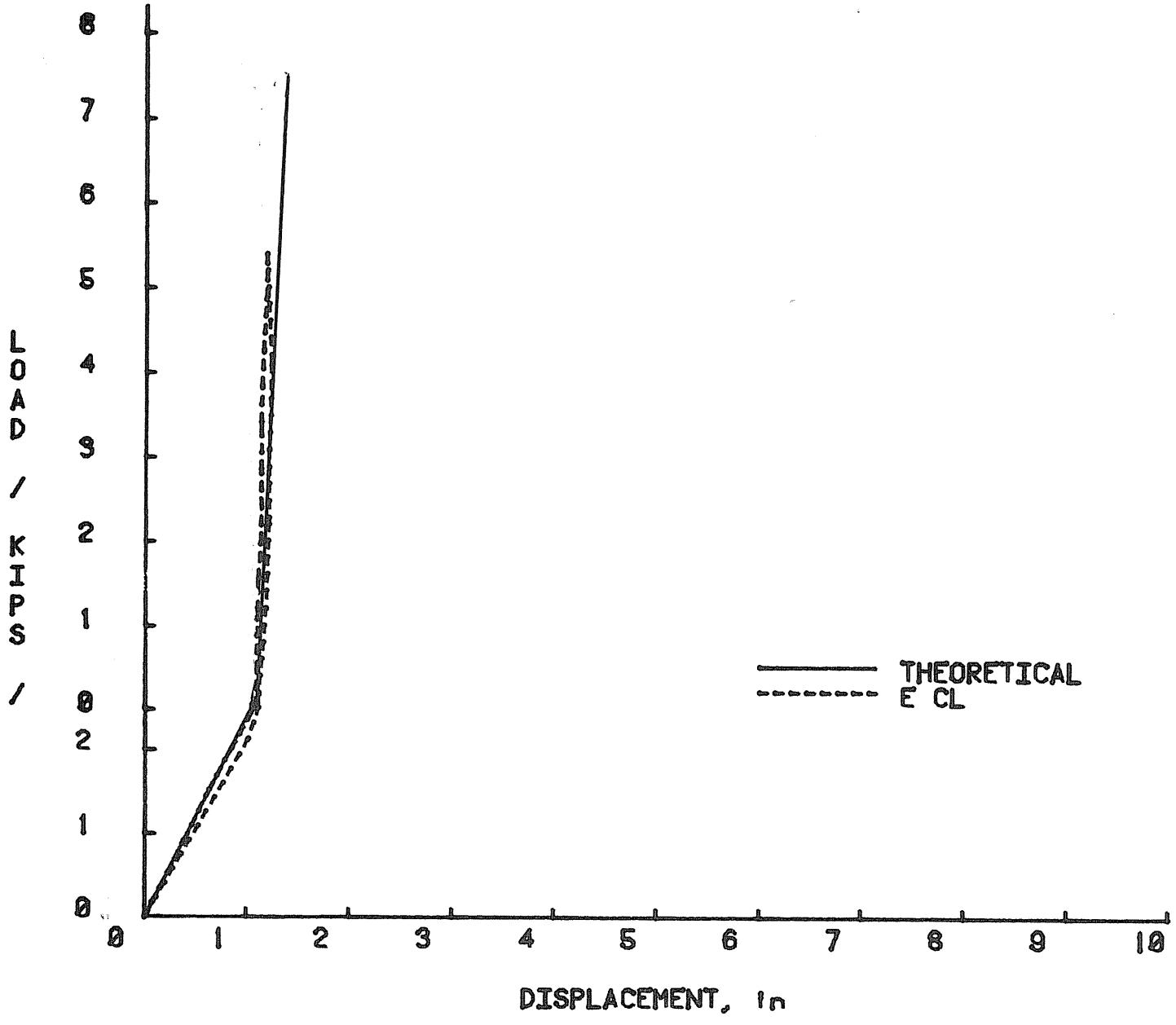


FIGURE E.2 LOAD VS. CENTERLINE DEFLECTION, EAST FRAME, TEST 4

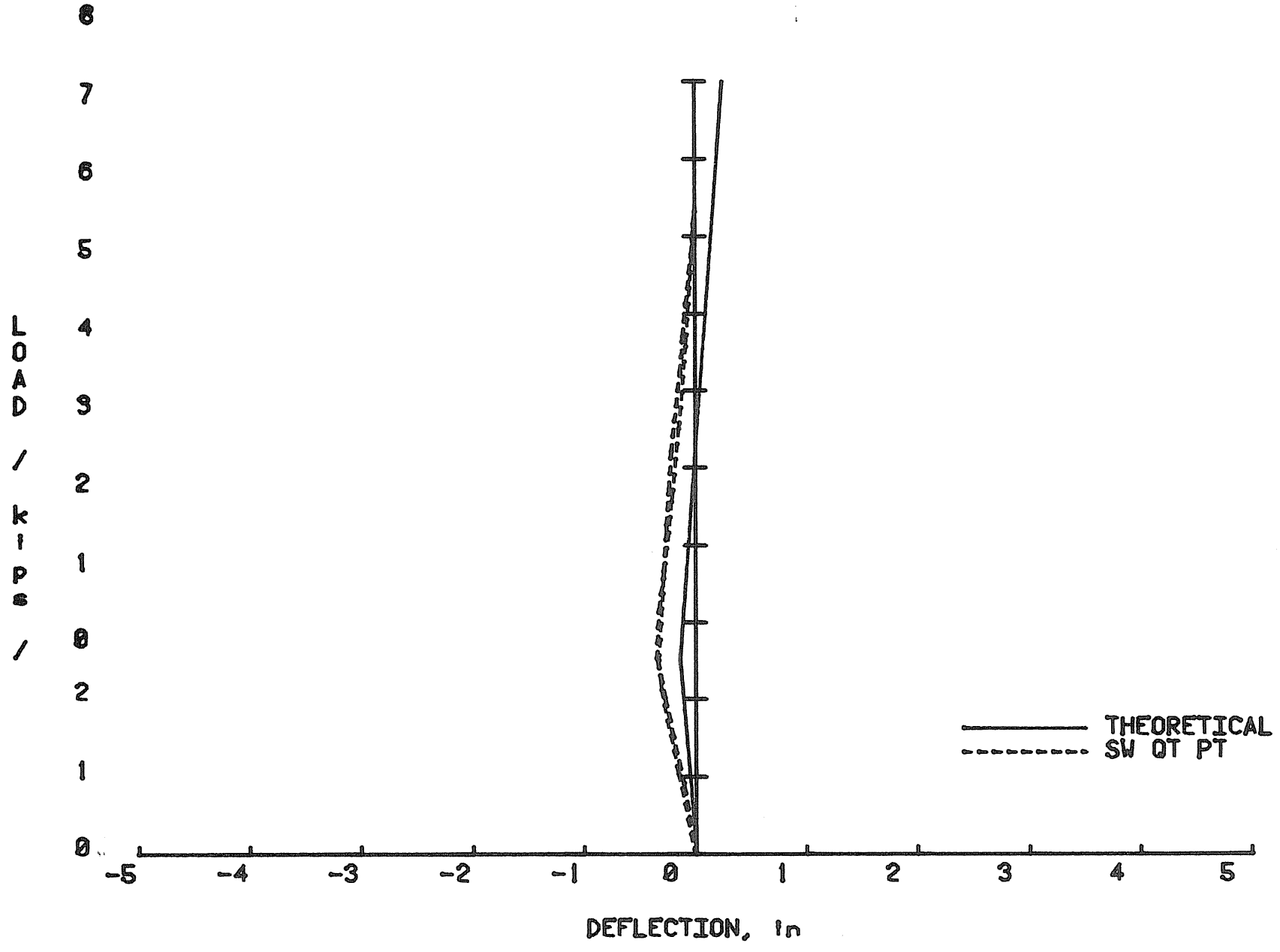


FIGURE E.3 LOAD VS. S.W. QUARTERPOINT DEFLECTION, TEST 4

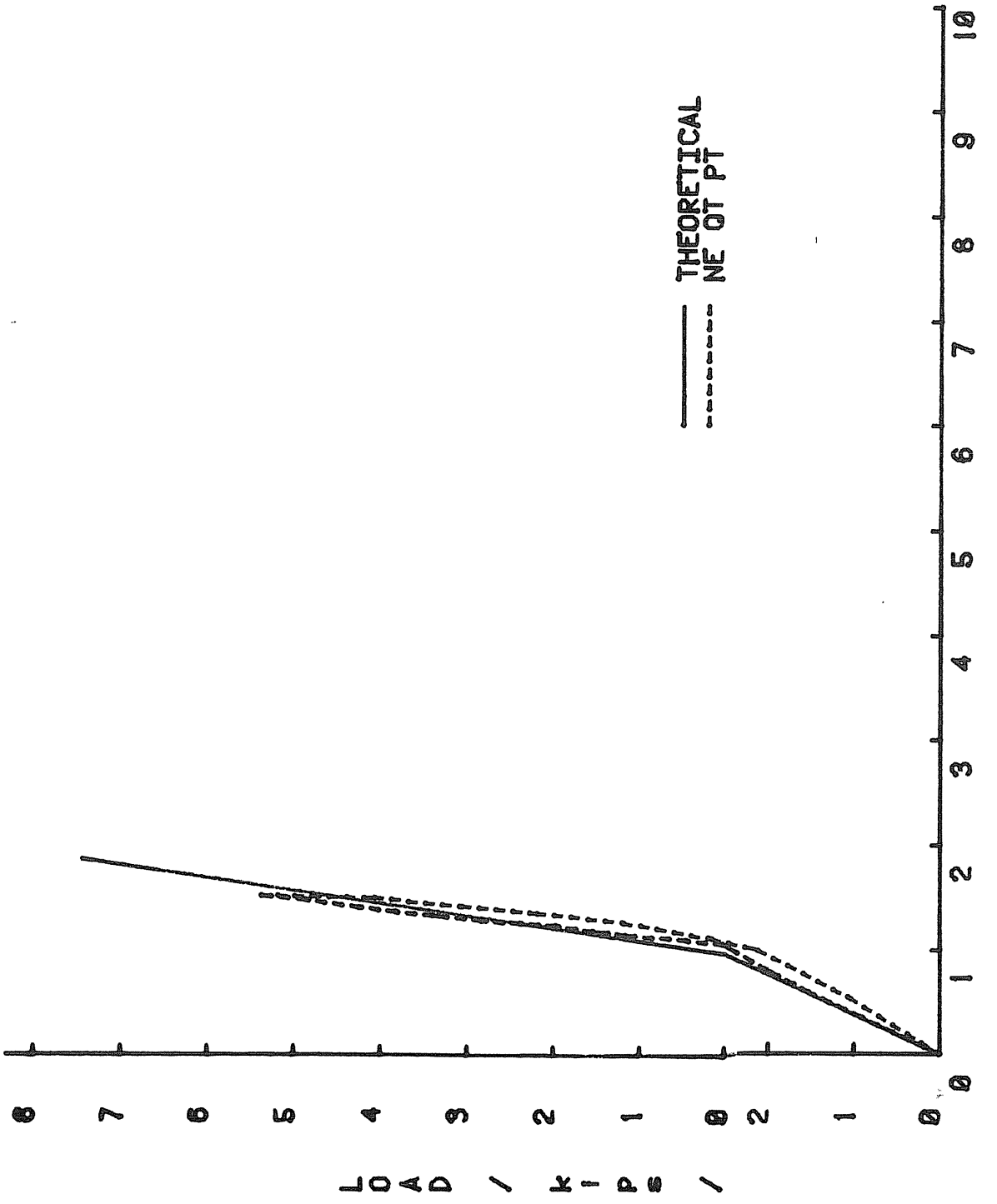


FIGURE E.4 LOAD VS. N.E. QUARTERPOINT DEFLECTION, TEST 4

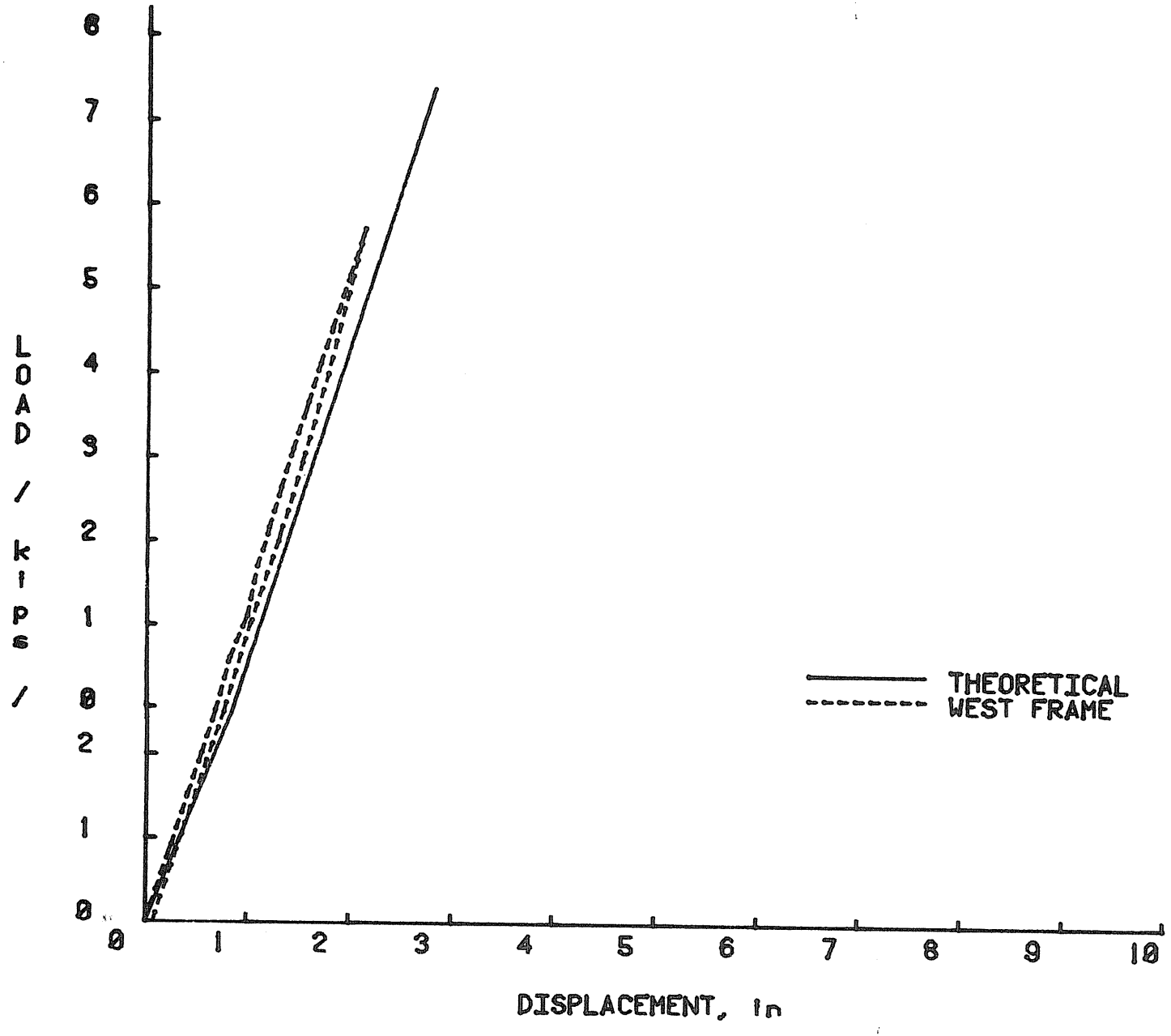


FIGURE E.5 LOAD VS. LATERAL DEFLECTION, WEST FRAME, TEST 4

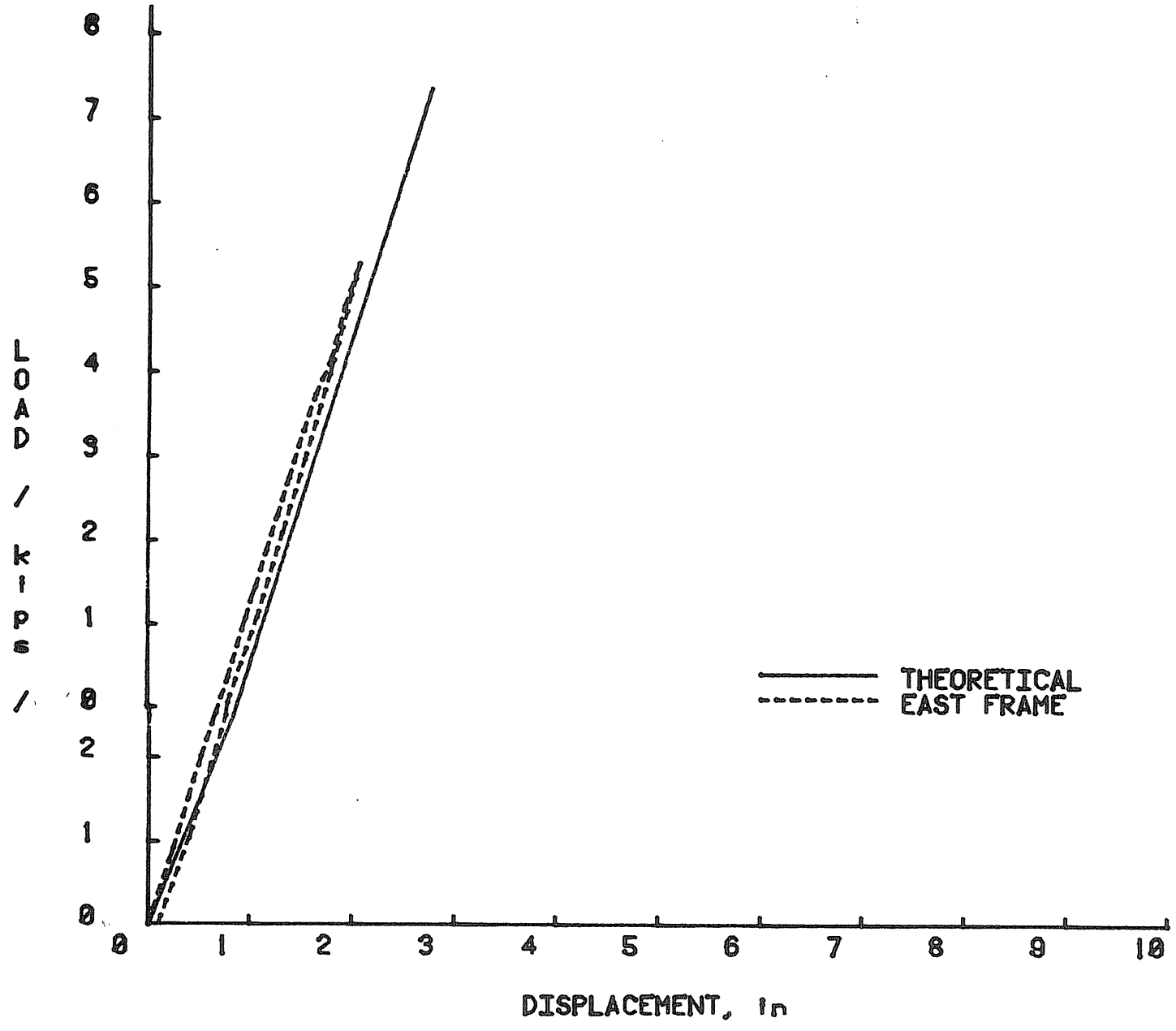


FIGURE E.6 LOAD VS. LATERAL DEFLECTION, EAST FRAME, TEST 4

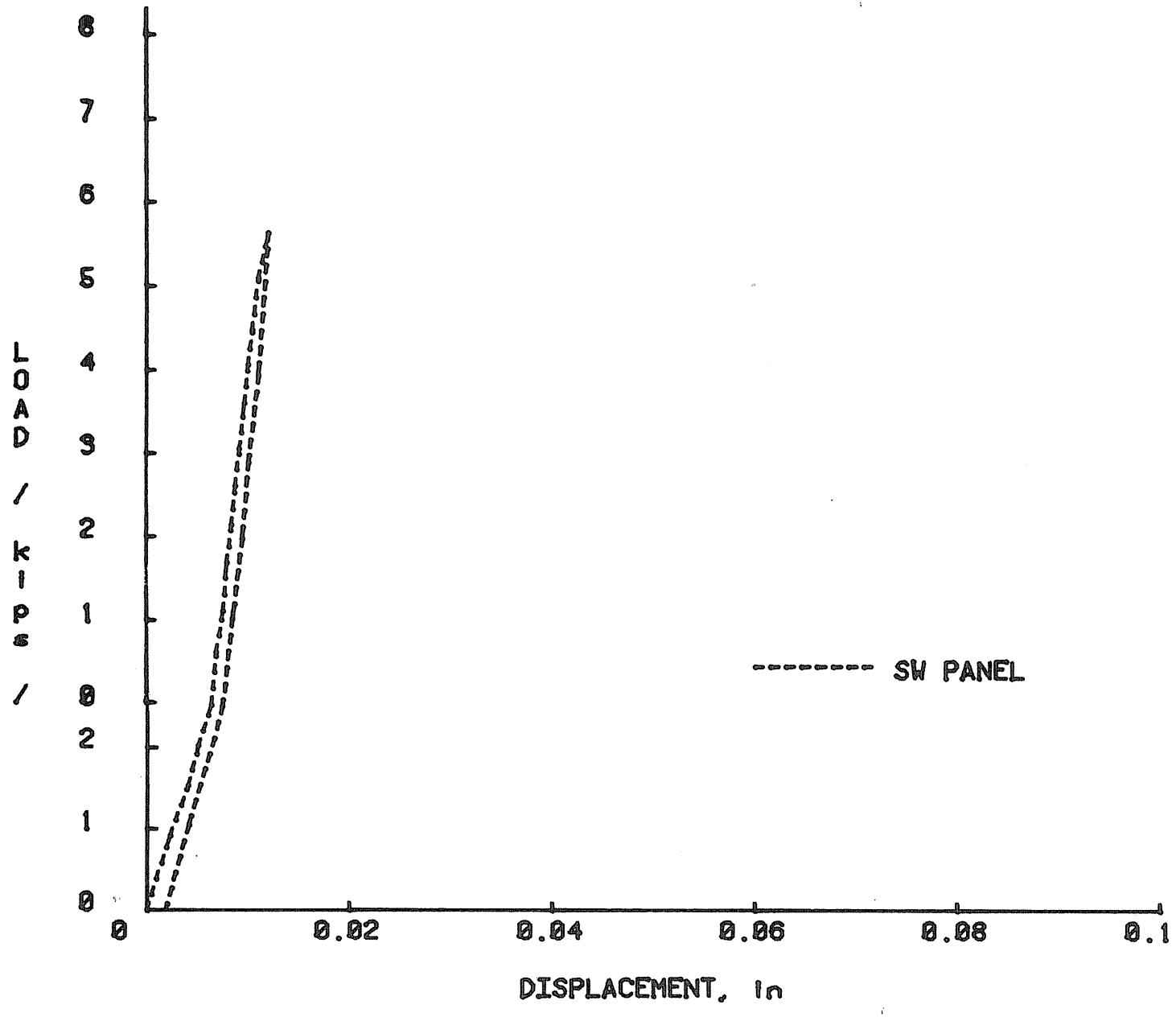


FIGURE E.7 LOAD VS. S.W. PANEL ZONE DISPLACEMENT, TEST 4

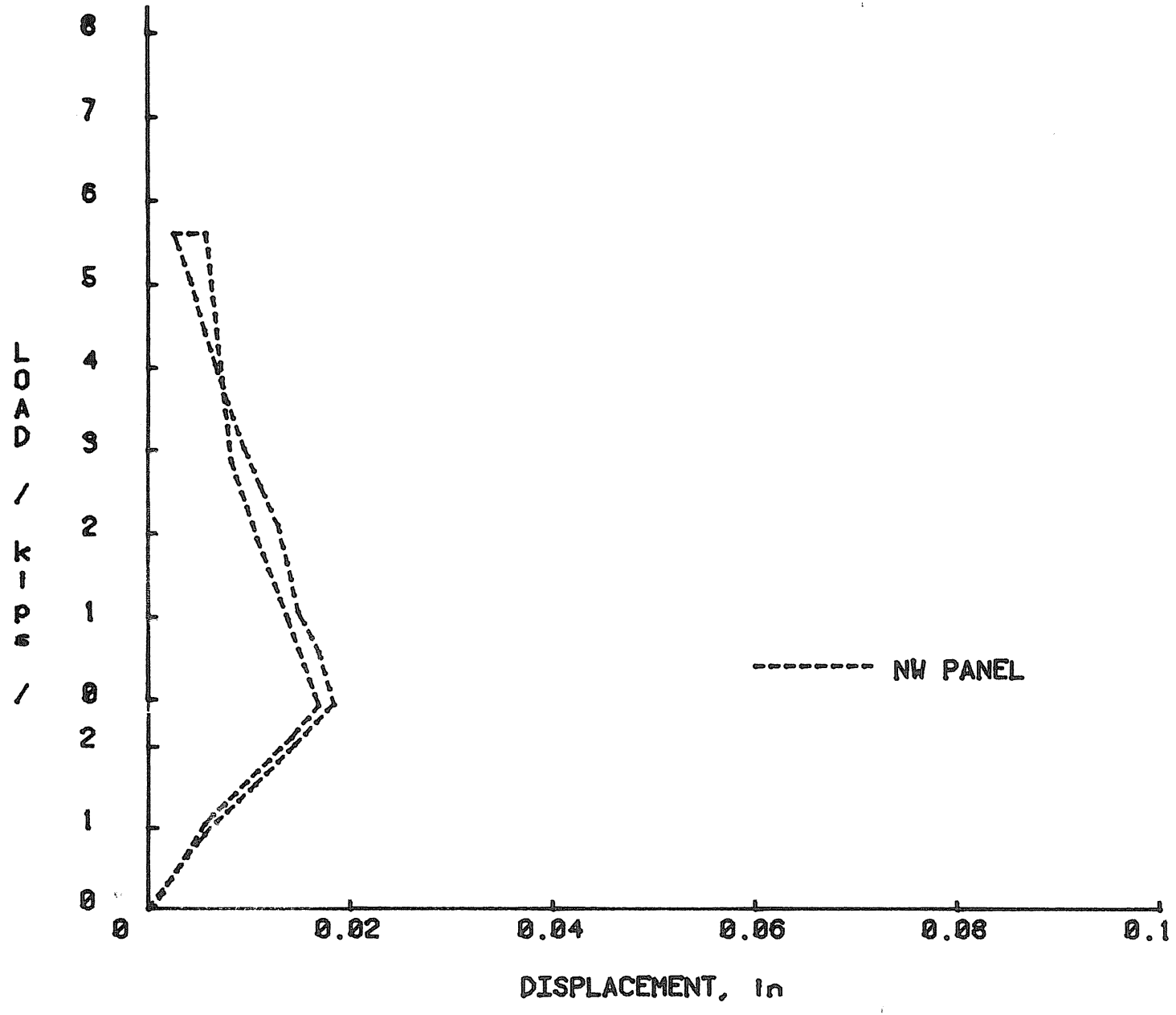


FIGURE E.8 LOAD VS. N.W. PANEL ZONE DISPLACEMENT, TEST 4

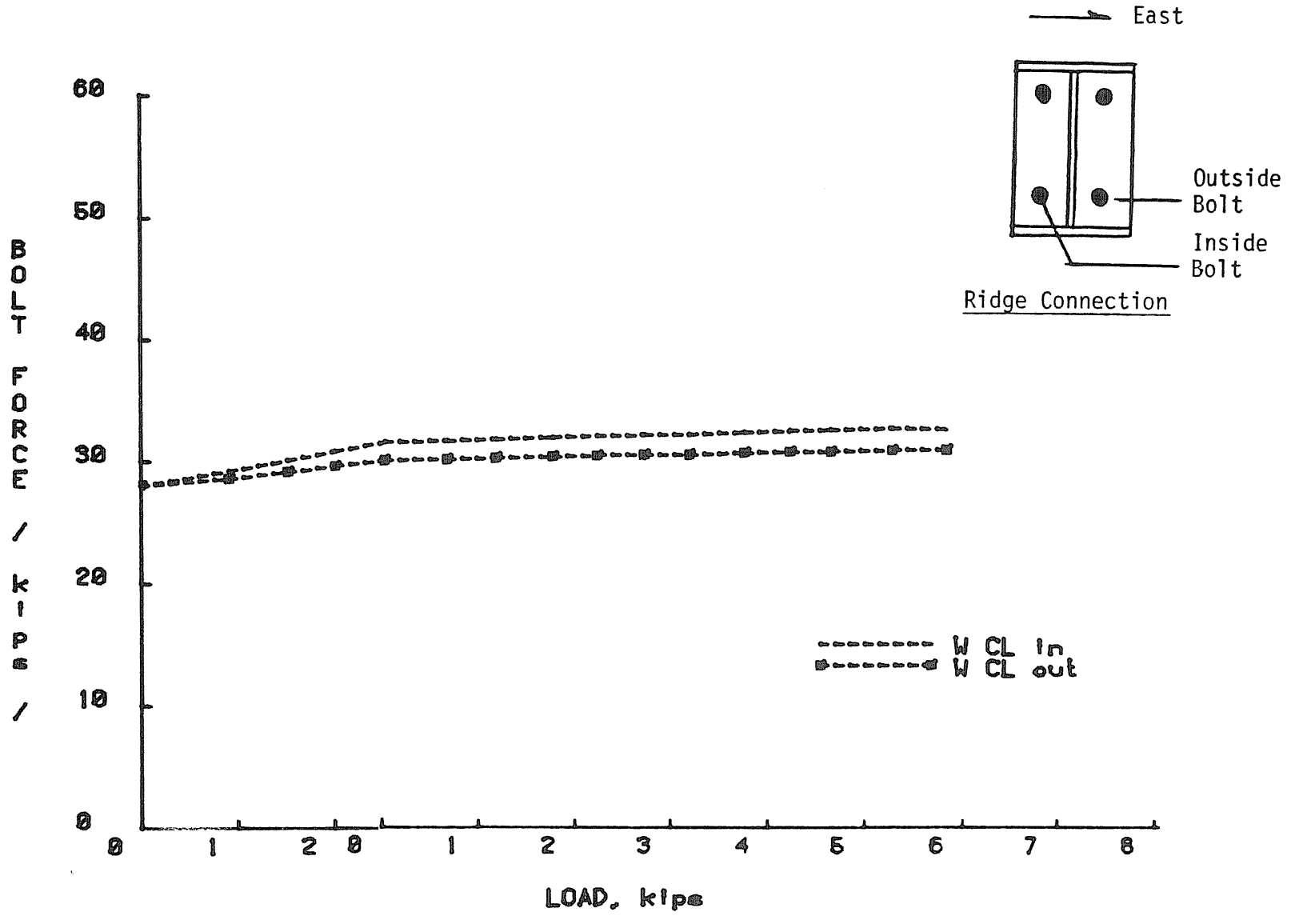


FIGURE E.9 RIDGE CONNECTION BOLT FORCES VS. LOAD, TEST 4

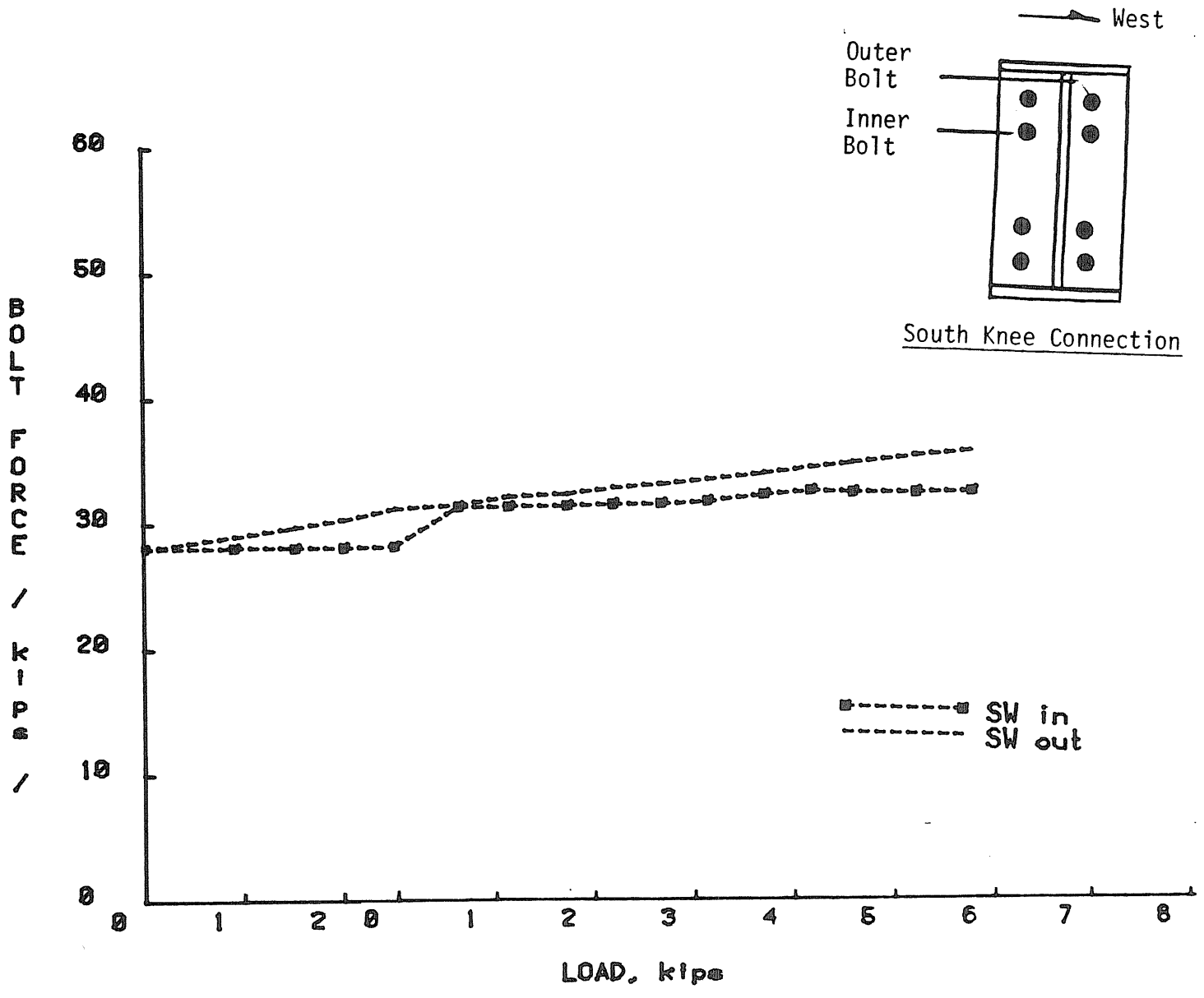


FIGURE E.10 S.W. KNEE CONNECTION BOLT FORCES VS. LOAD, TEST 4

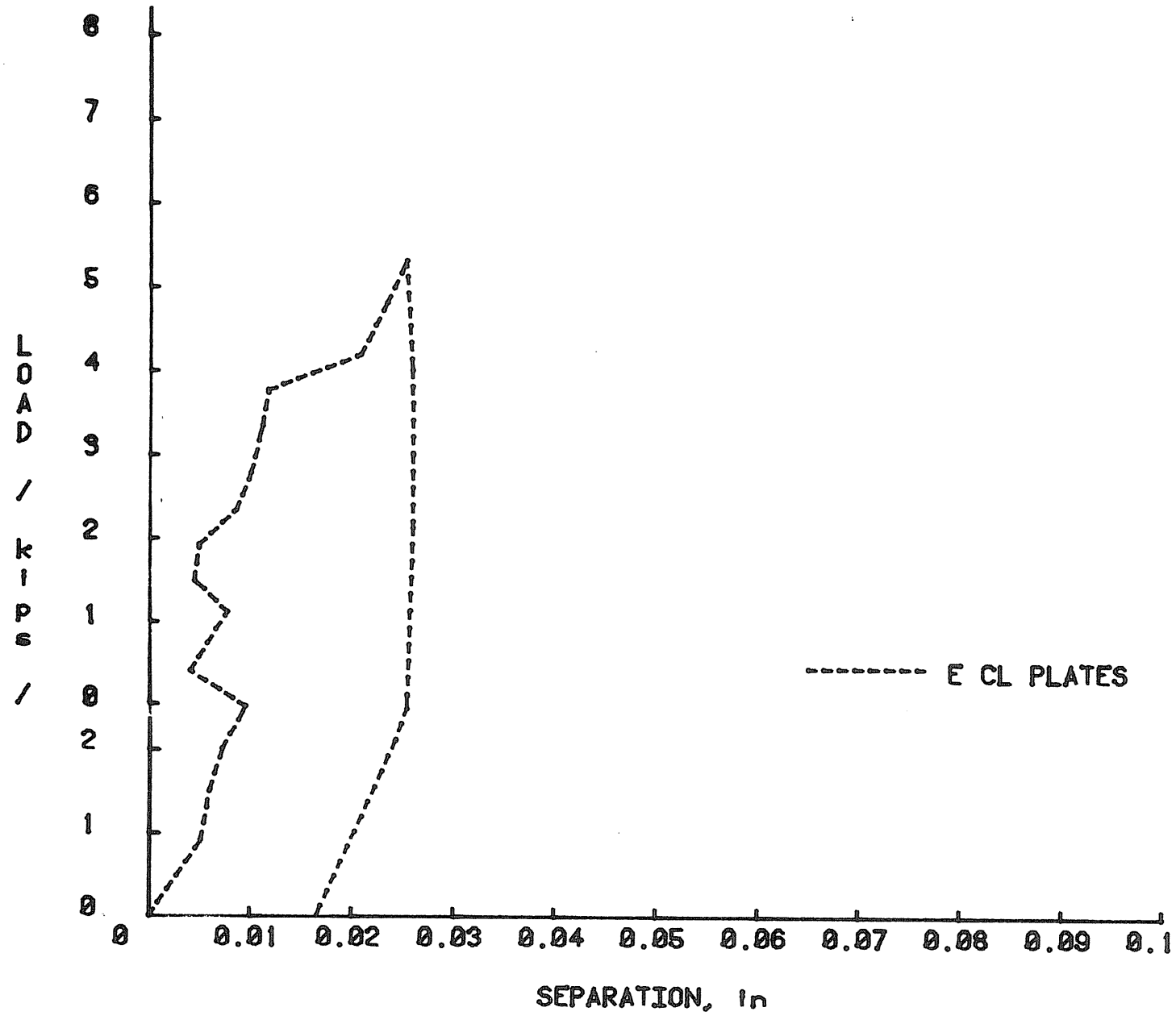


FIGURE E.11 LOAD VS. PLATE SEPARATION AT RIDGE CONNECTION, TEST 4

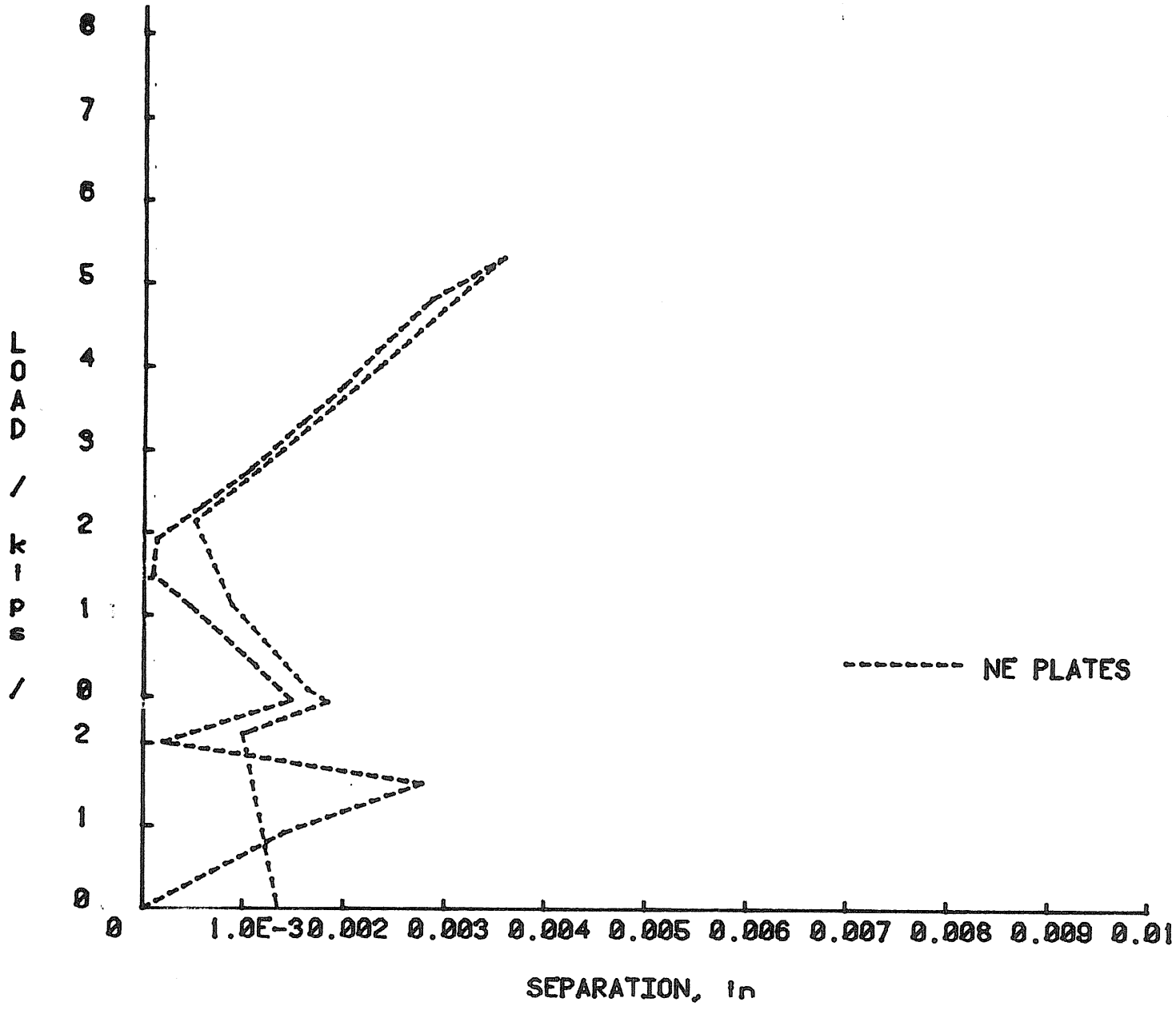


FIGURE E.12 LOAD VS. PLATE SEPARATION AT N.E. KNEE CONNECTION, TEST 4

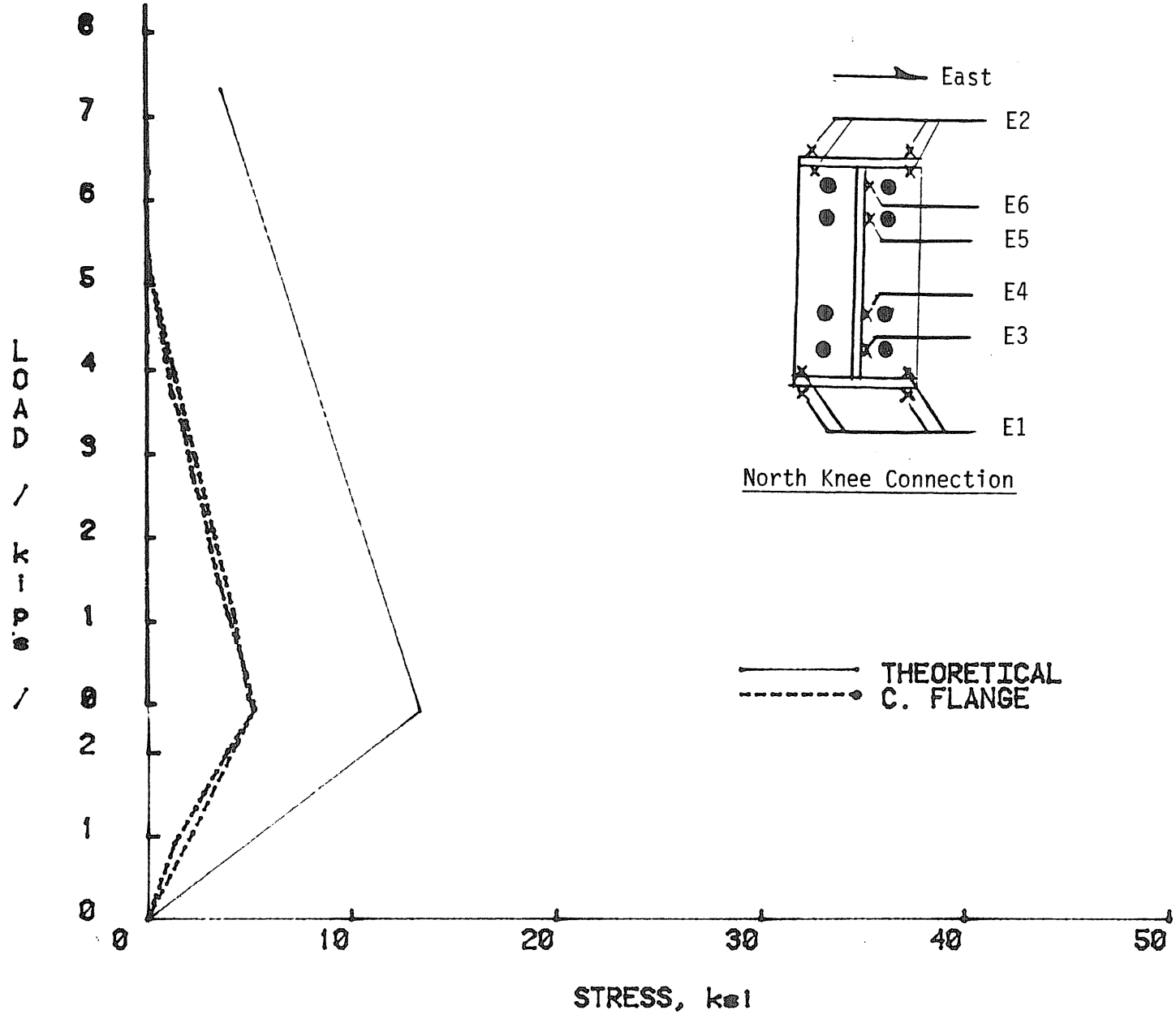


FIGURE E.13 LOAD VS. FLANGE STRESS AT LOCATION E1, TEST 4

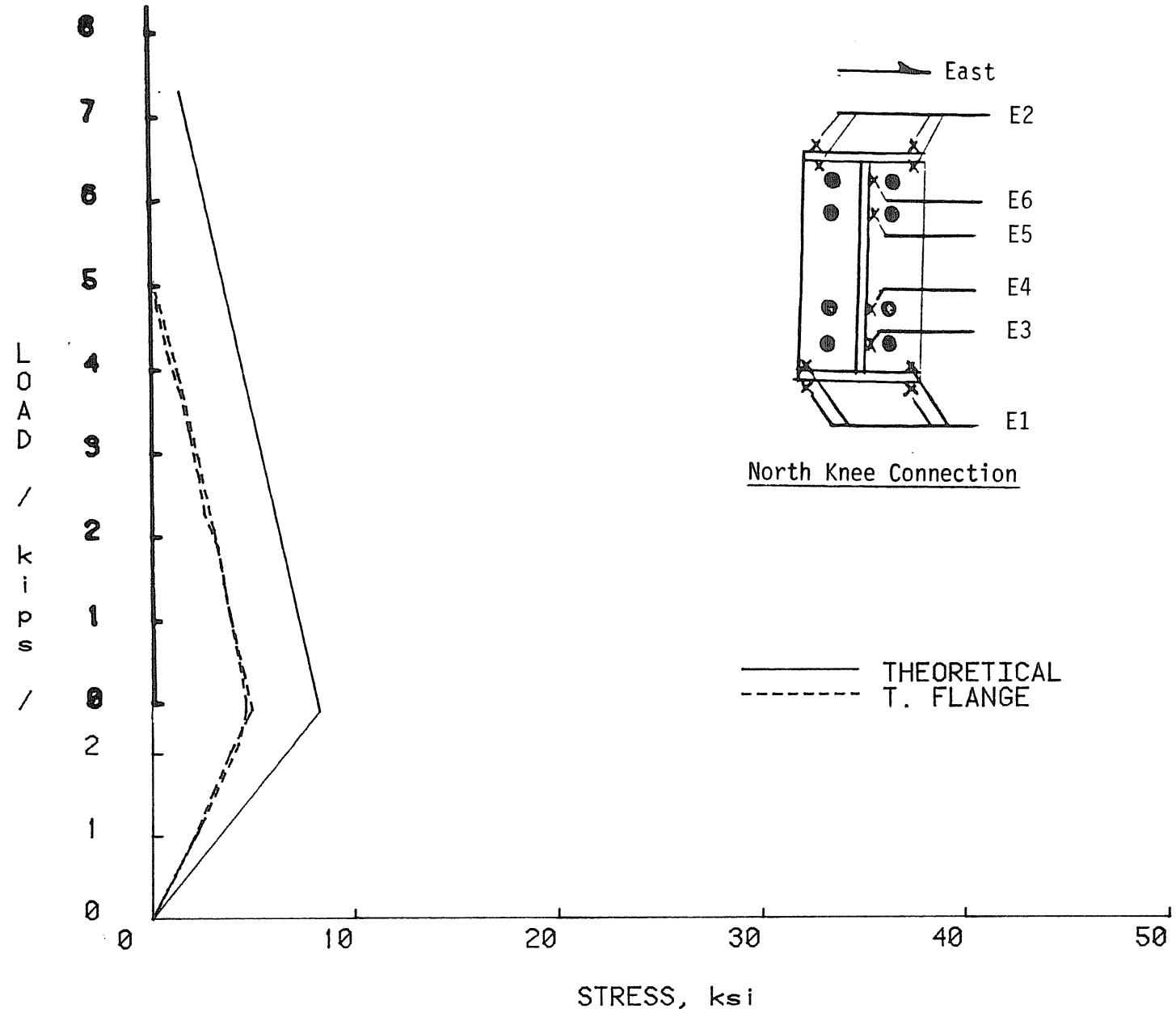


FIGURE E.14 LOAD VS. FLANGE STRESS AT LOCATION E2, TEST 4

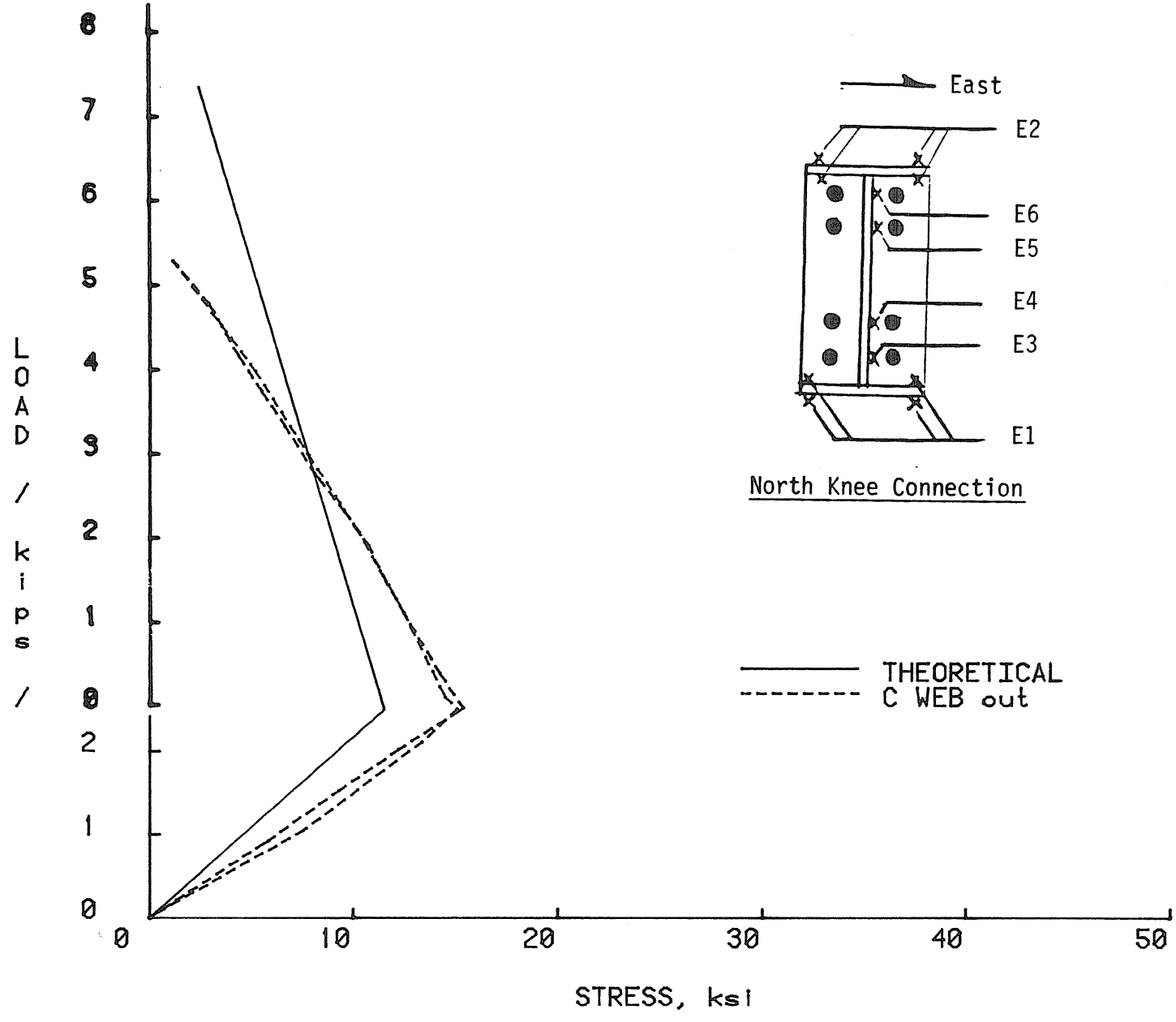


FIGURE E.15 LOAD VS. WEB STRESS AT LOCATION E3, TEST 4

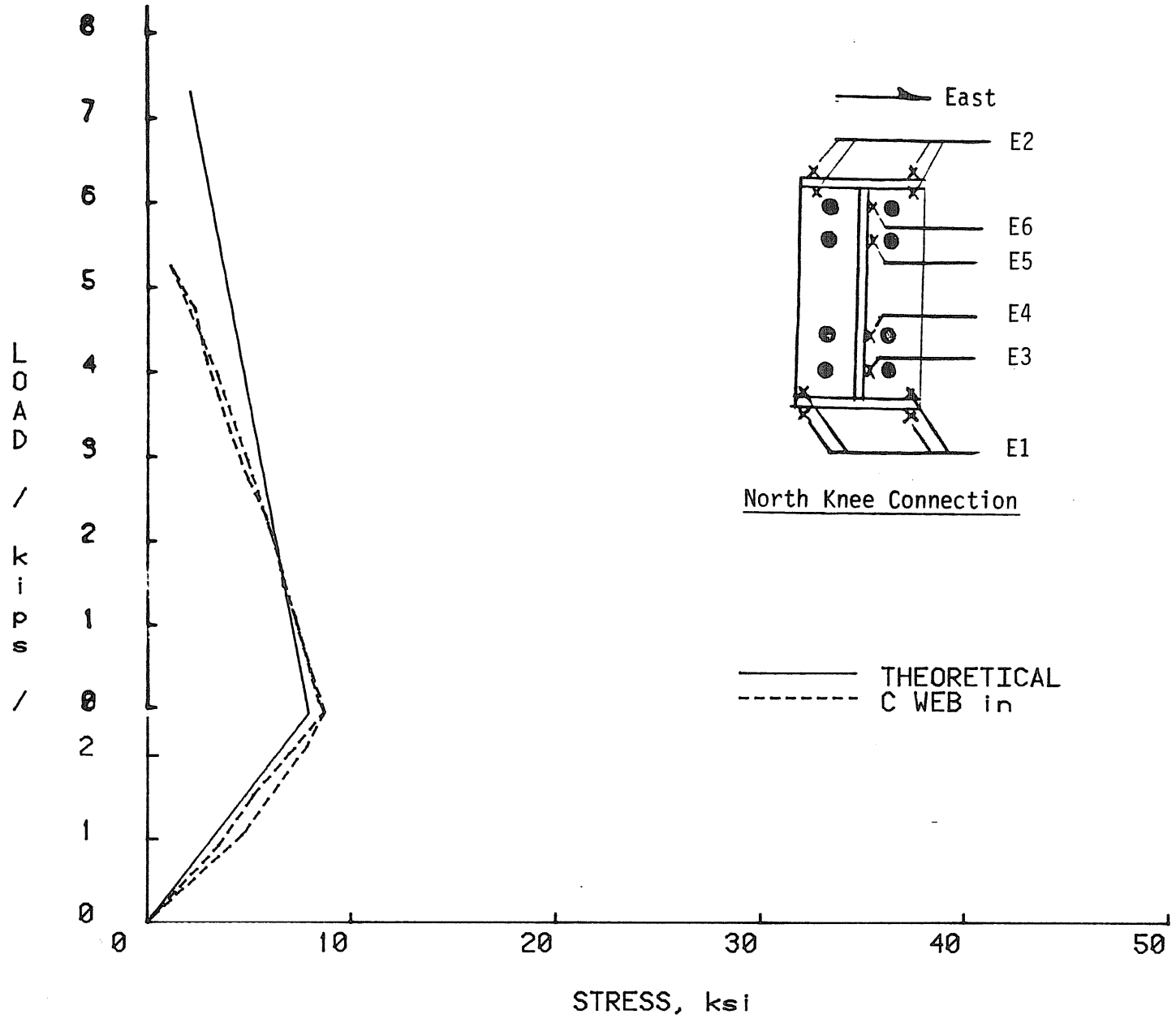


FIGURE E.16 LOAD VS. WEB STRESS AT LOCATION E4, TEST 4

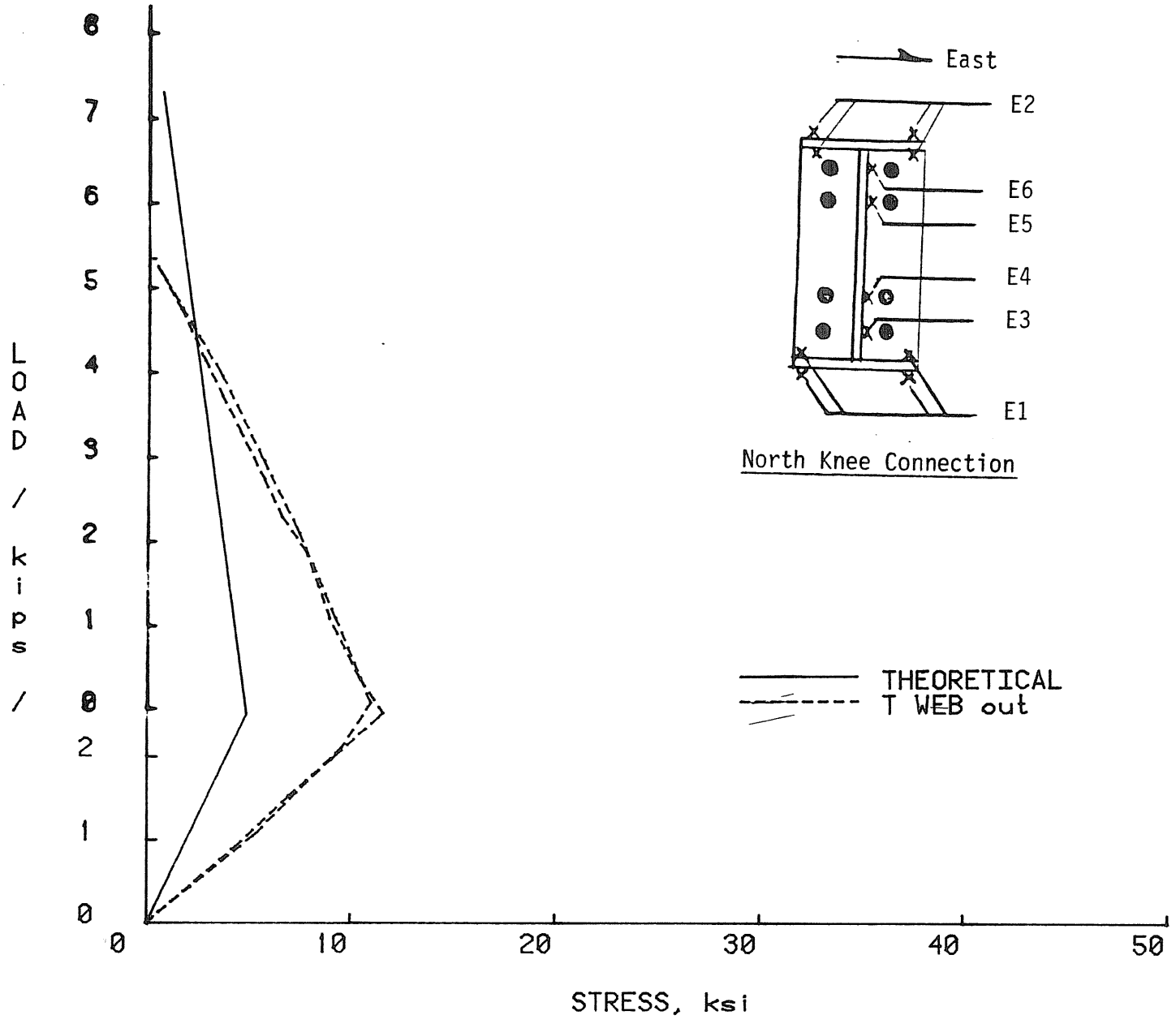


FIGURE E.17 LOAD VS. WEB STRESS AT LOCATION E6, TEST 4

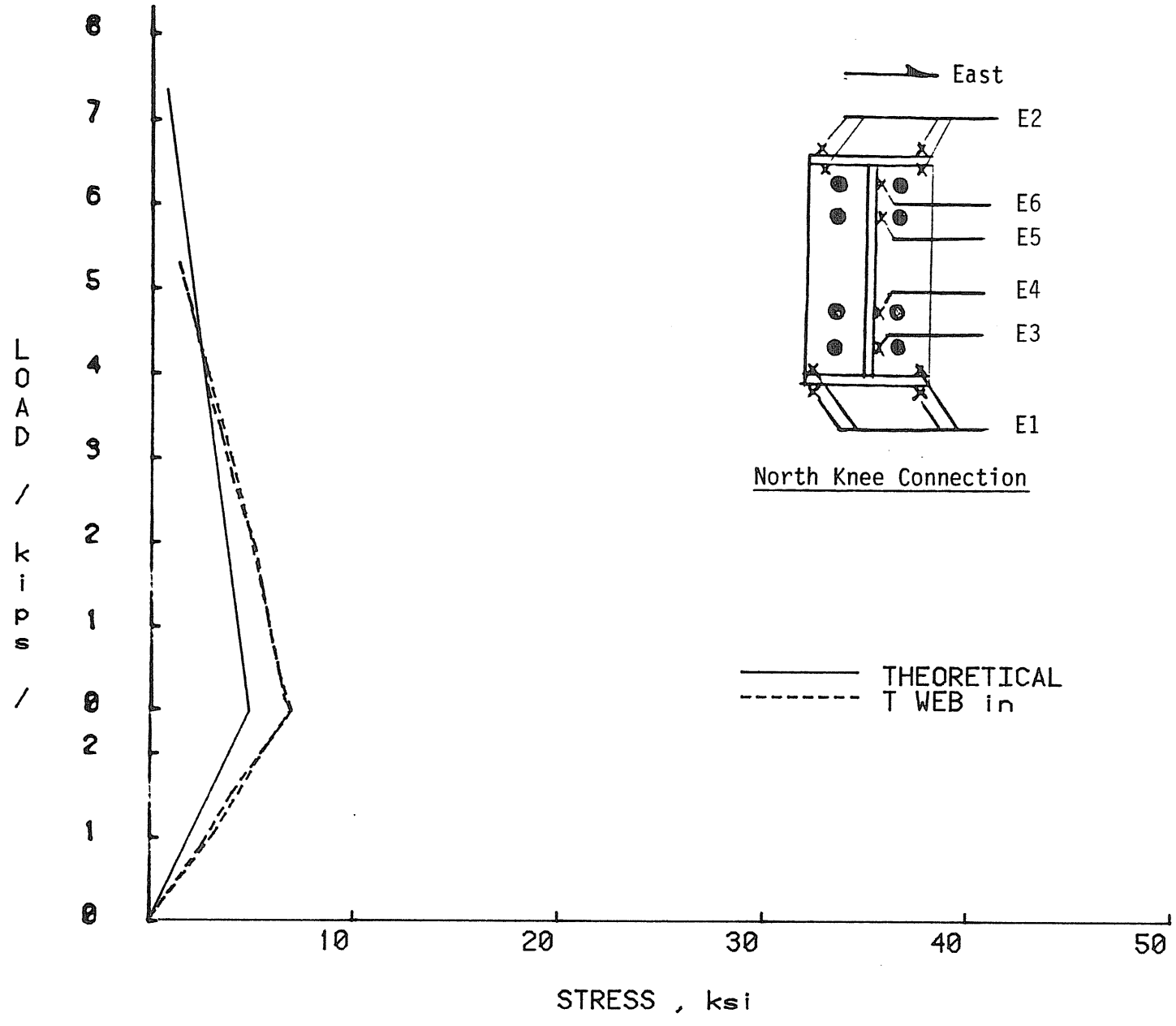


FIGURE E.18 LOAD VS. WEB STRESS AT LOCATION E5, TEST 4

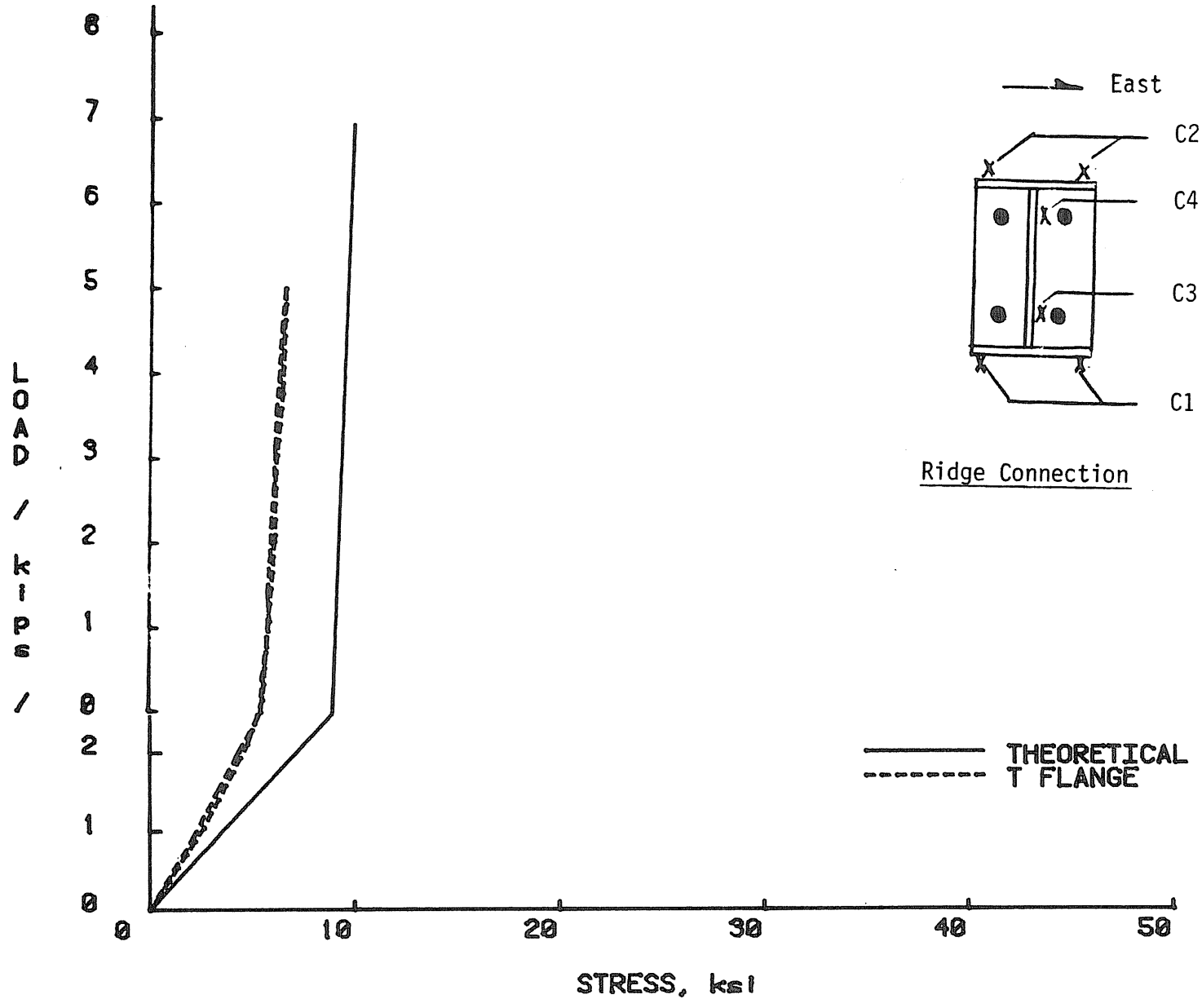


FIGURE E.19 LOAD VS. FLANGE STRESS AT LOCATION C1, TEST 4

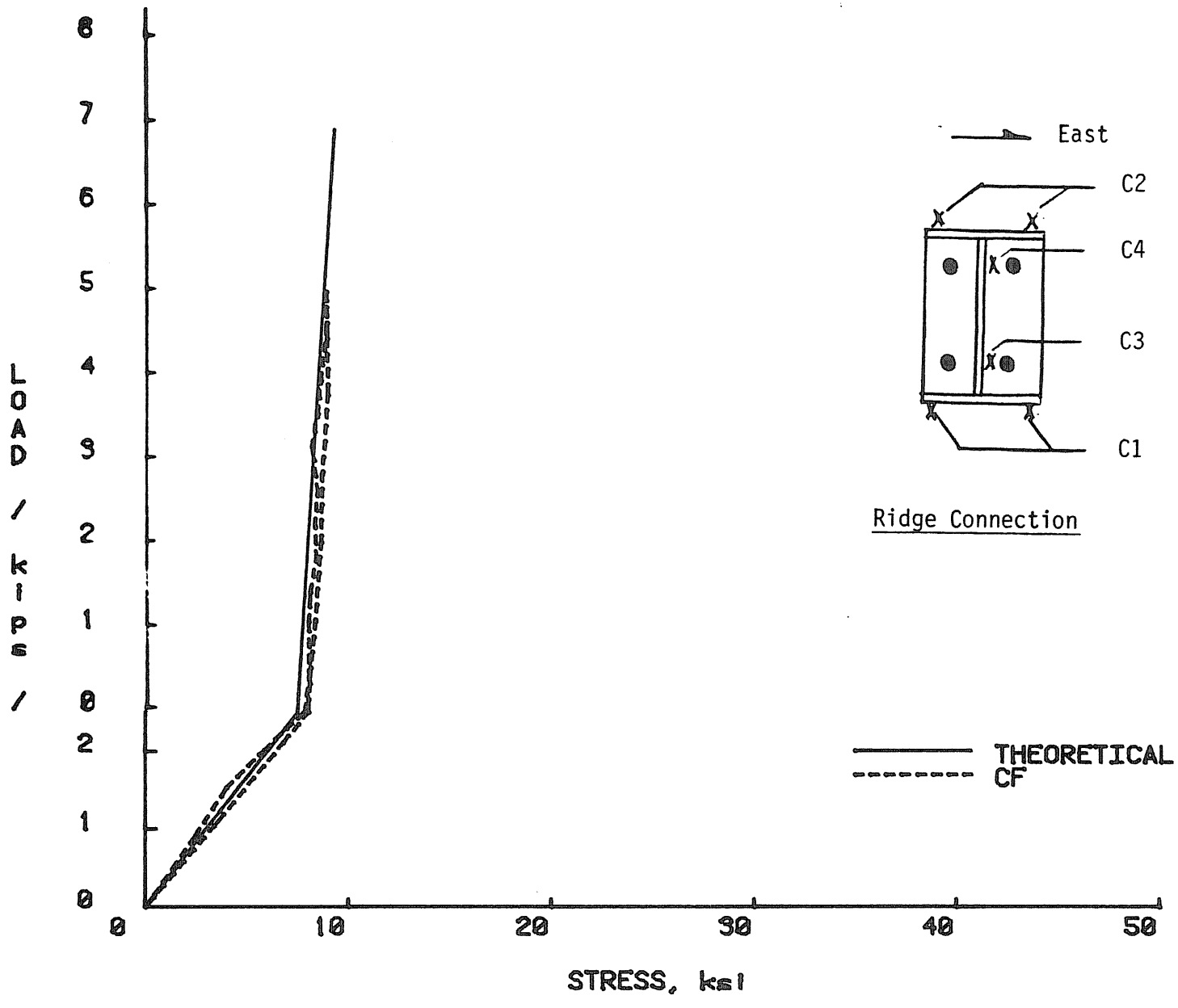


FIGURE E.20 LOAD VS. FLANGE STRESS AT LOCATION C2, TEST 4

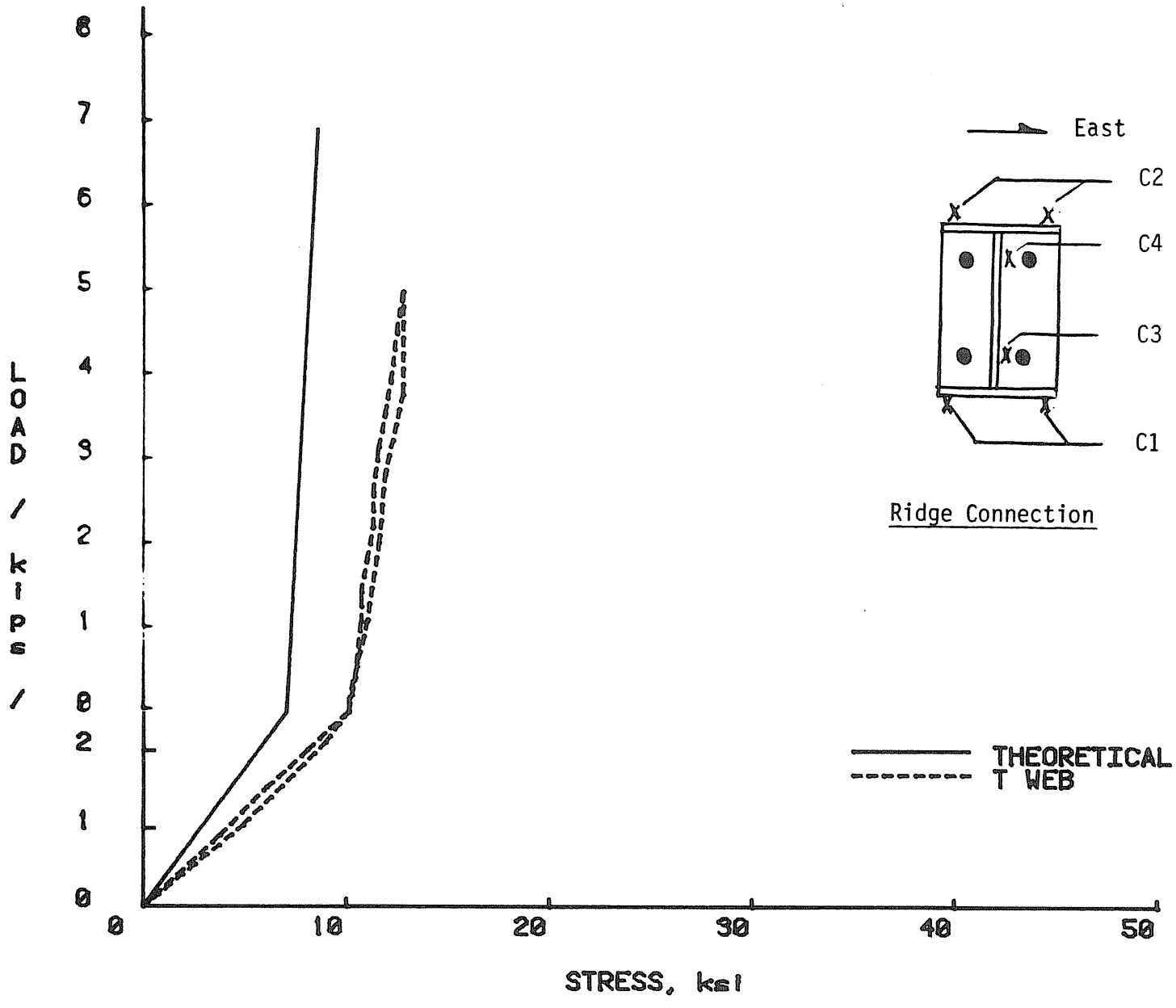


FIGURE E.21 LOAD VS. WEB STRESS AT LOCATION C3, TEST 4

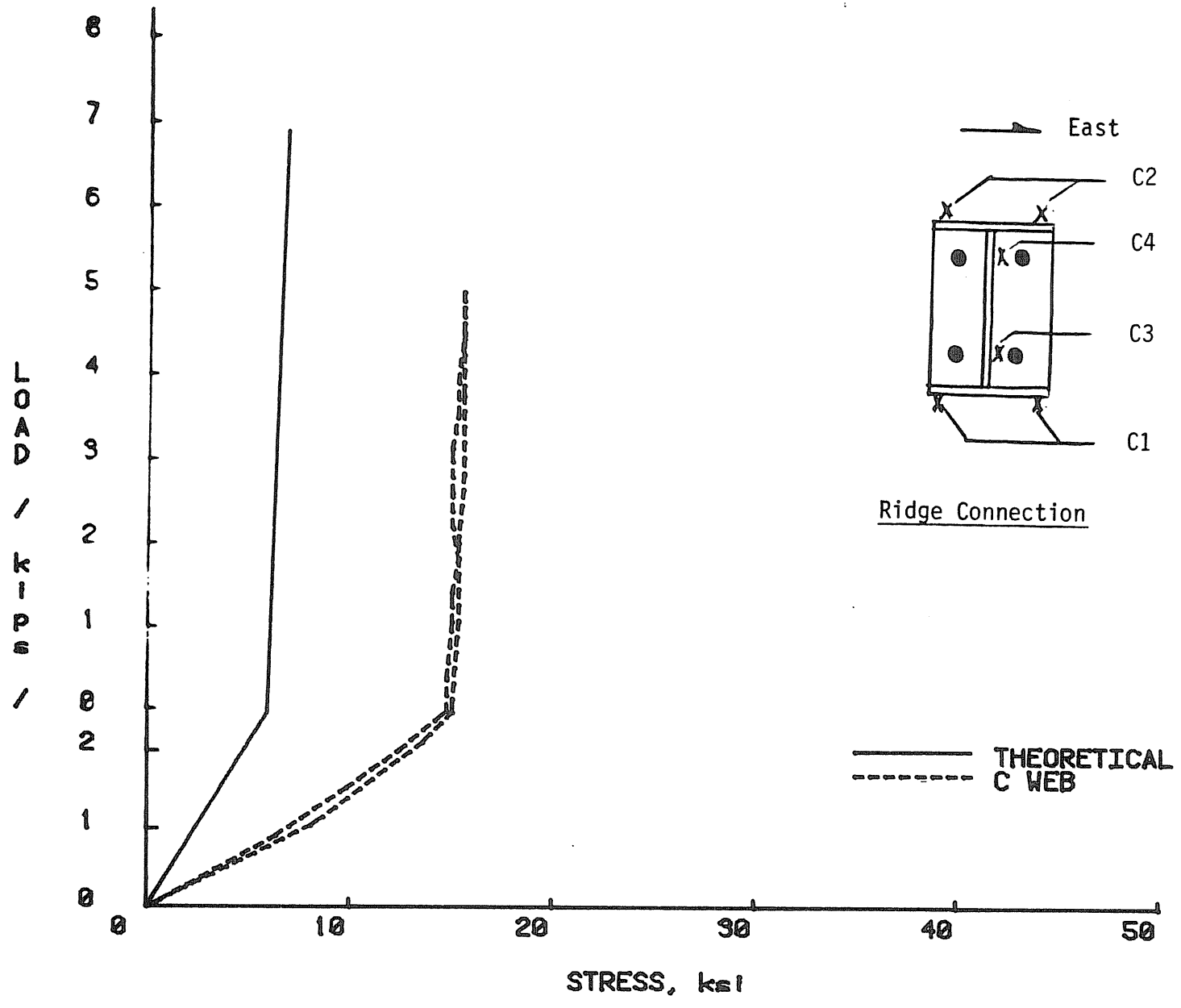


FIGURE E.22 LOAD VS. WEB STRESS AT LOCATION C4, TEST 4

APPENDIX F

FULL LIVE LOAD FAILURE OF EAST FRAME

TEST 5

MESCO FRAME TEST SUMMARY

Project: Mesco Frame

Test No.: FR2: Test 5

Test Date: January 28, 1985

Purpose: Test of full live loading on east frame until failure.

Bolt Diameter: 3/4" **Pretension Force per Bolt:** 28^{k}

Maximum Test Load: 4.165 kip

Discussion:

- Prior to approximately 2.2 kips the load-deflection as well as load-stress relationship remained linear. The load-deflection relationships resulted in slightly less vertical stiffness than predicted, however. Substantial lateral deflections were present in the north panel zone from the initiation of loading while the south panel zone experienced no deflections until a higher load was applied.
- At 2.0 kips the deflection of the north panel zone began to increase at a greater rate. The load-vertical deflection relationship began to become nonlinear shortly thereafter.
- At 3.0 kips the north panel zone began to deflect and the vertical stiffness started degenerating even more quickly.
- At 3.5 kips flaking of the whitewash was observed on the end-plates around the tension bolts and the rafters tension flange at the north knee.
- With the application of 3.75 kips of test load flaking of the whitewash occurred on the south knee end plates as well as on the rafters compression flange at this location. Further, diagonal yield lines appeared in the whitewash of both panel zones.
- Upon application of 4.16 kips flaking of the whitewash was observed on the end plates and rafter compression flange at midspan. Finally, severe buckling of the panel zones prevented any further increase in load above 4.165 kips.

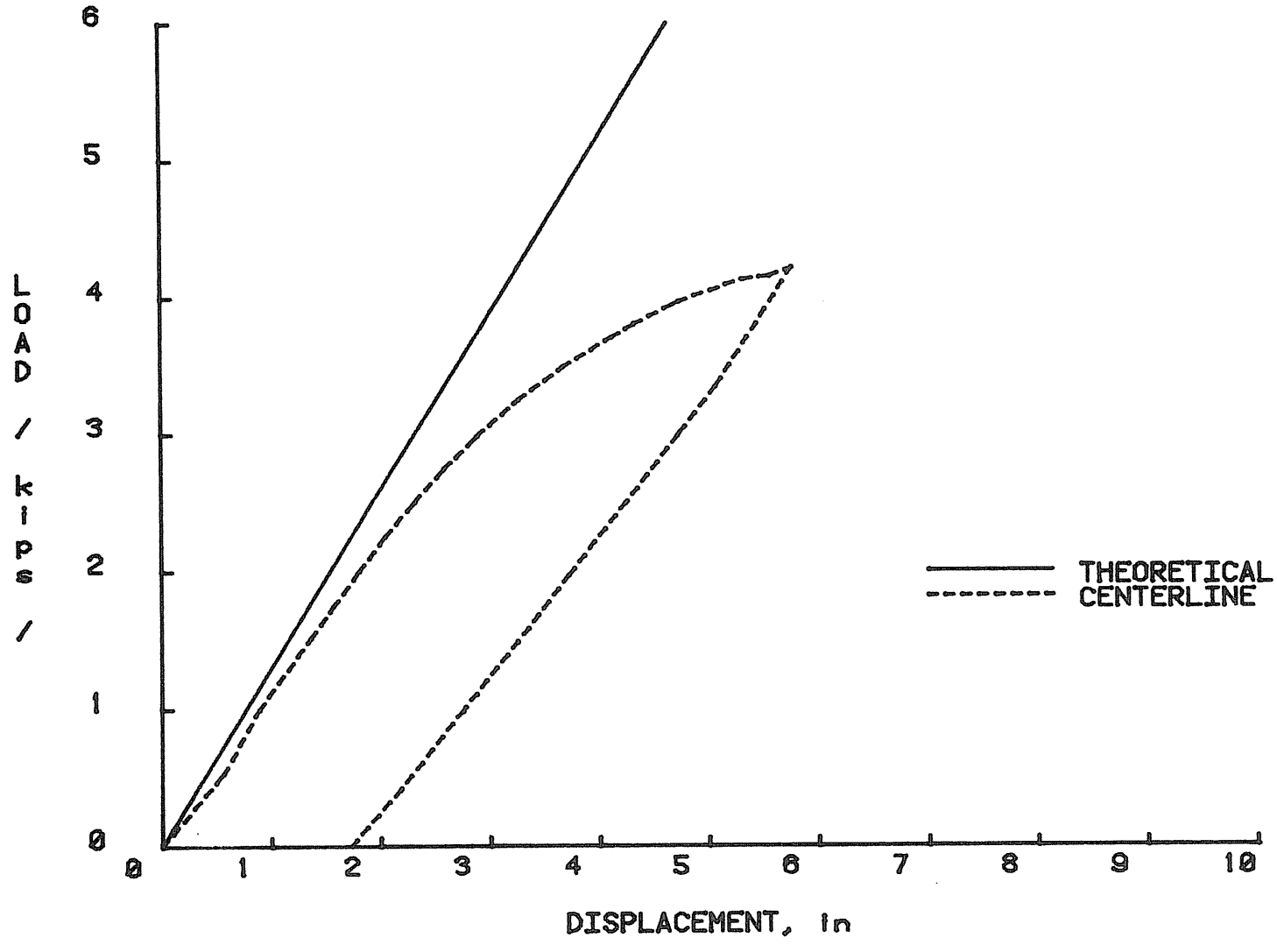


FIGURE F.1 LOAD VS. CENTERLINE DEFLECTION, EAST FRAME, TEST 5

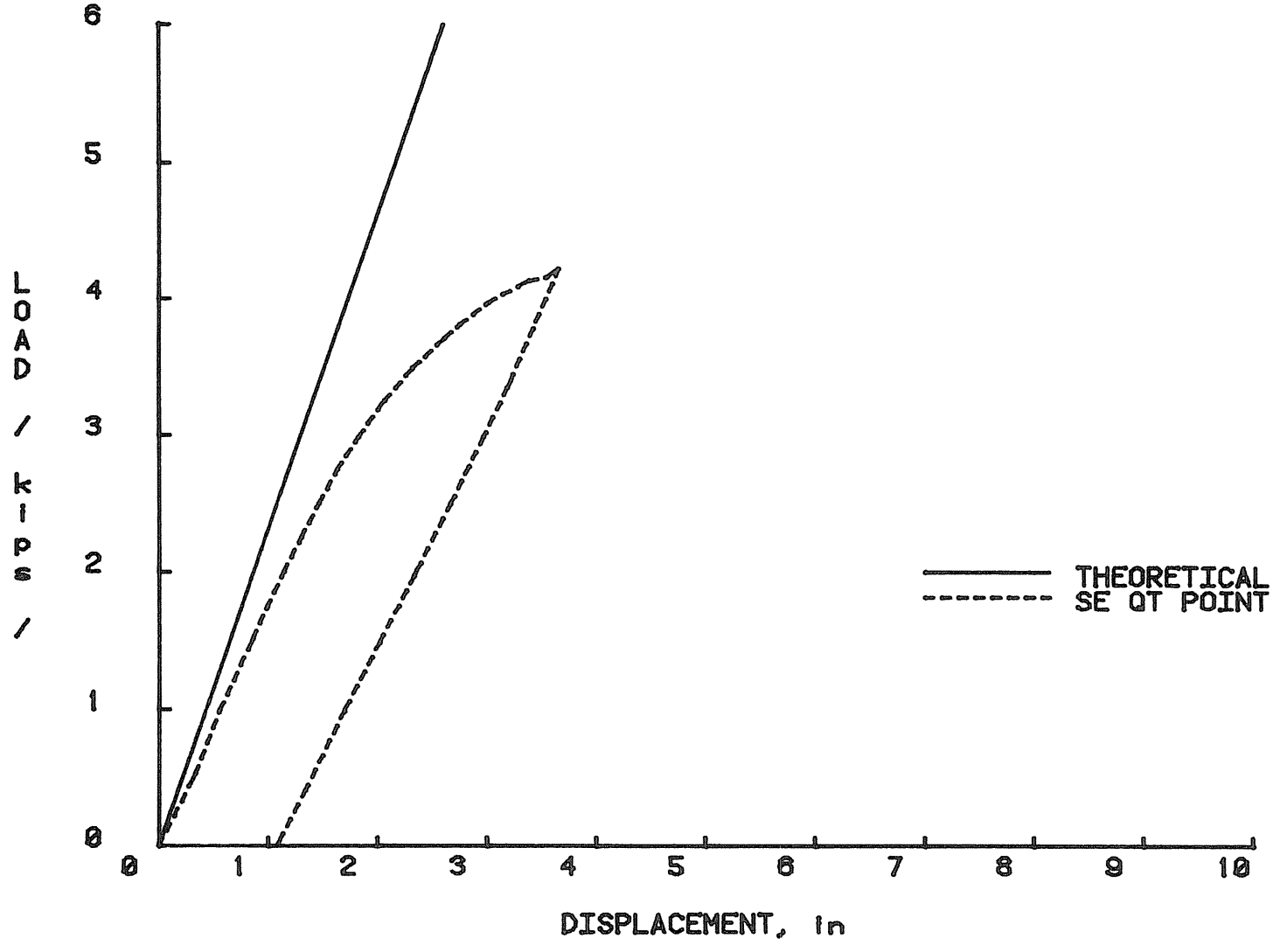


FIGURE F.2 LOAD VS. SOUTH QUARTERPOINT DEFLECTION, TEST 5

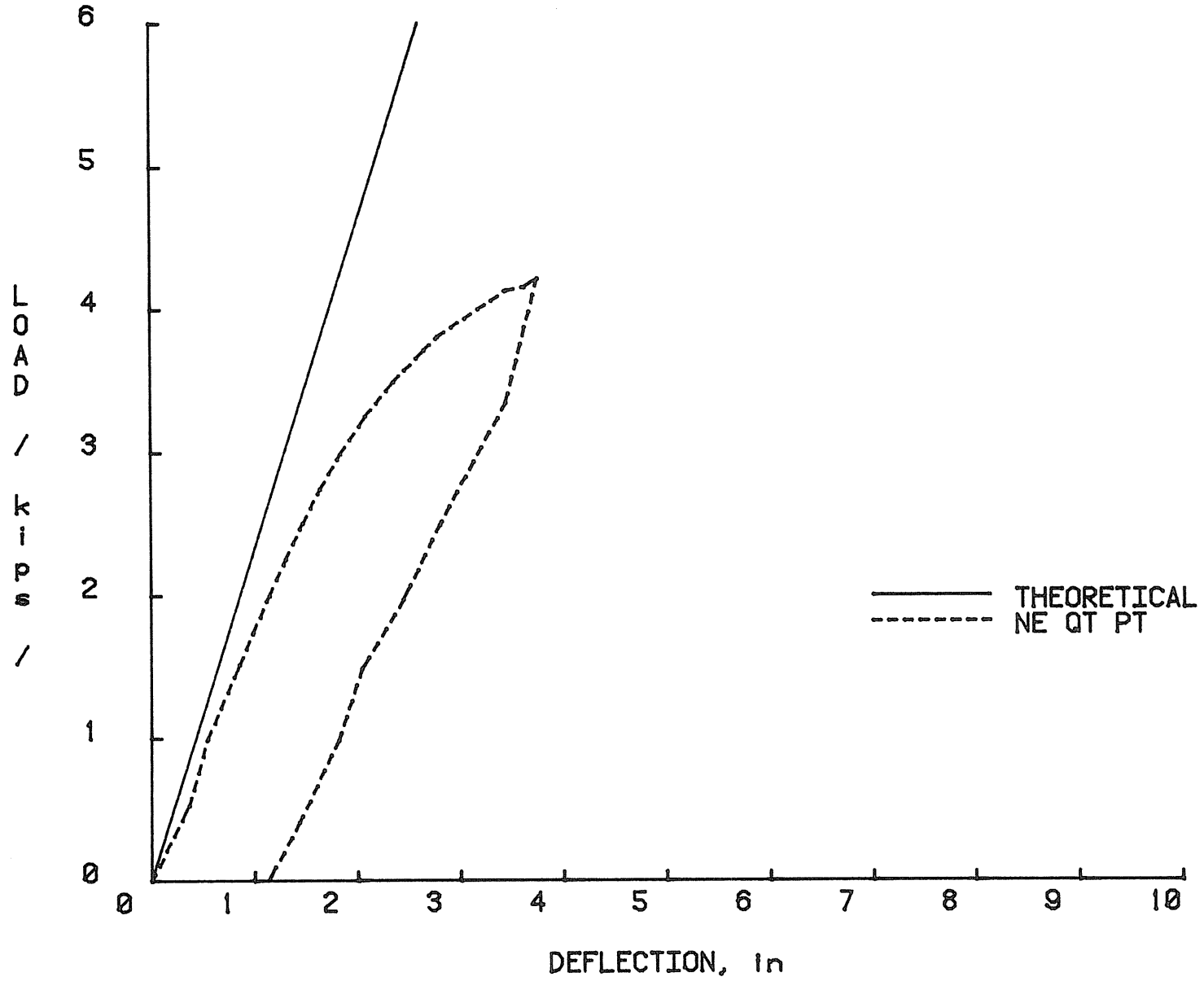


FIGURE F.3 LOAD VS. NORTH QUARTERPOINT DEFLECTION, TEST 5

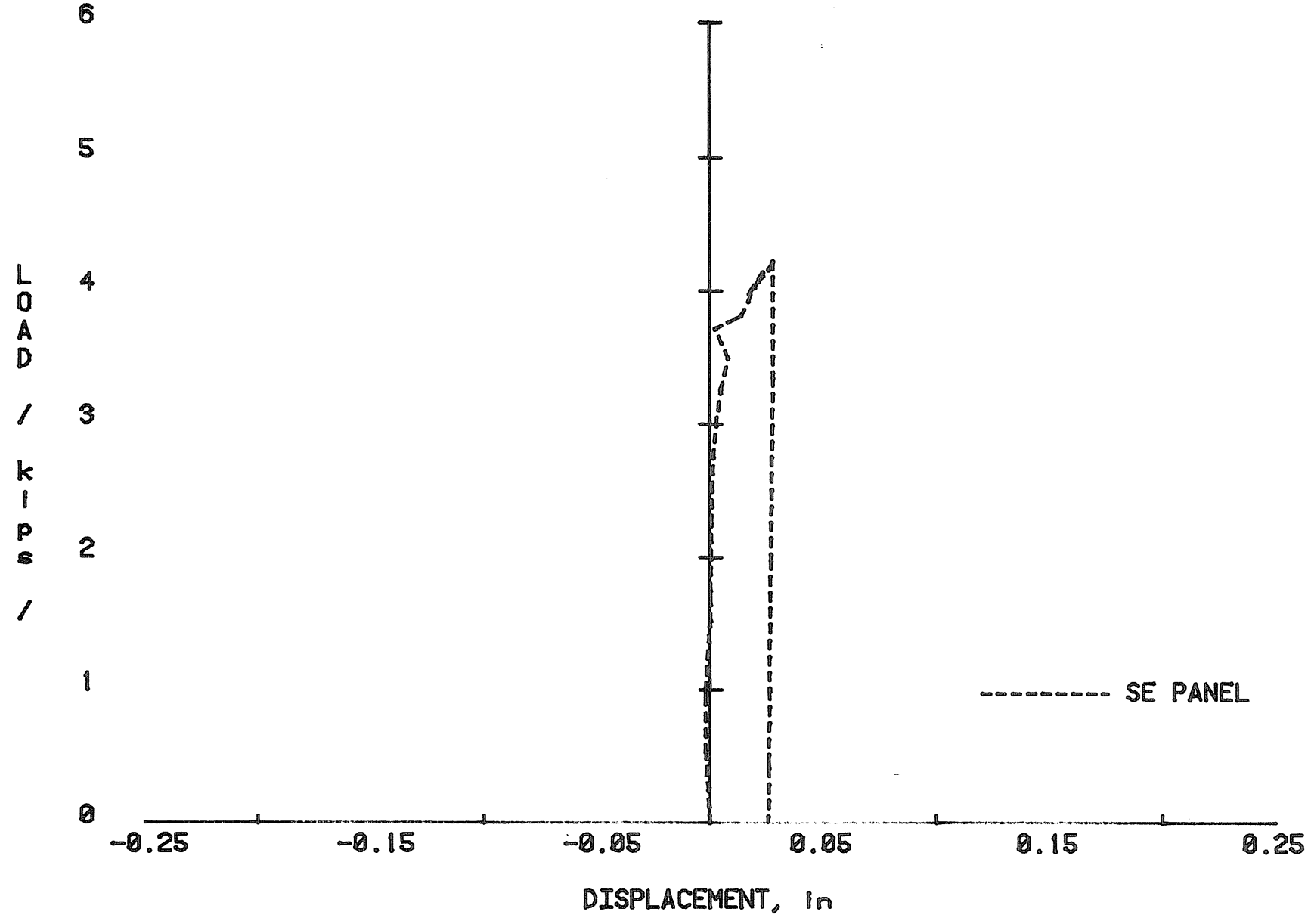


FIGURE F.4 LOAD VS. SOUTH PANEL ZONE DISPLACEMENTS, TEST 5

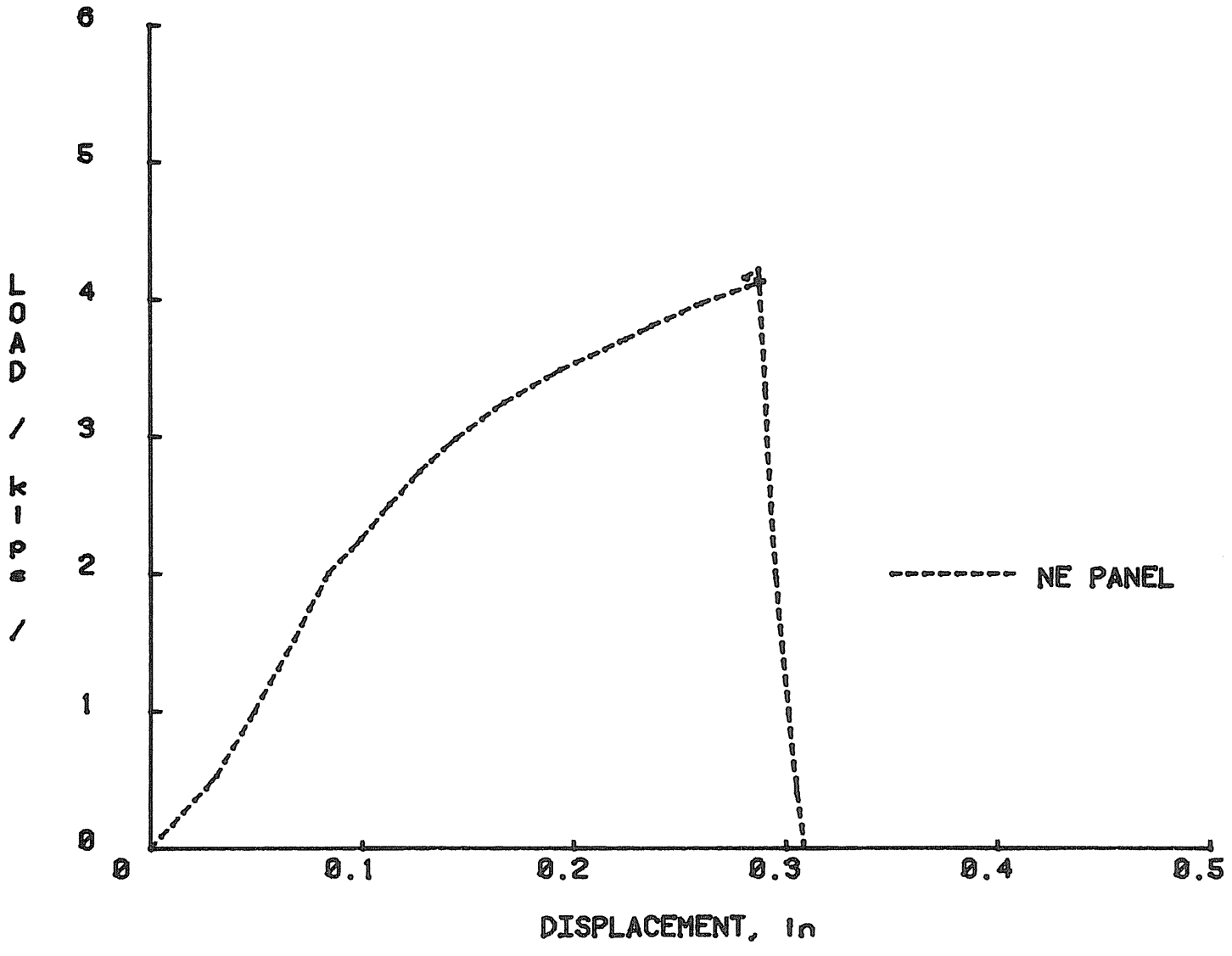


FIGURE F.5 LOAD VS. NORTH PANEL ZONE DISPLACEMENTS, TEST 5

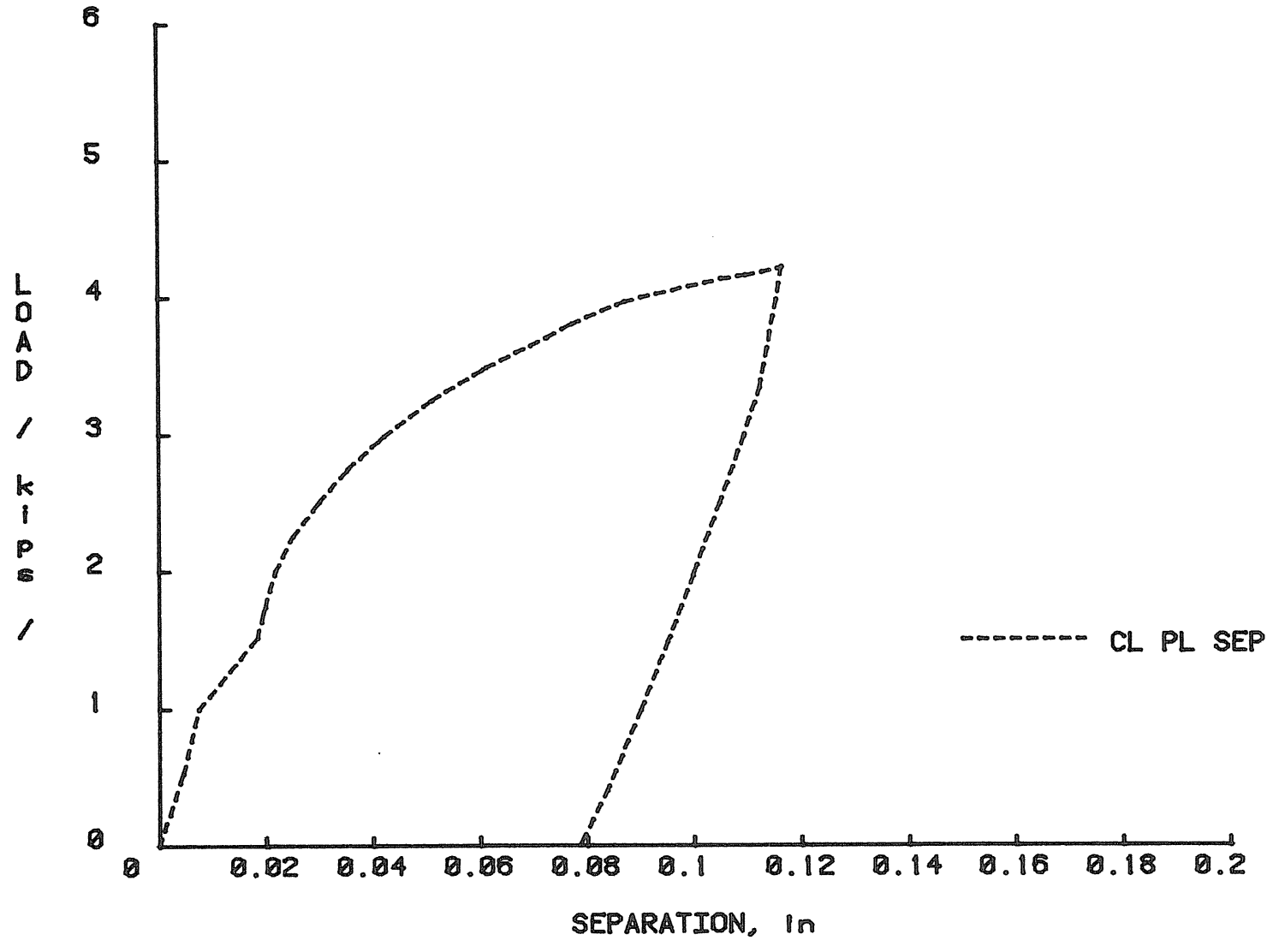


FIGURE F.6 LOAD VS. PLATE SEPARATION AT RIDGE CONNECTION, TEST 5

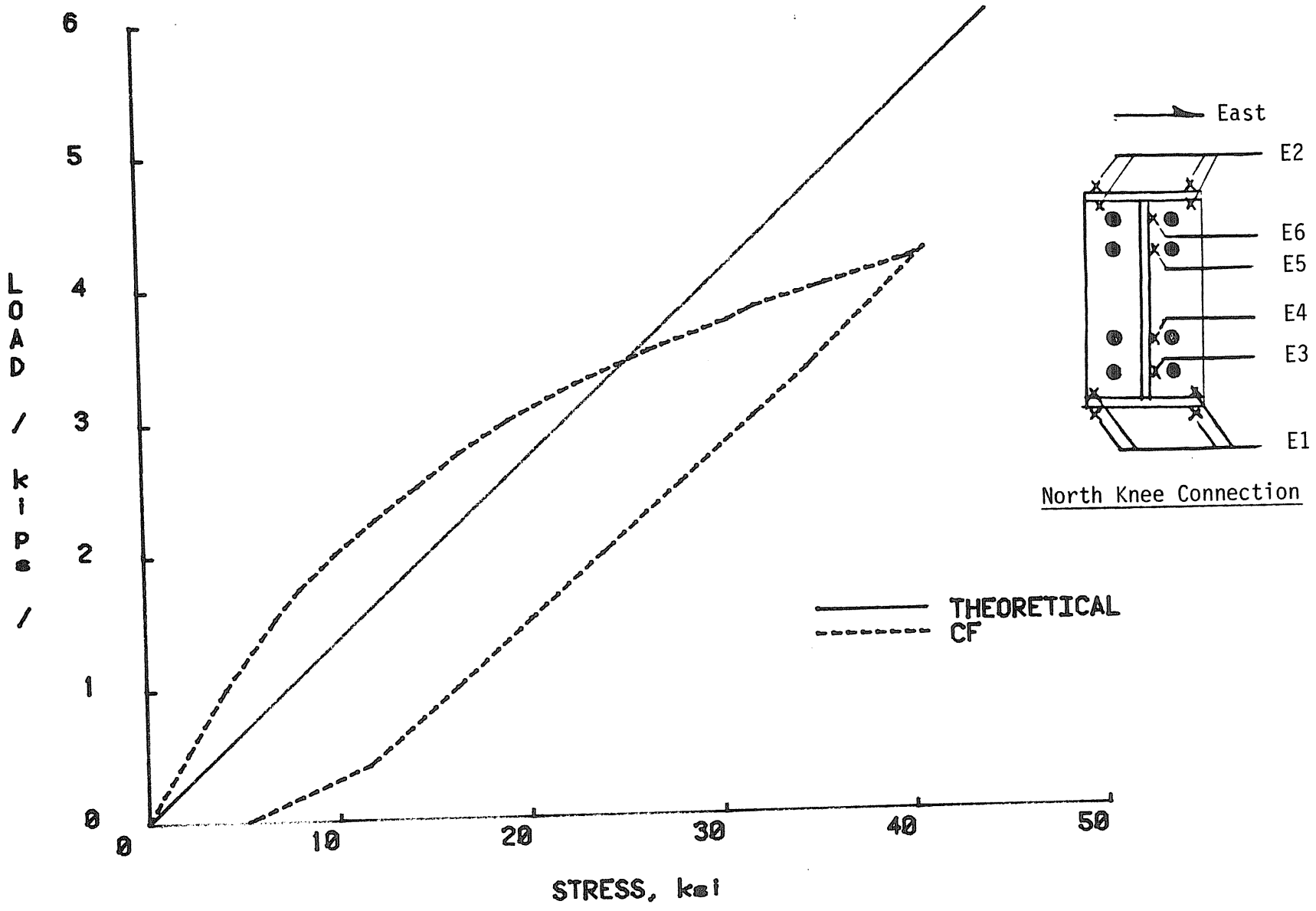


FIGURE F.7 LOAD VS. FLANGE STRESS AT LOCATION E1, TEST 5

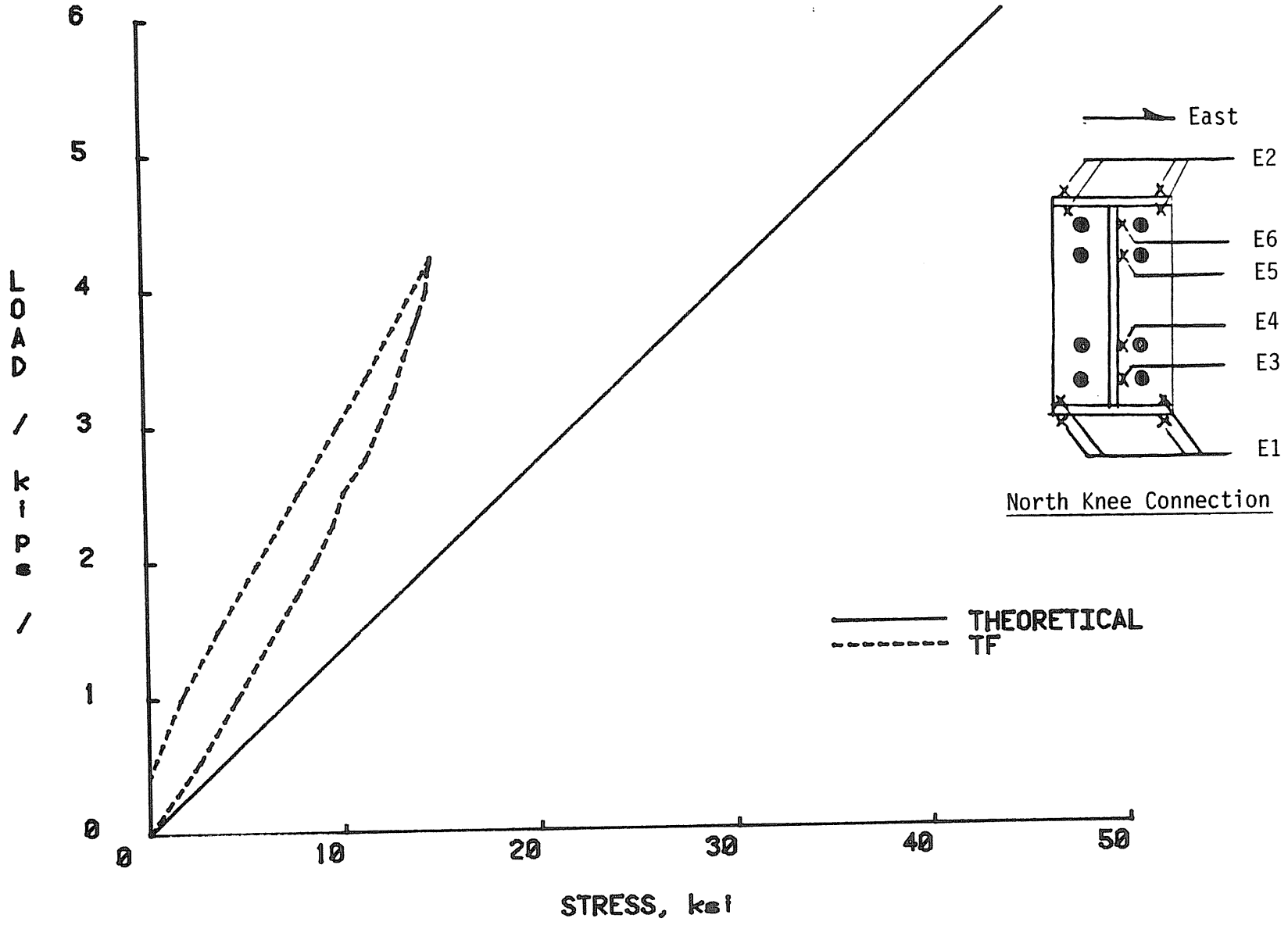
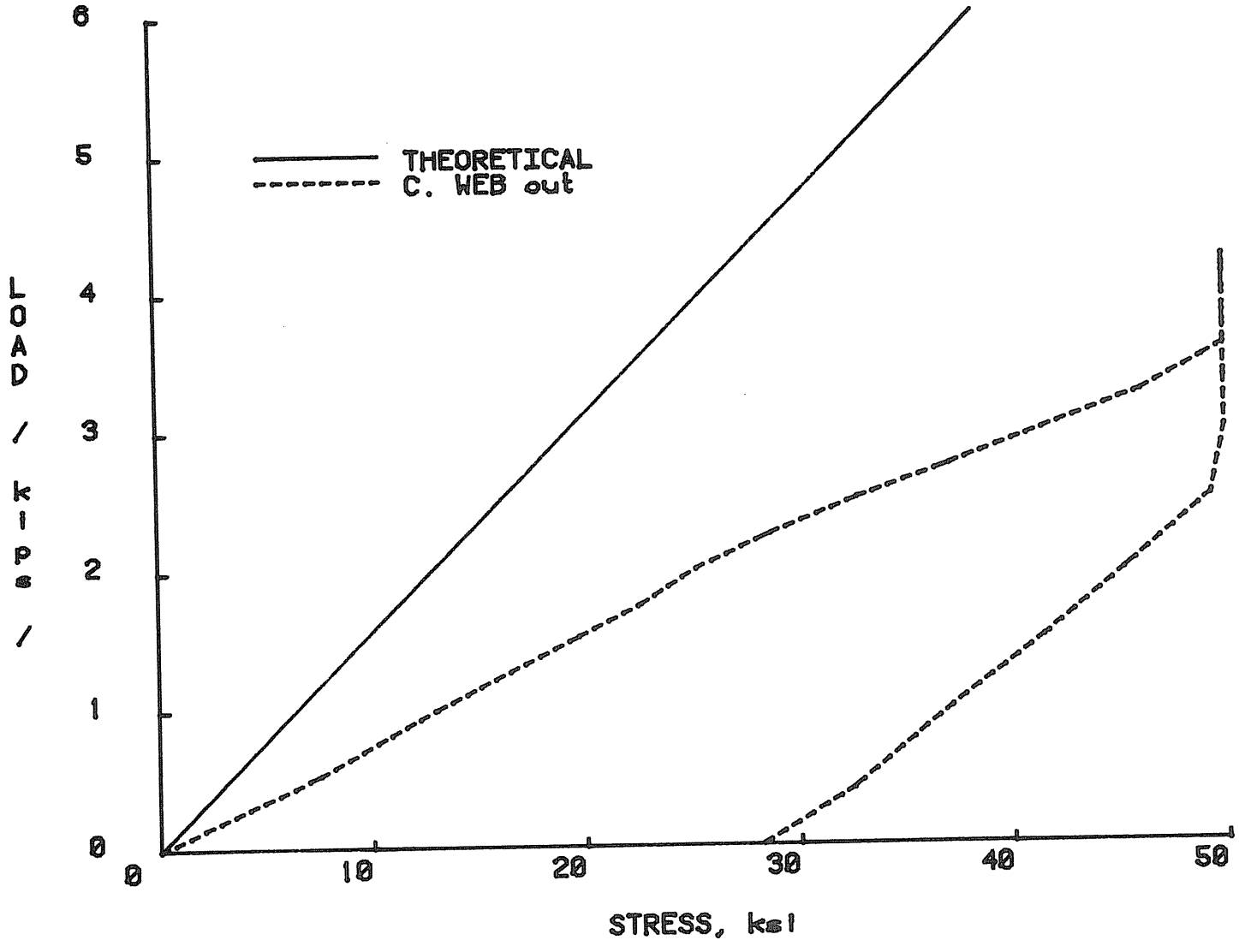
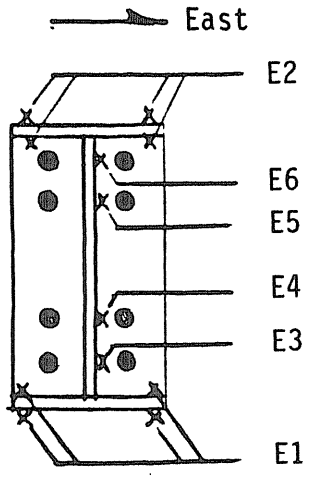


FIGURE F.8 LOAD VS. FLANGE STRESS AT LOCATION E2, TEST 5





North Knee Connection

FIGURE F.9 LOAD VS. WEB STRESS AT LOCATION E3, TEST 5

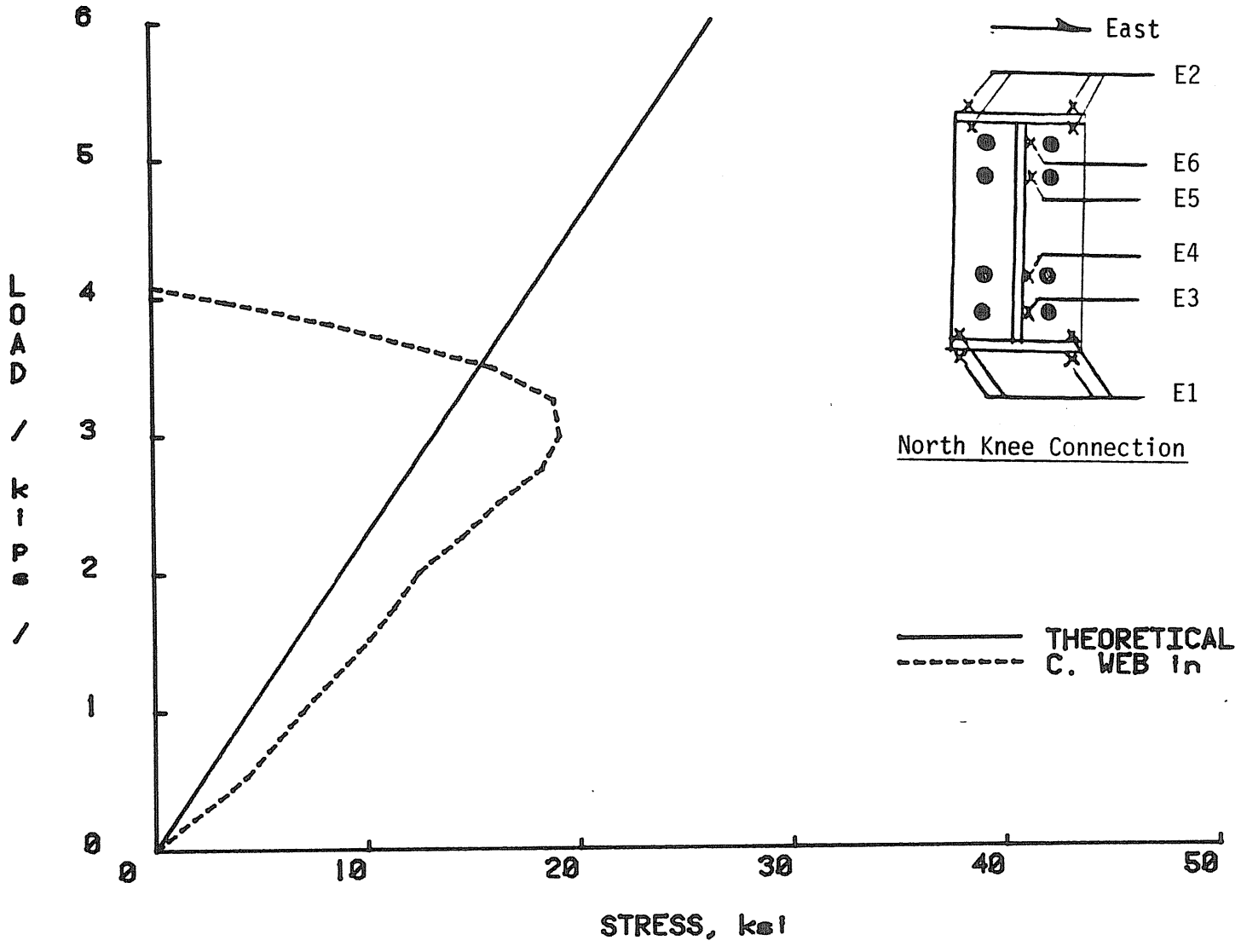


FIGURE F.10 LOAD VS. WEB STRESS AT LOCATION E4, TEST 5

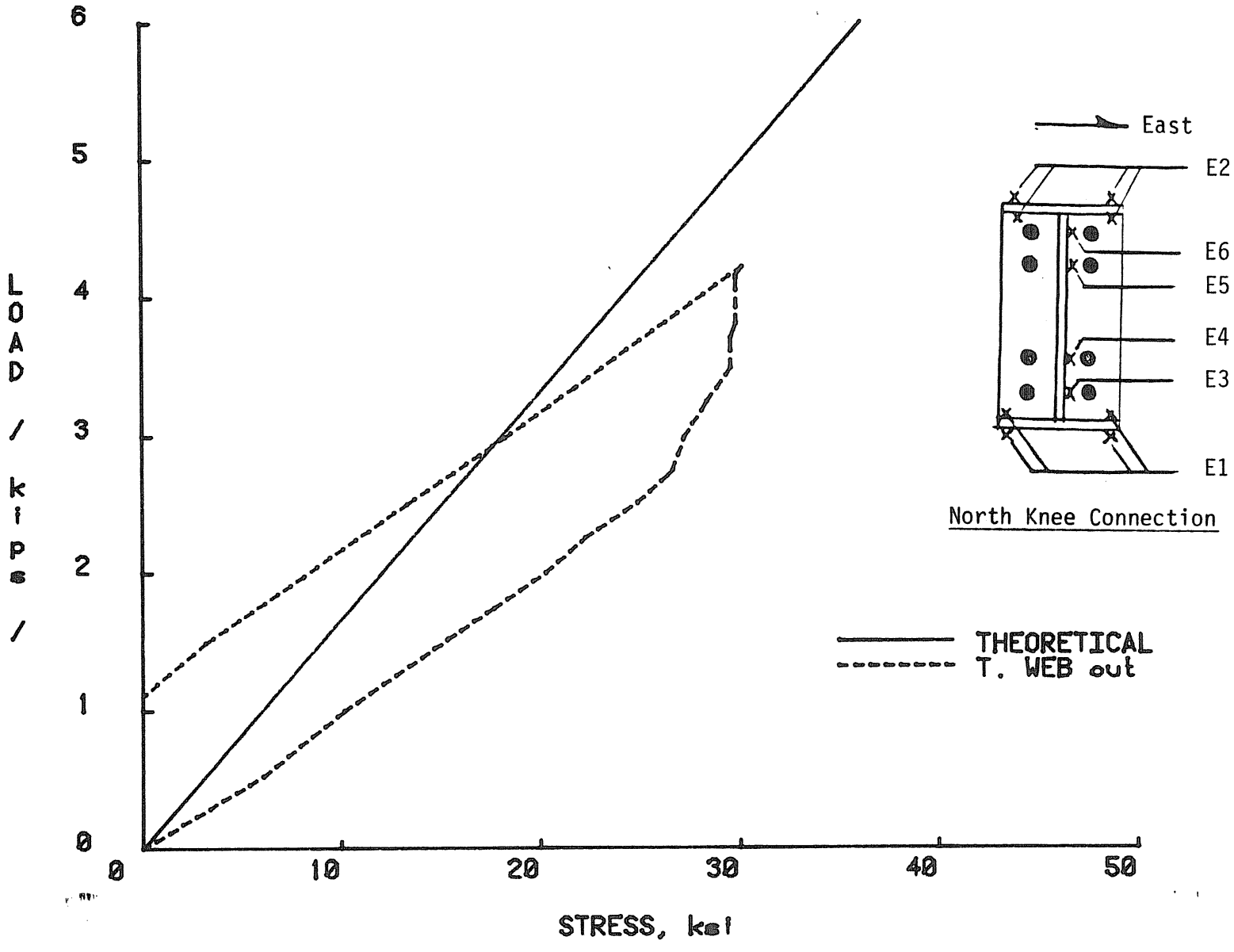


FIGURE F.11 LOAD VS. WEB STRESS AT LOCATION E6, TEST 5

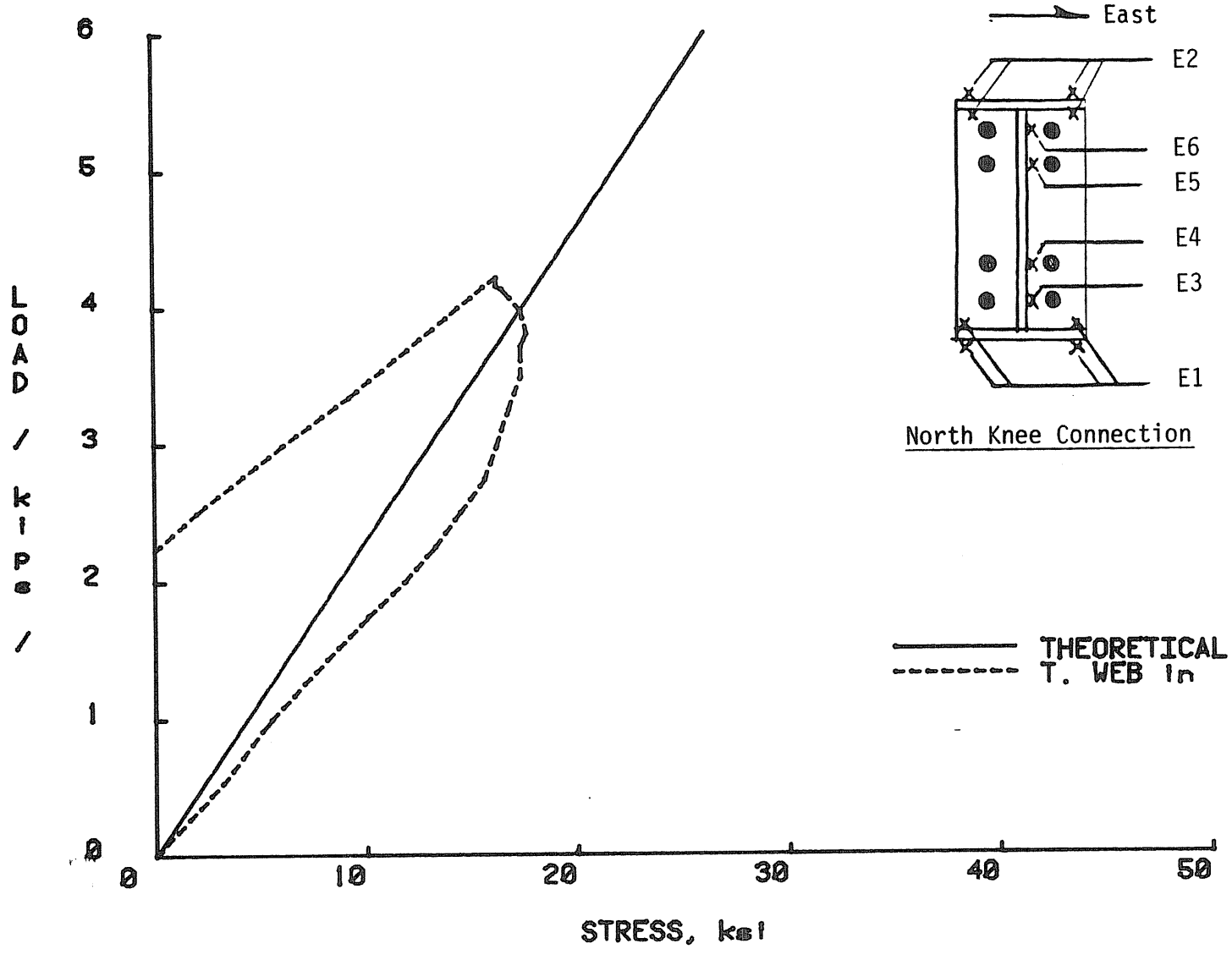


FIGURE F.12 LOAD VS. WEB STRESS AT LOCATION E5, TEST 5

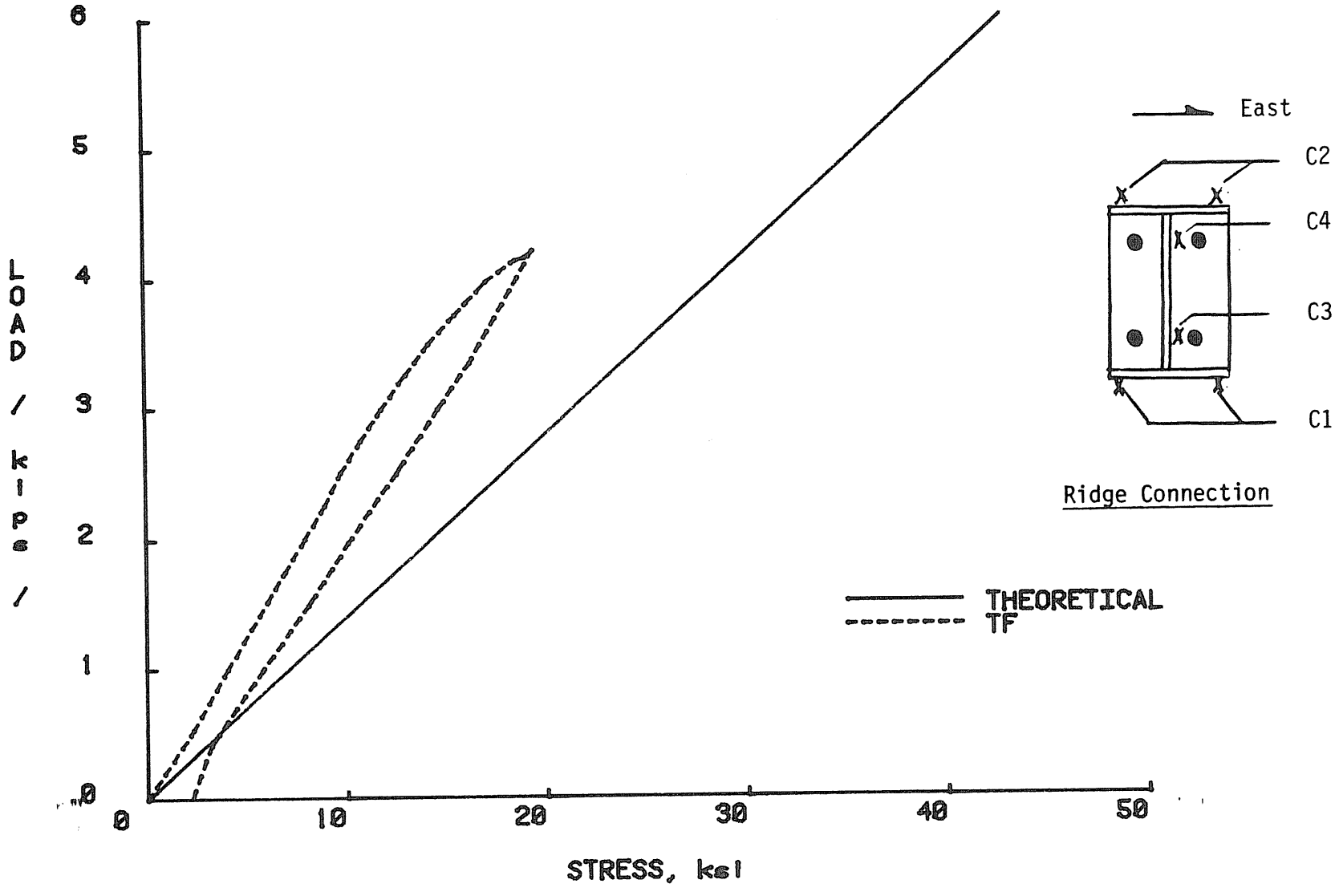


FIGURE F.13 LOAD VS. FLANGE STRESS AT LOCATION C1, TEST 5

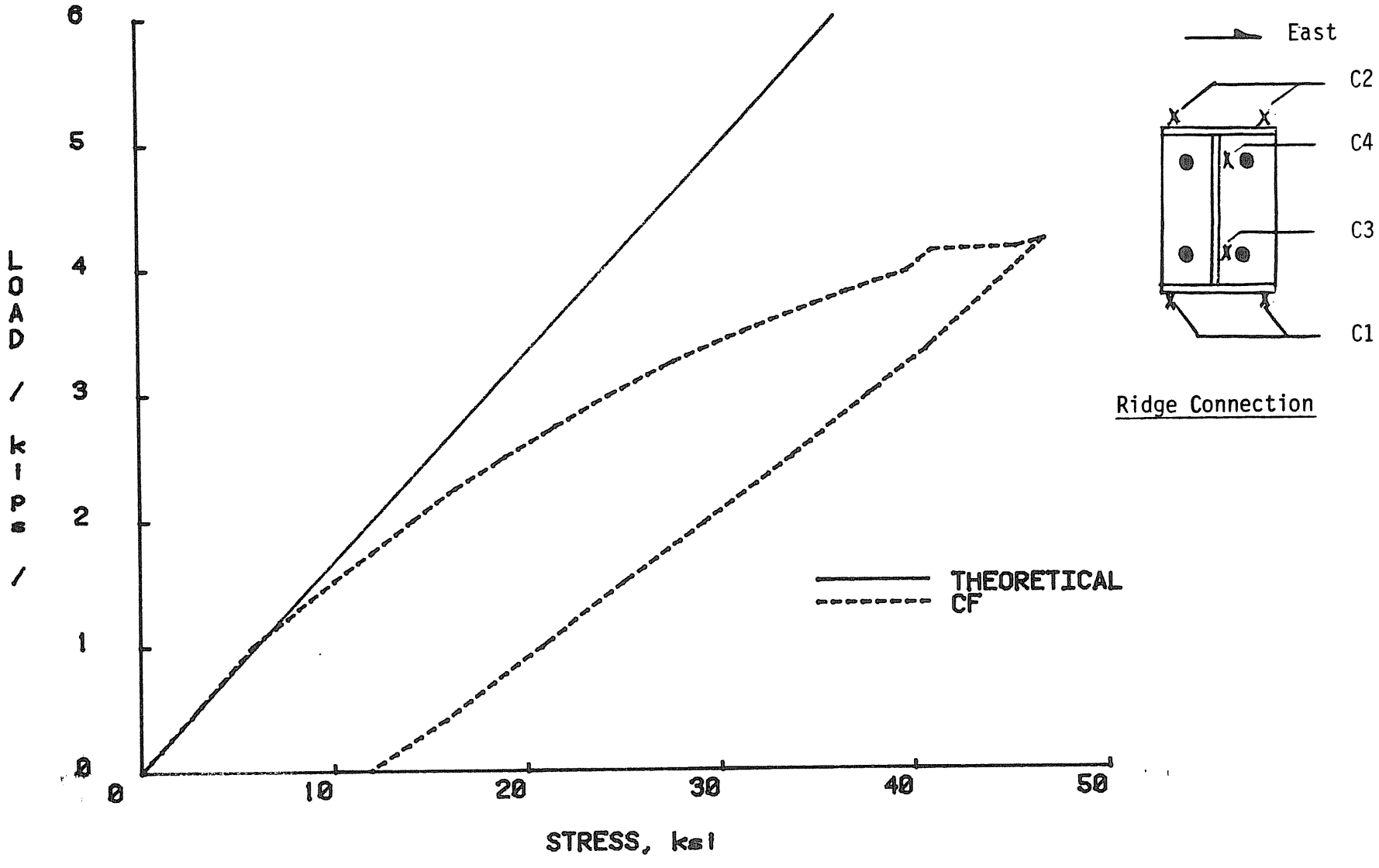


FIGURE F.14 LOAD VS. FLANGE STRESS AT LOCATION C2, TEST 5

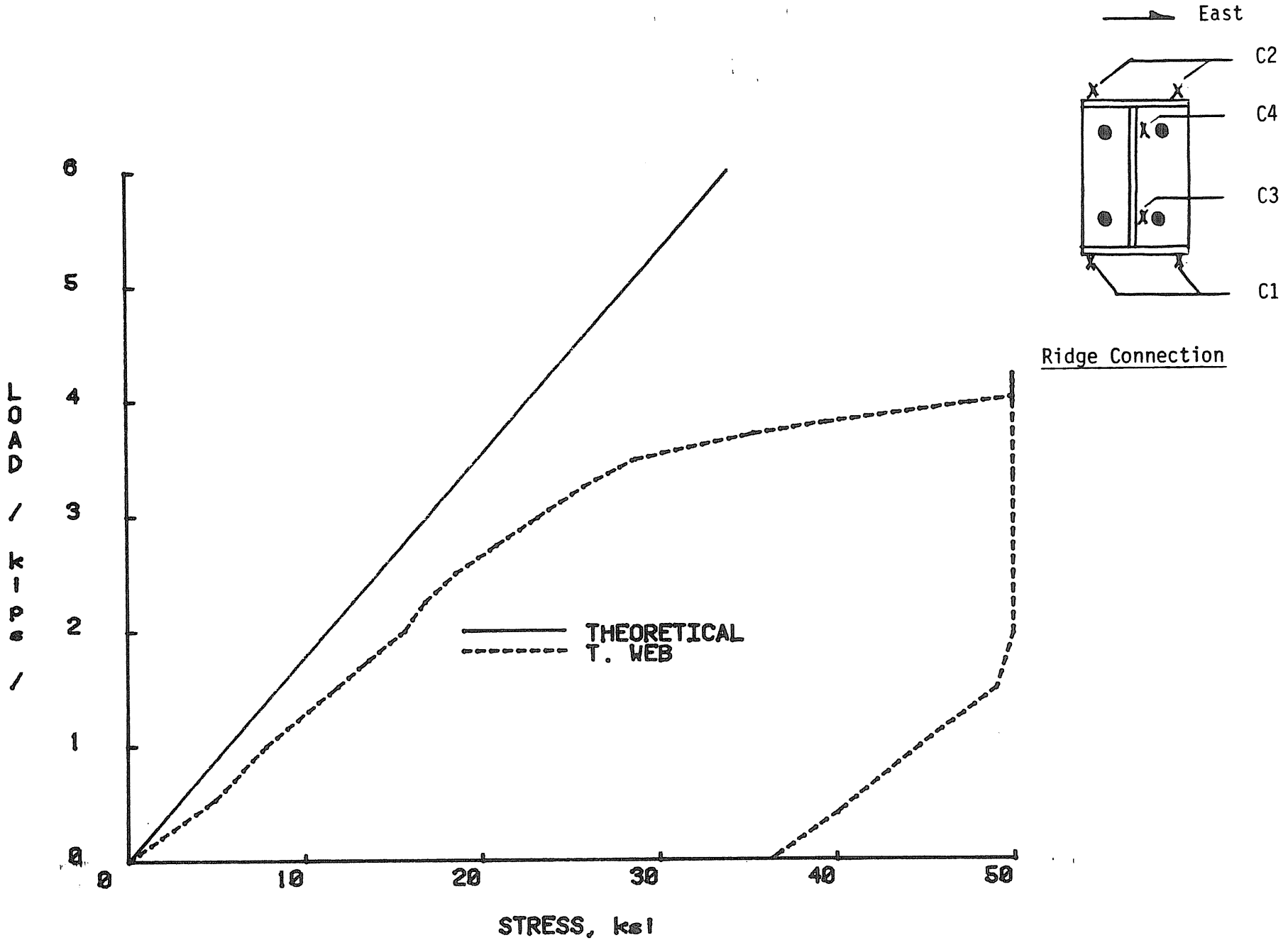


FIGURE F.15 LOAD VS. WEB STRESS AT LOCATION C3, TEST 5

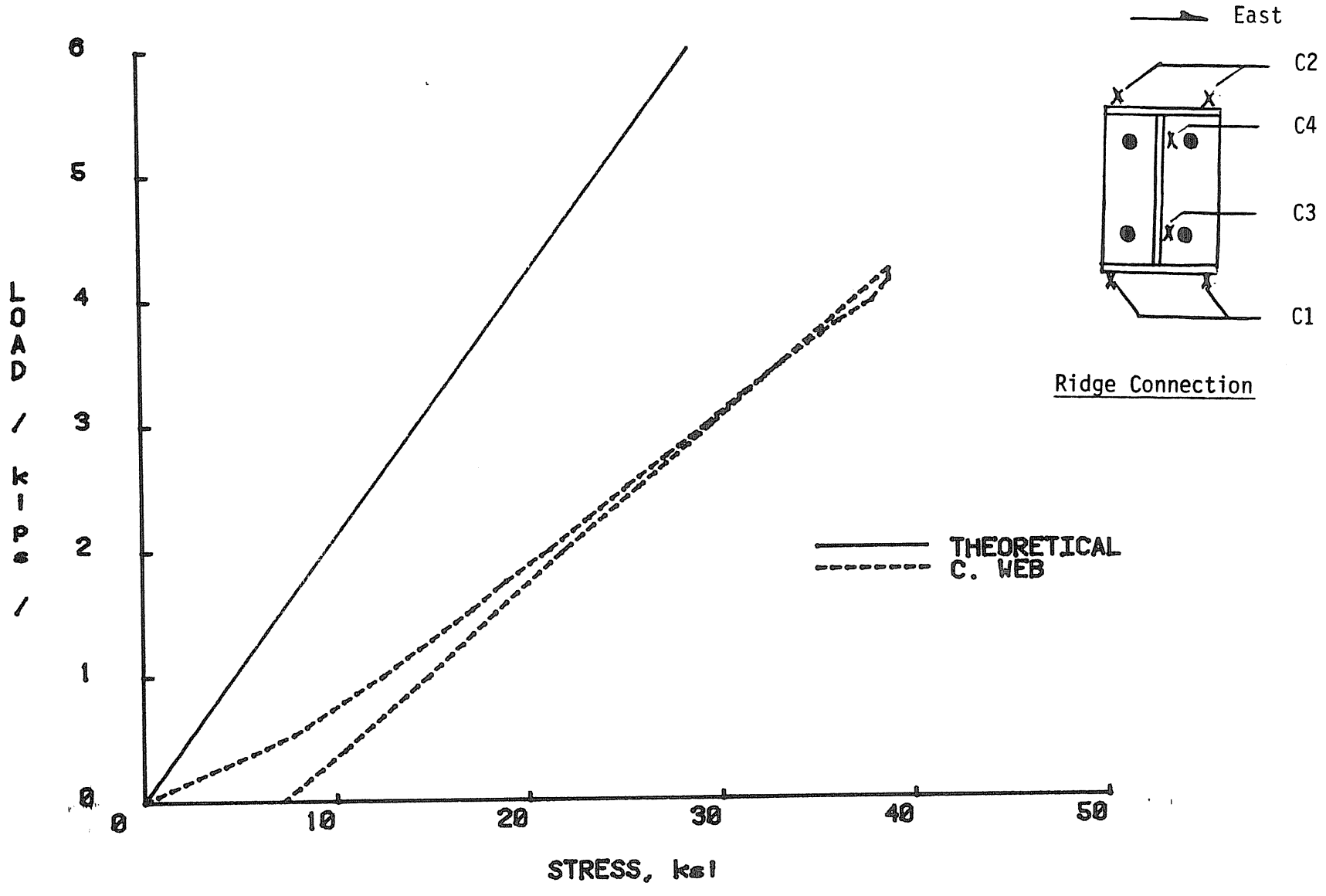


FIGURE F.16 LOAD VS. WEB STRESS AT LOCATION C4, TEST 5

APPENDIX G

FULL LIVE LOAD FAILURE OF WEST FRAME

TEST 6

MESCO FRAME TEST SUMMARY

Project: Mesco Frame

Test No.: FR2: Test 6

Test Date: February 4, 1985

Purpose: Test of full live load on west frame to failure

Bolt Diameter: 3/4" **Pretension Force per Bolt:** 28^{k}

Maximum Test Load: 4.132

Discussion:

- Linear increase in deflections and stresses prior to 3 kips of test load. Less stiffness with respect to vertical deflections than predicted was observed. Stresses in the rafter's flanges adjacent to the knee were less than predicted while those in the web were greater.
- At 2.6 kips the north panel began to buckle.
- At 3.1 kips the south panel began to buckle. This was accompanied by increased rates of strain in the knee area as well as increased deflections at the centerline and quarter points.
- By 4.0 kips flaking of the whitewash was continuous along the compression flange of the north column.
- At 4.132 kips buckling of the panel zones was so severe that no further load increases were possible.

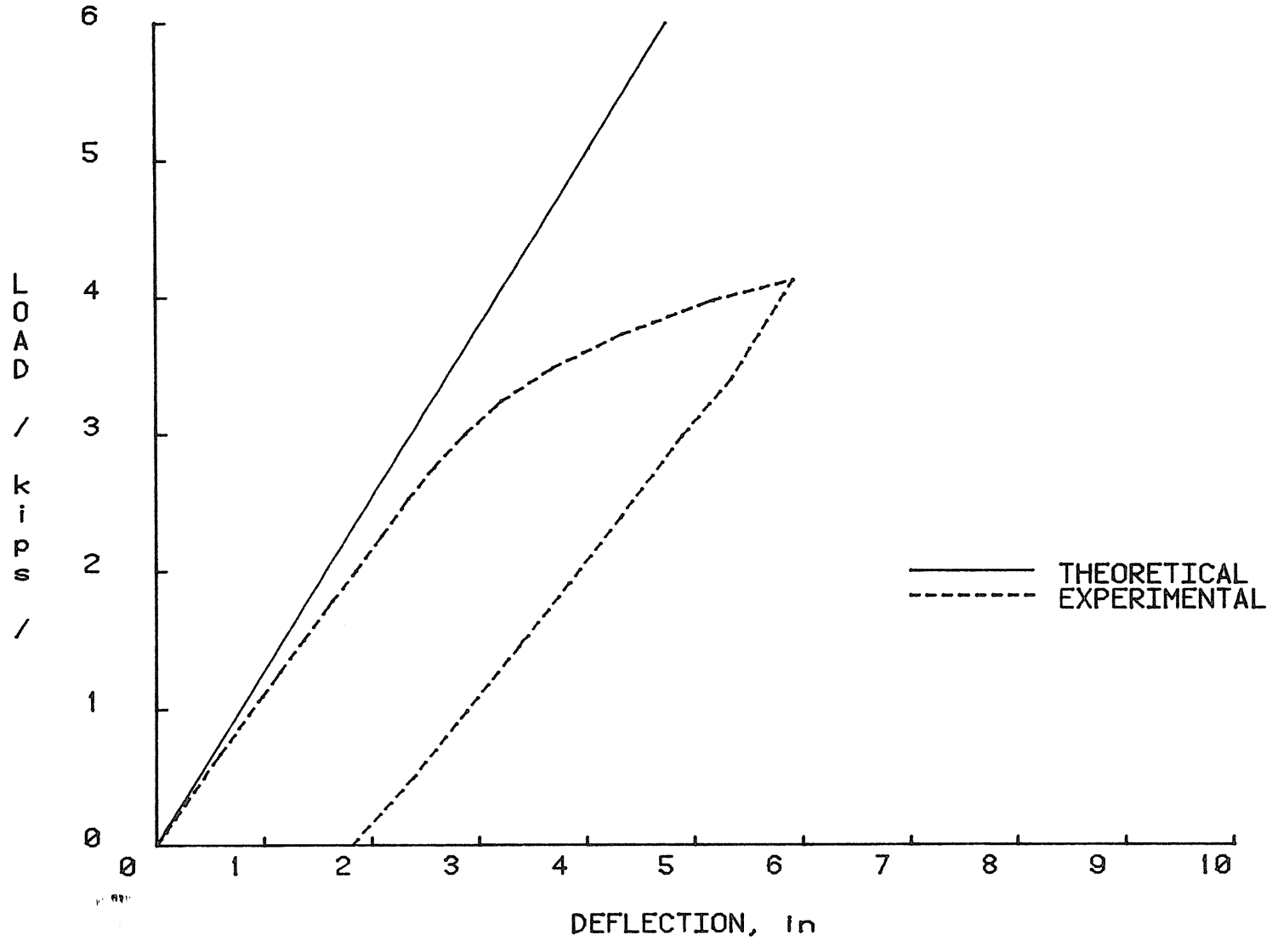


FIGURE G.1 LOAD VS. CENTERLINE DEFLECTION, WEST FRAME, TEST 6

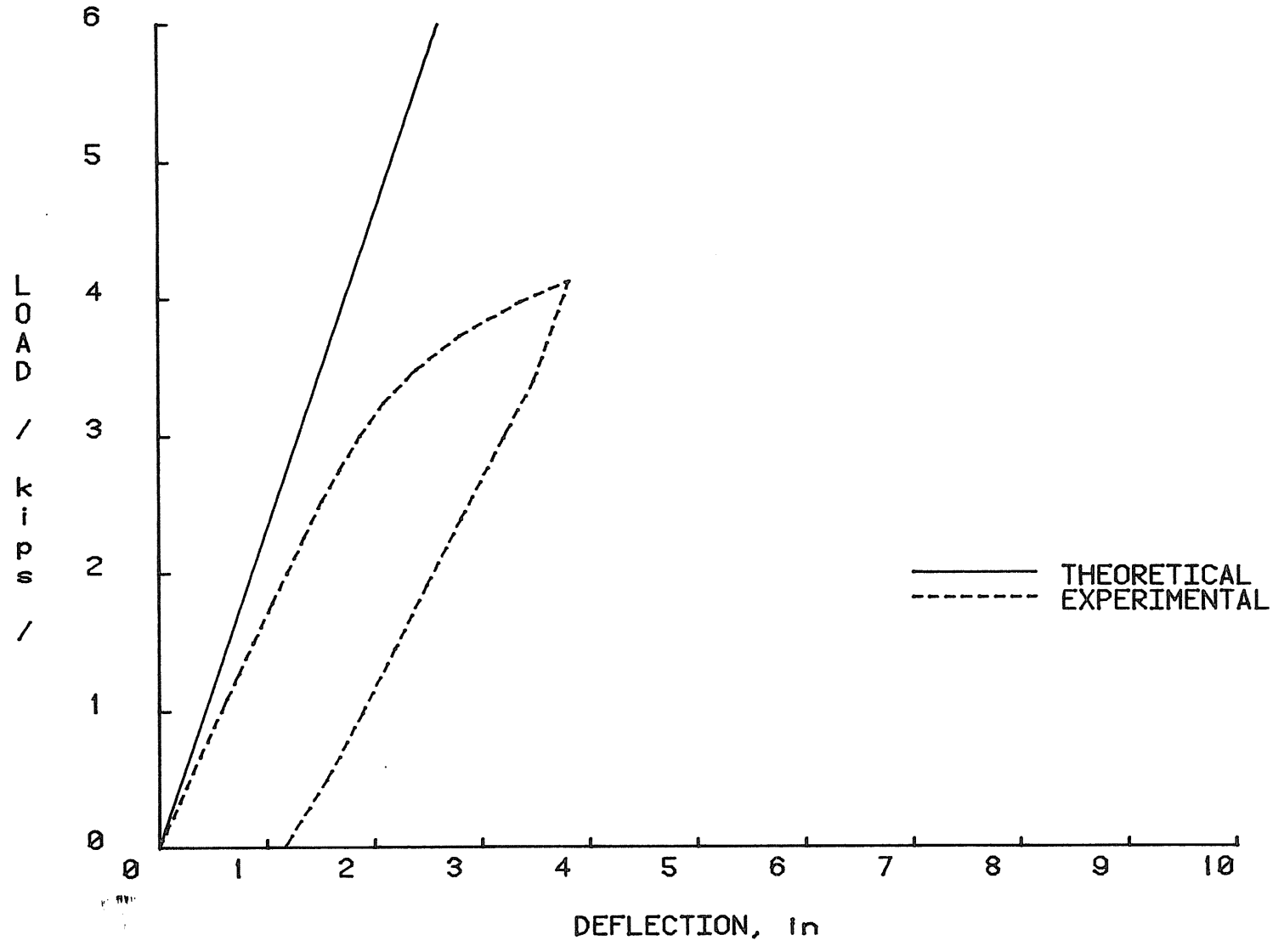


FIGURE G.2 LOAD VS. NORTH QUARTERPOINT DEFLECTION, TEST 6

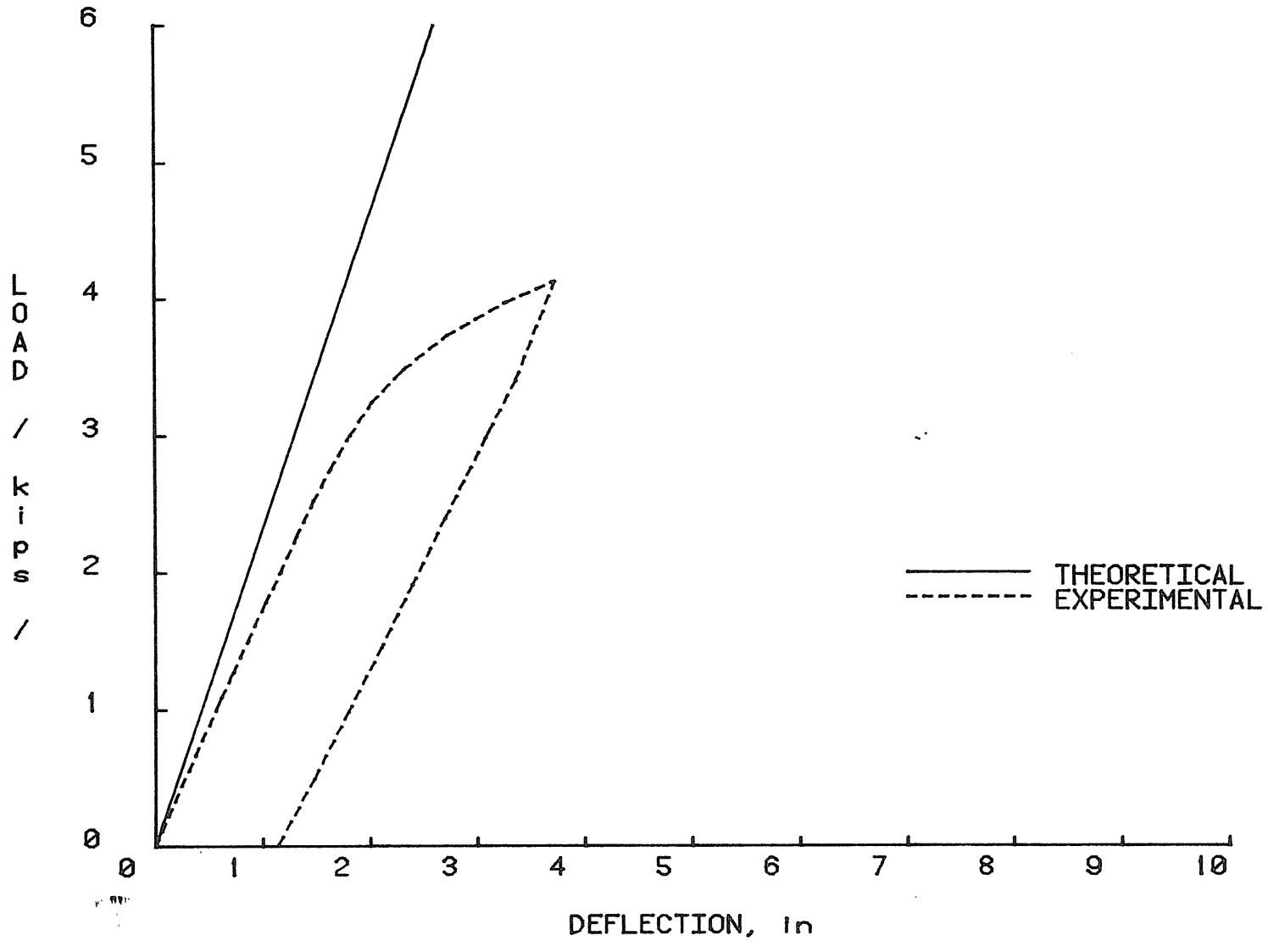


FIGURE G.3 LOAD VS. SOUTH QUARTERPOINT DEFLECTION, TEST 6

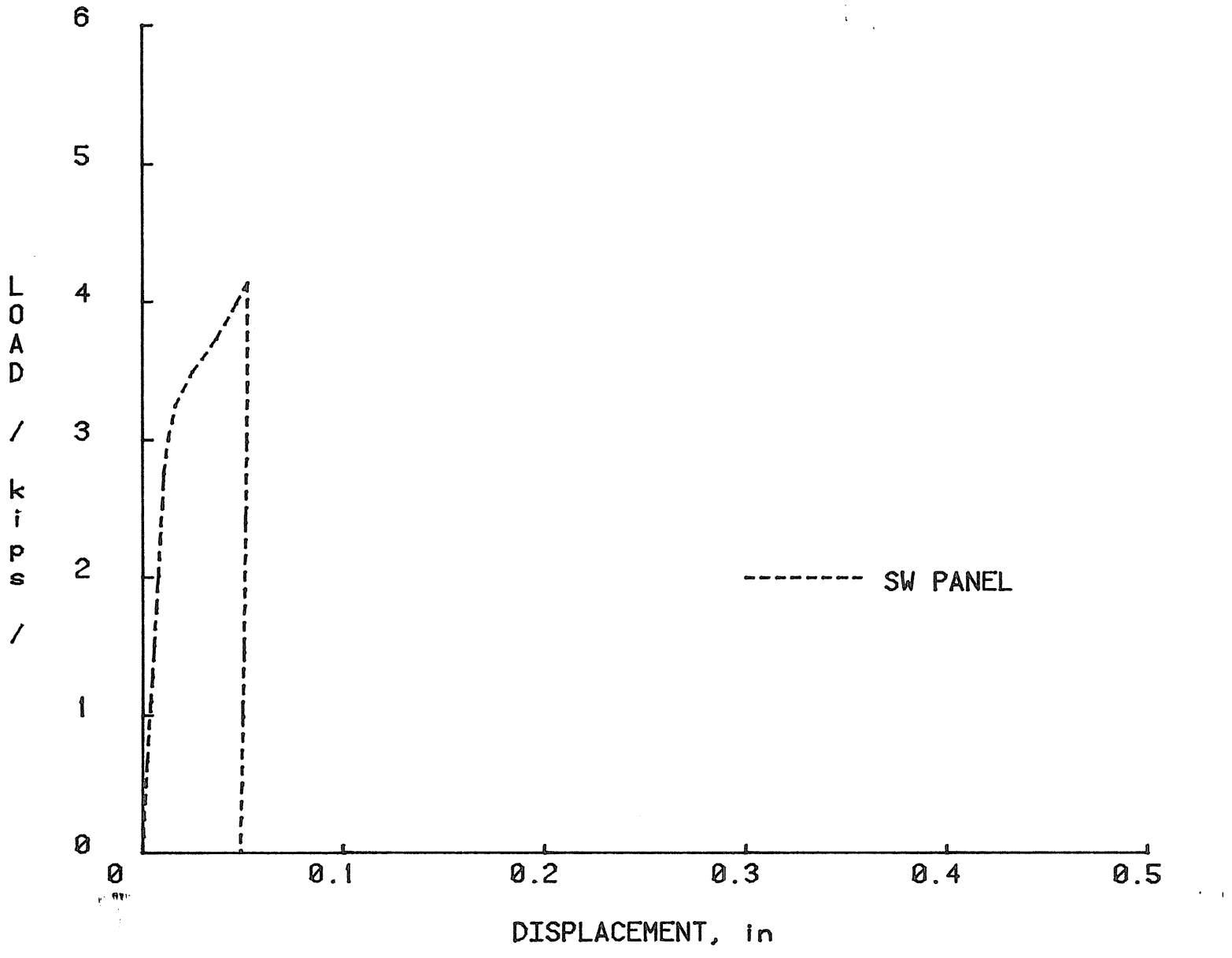


FIGURE G.4 LOAD VS. SOUTH PANEL ZONE DISPLACEMENT, TEST 6

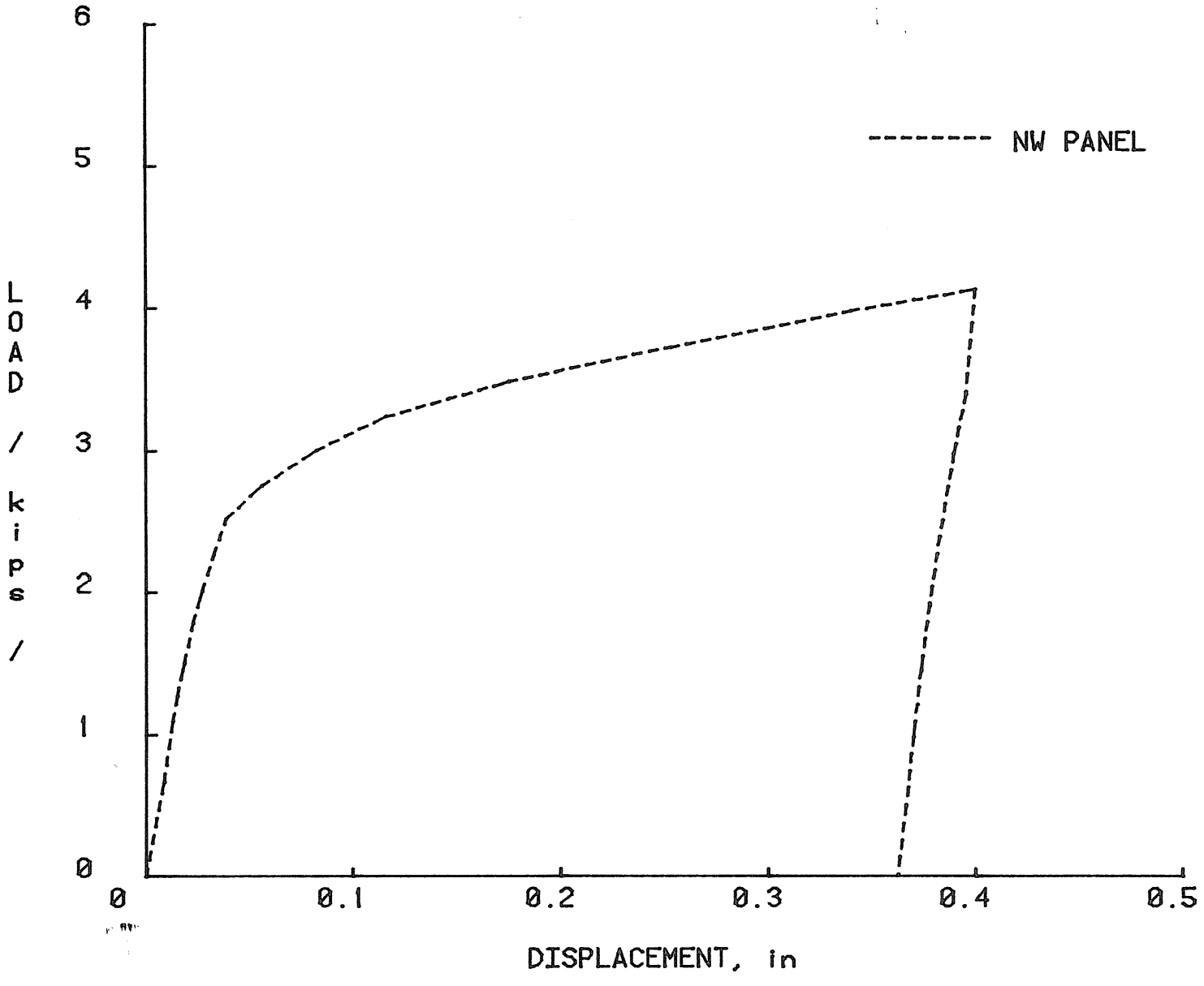


FIGURE G.5 LOAD VS. NORTH PANEL ZONE DISPLACEMENT, TEST 6

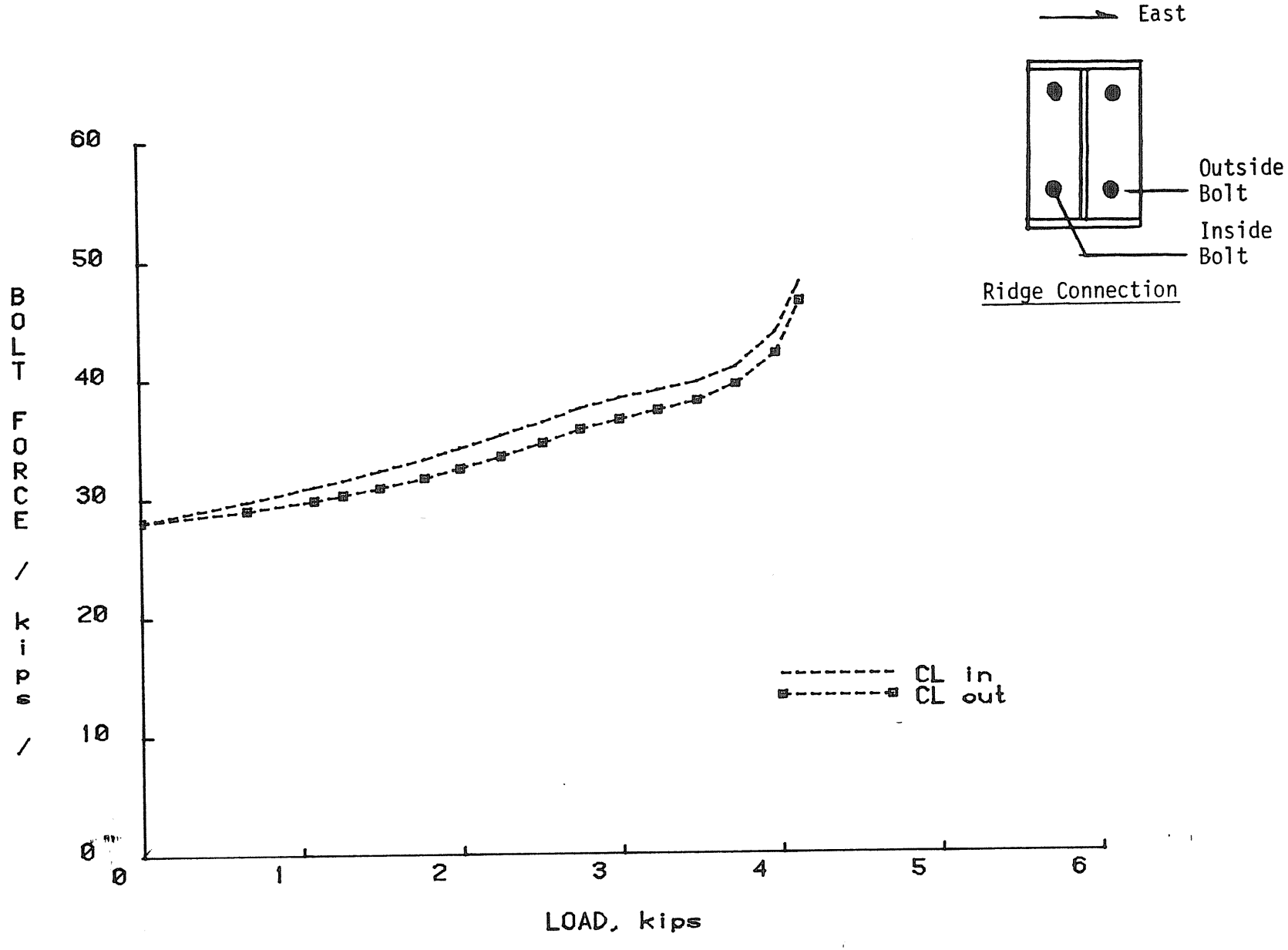


FIGURE G.6 RIDGE CONNECTION BOLT FORCES VS. LOAD, TEST 6

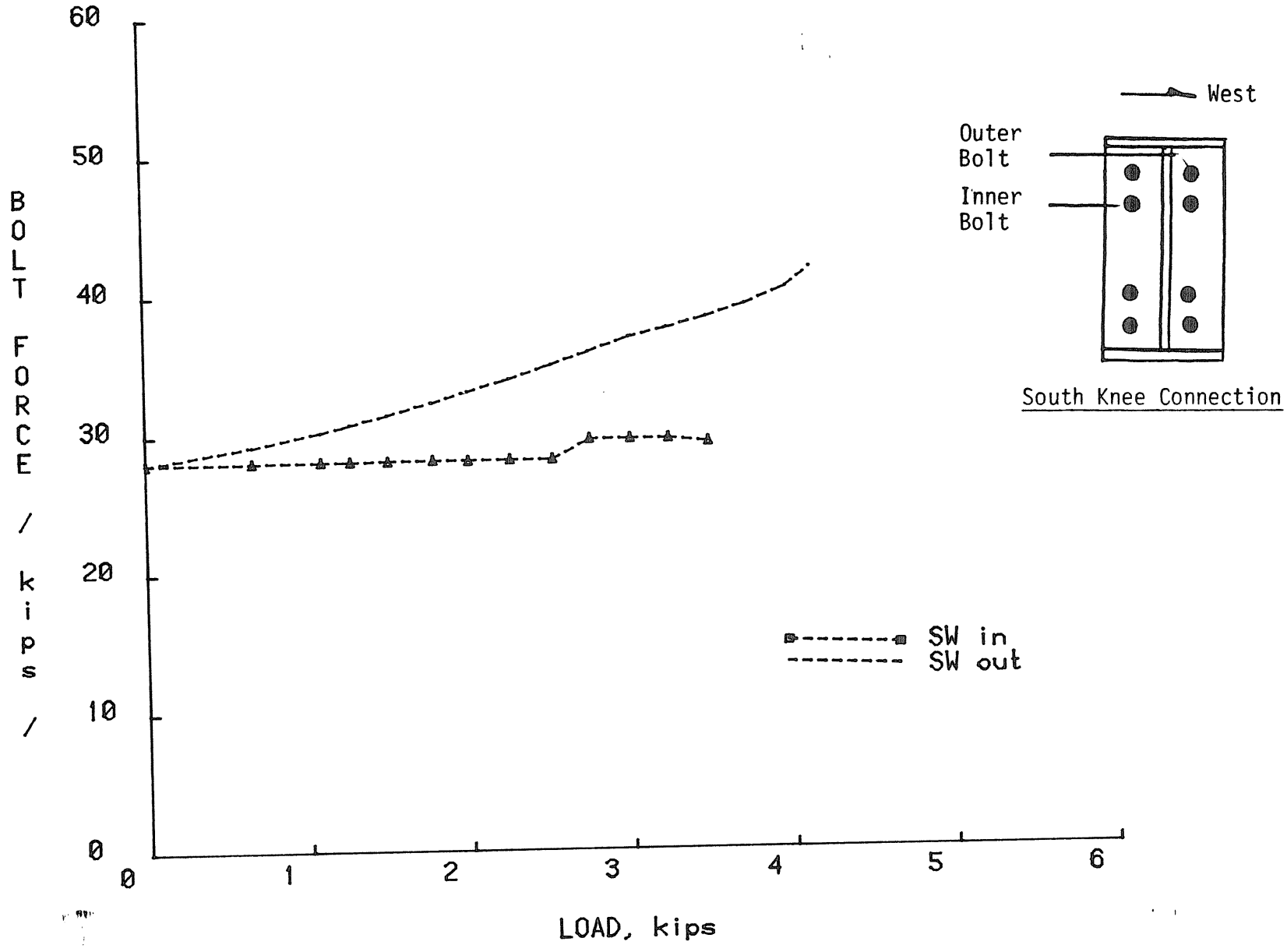


FIGURE G.7 SOUTH CONNECTION BOLT FORCES VS. LOAD, TEST 6

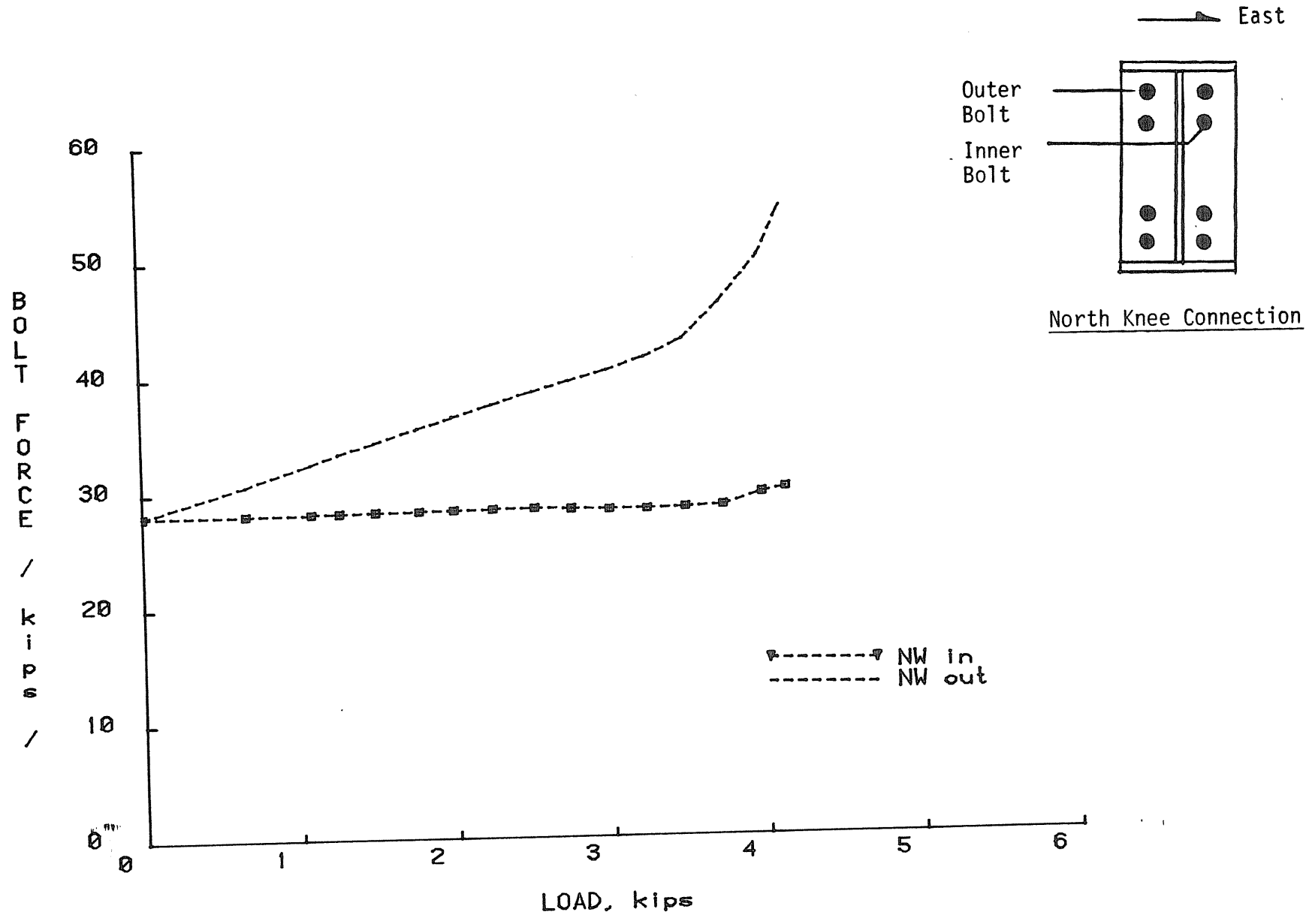


FIGURE G.8 NORTH CONNECTION BOLT FORCES VS. LOAD, TEST 6

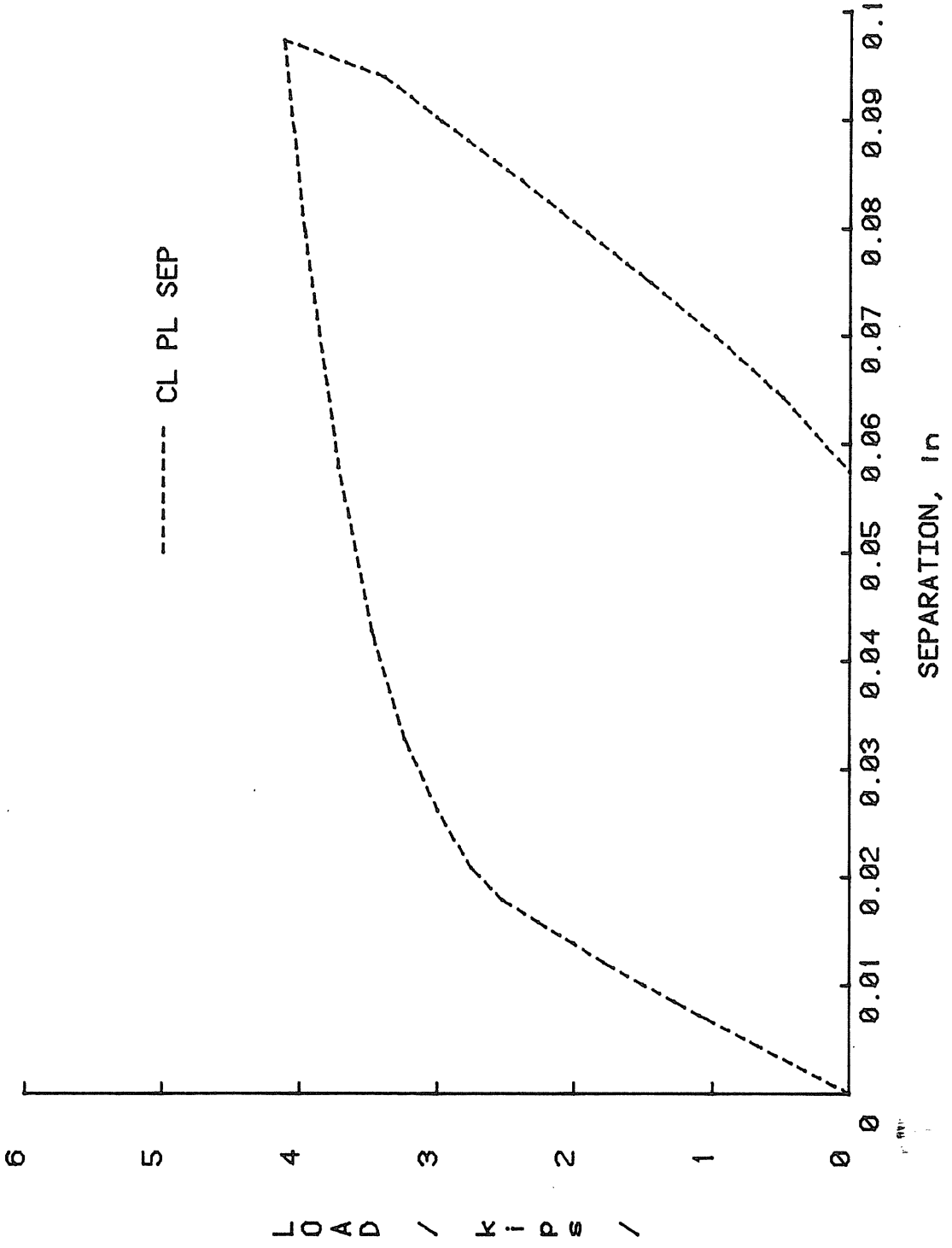


FIGURE G.9 LOAD VS. PLATE SEPARATION AT RIDGE CONNECTION, TEST 6

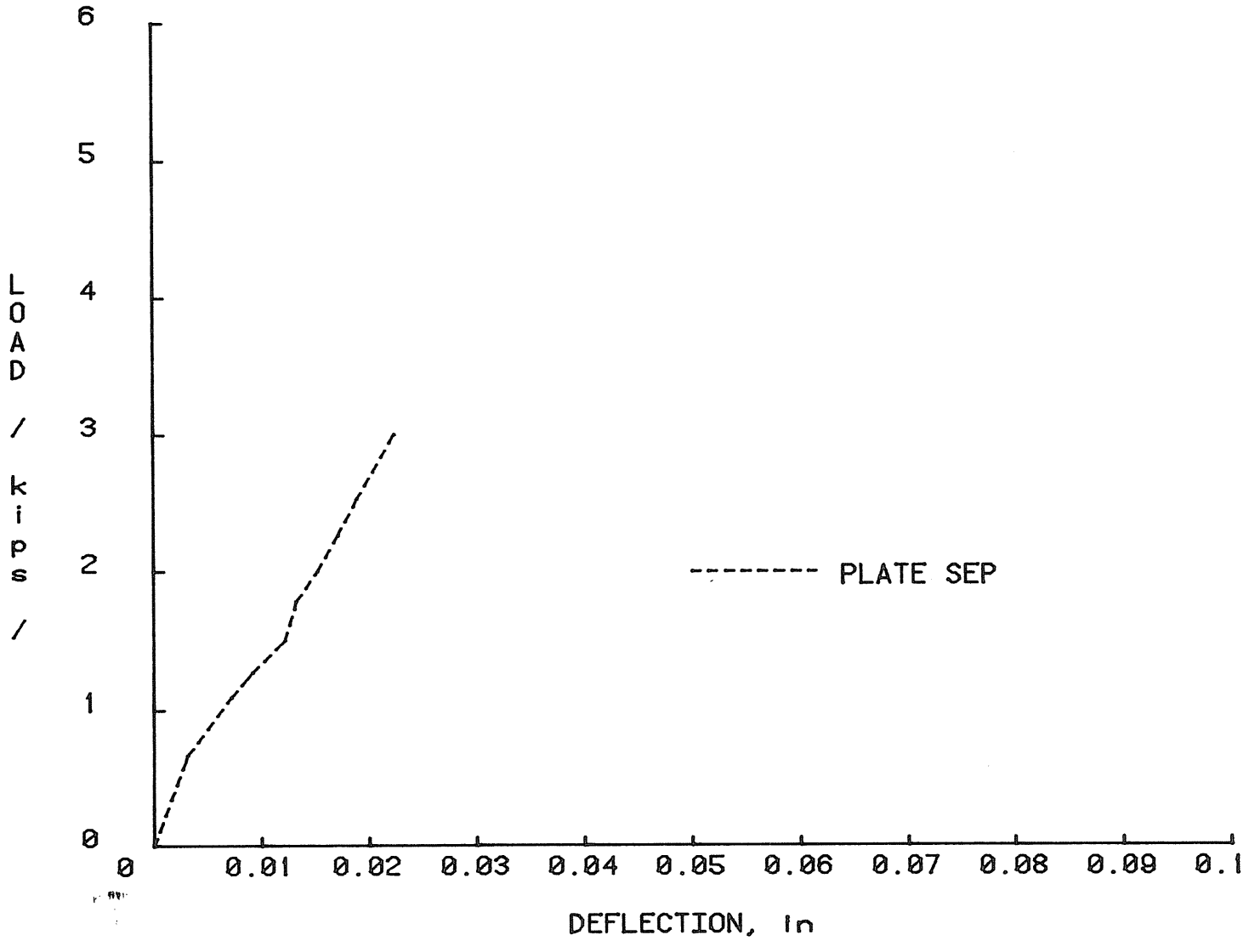


FIGURE G.10 LOAD VS. PLATE SEPARATION AT SOUTH KNEE CONNECTION, TEST 6

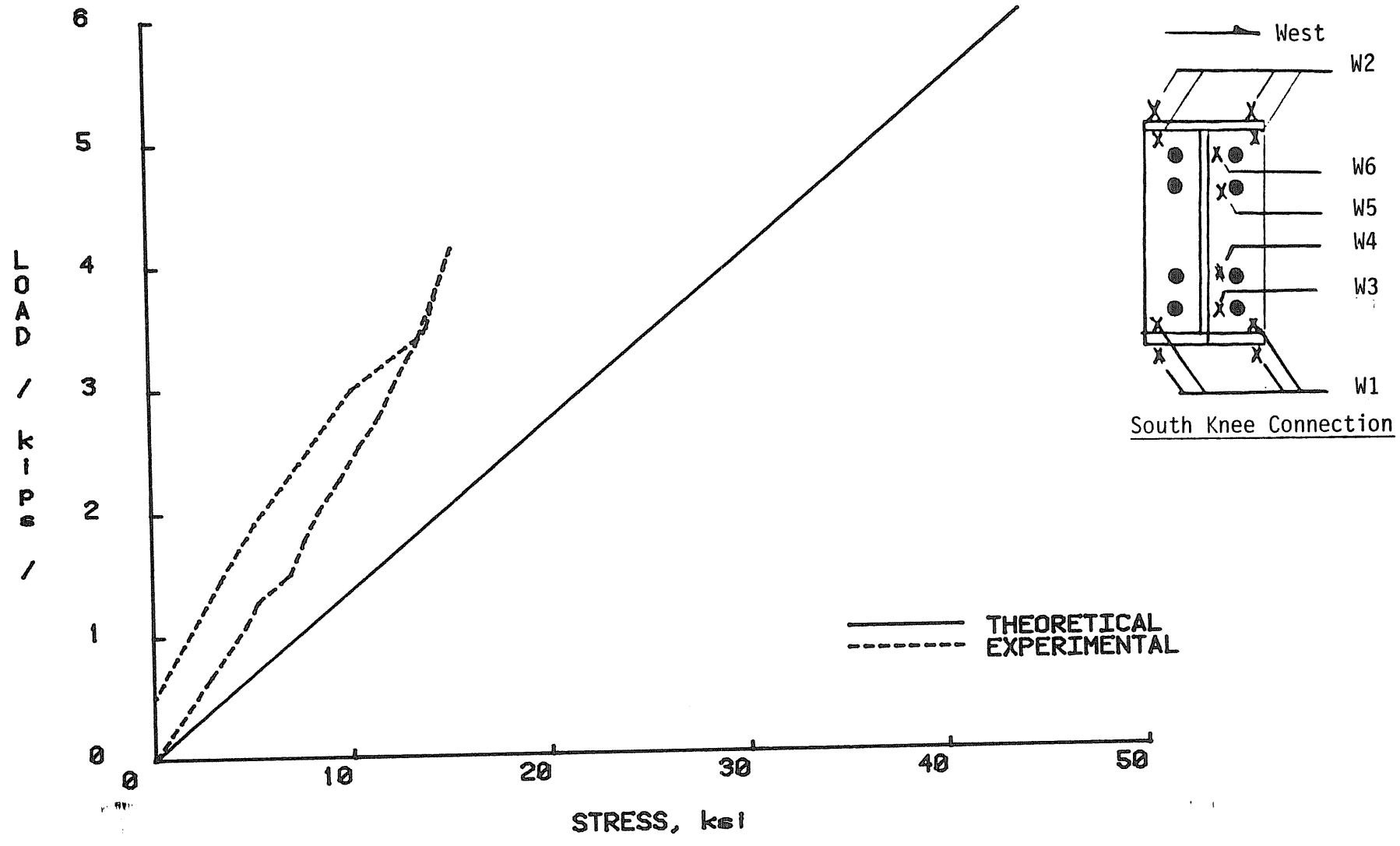


FIGURE G.11 LOAD VS. FLANGE STRESS AT LOCATION W1, TEST 6

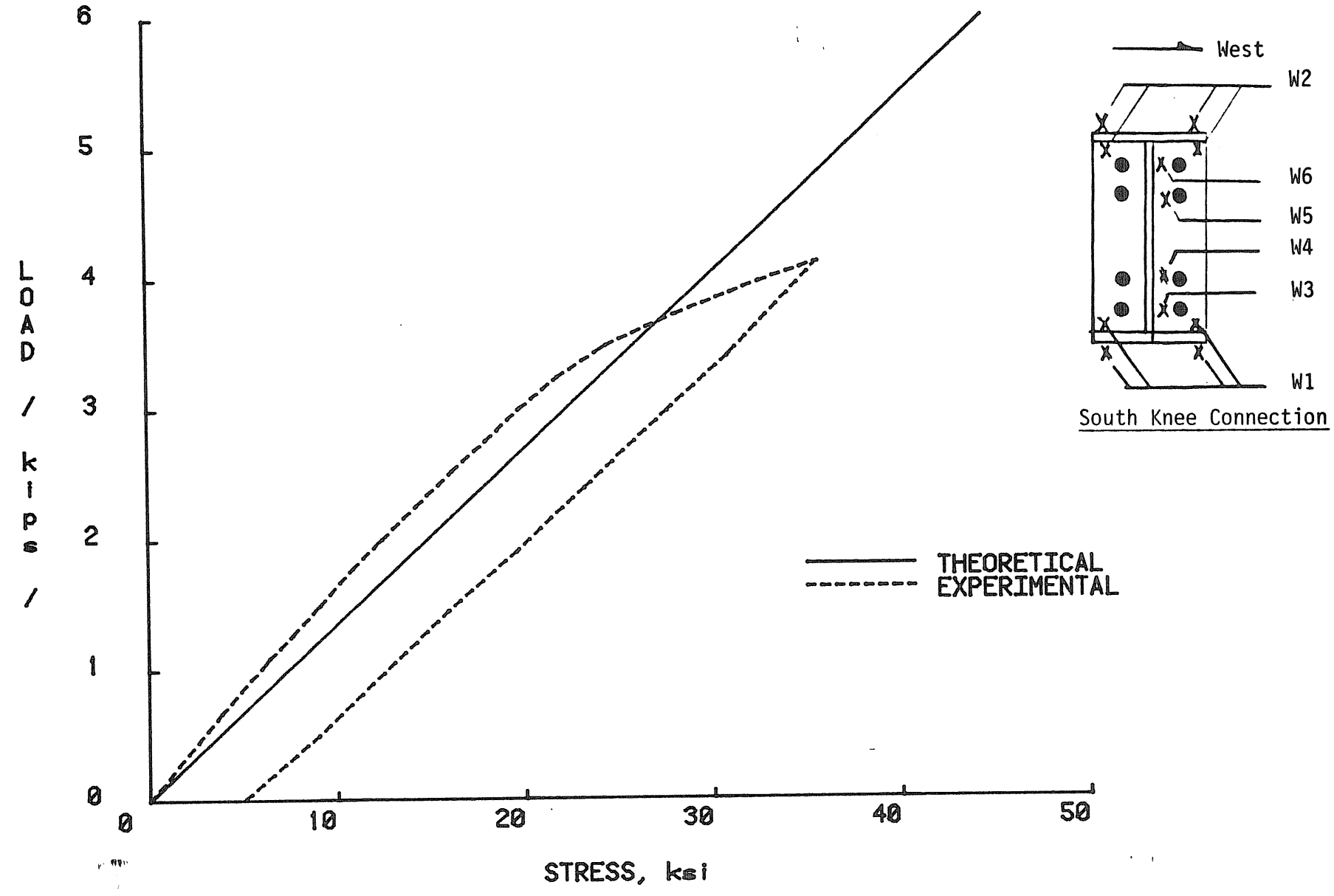


FIGURE G.12 LOAD VS. FLANGE STRESS AT LOCATION W2, TEST 6

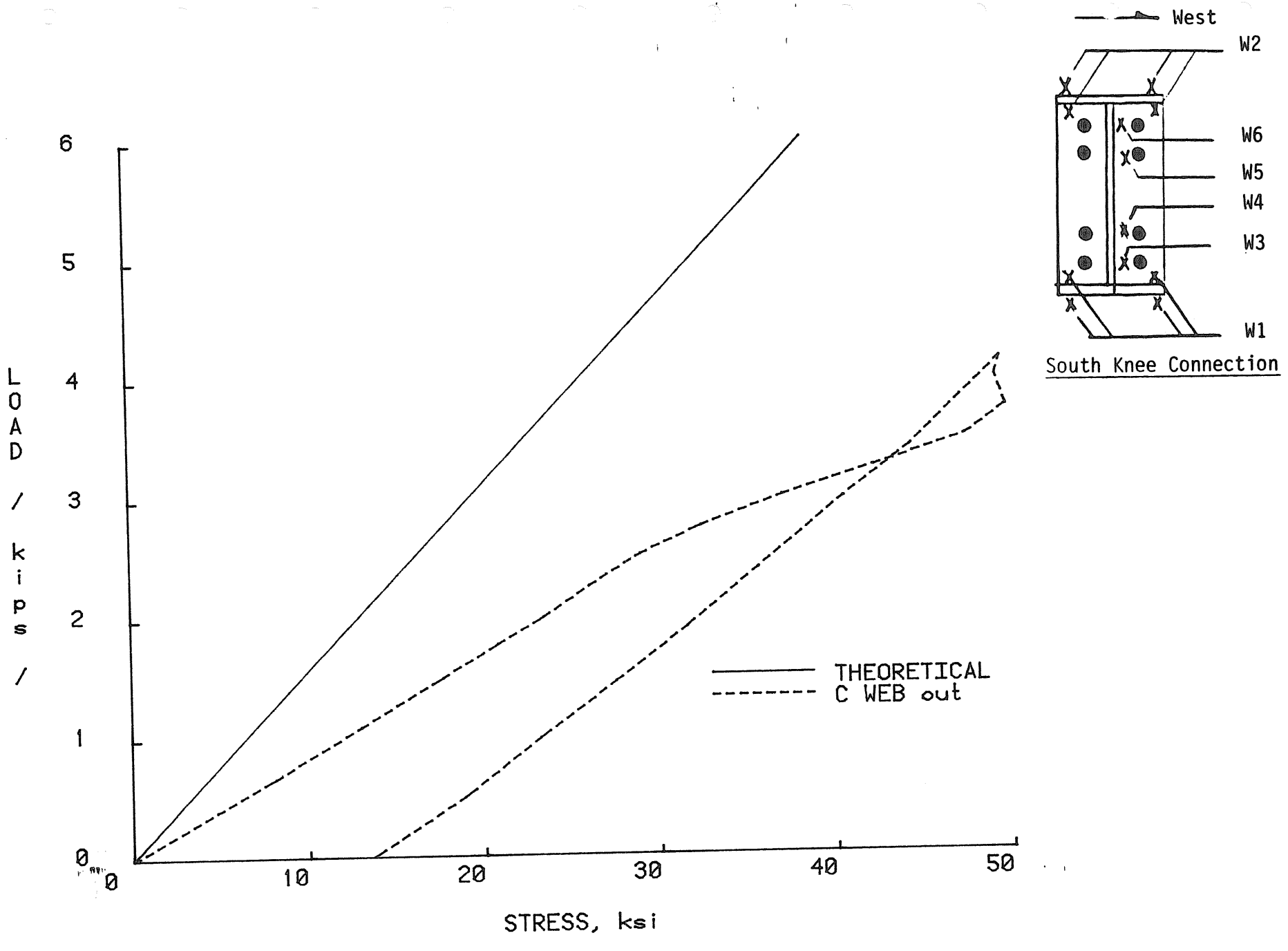


FIGURE G.13 LOAD VS. WEB STRESS AT LOCATION W3, TEST 6

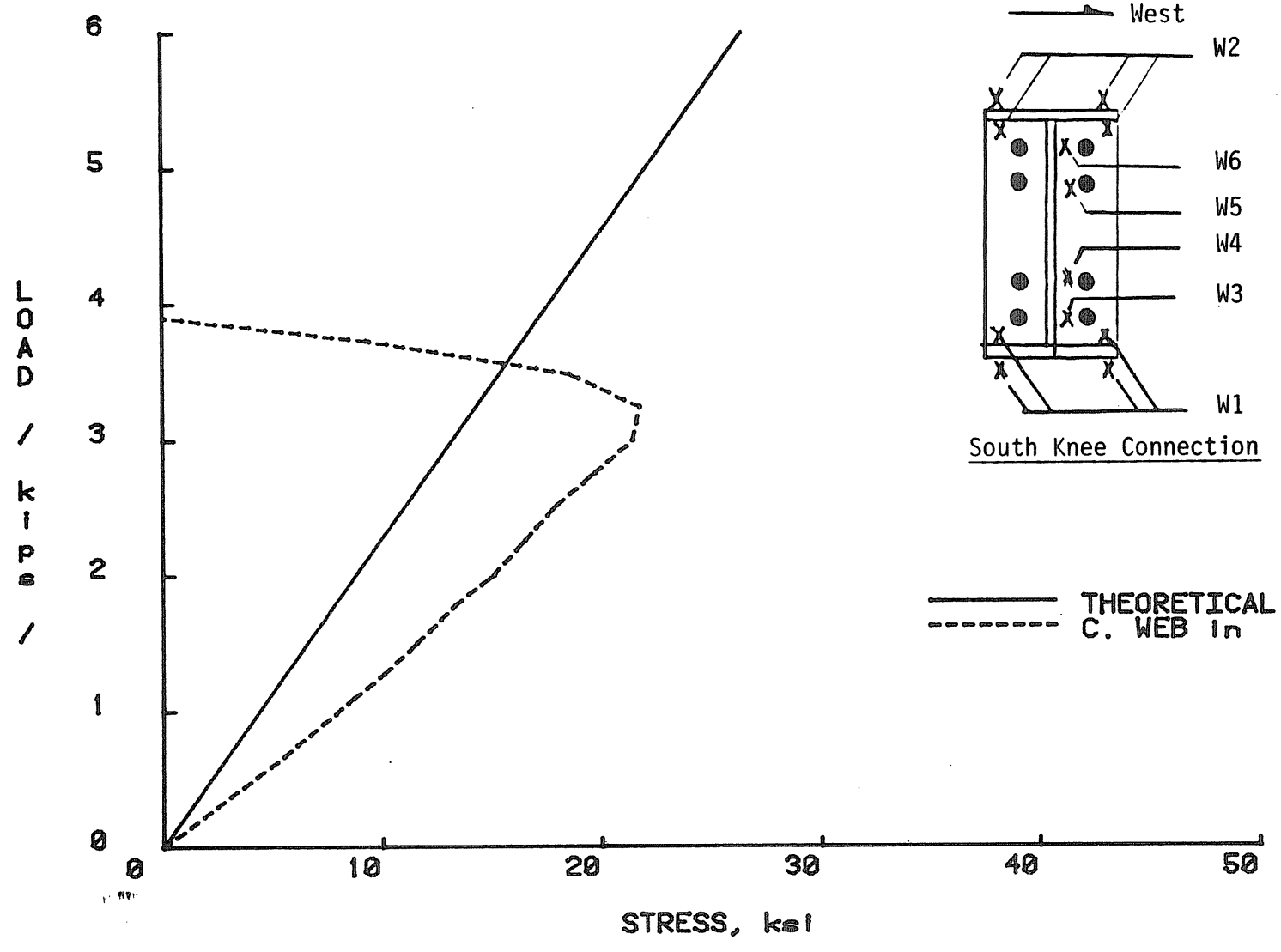
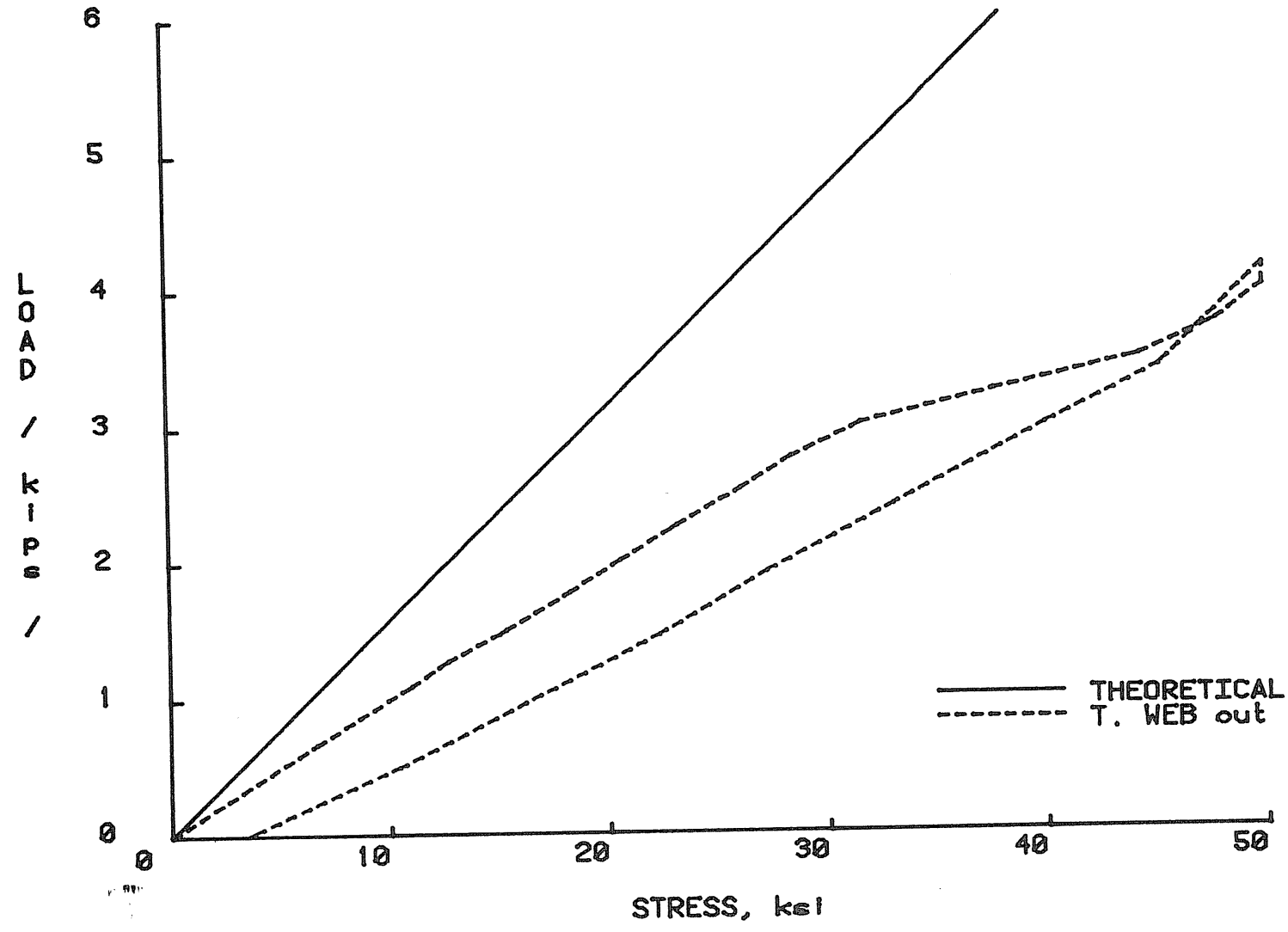
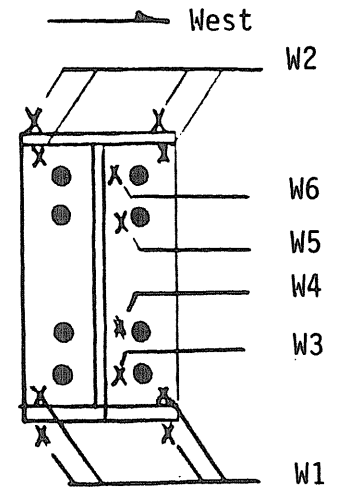


FIGURE G.14 LOAD VS. WEB STRESS AT LOCATION W4, TEST 6





South Knee Connection

FIGURE G.15 LOAD VS. WEB STRESS AT LOCATION W6, TEST 6

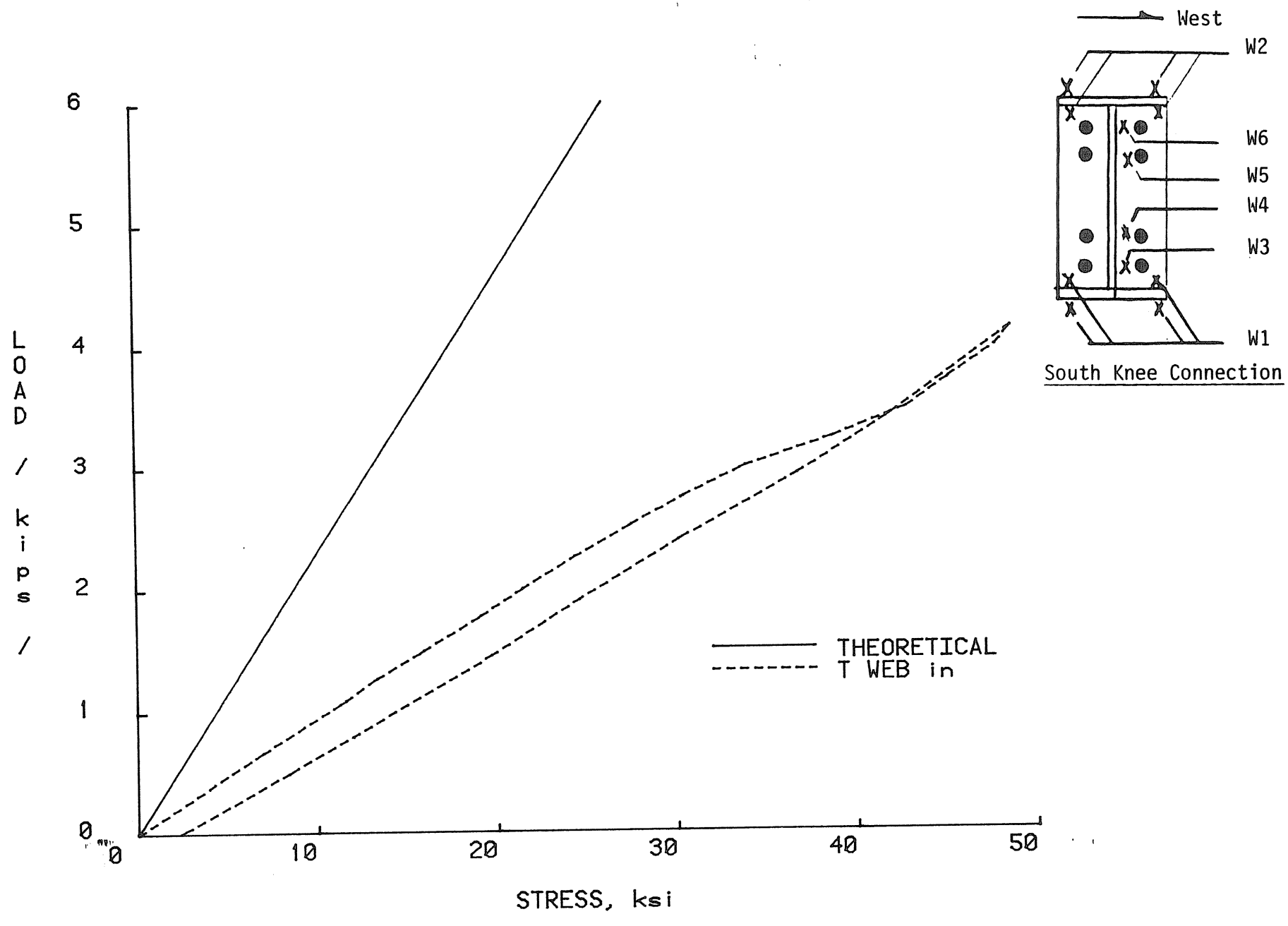


FIGURE G.16 LOAD VS. WEB STRESS AT LOCATION W5, TEST 6

APPENDIX H

MESCO WORKING LOAD COMPUTER ANALYSES

Nominal Dimensions

F_y = 50 ksi

1. Full Live Load -- 2.50 kips
2. Wind Load -- 9.63 kips (factored)
3. Unbalanced Live Load -- 4.18 kips
4. Unbalanced Live Load -- 2.5 kips
   plus Wind Load -- 5.6 kips

* * * G E N E R A L I N P U T * * * Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

4001 8 8 1 50 X 16 X 25 LRF44			LIVE LOAD	NOM GAGES	50 KSI	11		HEAD RECORD
1 1 2	11	0.69	13.43	6.563	21.813		0.80	MEMB DESC
2 9 8	11	-0.69	13.43	6.5	21.75		0.80	MEMB DESC
3 2 3		7.19	0.96	21.75	14.	0.81		MEMB DESC
4 8 7		-7.19	0.96	21.75	14.	0.81		MEMB DESC
5 3 4		4.33	0.36	14.	14.			MEMB DESC
6 7 6		-4.33	0.36	14.	14.			MEMB DESC
7 4 5		12.56	1.05	14.	14.			MEMB DESC
8 6 5		-12.56	1.05	14.	14.			MEMB DESC
DEG INDT	JT DISPL	NUMBER SUPPORTS	BAND WIDTH					
1	23	2	6					
1 112		50.	50.					HEADER
	6.0	0.187	6.0	0.25				FLANGE
86.1	86.1	1.348	120.2	120.2	1.293			BRACING
1	34.	1.0	2	31.7	1.0			BRACING
2	31.7	1.0						BRACING
10.				0.125	0.156			WEB
0.85	1.0	151.8						BUCKLING
2 112		50.	50.					HEADER
	6.0	0.313	6.0	0.187				FLANGE
151.9	151.9	1.257	86.1	86.1	1.348			BRACING
1	34.	1.0	1	34.	1.0			BRACING
			2	31.7	1.0			BRACING
10.				0.125	0.156			WEB
0.85	1.0	151.8						BUCKLING
3 121		50.	50.					HEADER
0.167	6.0	0.187	6.	0.25				FLANGE
	6.0	0.187	6.	0.25				FLANGE
41.3	53.3	1.0	101.3	92.3	1.0			BRACING
1	60.3	1.0	1	92.3	1.0			BRACING
				0.156				WEB
0.85	1.0	87.1						BUCKLING
4 121		50.	50.					HEADER
0.167	6.0	0.25	6.0	0.187				FLANGE
	6.0	0.25	6.0	0.187				FLANGE
101.3	92.3	1.0	41.3	53.3	1.0			BRACING
1	92.3	1.0	1	60.3	1.0			BRACING
				0.156				WEB
0.85	1.0	87.1						BUCKLING
5 111		50.	50.					HEADER
	6.0	0.187	6.	0.187				FLANGE
14.22	60.2	1.0	14.22	92.4	1.0			BRACING
1	60.2	1.0	1	120.4	1.			BRACING
				0.125				WEB
0.85	1.0	51.95						BUCKLING
6 111		50.	50.					HEADER
	6.	0.187	6.0	0.187				FLANGE
14.22	92.4	1.0	14.22	60.2	1.0			BRACING

```
0.85        1.0         51.95                                                   BUCKLING

7 121                   50.         50.                                         HEADER
            6.0         0.187       6.          0.187                           FLANGE
0.167       6.0         0.187       6.          0.187                           FLANGE
22.47       60.2        1.0         82.67       120.4       1.0                 BRACING
1           60.2        1.0         1           135.5       1.0                 BRACING
1           55.7        1.0                                                     BRACING
1           24.0        1.0                                                     BRACING
                                                0.125                           WEB
0.85        1.0         151.45                                                  BUCKLING

8 121                   50.         50.                                         HEADER
            6.          0.187       6.0         0.187                           FLANGE
0.167       6.          0.187       6.0         0.187                           FLANGE
82.67       120.4       1.0         22.47       60.2        1.0                 BRACING
1           135.5       1.0         1           60.2        1.0                 BRACING
                                    1           55.7        1.0                 BRACING
                                    1           24.0        1.0                 BRACING
                                                0.125                           WEB
0.85        1.0         151.45                                                  BUCKLING
1 10        VERT CONC LOADS                                                     LOADS
1 2         0.051                                                               LOADS
3 8         0.059                                                               LOADS
3 3                                 2.50                        2.78            LOADS
4 4                                 2.50                        2.78            LOADS
5 5                                 2.50                        0.2             LOADS
6 6                                 2.50                        0.2             LOADS
7 7                                 2.50                        3.37            LOADS
7 7                                 2.50                        8.37            LOADS
8 8                                 2.50                        3.37            LOADS
8 8                                 2.50                        8.37            LOADS

NO ERRORS WERE DETECTED IN INPUT
*---------*---------*---------*---------*---------*---------*---------*---------*
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H.2

PROJECT No. 4001 50 X 16 X 25 LRF44 LIVE LOAD NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

FRAME GEOMETRY

MEMBER NUMBER	LENGTH (FT)	PROJECTION HORIZ	PROJECTION VERT	INITIAL END JT No	INITIAL END X COORD.	INITIAL END Y COORD.	TERMINAL END JT No	TERMINAL END X COORD.	TERMINAL END Y COORD.
1	13.45	0.69	13.43	1	0.00	0.00	2	0.69	13.43
2	13.45	-0.69	13.43	9	49.54	-0.00	8	48.85	13.43
3	7.25	7.19	0.96	2	0.69	13.43	3	7.88	14.39
4	7.25	-7.19	0.96	8	48.85	13.43	7	41.66	14.39
5	4.34	4.33	0.36	3	7.88	14.39	4	12.21	14.75
6	4.34	-4.33	0.36	7	41.66	14.39	6	37.33	14.75
7	12.60	12.56	1.05	4	12.21	14.75	5	24.77	15.80
8	12.60	-12.56	1.05	6	37.33	14.75	5	24.77	15.80

	X	Y
MINIMUM JOINT COORDINATE	0.00	-0.00
MAXIMUM JOINT COORDINATE	49.54	15.80

PROJECT No. 4001 50 X 16 X 25 LRF44 LIVE LOAD NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

STRESS ANALYSIS FOR MEMBER 1

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	POSITIVE EXTREMITY AXIAL STRESS ALLOWABLE (KSI)	POSITIVE EXTREMITY BENDING STRESS COMPUTED (KSI)	POSITIVE EXTREMITY BENDING STRESS ALLOWABLE (KSI)	POSITIVE EXTREMITY STRESS RATIO	POSITIVE EXTREMITY LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	NEGATIVE EXTREMITY AXIAL STRESS ALLOWABLE (KSI)	NEGATIVE EXTREMITY BENDING STRESS COMPUTED (KSI)	NEGATIVE EXTREMITY BENDING STRESS ALLOWABLE (KSI)	NEGATIVE EXTREMITY STRESS RATIO	NEGATIVE EXTREMITY LC No	WEB SHEAR RATIO	WEB LC No
1	3.42	21.71	0.00	27.58	0.158	1	3.42	21.71	-0.00	30.00	0.158	1	0.369	1
2	3.08	21.27	-13.96	30.00	0.321	1	3.08	21.27	11.60	26.52	0.540	1	0.347	1
3	2.81	20.84	-20.23	30.00	0.540	1	2.81	20.84	17.05	26.28	0.742	1	0.434	1
4	2.57	21.96	-23.37	30.00	0.662	1	2.57	21.96	19.96	26.04	0.852	1	0.537	1
5	2.38	20.96	-24.99	30.00	0.720	1	2.38	20.96	21.59	25.80	0.916	1	0.641	1
6	2.13	21.69	-23.47	30.00	0.684	1	2.13	21.69	20.60	25.42	0.881	1	0.330	1
7	1.95	21.51	-24.07	30.00	0.712	1	1.95	21.51	21.35	29.96	0.778	1	0.386	1

GEOMETRIC PROPERTIES FOR MEMBER 1

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	POS FLANGE THK (IN)	POS FLANGE UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	NEG FLANGE THK (IN)	NEG FLANGE UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.00	6.0	0.187	86.1	6.0	0.250	120.2	0.125	6.56	3.4	32.6	8.47	10.37
2	2.50	6.0	0.187	86.1	6.0	0.250	120.2	0.125	9.58	3.8	71.2	13.01	15.67
3	5.00	6.0	0.187	86.1	6.0	0.250	120.2	0.125	12.59	4.2	127.0	17.96	21.31
4	7.50	6.0	0.187	34.0	6.0	0.250	120.2	0.125	15.61	4.6	201.8	23.32	27.31
5	10.00	6.0	0.187	34.0	6.0	0.250	120.2	0.125	18.62	4.9	297.4	29.08	33.67
6	10.00	6.0	0.187	34.0	6.0	0.250	120.2	0.156	18.62	5.5	314.4	30.98	35.29
7	12.65	6.0	0.187	31.7	6.0	0.250	31.7	0.156	21.81	6.0	450.3	38.19	43.06

YIELD STRESSES (KSI)	FLANGES	WEB
	50.0	50.0

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 1

PT No	POSITIVE FLANGE CB	POSITIVE FLANGE L/RT	POSITIVE FLANGE LD/AF	NEGATIVE FLANGE CB	NEGATIVE FLANGE L/RT	NEGATIVE FLANGE LD/AF	KL/RX	KL/RY	CM	F'E
1	1.348	52.986	537.166	1.293	72.136	560.933	49.302	56.954	0.850	61.435
2	1.348	54.369	768.464	1.293	73.419	802.465	51.311	59.988	0.850	56.720
3	1.348	55.701	999.762	1.293	74.698	1043.997	52.936	62.876	0.850	53.290
4	1.000	22.505	486.133	1.293	75.968	1285.529	54.331	25.919	0.850	50.588
5	1.000	22.999	577.470	1.293	77.228	1527.061	55.561	26.965	0.850	48.373
6	1.000	23.733	577.531	1.293	79.131	1527.222	57.108	28.489	0.850	45.789
7	1.000	22.696	628.632	1.000	21.296	470.216	58.359	27.731	0.850	43.847

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MEMBER FORCES FOR MEMBER 1

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES							
			MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	6.06	-0.00	11.78						
2	2.50	6.06	15.14	11.78						
3	5.00	6.06	30.28	11.77						
4	7.50	6.06	45.42	11.76						
5	10.00	6.06	60.56	11.76						
6	10.00	6.06	60.57	11.76						
7	12.65	6.06	76.61	11.75						

PROJECT No. 4001 50 X 16 X 25 LRF44 LIVE LOAD NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

STRESS ANALYSIS FOR MEMBER 2

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	WEB SHEAR RATIO	WEB LC No
1	3.09	21.84	0.00	26.64	0.141	1	3.09	21.84	-0.00	30.00	0.141	1	0.373	1
2	2.81	21.45	9.79	22.48	0.529	1	2.81	21.45	-13.74	30.00	0.327	1	0.347	1
3	2.58	21.07	14.48	22.19	0.739	1	2.58	21.07	-19.83	30.00	0.539	1	0.431	1
4	2.38	22.06	17.06	21.88	0.859	1	2.38	22.06	-22.85	30.00	0.654	1	0.535	1
5	2.21	21.24	18.56	21.58	0.934	1	2.21	21.24	-24.38	30.00	0.709	1	0.639	1
6	1.99	21.69	17.89	21.10	0.914	1	1.99	21.69	-22.85	30.00	0.670	1	0.329	1
7	1.84	21.52	18.67	20.69	0.963	1	1.84	21.52	-23.40	30.00	0.695	1	0.385	1

GEOMETRIC PROPERTIES FOR MEMBER 2

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.00	6.0	0.313	151.9	6.0	0.187	86.1	0.125	6.50	3.8	35.4	12.33	8.56
2	2.50	6.0	0.313	151.9	6.0	0.187	86.1	0.125	9.51	4.2	77.3	18.55	13.22
3	5.00	6.0	0.313	151.9	6.0	0.187	86.1	0.125	12.53	4.6	138.0	25.09	18.32
4	7.50	6.0	0.313	151.9	6.0	0.187	34.0	0.125	15.54	4.9	219.1	31.95	23.86
5	10.00	6.0	0.313	151.9	6.0	0.187	34.0	0.125	18.56	5.3	322.5	39.16	29.81
6	10.00	6.0	0.313	151.9	6.0	0.187	34.0	0.156	18.56	5.9	340.1	40.63	31.82
7	12.65	6.0	0.313	151.9	6.0	0.187	31.7	0.156	21.75	6.4	486.2	49.25	39.28

	FLANGES	WEB
YIELD STRESSES (KSI)	50.0	50.0

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 2

PT No	POSITIVE FLANGE CB	L/RT	LD/AF	NEGATIVE FLANGE CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.257	90.152	566.187	1.348	53.226	537.166	49.832	56.035	0.850	60.136
2	1.257	91.372	809.982	1.348	54.686	768.464	51.723	58.737	0.850	55.819
3	1.257	92.607	1053.776	1.348	56.079	999.762	53.228	61.320	0.850	52.707
4	1.257	93.851	1297.571	1.000	22.674	486.133	54.516	25.193	0.850	50.246
5	1.257	95.097	1541.365	1.000	23.184	577.470	55.655	26.135	0.850	48.211
6	1.257	96.990	1541.527	1.000	23.935	577.531	57.063	27.508	0.850	45.860
7	1.257	98.626	1799.667	1.000	22.896	628.632	58.243	26.707	0.850	44.021

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MEMBER FORCES FOR MEMBER 2

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES							
			MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	6.06	-0.00	11.78						
2	2.50	6.06	-15.14	11.78						
3	5.00	6.06	-30.28	11.77						
4	7.50	6.06	-45.42	11.76						
5	10.00	6.06	-60.56	11.76						
6	10.00	6.06	-60.57	11.76						
7	12.65	6.06	-76.61	11.75						

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STRESS ANALYSIS FOR MEMBER 3

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	WEB SHEAR RATIO	WEB LC No
1	1.35	23.13	-23.03	30.00	0.710	1	1.35	23.13	20.43	27.06	0.800	1	0.661	1
2	1.35	23.14	-22.77	30.00	0.700	1	1.35	23.14	20.18	27.07	0.790	1	0.654	1
3	1.35	23.14	-22.77	30.00	0.700	1	1.35	23.14	20.18	27.07	0.790	1	0.654	1
4	1.43	23.32	-19.36	30.00	0.584	1	1.43	23.32	17.04	27.24	0.673	1	0.583	1
5	1.37	23.32	-19.36	30.00	0.586	1	1.37	23.32	17.04	27.24	0.671	1	0.442	1
6	1.48	22.79	-15.78	30.00	0.461	1	1.48	22.79	13.76	27.45	0.550	1	0.374	1
7	1.61	23.06	-10.23	30.00	0.271	1	1.61	23.06	8.82	27.66	0.372	1	0.309	1

GEOMETRIC PROPERTIES FOR MEMBER 3

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.81	6.0	0.187	53.3	6.0	0.250	92.3	0.156	21.75	6.0	447.3	38.04	42.90
2	0.98	6.0	0.187	53.3	6.0	0.250	92.3	0.156	21.55	6.0	438.0	37.57	42.40
3	0.98	6.0	0.187	53.3	6.0	0.250	92.3	0.156	21.55	6.0	437.9	37.57	42.39
4	2.78	6.0	0.187	53.3	6.0	0.250	92.3	0.156	19.38	5.6	344.1	32.64	37.09
5	2.78	6.0	0.187	53.3	6.0	0.250	92.3	0.156	19.38	5.6	344.0	32.64	37.09
6	5.02	6.0	0.187	60.3	6.0	0.250	92.3	0.156	16.69	5.2	245.9	26.88	30.84
7	7.25	6.0	0.187	60.3	6.0	0.250	92.3	0.156	14.00	4.8	166.7	21.50	24.95

YIELD STRESSES (KSI)	FLANGES	WEB
	50.0	50.0

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 3

PT No	POSITIVE FLANGE CB	L/RT	LD/AF	NEGATIVE FLANGE CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	38.142	1053.981	1.000	61.982	1365.240	14.988	46.588	0.850	664.734
2	1.000	38.083	1044.487	1.000	61.904	1352.942	14.963	46.468	0.850	667.006
3	1.000	38.083	1044.392	1.000	61.904	1352.819	14.962	46.467	0.850	667.029
4	1.000	37.435	941.475	1.000	61.061	1219.508	14.669	45.137	0.850	694.028
5	1.000	37.435	941.380	1.000	61.060	1219.385	14.668	45.136	0.850	694.055
6	1.000	41.420	920.453	1.000	60.002	1053.871	14.252	49.132	0.850	735.203
7	1.000	40.461	775.892	1.000	58.932	888.356	13.758	47.121	0.850	788.884

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MEMBER FORCES FOR MEMBER 3

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES							
			MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.81	10.39	73.02	8.10						
2	0.98	10.38	71.29	8.10						
3	0.98	10.38	71.27	8.10						
4	2.78	10.28	52.66	8.08						
5	2.78	7.80	52.65	7.75						
6	5.02	7.67	35.35	7.74						
7	7.25	7.54	18.34	7.72						

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STRESS ANALYSIS FOR MEMBER 4

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	WEB SHEAR RATIO	WEB LC No
1	1.35	23.13	20.43	27.06	0.800	1	1.35	23.13	-23.03	30.00	0.710	1	0.661	1
2	1.35	23.14	20.18	27.07	0.790	1	1.35	23.14	-22.77	30.00	0.700	1	0.654	1
3	1.35	23.14	20.18	27.07	0.790	1	1.35	23.14	-22.77	30.00	0.700	1	0.654	1
4	1.43	23.32	17.04	27.24	0.673	1	1.43	23.32	-19.36	30.00	0.584	1	0.583	1
5	1.37	23.32	17.04	27.24	0.671	1	1.37	23.32	-19.36	30.00	0.586	1	0.442	1
6	1.48	22.79	13.76	27.45	0.550	1	1.48	22.79	-15.78	30.00	0.461	1	0.374	1
7	1.61	23.06	8.82	27.66	0.372	1	1.61	23.06	-10.23	30.00	0.271	1	0.309	1

GEOMETRIC PROPERTIES FOR MEMBER 4

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.81	6.0	0.250	92.3	6.0	0.187	53.3	0.156	21.75	6.0	447.3	42.90	38.04
2	0.98	6.0	0.250	92.3	6.0	0.187	53.3	0.156	21.55	6.0	438.0	42.40	37.57
3	0.98	6.0	0.250	92.3	6.0	0.187	53.3	0.156	21.55	6.0	437.9	42.39	37.57
4	2.78	6.0	0.250	92.3	6.0	0.187	53.3	0.156	19.38	5.6	344.1	37.09	32.64
5	2.78	6.0	0.250	92.3	6.0	0.187	53.3	0.156	19.38	5.6	344.0	37.09	32.64
6	5.02	6.0	0.250	92.3	6.0	0.187	60.3	0.156	16.69	5.2	245.9	30.84	26.88
7	7.25	6.0	0.250	92.3	6.0	0.187	60.3	0.156	14.00	4.8	166.7	24.95	21.50

YIELD STRESSES (KSI)	FLANGES	WEB
	50.0	50.0

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 4

PT No	POSITIVE FLANGE CB	L/RT	LD/AF	NEGATIVE FLANGE CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	61.982	1365.240	1.000	38.142	1053.981	14.988	46.588	0.850	664.734
2	1.000	61.904	1352.942	1.000	38.083	1044.487	14.963	46.468	0.850	667.006
3	1.000	61.904	1352.819	1.000	38.083	1044.392	14.962	46.467	0.850	667.029
4	1.000	61.061	1219.509	1.000	37.435	941.475	14.669	45.137	0.850	694.028
5	1.000	61.060	1219.385	1.000	37.435	941.380	14.668	45.136	0.850	694.056
6	1.000	60.002	1053.871	1.000	41.420	920.453	14.252	49.132	0.850	735.203
7	1.000	58.932	888.356	1.000	40.461	775.892	13.758	47.121	0.850	788.884

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MEMBER FORCES FOR MEMBER 4

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES							
			MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.81	10.39	-73.02	8.10						
2	0.98	10.38	-71.29	8.10						
3	0.98	10.38	-71.27	8.10						
4	2.78	10.28	-52.66	8.08						
5	2.78	7.80	-52.65	7.75						
6	5.02	7.67	-35.35	7.74						
7	7.25	7.54	-18.34	7.72						

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STRESS ANALYSIS FOR MEMBER 5

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	ALLOWABLE (KSI)	STRESS RATIO	LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	ALLOWABLE (KSI)	STRESS RATIO	LC No	WEB SHEAR RATIO	LC No
1	1.84	23.16	-11.17	30.00	0.293	1	1.84	23.16	11.17	27.47	0.468	1	0.630	1
2	1.84	23.16	-10.21	30.00	0.261	1	1.84	23.16	10.21	27.47	0.433	1	0.629	1
3	1.78	23.16	-10.21	30.00	0.263	1	1.78	23.16	10.21	27.47	0.431	1	0.431	1
4	1.78	23.16	-3.45	30.00	0.038	1	1.78	23.16	3.45	23.39	0.207	1	0.421	1
5	1.78	23.16	3.16	27.58	0.174	1	1.78	23.16	-3.16	30.00	0.028	1	0.411	1

GEOMETRIC PROPERTIES FOR MEMBER 5

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.00	6.0	0.187	60.2	6.0	0.187	92.4	0.125	14.00	4.0	141.5	19.69	19.69
2	0.20	6.0	0.187	60.2	6.0	0.187	92.4	0.125	14.00	4.0	141.5	19.69	19.69
3	0.20	6.0	0.187	60.2	6.0	0.187	92.4	0.125	14.00	4.0	141.5	19.69	19.69
4	2.27	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69
5	4.34	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69

	FLANGES	WEB
YIELD STRESSES (KSI)	50.0	50.0

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 5

PT No	POSITIVE FLANGE CB	L/RT	LD/AF	NEGATIVE FLANGE CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	39.013	771.225	1.000	59.881	1183.741	8.728	46.361	0.850	1960.360
2	1.000	39.013	771.225	1.000	59.881	1183.741	8.728	46.361	0.850	1960.360
3	1.000	39.013	771.225	1.000	59.881	1183.741	8.728	46.361	0.850	1960.360
4	1.000	39.013	771.225	1.000	78.027	1542.450	8.728	46.361	0.850	1960.360
5	1.000	39.013	771.225	1.000	78.027	1542.450	8.728	46.361	0.850	1960.360

MEMBER FORCES FOR MEMBER 5

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	7.92	18.33	7.33						
2	0.20	7.90	16.76	7.33						
3	0.20	5.41	16.75	7.13						
4	2.27	5.29	5.66	7.12						
5	4.34	5.17	-5.18	7.11						

PROJECT No. 4001 50 X 16 X 25 LRF44 LIVE LOAD NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

STRESS ANALYSIS FOR MEMBER 6

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	POSITIVE EXTREMITY AXIAL STRESS ALLOWABLE (KSI)	POSITIVE EXTREMITY BENDING STRESS COMPUTED (KSI)	POSITIVE EXTREMITY BENDING STRESS ALLOWABLE (KSI)	POSITIVE EXTREMITY STRESS RATIO	POSITIVE EXTREMITY LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	NEGATIVE EXTREMITY AXIAL STRESS ALLOWABLE (KSI)	NEGATIVE EXTREMITY BENDING STRESS COMPUTED (KSI)	NEGATIVE EXTREMITY BENDING STRESS ALLOWABLE (KSI)	NEGATIVE EXTREMITY STRESS RATIO	NEGATIVE EXTREMITY LC No	WEB SHEAR RATIO	WEB LC No
1	1.84	23.16	11.17	27.47	0.468	1	1.84	23.16	-11.17	30.00	0.293	1	0.630	1
2	1.84	23.16	10.21	27.47	0.433	1	1.84	23.16	-10.21	30.00	0.261	1	0.629	1
3	1.78	23.16	10.21	27.47	0.431	1	1.78	23.16	-10.21	30.00	0.263	1	0.431	1
4	1.78	23.16	3.45	23.39	0.207	1	1.78	23.16	-3.45	30.00	0.038	1	0.421	1
5	1.78	23.16	-3.16	30.00	0.028	1	1.78	23.16	3.16	27.58	0.174	1	0.411	1

GEOMETRIC PROPERTIES FOR MEMBER 6

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.00	6.0	0.187	92.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69
2	0.20	6.0	0.187	92.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69
3	0.20	6.0	0.187	92.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69
4	2.27	6.0	0.187	120.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69
5	4.34	6.0	0.187	120.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69

	FLANGES	WEB
YIELD STRESSES (KSI)	50.0	50.0

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 6

PT No	POSITIVE FLANGE CB	POSITIVE FLANGE L/RT	POSITIVE FLANGE LD/AF	NEGATIVE FLANGE CB	NEGATIVE FLANGE L/RT	NEGATIVE FLANGE LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	59.881	1183.741	1.000	39.013	771.225	8.728	46.361	0.850	1960.360
2	1.000	59.881	1183.741	1.000	39.013	771.225	8.728	46.361	0.850	1960.360
3	1.000	59.881	1183.741	1.000	39.013	771.225	8.728	46.361	0.850	1960.360
4	1.000	78.027	1542.450	1.000	39.013	771.225	8.728	46.361	0.850	1960.360
5	1.000	78.027	1542.450	1.000	39.013	771.225	8.728	46.361	0.850	1960.360

MEMBER FORCES FOR MEMBER 6

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	7.92	-18.34	7.33						
2	0.20	7.90	-16.76	7.33						
3	0.20	5.41	-16.75	7.13						
4	2.27	5.29	-5.66	7.12						
5	4.34	5.17	5.18	7.11						

PROJECT No. 4001 50 X 16 X 25 LRF44 LIVE LOAD NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

STRESS ANALYSIS FOR MEMBER 7

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	WEB SHEAR RATIO	WEB LC No
1	1.78	23.16	3.16	27.58	0.175	1	1.78	23.16	-3.16	30.00	0.028	1	0.411	1
2	1.78	23.16	8.41	27.58	0.364	1	1.78	23.16	-8.41	30.00	0.204	1	0.403	1
3	1.78	23.16	13.57	27.58	0.551	1	1.78	23.16	-13.57	30.00	0.376	1	0.395	1
4	1.72	23.16	13.57	27.58	0.549	1	1.72	23.16	-13.57	30.00	0.378	1	0.197	1
5	1.72	23.16	17.23	27.58	0.682	1	1.72	23.16	-17.23	30.00	0.500	1	0.186	1
6	1.72	23.60	20.67	27.58	0.807	1	1.72	23.60	-20.67	30.00	0.616	1	0.174	1
7	1.67	23.60	20.67	27.58	0.805	1	1.67	23.60	-20.67	30.00	0.618	1	0.024	1
8	1.66	23.60	20.22	27.58	0.789	1	1.66	23.60	-20.22	30.00	0.603	1	0.034	1
9	1.66	25.57	19.62	27.58	0.767	1	1.66	25.57	-19.62	30.00	0.589	1	0.043	1
10	1.66	25.57	19.62	27.58	0.767	1	1.66	25.57	-19.62	30.00	0.589	1	0.043	1
11	1.66	25.57	19.56	27.58	0.765	1	1.66	25.57	-19.56	30.00	0.587	1	0.044	1

GEOMETRIC PROPERTIES FOR MEMBER 7

H.14

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	POSITIVE FLANGE THK (IN)	POSITIVE FLANGE UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	NEGATIVE FLANGE THK (IN)	NEGATIVE FLANGE UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.00	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69
2	1.68	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69
3	3.37	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69
4	3.37	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69
5	5.87	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69
6	8.37	6.0	0.187	55.7	6.0	0.187	135.5	0.125	14.00	4.0	141.5	19.69	19.69
7	8.37	6.0	0.187	55.7	6.0	0.187	135.5	0.125	14.00	4.0	141.5	19.69	19.69
8	10.40	6.0	0.187	55.7	6.0	0.187	135.5	0.125	14.00	4.0	141.5	19.69	19.69
9	12.44	6.0	0.187	24.0	6.0	0.187	135.5	0.125	14.00	4.0	141.5	19.69	19.69
10	12.44	6.0	0.187	24.0	6.0	0.187	135.5	0.125	14.00	4.0	141.5	19.69	19.69
11	12.60	6.0	0.187	24.0	6.0	0.187	135.5	0.125	14.00	4.0	141.5	19.69	19.69

	FLANGES	WEB
YIELD STRESSES (KSI)	50.0	50.0

PROJECT No. 4001 50 X 16 X 25 LRF44 LIVE LOAD NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 7

PT	POSITIVE FLANGE			NEGATIVE FLANGE						
No	CB	L/RT	LD/AF	CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	39.013	771.225	1.000	78.027	1542.450	25.444	46.361	0.850	230.658
2	1.000	39.013	771.225	1.000	78.027	1542.450	25.444	46.361	0.850	230.658
3	1.000	39.013	771.225	1.000	78.027	1542.450	25.444	46.361	0.850	230.658
4	1.000	39.013	771.225	1.000	78.027	1542.450	25.444	46.361	0.850	230.658
5	1.000	39.013	771.225	1.000	78.027	1542.450	25.444	46.361	0.850	230.658
6	1.000	36.097	713.575	1.000	87.812	1735.897	25.444	42.896	0.850	230.658
7	1.000	36.097	713.575	1.000	87.812	1735.897	25.444	42.896	0.850	230.658
8	1.000	36.097	713.575	1.000	87.812	1735.897	25.444	42.896	0.850	230.658
9	1.000	15.553	307.465	1.000	87.812	1735.897	25.444	18.483	0.850	230.658
10	1.000	15.553	307.465	1.000	87.812	1735.897	25.444	18.483	0.850	230.658
11	1.000	15.553	307.465	1.000	87.812	1735.897	25.444	18.483	0.850	230.658

MEMBER FORCES FOR MEMBER 7

POINT		ABSOLUTE MAXIMUM	MOMENTS AND AXIAL FORCES							
No	LOCATION (FT)	SHEAR (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	5.17	-5.18	7.11						
2	1.68	5.07	-13.80	7.10						
3	3.37	4.97	-22.26	7.09						
4	3.37	2.48	-22.26	6.88						
5	5.87	2.33	-28.27	6.87						
6	8.37	2.19	-33.92	6.86						
7	8.37	0.31	-33.91	6.65						
8	10.40	0.43	-33.17	6.64						
9	12.44	0.54	-32.19	6.63						
10	12.44	0.54	-32.18	6.63						
11	12.60	0.55	-32.09	6.63						

PROJECT No. 4001 50 X 16 X 25 LRF44 LIVE LOAD NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

STRESS ANALYSIS FOR MEMBER 8

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	WEB SHEAR RATIO	WEB LC No
1	1.78	23.16	-3.16	30.00	0.028	1	1.78	23.16	3.16	27.58	0.175	1	0.411	1
2	1.78	23.16	-8.41	30.00	0.204	1	1.78	23.16	8.41	27.58	0.364	1	0.403	1
3	1.78	23.16	-13.56	30.00	0.375	1	1.78	23.16	13.56	27.58	0.551	1	0.395	1
4	1.72	23.16	-13.57	30.00	0.378	1	1.72	23.16	13.57	27.58	0.549	1	0.197	1
5	1.72	23.16	-17.23	30.00	0.500	1	1.72	23.16	17.23	27.58	0.682	1	0.186	1
6	1.72	23.60	-20.67	30.00	0.616	1	1.72	23.60	20.67	27.58	0.807	1	0.174	1
7	1.67	23.60	-20.67	30.00	0.618	1	1.67	23.60	20.67	27.58	0.805	1	0.024	1
8	1.66	23.60	-20.22	30.00	0.603	1	1.66	23.60	20.22	27.58	0.789	1	0.034	1
9	1.66	25.57	-19.62	30.00	0.589	1	1.66	25.57	19.62	27.58	0.767	1	0.043	1
10	1.66	25.57	-19.62	30.00	0.589	1	1.66	25.57	19.62	27.58	0.767	1	0.043	1
11	1.66	25.57	-19.56	30.00	0.587	1	1.66	25.57	19.56	27.58	0.765	1	0.044	1

GEOMETRIC PROPERTIES FOR MEMBER 8

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.00	6.0	0.187	120.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69
2	1.68	6.0	0.187	120.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69
3	3.37	6.0	0.187	120.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69
4	3.37	6.0	0.187	120.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69
5	5.87	6.0	0.187	120.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69
6	8.37	6.0	0.187	135.5	6.0	0.187	55.7	0.125	14.00	4.0	141.5	19.69	19.69
7	8.37	6.0	0.187	135.5	6.0	0.187	55.7	0.125	14.00	4.0	141.5	19.69	19.69
8	10.40	6.0	0.187	135.5	6.0	0.187	55.7	0.125	14.00	4.0	141.5	19.69	19.69
9	12.44	6.0	0.187	135.5	6.0	0.187	24.0	0.125	14.00	4.0	141.5	19.69	19.69
10	12.44	6.0	0.187	135.5	6.0	0.187	24.0	0.125	14.00	4.0	141.5	19.69	19.69
11	12.60	6.0	0.187	135.5	6.0	0.187	24.0	0.125	14.00	4.0	141.5	19.69	19.69

	FLANGES	WEB
YIELD STRESSES (KSI)	50.0	50.0

H.16

PROJECT No. 4001 50 X 16 X 25 LRF44 LIVE LOAD NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 8

PT No	POSITIVE FLANGE CB	L/RT	LD/AF	NEGATIVE FLANGE CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	78.027	1542.450	1.000	39.013	771.225	25.444	46.361	0.850	230.658
2	1.000	78.027	1542.450	1.000	39.013	771.225	25.444	46.361	0.850	230.658
3	1.000	78.027	1542.450	1.000	39.013	771.225	25.444	46.361	0.850	230.658
4	1.000	78.027	1542.450	1.000	39.013	771.225	25.444	46.361	0.850	230.658
5	1.000	78.027	1542.450	1.000	39.013	771.225	25.444	46.361	0.850	230.658
6	1.000	87.812	1735.897	1.000	36.097	713.575	25.444	42.896	0.850	230.658
7	1.000	87.812	1735.897	1.000	36.097	713.575	25.444	42.896	0.850	230.658
8	1.000	87.812	1735.897	1.000	36.097	713.575	25.444	42.896	0.850	230.658
9	1.000	87.812	1735.897	1.000	15.553	307.465	25.444	18.483	0.850	230.658
10	1.000	87.812	1735.897	1.000	15.553	307.465	25.444	18.483	0.850	230.658
11	1.000	87.812	1735.897	1.000	15.553	307.465	25.444	18.483	0.850	230.658

MEMBER FORCES FOR MEMBER 8

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	5.17	5.18	7.11						
2	1.68	5.07	13.80	7.10						
3	3.37	4.97	22.26	7.09						
4	3.37	2.48	22.26	6.88						
5	5.87	2.33	28.27	6.87						
6	8.37	2.19	33.91	6.86						
7	8.37	0.31	33.91	6.65						
8	10.40	0.43	33.17	6.64						
9	12.44	0.54	32.19	6.63						
10	12.44	0.54	32.18	6.63						
11	12.60	0.55	32.09	6.63						

H.17

PROJECT No. 4001 50 X 16 X 25 LRF44 LIVE LOAD NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

FORCES ACTING ON SUPPORTS

LOADING CONDITION No	LOADING CONDITION DESCRIPTION	SUPPORT No	HORIZONTAL (KIPS)	VERTICAL (KIPS)	MOMENT (K-FT)
1	VERT CONC LOADS	1	-6.65	11.46	-0.00
1	VERT CONC LOADS	9	6.65	11.46	-0.00
	TOTAL FORCES ACTING		-0.00	22.91	-0.00
	TOTAL FORCES APPLIED		0.00	22.91	0.00

EXTERNAL MEMBER LOADS

LOADING CONDITION No	LOADING CONDITION DESCRIPTION	MEMBER NUMBER	UNIFORMLY DISTRIBUTED LOADS VERTICAL (K/FT)	UNIFORMLY DISTRIBUTED LOADS HORIZONTAL (K/FT)	CONCENTRATED LOADS LOCATION (FT)	CONCENTRATED LOADS VERTICAL (KIPS)	CONCENTRATED LOADS HORIZONTAL (KIPS)	CONCENTRATED LOADS MOMENT (K-FT)
1	VERT CONC LOADS	1	0.051	0.000				
1	VERT CONC LOADS	2	0.051	-0.000				
1	VERT CONC LOADS	3	0.059	0.000	2.78	2.50	0.00	0.00
1	VERT CONC LOADS	4	0.059	0.000	2.78	2.50	-0.00	0.00
1	VERT CONC LOADS	5	0.059	-0.000	0.20	2.50	0.00	0.00
1	VERT CONC LOADS	6	0.059	-0.000	0.20	2.50	-0.00	0.00
1	VERT CONC LOADS	7	0.059	0.000	3.37	2.50	-0.00	0.00
					8.37	2.50	-0.00	0.00
1	VERT CONC LOADS	8	0.059	-0.000	3.37	2.50	-0.00	0.00
					8.37	2.50	-0.00	0.00

MEMBER END TRANSLATIONS

MEMBER NUMBER	LOADING CONDITION No	LOADING CONDITION DESCRIPTION	END TRANSLATIONS JOINT No	VERT (IN)	HORZ (IN)	JOINT No	VERT (IN)	HORZ (IN)
1	1	VERT CONC LOADS	1	0.00	0.00	2	-0.00	-0.25
2	1	VERT CONC LOADS	9	0.00	0.00	8	-0.00	0.17
3	1	VERT CONC LOADS	2	-0.00	-0.25	3	-0.69	-0.16
4	1	VERT CONC LOADS	8	-0.00	0.17	7	-0.69	0.08
5	1	VERT CONC LOADS	3	-0.69	-0.16	4	-1.27	-0.12
6	1	VERT CONC LOADS	7	-0.69	0.08	6	-1.27	0.03
7	1	VERT CONC LOADS	4	-1.27	-0.12	5	-2.28	-0.04
8	1	VERT CONC LOADS	6	-1.27	0.03	5	-2.28	-0.04

MODULUS OF ELASTICITY 29000. KSI

* * * G E N E R A L I N P U T * * * Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

4002 8 8 1 50 X 16 X 25 LRF44	WIND LOAD	FCTR NOM GAGE 50KSI	11					HEAD RECORD
1 1 2	11	0.69	13.43	6.563	21.813		0.80	MEMB DESC
2 9 8	11	-0.69	13.43	6.5	21.75		0.80	MEMB DESC
3 2 3		7.19	0.96	21.75	14.	0.81		MEMB DESC
4 8 7		-7.19	0.96	21.75	14.	0.81		MEMB DESC
5 3 4		4.33	0.36	14.	14.			MEMB DESC
6 7 6		-4.33	0.36	14.	14.			MEMB DESC
7 4 5		12.56	1.05	14.	14.			MEMB DESC
8 6 5		-12.56	1.05	14.	14.			MEMB DESC
DEG	JT	NUMBER	BAND					
INDT	DISPL	SUPPORTS	WIDTH					
1	23	2	6					
1 112		50.	50.					HEADER
	6.0	0.187	6.0	0.25				FLANGE
86.1	86.1	1.348	120.2	120.2	1.293			BRACING
1	34.	1.0	2	31.7	1.0			BRACING
2	31.7	1.0						BRACING
10.				0.125	0.156			WEB
0.85	1.0	151.8						BUCKLING
2 112		50.	50.					HEADER
	6.0	0.313	6.0	0.187				FLANGE
151.9	151.9	1.257	86.1	86.1	1.348			BRACING
1	34.	1.0	1	34.	1.0			BRACING
			2	31.7	1.0			BRACING
10.				0.125	0.156			WEB
0.85	1.0	151.8						BUCKLING
3 121		50.	50.					HEADER
0.167	6.0	0.187	6.	0.25				FLANGE
	6.0	0.187	6.	0.25				FLANGE
41.3	53.3	1.0	101.3	92.3	1.0			BRACING
1	60.3	1.0	1	92.3	1.0			BRACING
				0.156				WEB
0.85	1.0	87.1						BUCKLING
4 121		50.	50.					HEADER
0.167	6.0	0.25	6.0	0.187				FLANGE
	6.0	0.25	6.0	0.187				FLANGE
101.3	92.3	1.0	41.3	53.3	1.0			BRACING
1	92.3	1.0	1	60.3	1.0			BRACING
				0.156				WEB
0.85	1.0	87.1						BUCKLING
5 111		50.	50.					HEADER
	6.0	0.187	6.	0.187				FLANGE
14.22	60.2	1.0	14.22	92.4	1.0			BRACING
1	60.2	1.0	1	120.4	1.			BRACING
				0.125				WEB
0.85	1.0	51.95						BUCKLING
6 111		50.	50.					HEADER
	6.	0.187	6.0	0.187				FLANGE
14.22	92.4	1.0	14.22	60.2	1.0			BRACING

```
0.85        1.0         51.95                                                   BUCKLING

7 121                   50.         50.                                         HEADER
            6.0         0.187       6.          0.187                           FLANGE
0.167       6.0         0.187       6.          0.187                           FLANGE
22.47       60.2        1.0         82.67       120.4       1.0                 BRACING
1           60.2        1.0         1           135.5       1.0                 BRACING
1           55.7        1.0                                                     BRACING
1           24.0        1.0                                                     BRACING
                                                0.125                           WEB
0.85        1.0         151.45                                                  BUCKLING

8 121                   50.         50.                                         HEADER
            6.          0.187       6.0         0.187                           FLANGE
0.167       6.          0.187       6.0         0.187                           FLANGE
82.67       120.4       1.0         22.47       60.2        1.0                 BRACING
1           135.5       1.0         1           60.2        1.0                 BRACING
                                    1           55.7        1.0                 BRACING
                                    1           24.0        1.0                 BRACING
                                                0.125                           WEB
0.85        1.0         151.45                                                  BUCKLING
1 3         HORIZ CONC LOAD                                                     LOADS
1 2         0.051                                                               LOADS
3 8         0.059                                                               LOADS
1 1                                             -9.63                   12.583  LOADS

NO ERRORS WERE DETECTED IN INPUT
*---------*---------*---------*---------*---------*---------*---------*---------*
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PROJECT No. 4002 50 X 16 X 25 LRF44 WIND LOAD FCTR NOM GAGE 50KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

FRAME GEOMETRY

MEMBER NUMBER	LENGTH (FT)	PROJECTION HORIZ	PROJECTION VERT	INITIAL JT No	INITIAL X COORD.	INITIAL Y COORD.	END JT No	END X COORD.	END Y COORD.
1	13.45	0.69	13.43	1	0.00	0.00	2	0.69	13.43
2	13.45	-0.69	13.43	9	49.54	-0.00	8	48.85	13.43
3	7.25	7.19	0.96	2	0.69	13.43	3	7.88	14.39
4	7.25	-7.19	0.96	8	48.85	13.43	7	41.66	14.39
5	4.34	4.33	0.36	3	7.88	14.39	4	12.21	14.75
6	4.34	-4.33	0.36	7	41.66	14.39	6	37.33	14.75
7	12.60	12.56	1.05	4	12.21	14.75	5	24.77	15.80
8	12.60	-12.56	1.05	6	37.33	14.75	5	24.77	15.80

	X	Y
MINIMUM JOINT COORDINATE	0.00	-0.00
MAXIMUM JOINT COORDINATE	49.54	15.80

PROJECT No. 4002 50 X 16 X 25 LRF44 WIND LOAD FCTR NOM GAGE 50KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

STRESS ANALYSIS FOR MEMBER 1

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	WEB SHEAR RATIO	LC No
1	1.23	21.71	0.00	27.58	0.057	1	1.23	21.71	-0.00	30.00	0.057	1	0.375	1
2	1.10	21.27	-14.20	30.00	0.421	1	1.10	21.27	11.79	26.52	0.481	1	0.352	1
3	1.00	20.84	-20.56	30.00	0.637	1	1.00	20.84	17.33	26.28	0.693	1	0.441	1
4	0.92	22.08	-23.76	30.00	0.750	1	0.92	22.08	20.29	26.04	0.810	1	0.546	1
5	0.85	21.91	-25.41	30.00	0.808	1	0.85	21.91	21.95	25.80	0.879	1	0.652	1
6	0.76	21.69	-23.86	30.00	0.760	1	0.76	21.69	20.94	25.42	0.849	1	0.335	1
7	0.70	21.51	-24.46	30.00	0.783	1	0.70	21.51	21.69	29.98	0.747	1	0.391	1
8	0.61	21.51	-24.46	30.00	0.787	1	0.61	21.51	21.69	29.98	0.744	1	0.220	1
9	0.61	21.51	-24.27	30.00	0.781	1	0.61	21.51	21.53	29.96	0.739	1	0.221	1

GEOMETRIC PROPERTIES FOR MEMBER 1

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.00	6.0	0.187	86.1	6.0	0.250	120.2	0.125	6.56	3.4	32.6	8.47	10.37
2	2.50	6.0	0.187	86.1	6.0	0.250	120.2	0.125	9.58	3.8	71.2	13.01	15.67
3	5.00	6.0	0.187	86.1	6.0	0.250	120.2	0.125	12.59	4.2	127.0	17.96	21.31
4	7.50	6.0	0.187	34.0	6.0	0.250	120.2	0.125	15.61	4.6	201.8	23.32	27.31
5	10.00	6.0	0.187	34.0	6.0	0.250	120.2	0.125	18.62	4.9	297.4	29.08	33.67
6	10.00	6.0	0.187	34.0	6.0	0.250	120.2	0.156	18.62	5.5	314.4	30.98	35.29
7	12.58	6.0	0.187	31.7	6.0	0.250	31.7	0.156	21.73	6.0	446.6	38.00	42.86
8	12.58	6.0	0.187	31.7	6.0	0.250	31.7	0.156	21.74	6.0	446.7	38.01	42.86
9	12.65	6.0	0.187	31.7	6.0	0.250	31.7	0.156	21.81	6.0	450.3	38.19	43.06

	FLANGES	WEB
YIELD STRESSES (KSI)	50.0	50.0

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 1

PT No	POSITIVE FLANGE CB	L/RT	LD/AF	NEGATIVE FLANGE CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.348	52.986	537.166	1.293	72.136	560.933	49.302	56.954	0.850	61.435
2	1.348	54.369	768.464	1.293	73.419	802.465	51.311	59.988	0.850	56.720
3	1.348	55.701	999.762	1.293	74.698	1043.997	52.936	62.876	0.850	53.290
4	1.000	22.505	486.133	1.293	75.968	1285.529	54.331	25.919	0.850	50.588
5	1.000	22.999	577.470	1.293	77.228	1527.061	55.561	26.965	0.850	48.373
6	1.000	23.733	577.531	1.293	79.131	1527.222	57.108	28.489	0.850	45.789
7	1.000	22.682	626.399	1.000	21.285	468.546	58.329	27.703	0.850	43.891
8	1.000	22.683	626.456	1.000	21.285	468.589	58.330	27.703	0.850	43.890
9	1.000	22.696	628.632	1.000	21.296	470.216	58.359	27.731	0.850	43.847

PROJECT No. 4002 50 X 16 X 25 LRF44 WIND LOAD FCTR NOM GAGE 50KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

MEMBER FORCES FOR MEMBER 1

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES							
			MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	6.16	-0.00	4.22						
2	2.50	6.16	15.39	4.22						
3	5.00	6.16	30.78	4.21						
4	7.50	6.16	46.18	4.20						
5	10.00	6.16	61.57	4.20						
6	10.00	6.16	61.58	4.20						
7	12.58	6.16	77.48	4.19						
8	12.58	3.46	77.47	3.70						
9	12.65	3.46	77.25	3.70						

PROJECT No. 4002 50 X 16 X 25 LRF44 WIND LOAD FCTR NOM GAGE 50KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

STRESS ANALYSIS FOR MEMBER 2

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	WEB SHEAR RATIO	WEB LC No
1	-0.30	30.00	0.00	26.64	0.010	1	-0.30	30.00	-0.00	30.00	0.010	1	0.198	1
2	-0.28	30.00	-5.20	30.00	0.183	1	-0.28	30.00	7.30	27.58	0.255	1	0.184	1
3	-0.26	30.00	-7.69	30.00	0.265	1	-0.26	30.00	10.53	27.58	0.373	1	0.229	1
4	-0.24	30.00	-9.06	30.00	0.310	1	-0.24	30.00	12.13	27.58	0.432	1	0.284	1
5	-0.22	30.00	-9.86	30.00	0.336	1	-0.22	30.00	12.95	27.47	0.464	1	0.339	1
6	-0.20	30.00	-9.50	30.00	0.323	1	-0.20	30.00	12.13	27.58	0.433	1	0.175	1
7	-0.19	30.00	-9.91	30.00	0.337	1	-0.19	30.00	12.43	27.58	0.444	1	0.205	1

GEOMETRIC PROPERTIES FOR MEMBER 2

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.00	6.0	0.313	151.9	6.0	0.187	86.1	0.125	6.50	3.8	35.4	12.33	8.56
2	2.50	6.0	0.313	151.9	6.0	0.187	86.1	0.125	9.51	4.2	77.3	18.55	13.22
3	5.00	6.0	0.313	151.9	6.0	0.187	86.1	0.125	12.53	4.6	138.0	25.09	18.32
4	7.50	6.0	0.313	151.9	6.0	0.187	34.0	0.125	15.54	4.9	219.1	31.95	23.86
5	10.00	6.0	0.313	151.9	6.0	0.187	34.0	0.125	18.56	5.3	322.5	39.16	29.81
6	10.00	6.0	0.313	151.9	6.0	0.187	34.0	0.156	18.56	5.9	340.1	40.63	31.82
7	12.65	6.0	0.313	151.9	6.0	0.187	31.7	0.156	21.75	6.4	486.2	49.25	39.28

	FLANGES	WEB
YIELD STRESSES (KSI)	50.0	50.0

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 2

PT No	POSITIVE FLANGE CB	L/RT	LD/AF	NEGATIVE FLANGE CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.257	90.152	566.187	1.348	53.226	537.166	49.832	56.035	0.850	60.136
2	1.257	91.372	809.982	1.348	54.686	768.464	51.723	58.737	0.850	55.819
3	1.257	92.607	1053.776	1.348	56.079	999.762	53.228	61.320	0.850	52.707
4	1.257	93.851	1297.571	1.000	22.674	486.133	54.516	25.193	0.850	50.246
5	1.257	95.097	1541.365	1.000	23.184	577.470	55.655	26.135	0.850	48.211
6	1.257	96.990	1541.527	1.000	23.935	577.531	57.063	27.508	0.850	45.860
7	1.257	98.626	1799.667	1.000	22.896	628.632	58.243	26.707	0.850	44.021

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MEMBER FORCES FOR MEMBER 2

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES							
			MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	3.22	-0.00	-1.16						
2	2.50	3.22	8.04	-1.16						
3	5.00	3.22	16.08	-1.17						
4	7.50	3.22	24.12	-1.17						
5	10.00	3.22	32.16	-1.18						
6	10.00	3.22	32.16	-1.18						
7	12.65	3.22	40.68	-1.19						

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STRESS ANALYSIS FOR MEMBER 3

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	POSITIVE EXTREMITY AXIAL STRESS ALLOWABLE (KSI)	POSITIVE EXTREMITY BENDING STRESS COMPUTED (KSI)	POSITIVE EXTREMITY BENDING STRESS ALLOWABLE (KSI)	POSITIVE EXTREMITY STRESS RATIO	POSITIVE EXTREMITY LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	NEGATIVE EXTREMITY AXIAL STRESS ALLOWABLE (KSI)	NEGATIVE EXTREMITY BENDING STRESS COMPUTED (KSI)	NEGATIVE EXTREMITY BENDING STRESS ALLOWABLE (KSI)	NEGATIVE EXTREMITY STRESS RATIO	NEGATIVE EXTREMITY LC No	WEB SHEAR RATIO	WEB LC No
1	-0.45	30.00	-22.42	30.00	0.762	1	-0.45	30.00	19.88	27.06	0.720	1	0.268	1
2	-0.46	30.00	-22.47	30.00	0.764	1	-0.46	30.00	19.91	27.07	0.720	1	0.265	1
3	-0.46	30.00	-22.47	30.00	0.764	1	-0.46	30.00	19.92	27.07	0.720	1	0.265	1
4	-0.49	30.00	-23.22	30.00	0.790	1	-0.49	30.00	20.41	27.27	0.732	1	0.227	1
5	-0.53	30.00	-24.10	30.00	0.821	1	-0.53	30.00	20.99	27.46	0.747	1	0.191	1
6	-0.58	30.00	-25.16	30.00	0.858	1	-0.58	30.00	21.68	27.66	0.765	1	0.157	1

GEOMETRIC PROPERTIES FOR MEMBER 3

PT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	POS FLANGE THK (IN)	POS FLANGE UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	NEG FLANGE THK (IN)	NEG FLANGE UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.81	6.0	0.187	53.3	6.0	0.250	92.3	0.156	21.75	6.0	447.3	38.04	42.90
2	0.98	6.0	0.187	53.3	6.0	0.250	92.3	0.156	21.55	6.0	438.0	37.57	42.40
3	0.98	6.0	0.187	53.3	6.0	0.250	92.3	0.156	21.55	6.0	437.9	37.57	42.39
4	3.07	6.0	0.187	53.3	6.0	0.250	92.3	0.156	19.03	5.6	330.2	31.87	36.26
5	5.16	6.0	0.187	60.3	6.0	0.250	92.3	0.156	16.52	5.2	240.3	26.52	30.45
6	7.25	6.0	0.187	60.3	6.0	0.250	92.3	0.156	14.00	4.8	166.7	21.50	24.95

	FLANGES	WEB
YIELD STRESSES (KSI)	50.0	50.0

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 3

PT No	POSITIVE FLANGE CB	POS FLANGE L/RT	POS FLANGE LD/AF	NEGATIVE FLANGE CB	NEG FLANGE L/RT	NEG FLANGE LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	38.142	1053.981	1.000	61.982	1365.240	14.988	46.588	0.850	664.734
2	1.000	38.083	1044.487	1.000	61.904	1352.942	14.963	46.468	0.850	667.006
3	1.000	38.083	1044.392	1.000	61.904	1352.819	14.962	46.467	0.850	667.029
4	1.000	37.329	924.869	1.000	60.924	1197.998	14.618	44.919	0.850	698.841
5	1.000	41.359	911.113	1.000	59.934	1043.177	14.223	49.004	0.850	738.231
6	1.000	40.461	775.892	1.000	58.932	888.356	13.758	47.121	0.850	788.884

MEMBER FORCES FOR MEMBER 3

PT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.81	4.22	71.06	-2.73						
2	0.98	4.21	70.36	-2.73						
3	0.98	4.21	70.35	-2.73						
4	3.07	4.09	61.68	-2.75						
5	5.16	3.96	53.26	-2.76						
6	7.25	3.84	45.09	-2.78						

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STRESS ANALYSIS FOR MEMBER 4

PT	POSITIVE EXTREMITY						NEGATIVE EXTREMITY						WEB	
	AXIAL STRESS		BENDING STRESS		STRESS	LC	AXIAL STRESS		BENDING STRESS		STRESS	LC	SHEAR	LC
No	COMPUTED (KSI)	ALLOWABLE (KSI)	COMPUTED (KSI)	ALLOWABLE (KSI)	RATIO	No	COMPUTED (KSI)	ALLOWABLE (KSI)	COMPUTED (KSI)	ALLOWABLE (KSI)	RATIO	No	RATIO	No
1	-0.56	30.00	-11.96	30.00	0.417	1	-0.56	30.00	13.49	27.58	0.470	1	0.040	1
2	-0.57	30.00	-12.07	30.00	0.421	1	-0.57	30.00	13.62	27.58	0.475	1	0.040	1
3	-0.57	30.00	-12.07	30.00	0.421	1	-0.57	30.00	13.62	27.58	0.475	1	0.040	1
4	-0.61	30.00	-13.63	30.00	0.475	1	-0.61	30.00	15.51	27.58	0.542	1	0.042	1
5	-0.66	30.00	-15.56	30.00	0.540	1	-0.66	30.00	17.86	27.58	0.626	1	0.043	1
6	-0.71	30.00	-18.03	30.00	0.625	1	-0.71	30.00	20.93	27.58	0.735	1	0.041	1

GEOMETRIC PROPERTIES FOR MEMBER 4

POINT	SECTION DESCRIPTION								FULL SECTION PROPERTIES			
	POSITIVE FLANGE			NEGATIVE FLANGE			WEB			MOM OF	SECTION MODULUS	
No	LOCATION (FT)	WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	THK (IN)	HEIGHT (IN)	AREA (IN2)	INERTIA (IN4)	POSITIVE (IN3)	NEGATIVE (IN3)
1	0.81	6.0	0.250	92.3	6.0	0.187	53.3	0.156	21.75	6.0	447.3	42.90	38.04
2	0.98	6.0	0.250	92.3	6.0	0.187	53.3	0.156	21.55	6.0	438.0	42.40	37.57
3	0.98	6.0	0.250	92.3	6.0	0.187	53.3	0.156	21.55	6.0	437.9	42.39	37.57
4	3.07	6.0	0.250	92.3	6.0	0.187	53.3	0.156	19.03	5.6	330.2	36.26	31.87
5	5.16	6.0	0.250	92.3	6.0	0.187	60.3	0.156	16.52	5.2	240.3	30.45	26.52
6	7.25	6.0	0.250	92.3	6.0	0.187	60.3	0.156	14.00	4.8	166.7	24.95	21.50

YIELD STRESSES (KSI)	FLANGES	WEB
	50.0	50.0

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 4

PT	POSITIVE FLANGE			NEGATIVE FLANGE						
No	CB	L/RT	LD/AF	CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	61.982	1365.240	1.000	38.142	1053.981	14.988	46.588	0.850	664.734
2	1.000	61.904	1352.942	1.000	38.083	1044.487	14.963	46.468	0.850	667.006
3	1.000	61.904	1352.819	1.000	38.083	1044.392	14.962	46.467	0.850	667.029
4	1.000	60.924	1197.998	1.000	37.329	924.869	14.618	44.919	0.850	698.841
5	1.000	59.934	1043.177	1.000	41.359	911.113	14.223	49.004	0.850	738.232
6	1.000	58.932	888.356	1.000	40.461	775.892	13.758	47.121	0.850	788.884

MEMBER FORCES FOR MEMBER 4

POINT		ABSOLUTE MAXIMUM	MOMENTS AND AXIAL FORCES							
No	LOCATION (FT)	SHEAR (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.81	0.63	42.76	-3.38						
2	0.98	0.64	42.65	-3.38						
3	0.98	0.64	42.65	-3.38						
4	3.07	0.76	41.19	-3.40						
5	5.16	0.88	39.47	-3.41						
6	7.25	1.00	37.50	-3.43						

PROJECT No. 4002 50 X 16 X 25 LRF44 WIND LOAD FCTR NOM GAGE 50KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

STRESS ANALYSIS FOR MEMBER 5

PT	POSITIVE EXTREMITY						NEGATIVE EXTREMITY						WEB	
	AXIAL STRESS		BENDING STRESS		STRESS	LC	AXIAL STRESS		BENDING STRESS		STRESS	LC	SHEAR	LC
No	COMPUTED (KSI)	ALLOWABLE (KSI)	COMPUTED (KSI)	ALLOWABLE (KSI)	RATIO	No	COMPUTED (KSI)	ALLOWABLE (KSI)	COMPUTED (KSI)	ALLOWABLE (KSI)	RATIO	No	RATIO	No
1	-0.74	30.00	-27.48	30.00	0.941	1	-0.74	30.00	27.48	27.47	0.976	1	0.294	1
2	-0.75	30.00	-22.67	30.00	0.780	1	-0.75	30.00	22.67	23.39	0.944	1	0.284	1
3	-0.75	30.00	-18.02	30.00	0.626	1	-0.75	30.00	18.02	23.39	0.746	1	0.274	1

GEOMETRIC PROPERTIES FOR MEMBER 5

POINT	SECTION DESCRIPTION								FULL SECTION PROPERTIES			
	POSITIVE FLANGE			NEGATIVE FLANGE			WEB			MOM OF	SECTION MODULUS	
No	LOCATION (FT)	WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	THK (IN)	HEIGHT (IN)	AREA (IN2)	INERTIA (IN4)	POSITIVE (IN3)	NEGATIVE (IN3)
1	0.00	6.0	0.187	60.2	6.0	0.187	92.4	0.125	14.00	4.0	141.5	19.69	19.69
2	2.17	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69
3	4.34	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69

	FLANGES	WEB
YIELD STRESSES (KSI)	50.0	50.0

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 5

PT	POSITIVE FLANGE			NEGATIVE FLANGE						
No	CB	L/RT	LD/AF	CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	39.013	771.225	1.000	59.881	1183.741	8.728	46.361	0.850	1960.360
2	1.000	39.013	771.225	1.000	78.027	1542.450	8.728	46.361	0.850	1960.360
3	1.000	39.013	771.225	1.000	78.027	1542.450	8.728	46.361	0.850	1960.360

MEMBER FORCES FOR MEMBER 5

POINT	ABSOLUTE MAXIMUM	MOMENTS AND AXIAL FORCES							
No	LOCATION (FT)	SHEAR (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	3.70	45.09	-2.97						
2	2.17	3.57	37.19	-2.98						
3	4.34	3.45	29.57	-2.99						

PROJECT No. 4002 50 X 16 X 25 LRF44 WIND LOAD FCTR NOM GAGE 50KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

STRESS ANALYSIS FOR MEMBER 6

PT	POSITIVE EXTREMITY						NEGATIVE EXTREMITY						WEB	
	AXIAL STRESS		BENDING STRESS		STRESS	LC	AXIAL STRESS		BENDING STRESS		STRESS	LC	SHEAR	LC
No	COMPUTED (KSI)	ALLOWABLE (KSI)	COMPUTED (KSI)	ALLOWABLE (KSI)	RATIO	No	COMPUTED (KSI)	ALLOWABLE (KSI)	COMPUTED (KSI)	ALLOWABLE (KSI)	RATIO	No	RATIO	No
1	-0.85	30.00	-22.86	30.00	0.790	1	-0.85	30.00	22.86	27.58	0.801	1	0.093	1
2	-0.85	30.00	-21.22	30.00	0.736	1	-0.85	30.00	21.22	27.58	0.741	1	0.103	1
3	-0.85	30.00	-19.41	30.00	0.676	1	-0.85	30.00	19.41	27.58	0.676	1	0.114	1

GEOMETRIC PROPERTIES FOR MEMBER 6

POINT	SECTION DESCRIPTION								FULL SECTION PROPERTIES			
	POSITIVE FLANGE			NEGATIVE FLANGE			WEB			MOM OF	SECTION MODULUS	
No	LOCATION (FT)	WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	THK (IN)	HEIGHT (IN)	AREA (IN2)	INERTIA (IN4)	POSITIVE (IN3)	NEGATIVE (IN3)
1	0.00	6.0	0.187	92.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69
2	2.17	6.0	0.187	120.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69
3	4.34	6.0	0.187	120.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69

	FLANGES	WEB
YIELD STRESSES (KSI)	50.0	50.0

H.29

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 6

PT	POSITIVE FLANGE			NEGATIVE FLANGE						
No	CB	L/RT	LD/AF	CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	59.881	1183.741	1.000	39.013	771.225	8.728	46.361	0.850	1960.360
2	1.000	78.027	1542.450	1.000	39.013	771.225	8.728	46.361	0.850	1960.360
3	1.000	78.027	1542.450	1.000	39.013	771.225	8.728	46.361	0.850	1960.360

MEMBER FORCES FOR MEMBER 6

POINT		ABSOLUTE MAXIMUM	MOMENTS AND AXIAL FORCES							
No	LOCATION (FT)	SHEAR (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	1.17	37.50	-3.38						
2	2.17	1.30	34.82	-3.39						
3	4.34	1.43	31.85	-3.40						

PROJECT No. 4002 50 X 16 X 25 LRF44 WIND LOAD FCTR NOM GAGE 50KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

STRESS ANALYSIS FOR MEMBER 7

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	WEB SHEAR RATIO	WEB LC No
1	-0.75	30.00	-18.02	30.00	0.626	1	-0.75	30.00	18.02	23.39	0.746	1	0.274	1
2	-0.75	30.00	-12.91	30.00	0.455	1	-0.75	30.00	12.91	23.39	0.527	1	0.263	1
3	-0.75	30.00	-8.01	30.00	0.292	1	-0.75	30.00	8.01	23.39	0.317	1	0.251	1
4	-0.76	30.00	-3.34	30.00	0.137	1	-0.76	30.00	3.34	20.73	0.136	1	0.240	1
5	-0.76	30.00	1.11	27.58	0.015	1	-0.76	30.00	-1.11	30.00	0.062	1	0.228	1
6	-0.76	30.00	5.35	27.58	0.168	1	-0.76	30.00	-5.35	30.00	0.204	1	0.216	1
7	-0.76	30.00	5.35	27.58	0.168	1	-0.76	30.00	-5.35	30.00	0.204	1	0.216	1
8	-0.76	30.00	5.62	27.58	0.178	1	-0.76	30.00	-5.62	30.00	0.213	1	0.216	1

GEOMETRIC PROPERTIES FOR MEMBER 7

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.00	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69
2	2.49	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69
3	4.97	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69
4	7.46	6.0	0.187	55.7	6.0	0.187	135.5	0.125	14.00	4.0	141.5	19.69	19.69
5	9.95	6.0	0.187	55.7	6.0	0.187	135.5	0.125	14.00	4.0	141.5	19.69	19.69
6	12.44	6.0	0.187	24.0	6.0	0.187	135.5	0.125	14.00	4.0	141.5	19.69	19.69
7	12.44	6.0	0.187	24.0	6.0	0.187	135.5	0.125	14.00	4.0	141.5	19.69	19.69
8	12.60	6.0	0.187	24.0	6.0	0.187	135.5	0.125	14.00	4.0	141.5	19.69	19.69

H.30

	FLANGES	WEB
YIELD STRESSES (KSI)	50.0	50.0

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 7

PT No	POSITIVE FLANGE CB	L/RT	LD/AF	NEGATIVE FLANGE CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	39.013	771.225	1.000	78.027	1542.450	25.444	46.361	0.850	230.658
2	1.000	39.013	771.225	1.000	78.027	1542.450	25.444	46.361	0.850	230.658
3	1.000	39.013	771.225	1.000	78.027	1542.450	25.444	46.361	0.850	230.658
4	1.000	36.097	713.575	1.000	87.812	1735.897	25.444	42.896	0.850	230.658
5	1.000	36.097	713.575	1.000	87.812	1735.897	25.444	42.896	0.850	230.658
6	1.000	15.553	307.465	1.000	87.812	1735.897	25.444	18.483	0.850	230.658
7	1.000	15.553	307.465	1.000	87.812	1735.897	25.444	18.483	0.850	230.658
8	1.000	15.553	307.465	1.000	87.812	1735.897	25.444	18.483	0.850	230.658

PROJECT No. 4002 50 X 16 X 25 LRF44 WIND LOAD FCTR NOM GAGE 50KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

MEMBER FORCES FOR MEMBER 7

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES							
			MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	3.45	29.57	-2.99						
2	2.49	3.30	21.17	-3.00						
3	4.97	3.16	13.14	-3.01						
4	7.46	3.01	5.48	-3.02						
5	9.95	2.86	-1.83	-3.04						
6	12.44	2.72	-8.77	-3.05						
7	12.44	2.72	-8.78	-3.05						
8	12.60	2.71	-9.23	-3.05						

PROJECT No. 4002 50 X 16 X 25 LRF44 WIND LOAD FCTR NOM GAGE 50KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

STRESS ANALYSIS FOR MEMBER 8

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	WEB SHEAR RATIO	WEB LC No
1	-0.85	30.00	-19.41	30.00	0.675	1	-0.85	30.00	19.41	27.58	0.676	1	0.113	1
2	-0.85	30.00	-17.14	30.00	0.600	1	-0.85	30.00	17.14	27.58	0.593	1	0.125	1
3	-0.86	30.00	-14.65	30.00	0.517	1	-0.86	30.00	14.65	27.58	0.503	1	0.137	1
4	-0.86	30.00	-11.93	30.00	0.426	1	-0.86	30.00	11.93	27.58	0.404	1	0.148	1
5	-0.86	30.00	-9.00	30.00	0.329	1	-0.86	30.00	9.00	27.58	0.298	1	0.160	1
6	-0.87	30.00	-5.84	30.00	0.224	1	-0.87	30.00	5.84	27.58	0.183	1	0.171	1
7	-0.87	30.00	-5.84	30.00	0.224	1	-0.87	30.00	5.84	27.58	0.183	1	0.171	1
8	-0.87	30.00	-5.62	30.00	0.216	1	-0.87	30.00	5.62	27.58	0.175	1	0.172	1

GEOMETRIC PROPERTIES FOR MEMBER 8

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.00	6.0	0.187	120.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69
2	2.49	6.0	0.187	120.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69
3	4.97	6.0	0.187	120.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69
4	7.46	6.0	0.187	135.5	6.0	0.187	55.7	0.125	14.00	4.0	141.5	19.69	19.69
5	9.95	6.0	0.187	135.5	6.0	0.187	55.7	0.125	14.00	4.0	141.5	19.69	19.69
6	12.44	6.0	0.187	135.5	6.0	0.187	24.0	0.125	14.00	4.0	141.5	19.69	19.69
7	12.44	6.0	0.187	135.5	6.0	0.187	24.0	0.125	14.00	4.0	141.5	19.69	19.69
8	12.60	6.0	0.187	135.5	6.0	0.187	24.0	0.125	14.00	4.0	141.5	19.69	19.69

	FLANGES	WEB
YIELD STRESSES (KSI)	50.0	50.0

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 8

PT No	POSITIVE FLANGE CB	L/RT	LD/AF	NEGATIVE FLANGE CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	78.027	1542.450	1.000	39.013	771.225	25.444	46.361	0.850	230.658
2	1.000	78.027	1542.450	1.000	39.013	771.225	25.444	46.361	0.850	230.658
3	1.000	78.027	1542.450	1.000	39.013	771.225	25.444	46.361	0.850	230.658
4	1.000	87.812	1735.897	1.000	36.097	713.575	25.444	42.896	0.850	230.658
5	1.000	87.812	1735.897	1.000	36.097	713.575	25.444	42.896	0.850	230.658
6	1.000	87.812	1735.897	1.000	15.553	307.465	25.444	18.483	0.850	230.658
7	1.000	87.812	1735.897	1.000	15.553	307.465	25.444	18.483	0.850	230.658
8	1.000	87.812	1735.897	1.000	15.553	307.465	25.444	18.483	0.850	230.658

PROJECT No. 4002 50 X 16 X 25 LRF44 WIND LOAD FCTR NOM GAGE 50KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

MEMBER FORCES FOR MEMBER 8

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES							
			MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	1.43	31.85	-3.40						
2	2.49	1.57	28.13	-3.41						
3	4.97	1.72	24.03	-3.42						
4	7.46	1.86	19.58	-3.43						
5	9.95	2.01	14.77	-3.44						
6	12.44	2.15	9.59	-3.46						
7	12.44	2.15	9.58	-3.46						
8	12.60	2.16	9.23	-3.46						

PROJECT No. 4002 50 X 16 X 25 LRF44 WIND LOAD FCTR NOM GAGE 50KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

FORCES ACTING ON SUPPORTS

LOADING CONDITION No	LOADING CONDITION DESCRIPTION	SUPPORT No	HORIZONTAL (KIPS)	VERTICAL (KIPS)	MOMENT (K-FT)
1	HORIZ CONC LOAD	1	-6.37	3.90	-0.00
1	HORIZ CONC LOAD	9	-3.27	-0.99	-0.00
	TOTAL FORCES ACTING		-9.64	2.91	-0.00
	TOTAL FORCES APPLIED		-9.63	2.91	0.00

EXTERNAL MEMBER LOADS

LOADING CONDITION No	LOADING CONDITION DESCRIPTION	MEMBER NUMBER	UNIFORMLY DISTRIBUTED LOADS VERTICAL (K/FT)	UNIFORMLY DISTRIBUTED LOADS HORIZONTAL (K/FT)	CONCENTRATED LOADS LOCATION (FT)	CONCENTRATED LOADS VERTICAL (KIPS)	CONCENTRATED LOADS HORIZONTAL (KIPS)	CONCENTRATED LOADS MOMENT (K-FT)
1	HORIZ CONC LOAD	1	0.051	0.000	12.58	-0.00	-9.63	0.00
1	HORIZ CONC LOAD	2	0.051	-0.000				
1	HORIZ CONC LOAD	3	0.059	0.000				
1	HORIZ CONC LOAD	4	0.059	0.000				
1	HORIZ CONC LOAD	5	0.059	-0.000				
1	HORIZ CONC LOAD	6	0.059	-0.000				
1	HORIZ CONC LOAD	7	0.059	0.000				
1	HORIZ CONC LOAD	8	0.059	-0.000				

MEMBER END TRANSLATIONS

MEMBER NUMBER	LC No	LOADING CONDITION DESCRIPTION	JOINT No	END TRANSLATIONS VERT (IN)	END TRANSLATIONS HORZ (IN)	JOINT No	END TRANSLATIONS VERT (IN)	END TRANSLATIONS HORZ (IN)
1	1	HORIZ CONC LOAD	1	0.00	0.00	2	0.13	-2.54
2	1	HORIZ CONC LOAD	9	0.00	0.00	8	-0.12	-2.42
3	1	HORIZ CONC LOAD	2	0.13	-2.54	3	0.62	-2.60
4	1	HORIZ CONC LOAD	8	-0.12	-2.42	7	-0.95	-2.53
5	1	HORIZ CONC LOAD	3	0.62	-2.60	4	0.56	-2.60
6	1	HORIZ CONC LOAD	7	-0.95	-2.53	6	-1.16	-2.55
7	1	HORIZ CONC LOAD	4	0.56	-2.60	5	-0.54	-2.50
8	1	HORIZ CONC LOAD	6	-1.16	-2.55	5	-0.54	-2.50

MODULUS OF ELASTICITY 29000. KSI

* * * G E N E R A L I N P U T * * * Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

4003 8 8 1 50 X 16 X 25 LRF44		UNBAL LL	NOM GAGES	50 KSI	11		HEAD RECORD
1 1 2	11	0.69	13.43	6.563	21.813	0.80	MEMB DESC
2 9 8	11	-0.69	13.43	6.5	21.75	0.80	MEMB DESC
3 2 3		7.19	0.96	21.75	14.	0.81	MEMB DESC
4 8 7		-7.19	0.96	21.75	14.	0.81	MEMB DESC
5 3 4		4.33	0.36	14.	14.		MEMB DESC
6 7 6		-4.33	0.36	14.	14.		MEMB DESC
7 4 5		12.56	1.05	14.	14.		MEMB DESC
8 6 5		-12.56	1.05	14.	14.		MEMB DESC
DEG INDT 1	JT DISPL 23	NUMBER SUPPORTS 2	BAND WIDTH 6				
1 112		50.	50.				HEADER
	6.0	0.187	6.0	0.25			FLANGE
86.1	86.1	1.348	120.2	120.2	1.293		BRACING
1	34.	1.0	2	31.7	1.0		BRACING
2	31.7	1.0					BRACING
10.				0.125	0.156		WEB
0.85	1.0	151.8					BUCKLING
2 112		50.	50.				HEADER
	6.0	0.313	6.0	0.187			FLANGE
151.9	151.9	1.257	86.1	86.1	1.348		BRACING
1	34.	1.0	1	34.	1.0		BRACING
			2	31.7	1.0		BRACING
10.				0.125	0.156		WEB
0.85	1.0	151.8					BUCKLING
3 121		50.	50.				HEADER
0.167	6.0	0.187	6.	0.25			FLANGE
	6.0	0.187	6.	0.25			FLANGE
41.3	53.3	1.0	101.3	92.3	1.0		BRACING
1	60.3	1.0	1	92.3	1.0		BRACING
				0.156			WEB
0.85	1.0	87.1					BUCKLING
4 121		50.	50.				HEADER
0.167	6.0	0.25	6.0	0.187			FLANGE
	6.0	0.25	6.0	0.187			FLANGE
101.3	92.3	1.0	41.3	53.3	1.0		BRACING
1	92.3	1.0	1	60.3	1.0		BRACING
				0.156			WEB
0.85	1.0	87.1					BUCKLING
5 111		50.	50.				HEADER
	6.0	0.187	6.	0.187			FLANGE
14.22	60.2	1.0	14.22	92.4	1.0		BRACING
1	60.2	1.0	1	120.4	1.		BRACING
				0.125			WEB
0.85	1.0	51.95					BUCKLING
6 111		50.	50.				HEADER
	6.	0.187	6.0	0.187			FLANGE
14.22	92.4	1.0	14.22	60.2	1.0		BRACING

```
0.85        1.0         51.95                                                   BUCKLING

7 121                   50.         50.                                         HEADER
            6.0         0.187       6.          0.187                           FLANGE
0.167       6.0         0.187       6.          0.187                           FLANGE
22.47       60.2        1.0         82.67       120.4       1.0                 BRACING
1           60.2        1.0         1           135.5       1.0                 BRACING
1           55.7        1.0                                                     BRACING
1           24.0        1.0                                                     BRACING
                                                0.125                           WEB
0.85        1.0         151.45                                                  BUCKLING

8 121                   50.         50.                                         HEADER
            6.          0.187       6.0         0.187                           FLANGE
0.167       6.          0.187       6.0         0.187                           FLANGE
82.67       120.4       1.0         22.47       60.2        1.0                 BRACING
1           135.5       1.0         1           60.2        1.0                 BRACING
                                    1           55.7        1.0                 BRACING
                                    1           24.0        1.0                 BRACING
                                                0.125                           WEB
0.85        1.0         151.45                                                  BUCKLING
1 6         VERT CONC LOADS UNBAL                                               LOADS
1 2         0.051                                                               LOADS
3 8         0.059                                                               LOADS
3 3                                 4.18                        2.78            LOADS
5 5                                 4.18                        0.2             LOADS
7 7                                 4.18                        3.37            LOADS
7 7                                 4.18                        8.37            LOADS

NO ERRORS WERE DETECTED IN INPUT
*---------*---------*---------*---------*---------*---------*---------*---------*
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PROJECT No. 4003 50 X 16 X 25 LRF44 UNBAL LL NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

FRAME GEOMETRY

MEMBER NUMBER	LENGTH (FT)	PROJECTION HORIZ	PROJECTION VERT	INITIAL END JT No	INITIAL END X COORD.	INITIAL END Y COORD.	TERMINAL END JT No	TERMINAL END X COORD.	TERMINAL END Y COORD.
1	13.45	0.69	13.43	1	0.00	0.00	2	0.69	13.43
2	13.45	-0.69	13.43	9	49.54	-0.00	8	48.85	13.43
3	7.25	7.19	0.96	2	0.69	13.43	3	7.88	14.39
4	7.25	-7.19	0.96	8	48.85	13.43	7	41.66	14.39
5	4.34	4.33	0.36	3	7.88	14.39	4	12.21	14.75
6	4.34	-4.33	0.36	7	41.66	14.39	6	37.33	14.75
7	12.60	12.56	1.05	4	12.21	14.75	5	24.77	15.80
8	12.60	-12.56	1.05	6	37.33	14.75	5	24.77	15.80

	X	Y
MINIMUM JOINT COORDINATE	0.00	-0.00
MAXIMUM JOINT COORDINATE	49.54	15.80

PROJECT No. 4003 50 X 16 X 25 LRF44 UNBAL LL NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

STRESS ANALYSIS FOR MEMBER 1

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	WEB SHEAR RATIO	WEB LC No
1	4.19	21.71	0.00	27.58	0.193	1	4.19	21.71	-0.00	30.00	0.193	1	0.303	1
2	3.78	21.27	-11.45	30.00	0.256	1	3.78	21.27	9.51	26.52	0.504	1	0.284	1
3	3.44	20.84	-16.59	30.00	0.439	1	3.44	20.84	13.99	26.28	0.648	1	0.356	1
4	3.15	21.40	-19.17	30.00	0.492	1	3.15	21.40	16.37	26.04	0.734	1	0.441	1
5	2.91	20.38	-20.50	30.00	0.541	1	2.91	20.38	17.71	25.80	0.783	1	0.526	1
6	2.61	21.69	-19.25	30.00	0.521	1	2.61	21.69	16.90	25.42	0.752	1	0.271	1
7	2.39	20.82	-19.75	30.00	0.543	1	2.39	20.82	17.51	29.96	0.664	1	0.317	1

GEOMETRIC PROPERTIES FOR MEMBER 1

PT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.00	6.0	0.187	86.1	6.0	0.250	120.2	0.125	6.56	3.4	32.6	8.47	10.37
2	2.50	6.0	0.187	86.1	6.0	0.250	120.2	0.125	9.58	3.8	71.2	13.01	15.67
3	5.00	6.0	0.187	86.1	6.0	0.250	120.2	0.125	12.59	4.2	127.0	17.96	21.31
4	7.50	6.0	0.187	34.0	6.0	0.250	120.2	0.125	15.61	4.6	201.8	23.32	27.31
5	10.00	6.0	0.187	34.0	6.0	0.250	120.2	0.125	18.62	4.9	297.4	29.08	33.67
6	10.00	6.0	0.187	34.0	6.0	0.250	120.2	0.156	18.62	5.5	314.4	30.98	35.29
7	12.65	6.0	0.187	31.7	6.0	0.250	31.7	0.156	21.81	6.0	450.3	38.19	43.06

YIELD STRESSES (KSI)	FLANGES	WEB
	50.0	50.0

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 1

PT No	POSITIVE FLANGE CB	L/RT	LD/AF	NEGATIVE FLANGE CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.348	52.986	537.166	1.293	72.136	560.933	49.302	56.954	0.850	61.435
2	1.348	54.369	768.464	1.293	73.419	802.465	51.311	59.988	0.850	56.720
3	1.348	55.701	999.762	1.293	74.698	1043.997	52.936	62.876	0.850	53.290
4	1.000	22.505	486.133	1.293	75.968	1285.529	54.331	25.919	0.850	50.588
5	1.000	22.999	577.470	1.293	77.228	1527.061	55.561	26.965	0.850	48.373
6	1.000	23.733	577.531	1.293	79.131	1527.222	57.108	28.489	0.850	45.789
7	1.000	22.696	628.632	1.000	21.296	470.216	58.359	27.731	0.850	43.847

PROJECT No. 4003 50 X 16 X 25 LRF44 UNBAL LL NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

MEMBER FORCES FOR MEMBER 1

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES							
			MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	4.97	-0.00	14.43						
2	2.50	4.97	12.42	14.42						
3	5.00	4.97	24.84	14.42						
4	7.50	4.97	37.26	14.41						
5	10.00	4.97	49.68	14.40						
6	10.00	4.97	49.69	14.40						
7	12.65	4.97	62.84	14.40						

PROJECT No. 4003 50 X 16 X 25 LRF44 UNBAL LL NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

STRESS ANALYSIS FOR MEMBER 2

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	WEB SHEAR RATIO	WEB LC No
1	1.51	21.84	-0.00	30.00	0.069	1	1.51	21.84	0.00	27.58	0.069	1	0.333	1
2	1.37	21.45	8.76	22.48	0.435	1	1.37	21.45	-12.29	30.00	0.346	1	0.310	1
3	1.26	21.07	12.95	22.19	0.626	1	1.26	21.07	-17.74	30.00	0.531	1	0.386	1
4	1.16	22.06	15.26	21.88	0.736	1	1.16	22.06	-20.43	30.00	0.628	1	0.479	1
5	1.08	21.90	16.60	21.58	0.805	1	1.08	21.90	-21.80	30.00	0.678	1	0.571	1
6	0.97	21.69	16.00	21.10	0.791	1	0.97	21.69	-20.43	30.00	0.636	1	0.294	1
7	0.90	21.52	16.69	20.69	0.837	1	0.90	21.52	-20.93	30.00	0.656	1	0.345	1

GEOMETRIC PROPERTIES FOR MEMBER 2

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.00	6.0	0.313	151.9	6.0	0.187	86.1	0.125	6.50	3.8	35.4	12.33	8.56
2	2.50	6.0	0.313	151.9	6.0	0.187	86.1	0.125	9.51	4.2	77.3	18.55	13.22
3	5.00	6.0	0.313	151.9	6.0	0.187	86.1	0.125	12.53	4.6	138.0	25.09	18.32
4	7.50	6.0	0.313	151.9	6.0	0.187	34.0	0.125	15.54	4.9	219.1	31.95	23.86
5	10.00	6.0	0.313	151.9	6.0	0.187	34.0	0.125	18.56	5.3	322.5	39.16	29.81
6	10.00	6.0	0.313	151.9	6.0	0.187	34.0	0.156	18.56	5.9	340.1	40.63	31.82
7	12.65	6.0	0.313	151.9	6.0	0.187	31.7	0.156	21.75	6.4	486.2	49.25	39.28

YIELD STRESSES (KSI)	FLANGES	WEB
	50.0	50.0

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 2

PT No	POSITIVE FLANGE CB	L/RT	LD/AF	NEGATIVE FLANGE CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.257	90.152	566.187	1.348	53.226	537.166	49.832	56.035	0.850	60.136
2	1.257	91.372	809.982	1.348	54.686	768.464	51.723	58.737	0.850	55.819
3	1.257	92.607	1053.776	1.348	56.079	999.762	53.228	61.320	0.850	52.707
4	1.257	93.851	1297.571	1.000	22.674	486.133	54.516	25.193	0.850	50.246
5	1.257	95.097	1541.365	1.000	23.184	577.470	55.655	26.135	0.850	48.211
6	1.257	96.990	1541.527	1.000	23.935	577.531	57.063	27.508	0.850	45.860
7	1.257	98.626	1799.667	1.000	22.896	628.632	58.243	26.707	0.850	44.021

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MEMBER FORCES FOR MEMBER 2

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES							
			MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	5.42	0.00	5.76						
2	2.50	5.42	-13.54	5.76						
3	5.00	5.42	-27.08	5.75						
4	7.50	5.42	-40.62	5.74						
5	10.00	5.42	-54.17	5.74						
6	10.00	5.42	-54.18	5.74						
7	12.65	5.42	-68.52	5.73						

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STRESS ANALYSIS FOR MEMBER 3

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	WEB SHEAR RATIO	WEB LC No
1	1.25	23.13	-17.70	30.00	0.536	1	1.25	23.13	15.70	27.06	0.622	1	0.839	1
2	1.26	23.14	-17.22	30.00	0.520	1	1.26	23.14	15.26	27.07	0.606	1	0.831	1
3	1.26	23.14	-17.22	30.00	0.520	1	1.26	23.14	15.26	27.07	0.605	1	0.831	1
4	1.33	23.32	-11.12	30.00	0.314	1	1.33	23.32	9.78	27.24	0.403	1	0.741	1
5	1.23	23.32	-11.11	30.00	0.318	1	1.23	23.32	9.78	27.24	0.400	1	0.507	1
6	1.33	22.79	-4.64	30.00	0.096	1	1.33	22.79	4.04	27.45	0.191	1	0.430	1
7	1.44	23.06	5.12	27.58	0.233	1	1.44	23.06	-4.41	30.00	0.085	1	0.355	1

GEOMETRIC PROPERTIES FOR MEMBER 3

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.81	6.0	0.187	53.3	6.0	0.250	92.3	0.156	21.75	6.0	447.3	38.04	42.90
2	0.98	6.0	0.187	53.3	6.0	0.250	92.3	0.156	21.55	6.0	438.0	37.57	42.40
3	0.98	6.0	0.187	53.3	6.0	0.250	92.3	0.156	21.55	6.0	437.9	37.57	42.39
4	2.78	6.0	0.187	53.3	6.0	0.250	92.3	0.156	19.38	5.6	344.1	32.64	37.09
5	2.78	6.0	0.187	53.3	6.0	0.250	92.3	0.156	19.38	5.6	344.0	32.64	37.09
6	5.02	6.0	0.187	60.3	6.0	0.250	92.3	0.156	16.69	5.2	245.9	26.88	30.84
7	7.25	6.0	0.187	60.3	6.0	0.250	92.3	0.156	14.00	4.8	166.7	21.50	24.95

YIELD STRESSES (KSI)	FLANGES	WEB
	50.0	50.0

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 3

PT No	POSITIVE FLANGE CB	L/RT	LD/AF	NEGATIVE FLANGE CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	38.142	1053.981	1.000	61.982	1365.240	14.988	46.588	0.850	664.734
2	1.000	38.083	1044.487	1.000	61.904	1352.942	14.963	46.468	0.850	667.006
3	1.000	38.083	1044.392	1.000	61.904	1352.819	14.962	46.467	0.850	667.029
4	1.000	37.435	941.475	1.000	61.061	1219.508	14.669	45.137	0.850	694.028
5	1.000	37.435	941.380	1.000	61.060	1219.385	14.668	45.136	0.850	694.055
6	1.000	41.420	920.453	1.000	60.002	1053.871	14.252	49.132	0.850	735.203
7	1.000	40.461	775.892	1.000	58.932	888.356	13.758	47.121	0.850	788.884

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MEMBER FORCES FOR MEMBER 3

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES							
			MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.81	13.19	56.11	7.51						
2	0.98	13.18	53.92	7.51						
3	0.98	13.18	53.90	7.51						
4	2.78	13.08	30.24	7.50						
5	2.78	8.94	30.23	6.95						
6	5.02	8.81	10.38	6.93						
7	7.25	8.68	-9.17	6.91						

PROJECT No. 4003 50 X 16 X 25 LRF44 UNBAL LL NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

STRESS ANALYSIS FOR MEMBER 4

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	POSITIVE EXTREMITY AXIAL STRESS ALLOWABLE (KSI)	POSITIVE EXTREMITY BENDING STRESS COMPUTED (KSI)	POSITIVE EXTREMITY BENDING STRESS ALLOWABLE (KSI)	POSITIVE EXTREMITY STRESS RATIO	POSITIVE EXTREMITY LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	NEGATIVE EXTREMITY AXIAL STRESS ALLOWABLE (KSI)	NEGATIVE EXTREMITY BENDING STRESS COMPUTED (KSI)	NEGATIVE EXTREMITY BENDING STRESS ALLOWABLE (KSI)	NEGATIVE EXTREMITY STRESS RATIO	NEGATIVE EXTREMITY LC No	WEB SHEAR RATIO	WEB LC No
1	1.06	23.13	19.33	27.06	0.750	1	1.06	23.13	-21.80	30.00	0.681	1	0.292	1
2	1.06	23.14	19.35	27.07	0.750	1	1.06	23.14	-21.83	30.00	0.682	1	0.289	1
3	1.06	23.14	19.35	27.07	0.750	1	1.06	23.14	-21.83	30.00	0.682	1	0.289	1
4	1.14	23.34	19.49	27.27	0.753	1	1.14	23.34	-22.17	30.00	0.690	1	0.248	1
5	1.22	22.81	19.58	27.46	0.754	1	1.22	22.81	-22.48	30.00	0.696	1	0.210	1
6	1.32	23.06	19.59	27.66	0.752	1	1.32	23.06	-22.73	30.00	0.701	1	0.173	1

GEOMETRIC PROPERTIES FOR MEMBER 4

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	POS FLANGE THK (IN)	POS FLANGE UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	NEG FLANGE THK (IN)	NEG FLANGE UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.81	6.0	0.250	92.3	6.0	0.187	53.3	0.156	21.75	6.0	447.3	42.90	38.04
2	0.98	6.0	0.250	92.3	6.0	0.187	53.3	0.156	21.55	6.0	438.0	42.40	37.57
3	0.98	6.0	0.250	92.3	6.0	0.187	53.3	0.156	21.55	6.0	437.9	42.39	37.57
4	3.07	6.0	0.250	92.3	6.0	0.187	53.3	0.156	19.03	5.6	330.2	36.26	31.87
5	5.16	6.0	0.250	92.3	6.0	0.187	60.3	0.156	16.52	5.2	240.3	30.45	26.52
6	7.25	6.0	0.250	92.3	6.0	0.187	60.3	0.156	14.00	4.8	166.7	24.95	21.50

YIELD STRESSES (KSI)	FLANGES	WEB
	50.0	50.0

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 4

PT No	POSITIVE FLANGE CB	POS FLANGE L/RT	POS FLANGE LD/AF	NEGATIVE FLANGE CB	NEG FLANGE L/RT	NEG FLANGE LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	61.982	1365.240	1.000	38.142	1053.981	14.988	46.588	0.850	664.734
2	1.000	61.904	1352.942	1.000	38.083	1044.487	14.963	46.468	0.850	667.006
3	1.000	61.904	1352.819	1.000	38.083	1044.392	14.962	46.467	0.850	667.029
4	1.000	60.924	1197.998	1.000	37.329	924.869	14.618	44.919	0.850	698.841
5	1.000	59.934	1043.177	1.000	41.359	911.113	14.223	49.004	0.850	738.232
6	1.000	58.932	888.356	1.000	40.461	775.892	13.758	47.121	0.850	788.884

MEMBER FORCES FOR MEMBER 4

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.81	4.59	-69.11	6.37						
2	0.98	4.58	-68.35	6.37						
3	0.98	4.58	-68.34	6.37						
4	3.07	4.46	-58.88	6.35						
5	5.16	4.34	-49.68	6.34						
6	7.25	4.22	-40.73	6.32						

H.44

PROJECT No. 4003 50 X 16 X 25 LRF44 UNBAL LL NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

STRESS ANALYSIS FOR MEMBER 5

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	WEB SHEAR RATIO	WEB LC No
1	1.62	23.16	5.59	27.58	0.257	1	1.62	23.16	-5.59	30.00	0.116	1	0.717	1
2	1.62	23.16	6.68	27.58	0.296	1	1.62	23.16	-6.68	30.00	0.153	1	0.716	1
3	1.53	23.16	6.69	27.58	0.294	1	1.53	23.16	-6.69	30.00	0.157	1	0.385	1
4	1.53	23.16	12.72	27.58	0.512	1	1.53	23.16	-12.72	30.00	0.358	1	0.375	1
5	1.53	23.16	18.59	27.58	0.725	1	1.53	23.16	-18.59	30.00	0.554	1	0.365	1

GEOMETRIC PROPERTIES FOR MEMBER 5

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.00	6.0	0.187	60.2	6.0	0.187	92.4	0.125	14.00	4.0	141.5	19.69	19.69
2	0.20	6.0	0.187	60.2	6.0	0.187	92.4	0.125	14.00	4.0	141.5	19.69	19.69
3	0.20	6.0	0.187	60.2	6.0	0.187	92.4	0.125	14.00	4.0	141.5	19.69	19.69
4	2.27	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69
5	4.34	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69

	FLANGES	WEB
YIELD STRESSES (KSI)	50.0	50.0

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 5

PT No	POSITIVE FLANGE CB	L/RT	LD/AF	NEGATIVE FLANGE CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	39.013	771.225	1.000	59.881	1183.741	8.728	46.361	0.850	1960.360
2	1.000	39.013	771.225	1.000	59.881	1183.741	8.728	46.361	0.850	1960.360
3	1.000	39.013	771.225	1.000	59.881	1183.741	8.728	46.361	0.850	1960.360
4	1.000	39.013	771.225	1.000	78.027	1542.450	8.728	46.361	0.850	1960.360
5	1.000	39.013	771.225	1.000	78.027	1542.450	8.728	46.361	0.850	1960.360

MEMBER FORCES FOR MEMBER 5

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	9.01	-9.17	6.47						
2	0.20	9.00	-10.97	6.47						
3	0.20	4.83	-10.97	6.12						
4	2.27	4.71	-20.86	6.11						
5	4.34	4.59	-30.50	6.10						

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STRESS ANALYSIS FOR MEMBER 6

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	WEB SHEAR RATIO	WEB LC No
1	1.53	23.16	24.82	27.47	0.954	1	1.53	23.16	-24.82	30.00	0.761	1	0.360	1
2	1.52	23.16	18.91	23.39	0.860	1	1.52	23.16	-18.91	30.00	0.565	1	0.350	1
3	1.52	23.16	13.17	23.39	0.614	1	1.52	23.16	-13.17	30.00	0.373	1	0.340	1

GEOMETRIC PROPERTIES FOR MEMBER 6

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.00	6.0	0.187	92.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69
2	2.17	6.0	0.187	120.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69
3	4.34	6.0	0.187	120.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69

	FLANGES	WEB
YIELD STRESSES (KSI)	50.0	50.0

H.46

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 6

PT No	POSITIVE FLANGE CB	L/RT	LD/AF	NEGATIVE FLANGE CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	59.881	1183.741	1.000	39.013	771.225	8.728	46.361	0.850	1960.360
2	1.000	78.027	1542.450	1.000	39.013	771.225	8.728	46.361	0.850	1960.360
3	1.000	78.027	1542.450	1.000	39.013	771.225	8.728	46.361	0.850	1960.360

MEMBER FORCES FOR MEMBER 6

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	4.53	-40.73	6.10						
2	2.17	4.40	-31.03	6.09						
3	4.34	4.27	-21.61	6.08						

PROJECT No. 4003 50 X 16 X 25 LRF44 UNBAL LL NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

STRESS ANALYSIS FOR MEMBER 7

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	WEB SHEAR RATIO	WEB LC No
1	1.53	23.16	18.59	27.58	0.725	1	1.53	23.16	-18.59	30.00	0.554	1	0.365	1
2	1.53	23.16	23.25	27.58	0.894	1	1.53	23.16	-23.25	30.00	0.709	1	0.357	1
3	1.52	23.16	27.81	27.58	1.059	1	1.52	23.16	-27.81	30.00	0.861	1	0.349	1
4	1.44	23.16	27.81	27.58	1.056	1	1.44	23.16	-27.81	30.00	0.865	1	0.018	1
5	1.43	23.16	28.04	27.58	1.064	1	1.43	23.16	-28.04	30.00	0.873	1	0.006	1
6	1.43	23.60	28.05	27.58	1.065	1	1.43	23.60	-28.05	30.00	0.874	1	0.005	1
7	1.34	23.60	28.04	27.58	1.062	1	1.34	23.60	-28.04	30.00	0.878	1	0.337	1
8	1.34	23.60	22.72	27.58	0.869	1	1.34	23.60	-22.72	30.00	0.701	1	0.346	1
9	1.34	25.57	17.26	27.58	0.670	1	1.34	25.57	-17.26	30.00	0.523	1	0.356	1
10	1.34	25.57	17.25	27.58	0.670	1	1.34	25.57	-17.25	30.00	0.523	1	0.356	1
11	1.34	25.57	16.80	27.58	0.654	1	1.34	25.57	-16.80	30.00	0.508	1	0.357	1

GEOMETRIC PROPERTIES FOR MEMBER 7

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.00	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69
2	1.68	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69
3	3.37	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69
4	3.37	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69
5	5.87	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69
6	8.37	6.0	0.187	55.7	6.0	0.187	135.5	0.125	14.00	4.0	141.5	19.69	19.69
7	8.37	6.0	0.187	55.7	6.0	0.187	135.5	0.125	14.00	4.0	141.5	19.69	19.69
8	10.40	6.0	0.187	55.7	6.0	0.187	135.5	0.125	14.00	4.0	141.5	19.69	19.69
9	12.44	6.0	0.187	24.0	6.0	0.187	135.5	0.125	14.00	4.0	141.5	19.69	19.69
10	12.44	6.0	0.187	24.0	6.0	0.187	135.5	0.125	14.00	4.0	141.5	19.69	19.69
11	12.60	6.0	0.187	24.0	6.0	0.187	135.5	0.125	14.00	4.0	141.5	19.69	19.69

	FLANGES	WEB
YIELD STRESSES (KSI)	50.0	50.0

H.47

PROJECT No. 4003 50 X 16 X 25 LRF44 UNBAL LL NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 7

PT	POSITIVE FLANGE			NEGATIVE FLANGE						
No	CB	L/RT	LD/AF	CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	39.013	771.225	1.000	78.027	1542.450	25.444	46.361	0.850	230.658
2	1.000	39.013	771.225	1.000	78.027	1542.450	25.444	46.361	0.850	230.658
3	1.000	39.013	771.225	1.000	78.027	1542.450	25.444	46.361	0.850	230.658
4	1.000	39.013	771.225	1.000	78.027	1542.450	25.444	46.361	0.850	230.658
5	1.000	39.013	771.225	1.000	78.027	1542.450	25.444	46.361	0.850	230.658
6	1.000	36.097	713.575	1.000	87.812	1735.897	25.444	42.896	0.850	230.658
7	1.000	36.097	713.575	1.000	87.812	1735.897	25.444	42.896	0.850	230.658
8	1.000	36.097	713.575	1.000	87.812	1735.897	25.444	42.896	0.850	230.658
9	1.000	15.553	307.465	1.000	87.812	1735.897	25.444	18.483	0.850	230.658
10	1.000	15.553	307.465	1.000	87.812	1735.897	25.444	18.483	0.850	230.658
11	1.000	15.553	307.465	1.000	87.812	1735.897	25.444	18.483	0.850	230.658

MEMBER FORCES FOR MEMBER 7

POINT		ABSOLUTE MAXIMUM	MOMENTS AND AXIAL FORCES							
No	LOCATION (FT)	SHEAR (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	4.59	-30.50	6.11						
2	1.68	4.49	-38.15	6.10						
3	3.37	4.39	-45.63	6.09						
4	3.37	0.22	-45.63	5.74						
5	5.87	0.08	-46.00	5.73						
6	8.37	0.07	-46.01	5.72						
7	8.37	4.23	-46.01	5.37						
8	10.40	4.35	-37.28	5.36						
9	12.44	4.47	-28.31	5.35						
10	12.44	4.47	-28.30	5.35						
11	12.60	4.48	-27.56	5.35						

PROJECT No. 4003 50 X 16 X 25 LRF44 UNBAL LL NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

STRESS ANALYSIS FOR MEMBER 8

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	WEB SHEAR RATIO	WEB LC No
1	1.52	23.16	13.17	23.39	0.614	1	1.52	23.16	-13.17	30.00	0.373	1	0.340	1
2	1.52	23.16	6.81	23.39	0.342	1	1.52	23.16	-6.81	30.00	0.161	1	0.328	1
3	1.52	23.16	0.66	23.39	0.090	1	1.52	23.16	-0.66	30.00	0.043	1	0.317	1
4	1.51	23.60	-5.26	30.00	0.111	1	1.51	23.60	5.26	27.58	0.241	1	0.305	1
5	1.51	23.60	-10.96	30.00	0.301	1	1.51	23.60	10.96	27.58	0.448	1	0.293	1
6	1.51	25.57	-16.44	30.00	0.489	1	1.51	25.57	16.44	27.58	0.646	1	0.282	1
7	1.51	25.57	-16.44	30.00	0.489	1	1.51	25.57	16.44	27.58	0.646	1	0.282	1
8	1.51	25.57	-16.80	30.00	0.501	1	1.51	25.57	16.80	27.58	0.659	1	0.281	1

GEOMETRIC PROPERTIES FOR MEMBER 8

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.00	6.0	0.187	120.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69
2	2.49	6.0	0.187	120.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69
3	4.97	6.0	0.187	120.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69
4	7.46	6.0	0.187	135.5	6.0	0.187	55.7	0.125	14.00	4.0	141.5	19.69	19.69
5	9.95	6.0	0.187	135.5	6.0	0.187	55.7	0.125	14.00	4.0	141.5	19.69	19.69
6	12.44	6.0	0.187	135.5	6.0	0.187	24.0	0.125	14.00	4.0	141.5	19.69	19.69
7	12.44	6.0	0.187	135.5	6.0	0.187	24.0	0.125	14.00	4.0	141.5	19.69	19.69
8	12.60	6.0	0.187	135.5	6.0	0.187	24.0	0.125	14.00	4.0	141.5	19.69	19.69

	FLANGES	WEB
YIELD STRESSES (KSI)	50.0	50.0

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 8

PT No	POSITIVE FLANGE CB	L/RT	LD/AF	NEGATIVE FLANGE CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	78.027	1542.450	1.000	39.013	771.225	25.444	46.361	0.850	230.658
2	1.000	78.027	1542.450	1.000	39.013	771.225	25.444	46.361	0.850	230.658
3	1.000	78.027	1542.450	1.000	39.013	771.225	25.444	46.361	0.850	230.658
4	1.000	87.812	1735.897	1.000	36.097	713.575	25.444	42.896	0.850	230.658
5	1.000	87.812	1735.897	1.000	36.097	713.575	25.444	42.896	0.850	230.658
6	1.000	87.812	1735.897	1.000	15.553	307.465	25.444	18.483	0.850	230.658
7	1.000	87.812	1735.897	1.000	15.553	307.465	25.444	18.483	0.850	230.658
8	1.000	87.812	1735.897	1.000	15.553	307.465	25.444	18.483	0.850	230.658

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MEMBER FORCES FOR MEMBER 8

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES							
			MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	4.27	-21.61	6.08						
2	2.49	4.12	-11.17	6.07						
3	4.97	3.98	-1.09	6.06						
4	7.46	3.83	8.63	6.04						
5	9.95	3.69	17.98	6.03						
6	12.44	3.54	26.97	6.02						
7	12.44	3.54	26.98	6.02						
8	12.60	3.53	27.57	6.02						

PROJECT No. 4003 50 X 16 X 25 LRF44 UNBAL LL NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

FORCES ACTING ON SUPPORTS

LOADING CONDITION No	LOADING CONDITION DESCRIPTION	SUPPORT No	HORIZONTAL (KIPS)	VERTICAL (KIPS)	MOMENT (K-FT)
1	VERT CONC LOADS UNBAL	1	-5.70	14.16	-0.00
1	VERT CONC LOADS UNBAL	9	5.70	5.48	0.00
	TOTAL FORCES ACTING		0.00	19.63	0.00
	TOTAL FORCES APPLIED		0.00	19.63	0.00

EXTERNAL MEMBER LOADS

LOADING CONDITION No	LOADING CONDITION DESCRIPTION	MEMBER NUMBER	UNIFORMLY DISTRIBUTED LOADS VERTICAL (K/FT)	UNIFORMLY DISTRIBUTED LOADS HORIZONTAL (K/FT)	CONCENTRATED LOADS LOCATION (FT)	CONCENTRATED LOADS VERTICAL (KIPS)	CONCENTRATED LOADS HORIZONTAL (KIPS)	CONCENTRATED LOADS MOMENT (K-FT)
1	VERT CONC LOADS UNBAL	1	0.051	0.000				
1	VERT CONC LOADS UNBAL	2	0.051	-0.000				
1	VERT CONC LOADS UNBAL	3	0.059	0.000	2.78	4.18	0.00	0.00
1	VERT CONC LOADS UNBAL	4	0.059	0.000				
1	VERT CONC LOADS UNBAL	5	0.059	-0.000	0.20	4.18	-0.00	0.00
1	VERT CONC LOADS UNBAL	6	0.059	-0.000				
1	VERT CONC LOADS UNBAL	7	0.059	0.000	3.37	4.18	0.00	0.00
					8.37	4.18	0.00	0.00
1	VERT CONC LOADS UNBAL	8	0.059	-0.000				

H.51

MEMBER END TRANSLATIONS

MEMBER NUMBER	LC No	LOADING CONDITION DESCRIPTION	END TRANSLATIONS JOINT No	VERT (IN)	HORZ (IN)	JOINT No	VERT (IN)	HORZ (IN)
1	1	VERT CONC LOADS UNBAL	1	0.00	0.00	2	-0.06	0.88
2	1	VERT CONC LOADS UNBAL	9	0.00	0.00	8	0.06	1.24
3	1	VERT CONC LOADS UNBAL	2	-0.06	0.88	3	-1.16	1.02
4	1	VERT CONC LOADS UNBAL	8	0.06	1.24	7	-0.03	1.23
5	1	VERT CONC LOADS UNBAL	3	-1.16	1.02	4	-1.78	1.07
6	1	VERT CONC LOADS UNBAL	7	-0.03	1.23	6	-0.40	1.20
7	1	VERT CONC LOADS UNBAL	4	-1.78	1.07	5	-1.95	1.08
8	1	VERT CONC LOADS UNBAL	6	-0.40	1.20	5	-1.95	1.08

MODULUS OF ELASTICITY 29000. KSI

* * * G E N E R A L I N P U T * * * Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

4004 8 8 1 50 X 16 X 25 LRF44			UBLL + WIND NOM GAGES 50 KSI			11		HEAD RECORD
1 1 2	11	0.69	13.43	6.563	21.813		0.80	MEMB DESC
2 9 8	11	-0.69	13.43	6.5	21.75		0.80	MEMB DESC
3 2 3		7.19	0.96	21.75	14.	0.81		MEMB DESC
4 8 7		-7.19	0.96	21.75	14.	0.81		MEMB DESC
5 3 4		4.33	0.36	14.	14.			MEMB DESC
6 7 6		-4.33	0.36	14.	14.			MEMB DESC
7 4 5		12.56	1.05	14.	14.			MEMB DESC
8 6 5		-12.56	1.05	14.	14.			MEMB DESC
DEG INDT 1	JT DISPL 23	NUMBER SUPPORTS 2	BAND WIDTH 6					
1 112		50.	50.					HEADER
	6.0	0.187	6.0	0.25				FLANGE
86.1	86.1	1.348	120.2	120.2	1.293			BRACING
1	34.	1.0	2	31.7	1.0			BRACING
2	31.7	1.0						BRACING
10.				0.125	0.156			WEB
0.85	1.0	151.8						BUCKLING
2 112		50.	50.					HEADER
	6.0	0.313	6.0	0.187				FLANGE
151.9	151.9	1.257	86.1	86.1	1.348			BRACING
1	34.	1.0	1	34.	1.0			BRACING
			2	31.7	1.0			BRACING
10.				0.125	0.156			WEB
0.85	1.0	151.8						BUCKLING
3 121		50.	50.					HEADER
0.167	6.0	0.187	6.	0.25				FLANGE
	6.0	0.187	6.	0.25				FLANGE
41.3	53.3	1.0	101.3	92.3	1.0			BRACING
1	60.3	1.0	1	92.3	1.0			BRACING
				0.156				WEB
0.85	1.0	87.1						BUCKLING
4 121		50.	50.					HEADER
0.167	6.0	0.25	6.0	0.187				FLANGE
	6.0	0.25	6.0	0.187				FLANGE
101.3	92.3	1.0	41.3	53.3	1.0			BRACING
1	92.3	1.0	1	60.3	1.0			BRACING
				0.156				WEB
0.85	1.0	87.1						BUCKLING
5 111		50.	50.					HEADER
	6.0	0.187	6.	0.187				FLANGE
14.22	60.2	1.0	14.22	92.4	1.0			BRACING
1	60.2	1.0	1	120.4	1.			BRACING
				0.125				WEB
0.85	1.0	51.95						BUCKLING
6 111		50.	50.					HEADER
	6.	0.187	6.0	0.187				FLANGE
14.22	92.4	1.0	14.22	60.2	1.0			BRACING
1	120.4	1.0	1	60.2	1			BRACING

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0.85        1.0         51.95                                                   BUCKLING

7 121                   50.         50.                                         HEADER
            6.0         0.187       6.          0.187                           FLANGE
0.167       6.0         0.187       6.          0.187                           FLANGE
22.47       60.2        1.0         82.67       120.4       1.0                 BRACING
1           60.2        1.0         1           135.5       1.0                 BRACING
1           55.7        1.0                                                     BRACING
1           24.0        1.0                                                     BRACING
                                                0.125                           WEB
0.85        1.0         151.45                                                  BUCKLING

8 121                   50.         50.                                         HEADER
            6.          0.187       6.0         0.187                           FLANGE
0.167       6.          0.187       6.0         0.187                           FLANGE
82.67       120.4       1.0         22.47       60.2        1.0                 BRACING
1           135.5       1.0         1           60.2        1.0                 BRACING
                                    1           55.7        1.0                 BRACING
                                    1           24.0        1.0                 BRACING
                                                0.125                           WEB
0.85        1.0         151.45                                                  BUCKLING
1 7         VERT CONC LOADS UNBAL + WIND                                        LOADS
1 2         0.051                                                               LOADS
3 8         0.059                                                               LOADS
1 1                                             -5.6                12.583      LOADS
3 3                     2.50                                        2.78        LOADS
5 5                     2.50                                        0.2         LOADS
7 7                     2.50                                        3.37        LOADS
7 7                     2.50                                        8.37        LOADS

NO ERRORS WERE DETECTED IN INPUT
*---------*---------*---------*---------*---------*---------*---------*---------*
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PROJECT No. 4004 50 X 16 X 25 LRF44 UBLL + WIND NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

FRAME GEOMETRY

MEMBER NUMBER	LENGTH (FT)	PROJECTION HORIZ	PROJECTION VERT	INITIAL JT No	INITIAL X COORD.	INITIAL Y COORD.	END JT No	END X COORD.	END Y COORD.
1	13.45	0.69	13.43	1	0.00	0.00	2	0.69	13.43
2	13.45	-0.69	13.43	9	49.54	-0.00	8	48.85	13.43
3	7.25	7.19	0.96	2	0.69	13.43	3	7.88	14.39
4	7.25	-7.19	0.96	8	48.85	13.43	7	41.66	14.39
5	4.34	4.33	0.36	3	7.88	14.39	4	12.21	14.75
6	4.34	-4.33	0.36	7	41.66	14.39	6	37.33	14.75
7	12.60	12.56	1.05	4	12.21	14.75	5	24.77	15.80
8	12.60	-12.56	1.05	6	37.33	14.75	5	24.77	15.80

	X	Y
MINIMUM JOINT COORDINATE	0.00	-0.00
MAXIMUM JOINT COORDINATE	49.54	15.80

PROJECT No. 4004 50 X 16 X 25 LRF44 UBLL + WIND NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

STRESS ANALYSIS FOR MEMBER 1

PT	POSITIVE EXTREMITY						NEGATIVE EXTREMITY						WEB	
	AXIAL STRESS		BENDING STRESS		STRESS	LC	AXIAL STRESS		BENDING STRESS		STRESS	LC	SHEAR	LC
No	COMPUTED (KSI)	ALLOWABLE (KSI)	COMPUTED (KSI)	ALLOWABLE (KSI)	RATIO	No	COMPUTED (KSI)	ALLOWABLE (KSI)	COMPUTED (KSI)	ALLOWABLE (KSI)	RATIO	No	RATIO	No
1	3.14	21.71	-0.00	30.00	0.145	1	3.14	21.71	0.00	27.66	0.145	1	0.391	1
2	2.83	21.27	-14.78	30.00	0.360	1	2.83	21.27	12.27	26.52	0.557	1	0.367	1
3	2.57	20.84	-21.41	30.00	0.590	1	2.57	20.84	18.05	26.28	0.773	1	0.459	1
4	2.36	22.08	-24.74	30.00	0.718	1	2.36	22.08	21.13	26.04	0.890	1	0.569	1
5	2.18	21.22	-26.45	30.00	0.779	1	2.18	21.22	22.85	25.80	0.958	1	0.679	1
6	1.95	21.69	-24.84	30.00	0.738	1	1.95	21.69	21.80	25.42	0.923	1	0.349	1
7	1.79	21.51	-25.47	30.00	0.766	1	1.79	21.51	22.59	29.98	0.813	1	0.408	1
8	1.75	21.51	-25.47	30.00	0.768	1	1.75	21.51	22.59	29.98	0.812	1	0.052	1
9	1.74	21.51	-25.37	30.00	0.765	1	1.74	21.51	22.50	29.96	0.809	1	0.052	1

GEOMETRIC PROPERTIES FOR MEMBER 1

POINT	LOCATION	SECTION DESCRIPTION: POSITIVE FLANGE			NEGATIVE FLANGE			WEB		FULL SECTION PROPERTIES:			
		WIDTH	THK	UNBR LGTH	WIDTH	THK	UNBR LGTH	THK	HEIGHT	AREA	MOM OF INERTIA	SECTION MODULUS POSITIVE	SECTION MODULUS NEGATIVE
No	(FT)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN)	(IN2)	(IN4)	(IN3)	(IN3)
1	0.00	6.0	0.187	86.1	6.0	0.250	120.2	0.125	6.56	3.4	32.6	8.47	10.37
2	2.50	6.0	0.187	86.1	6.0	0.250	120.2	0.125	9.58	3.8	71.2	13.01	15.67
3	5.00	6.0	0.187	86.1	6.0	0.250	120.2	0.125	12.59	4.2	127.0	17.96	21.31
4	7.50	6.0	0.187	34.0	6.0	0.250	120.2	0.125	15.61	4.6	201.8	23.32	27.31
5	10.00	6.0	0.187	34.0	6.0	0.250	120.2	0.125	18.62	4.9	297.4	29.08	33.67
6	10.00	6.0	0.187	34.0	6.0	0.250	120.2	0.156	18.62	5.5	314.4	30.98	35.29
7	12.58	6.0	0.187	31.7	6.0	0.250	31.7	0.156	21.73	6.0	446.6	38.00	42.86
8	12.58	6.0	0.187	31.7	6.0	0.250	31.7	0.156	21.74	6.0	446.7	38.01	42.86
9	12.65	6.0	0.187	31.7	6.0	0.250	31.7	0.156	21.81	6.0	450.3	38.19	43.06

	FLANGES	WEB
YIELD STRESSES (KSI)	50.0	50.0

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 1

PT	POSITIVE FLANGE			NEGATIVE FLANGE						
No	CB	L/RT	LD/AF	CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.348	52.986	537.166	1.293	72.136	560.933	49.302	56.954	0.850	61.435
2	1.348	54.369	768.464	1.293	73.419	802.465	51.311	59.988	0.850	56.720
3	1.348	55.701	999.762	1.293	74.698	1043.997	52.936	62.876	0.850	53.290
4	1.000	22.505	486.133	1.293	75.968	1285.529	54.331	25.919	0.850	50.588
5	1.000	22.999	577.470	1.293	77.228	1527.061	55.561	26.965	0.850	48.373
6	1.000	23.733	577.531	1.293	79.131	1527.222	57.108	28.489	0.850	45.789
7	1.000	22.682	626.399	1.000	21.285	468.546	58.329	27.703	0.850	43.891
8	1.000	22.683	626.456	1.000	21.285	468.589	58.330	27.703	0.850	43.890
9	1.000	22.696	628.632	1.000	21.296	470.216	58.359	27.731	0.850	43.847

PROJECT No. 4004 50 X 16 X 25 LRF44 UBLL + WIND NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

MEMBER FORCES FOR MEMBER 1

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES							
			MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	6.41	0.00	10.82						
2	2.50	6.41	16.03	10.81						
3	5.00	6.41	32.05	10.80						
4	7.50	6.41	48.08	10.80						
5	10.00	6.41	64.11	10.79						
6	10.00	6.41	64.12	10.79						
7	12.58	6.41	80.67	10.78						
8	12.58	0.82	80.68	10.50						
9	12.65	0.82	80.73	10.50						

PROJECT No. 4004 50 X 16 X 25 LRF44 UBLL + WIND NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

STRESS ANALYSIS FOR MEMBER 2

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	WEB SHEAR RATIO	WEB LC No
1	0.66	21.84	0.00	26.64	0.030	1	0.66	21.84	-0.00	30.00	0.030	1	0.076	1
2	0.60	21.45	1.99	22.48	0.108	1	0.60	21.45	-2.79	30.00	0.065	1	0.070	1
3	0.55	21.07	2.94	22.19	0.151	1	0.55	21.07	-4.02	30.00	0.108	1	0.088	1
4	0.50	22.06	3.46	21.88	0.175	1	0.50	22.06	-4.64	30.00	0.132	1	0.109	1
5	0.47	21.90	3.77	21.58	0.190	1	0.47	21.90	-4.95	30.00	0.144	1	0.130	1
6	0.42	21.69	3.63	21.10	0.186	1	0.42	21.69	-4.64	30.00	0.135	1	0.067	1
7	0.39	21.52	3.79	20.69	0.196	1	0.39	21.52	-4.75	30.00	0.140	1	0.078	1

GEOMETRIC PROPERTIES FOR MEMBER 2

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.00	6.0	0.313	151.9	6.0	0.187	86.1	0.125	6.50	3.8	35.4	12.33	8.56
2	2.50	6.0	0.313	151.9	6.0	0.187	86.1	0.125	9.51	4.2	77.3	18.55	13.22
3	5.00	6.0	0.313	151.9	6.0	0.187	86.1	0.125	12.53	4.6	138.0	25.09	18.32
4	7.50	6.0	0.313	151.9	6.0	0.187	34.0	0.125	15.54	4.9	219.1	31.95	23.86
5	10.00	6.0	0.313	151.9	6.0	0.187	34.0	0.125	18.56	5.3	322.5	39.16	29.81
6	10.00	6.0	0.313	151.9	6.0	0.187	34.0	0.156	18.56	5.9	340.1	40.63	31.82
7	12.65	6.0	0.313	151.9	6.0	0.187	31.7	0.156	21.75	6.4	486.2	49.25	39.28

	FLANGES	WEB
YIELD STRESSES (KSI)	50.0	50.0

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 2

PT No	POSITIVE FLANGE CB	L/RT	LD/AF	NEGATIVE FLANGE CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.257	90.152	566.187	1.348	53.226	537.166	49.832	56.035	0.850	60.136
2	1.257	91.372	809.982	1.348	54.686	768.464	51.723	58.737	0.850	55.819
3	1.257	92.607	1053.776	1.348	56.079	999.762	53.228	61.320	0.850	52.707
4	1.257	93.851	1297.571	1.000	22.674	486.133	54.516	25.193	0.850	50.246
5	1.257	95.097	1541.365	1.000	23.184	577.470	55.655	26.135	0.850	48.211
6	1.257	96.990	1541.527	1.000	23.935	577.531	57.063	27.508	0.850	45.860
7	1.257	98.626	1799.667	1.000	22.896	628.632	58.243	26.707	0.850	44.021

PROJECT No. 4004 50 X 16 X 25 LRF44 UBLL + WIND NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

MEMBER FORCES FOR MEMBER 2

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES							
			MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	1.23	-0.00	2.51						
2	2.50	1.23	-3.07	2.50						
3	5.00	1.23	-6.14	2.49						
4	7.50	1.23	-9.22	2.49						
5	10.00	1.23	-12.29	2.48						
6	10.00	1.23	-12.29	2.48						
7	12.65	1.23	-15.55	2.47						

PROJECT No. 4004 50 X 16 X 25 LRF44 UBLL + WIND NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

STRESS ANALYSIS FOR MEMBER 3

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	WEB SHEAR RATIO	WEB LC No
1	0.45	23.13	-23.08	30.00	0.750	1	0.45	23.13	20.47	27.06	0.772	1	0.644	1
2	0.45	23.14	-22.83	30.00	0.741	1	0.45	23.14	20.24	27.07	0.763	1	0.637	1
3	0.45	23.14	-22.83	30.00	0.741	1	0.45	23.14	20.23	27.07	0.763	1	0.637	1
4	0.48	23.32	-19.61	30.00	0.633	1	0.48	23.32	17.26	27.24	0.650	1	0.567	1
5	0.42	23.32	-19.61	30.00	0.636	1	0.42	23.32	17.26	27.24	0.648	1	0.427	1
6	0.45	22.79	-16.37	30.00	0.526	1	0.45	22.79	14.26	27.45	0.535	1	0.361	1
7	0.49	23.06	-11.31	30.00	0.356	1	0.49	23.06	9.74	27.66	0.368	1	0.298	1

GEOMETRIC PROPERTIES FOR MEMBER 3

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.81	6.0	0.187	53.3	6.0	0.250	92.3	0.156	21.75	6.0	447.3	38.04	42.90
2	0.98	6.0	0.187	53.3	6.0	0.250	92.3	0.156	21.55	6.0	438.0	37.57	42.40
3	0.98	6.0	0.187	53.3	6.0	0.250	92.3	0.156	21.55	6.0	437.9	37.57	42.39
4	2.78	6.0	0.187	53.3	6.0	0.250	92.3	0.156	19.38	5.6	344.1	32.64	37.09
5	2.78	6.0	0.187	53.3	6.0	0.250	92.3	0.156	19.38	5.6	344.0	32.64	37.09
6	5.02	6.0	0.187	60.3	6.0	0.250	92.3	0.156	16.69	5.2	245.9	26.88	30.84
7	7.25	6.0	0.187	60.3	6.0	0.250	92.3	0.156	14.00	4.8	166.7	21.50	24.95

	FLANGES	WEB
YIELD STRESSES (KSI)	50.0	50.0

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 3

PT No	POSITIVE FLANGE CB	L/RT	LD/AF	NEGATIVE FLANGE CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	38.142	1053.981	1.000	61.982	1365.240	14.988	46.588	0.850	664.734
2	1.000	38.083	1044.487	1.000	61.904	1352.942	14.963	46.468	0.850	667.006
3	1.000	38.083	1044.392	1.000	61.904	1352.819	14.962	46.467	0.850	667.029
4	1.000	37.435	941.475	1.000	61.061	1219.508	14.669	45.137	0.850	694.028
5	1.000	37.435	941.380	1.000	61.060	1219.385	14.668	45.136	0.850	694.055
6	1.000	41.420	920.453	1.000	60.002	1053.871	14.252	49.132	0.850	735.203
7	1.000	40.461	775.892	1.000	58.932	888.356	13.758	47.121	0.850	788.884

PROJECT No. 4004 50 X 16 X 25 LRF44 UBLL + WIND NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

MEMBER FORCES FOR MEMBER 3

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES							
			MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.81	10.12	73.17	2.72						
2	0.98	10.11	71.49	2.72						
3	0.98	10.11	71.48	2.72						
4	2.78	10.01	53.36	2.71						
5	2.78	7.53	53.35	2.37						
6	5.02	7.40	36.66	2.36						
7	7.25	7.27	20.26	2.34						

PROJECT No. 4004 50 X 16 X 25 LRF44 UBLL + WIND NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

STRESS ANALYSIS FOR MEMBER 4

PT	POSITIVE EXTREMITY						NEGATIVE EXTREMITY						WEB	
	AXIAL STRESS		BENDING STRESS		STRESS	LC	AXIAL STRESS		BENDING STRESS		STRESS	LC	SHEAR	LC
No	COMPUTED (KSI)	ALLOWABLE (KSI)	COMPUTED (KSI)	ALLOWABLE (KSI)	RATIO	No	COMPUTED (KSI)	ALLOWABLE (KSI)	COMPUTED (KSI)	ALLOWABLE (KSI)	RATIO	No	RATIO	No
1	0.28	23.13	4.13	27.06	0.162	1	0.28	23.13	-4.66	30.00	0.143	1	0.137	1
2	0.28	23.14	4.08	27.07	0.160	1	0.28	23.14	-4.60	30.00	0.141	1	0.135	1
3	0.28	23.14	4.08	27.07	0.160	1	0.28	23.14	-4.60	30.00	0.141	1	0.135	1
4	0.29	23.34	3.32	27.27	0.132	1	0.29	23.34	-3.78	30.00	0.113	1	0.113	1
5	0.31	22.81	2.34	27.46	0.095	1	0.31	22.81	-2.68	30.00	0.076	1	0.092	1
6	0.33	23.06	1.00	27.66	0.047	1	0.33	23.06	-1.16	30.00	0.024	1	0.073	1

GEOMETRIC PROPERTIES FOR MEMBER 4

POINT	SECTION DESCRIPTION								FULL SECTION PROPERTIES			
	POSITIVE FLANGE			NEGATIVE FLANGE			WEB			MOM OF	SECTION MODULUS	
No	LOCATION (FT)	WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	THK (IN)	HEIGHT (IN)	AREA (IN2)	INERTIA (IN4)	POSITIVE (IN3)	NEGATIVE (IN3)
1	0.81	6.0	0.250	92.3	6.0	0.187	53.3	0.156	21.75	6.0	447.3	42.90	38.04
2	0.98	6.0	0.250	92.3	6.0	0.187	53.3	0.156	21.55	6.0	438.0	42.40	37.57
3	0.98	6.0	0.250	92.3	6.0	0.187	53.3	0.156	21.55	6.0	437.9	42.39	37.57
4	3.07	6.0	0.250	92.3	6.0	0.187	53.3	0.156	19.03	5.6	330.2	36.26	31.87
5	5.16	6.0	0.250	92.3	6.0	0.187	60.3	0.156	16.52	5.2	240.3	30.45	26.52
6	7.25	6.0	0.250	92.3	6.0	0.187	60.3	0.156	14.00	4.8	166.7	24.95	21.50

	FLANGES	WEB
YIELD STRESSES (KSI)	50.0	50.0

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 4

PT	POSITIVE FLANGE			NEGATIVE FLANGE						
No	CB	L/RT	LD/AF	CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	61.982	1365.240	1.000	38.142	1053.981	14.988	46.588	0.850	664.734
2	1.000	61.904	1352.942	1.000	38.083	1044.487	14.963	46.468	0.850	667.006
3	1.000	61.904	1352.819	1.000	38.083	1044.392	14.962	46.467	0.850	667.029
4	1.000	60.924	1197.998	1.000	37.329	924.869	14.618	44.919	0.850	698.841
5	1.000	59.934	1043.177	1.000	41.359	911.113	14.223	49.004	0.850	738.232
6	1.000	58.932	888.356	1.000	40.461	775.892	13.758	47.121	0.850	788.884

MEMBER FORCES FOR MEMBER 4

POINT	ABSOLUTE MAXIMUM	MOMENTS AND AXIAL FORCES							
No	LOCATION (FT)	SHEAR (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.81	2.16	-14.76	1.66						
2	0.98	2.15	-14.41	1.65						
3	0.98	2.15	-14.40	1.65						
4	3.07	2.03	-10.04	1.64						
5	5.16	1.90	-5.93	1.62						
6	7.25	1.78	-2.07	1.61						

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STRESS ANALYSIS FOR MEMBER 5

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	POSITIVE EXTREMITY AXIAL STRESS ALLOWABLE (KSI)	POSITIVE EXTREMITY BENDING STRESS COMPUTED (KSI)	POSITIVE EXTREMITY BENDING STRESS ALLOWABLE (KSI)	POSITIVE EXTREMITY STRESS RATIO	POSITIVE EXTREMITY LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	NEGATIVE EXTREMITY AXIAL STRESS ALLOWABLE (KSI)	NEGATIVE EXTREMITY BENDING STRESS COMPUTED (KSI)	NEGATIVE EXTREMITY BENDING STRESS ALLOWABLE (KSI)	NEGATIVE EXTREMITY STRESS RATIO	NEGATIVE EXTREMITY LC No	WEB SHEAR RATIO	WEB LC No
1	0.49	23.16	-12.35	30.00	0.390	1	0.49	23.16	12.35	27.47	0.466	1	0.587	1
2	0.49	23.16	-11.45	30.00	0.360	1	0.49	23.16	11.45	27.47	0.433	1	0.586	1
3	0.44	23.16	-11.45	30.00	0.362	1	0.44	23.16	11.45	27.47	0.431	1	0.388	1
4	0.44	23.16	-5.37	30.00	0.160	1	0.44	23.16	5.37	23.39	0.244	1	0.378	1
5	0.44	23.16	0.55	27.58	0.036	1	0.44	23.16	-0.55	30.00	0.000	1	0.368	1

GEOMETRIC PROPERTIES FOR MEMBER 5

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	POS FLANGE THK (IN)	POS FLANGE UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	NEG FLANGE THK (IN)	NEG FLANGE UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.00	6.0	0.187	60.2	6.0	0.187	92.4	0.125	14.00	4.0	141.5	19.69	19.69
2	0.20	6.0	0.187	60.2	6.0	0.187	92.4	0.125	14.00	4.0	141.5	19.69	19.69
3	0.20	6.0	0.187	60.2	6.0	0.187	92.4	0.125	14.00	4.0	141.5	19.69	19.69
4	2.27	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69
5	4.34	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69

H.62

	FLANGES	WEB
YIELD STRESSES (KSI)	50.0	50.0

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 5

PT No	POSITIVE FLANGE CB	POS FLANGE L/RT	POS FLANGE LD/AF	NEGATIVE FLANGE CB	NEG FLANGE L/RT	NEG FLANGE LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	39.013	771.225	1.000	59.881	1183.741	8.728	46.361	0.850	1960.360
2	1.000	39.013	771.225	1.000	59.881	1183.741	8.728	46.361	0.850	1960.360
3	1.000	39.013	771.225	1.000	59.881	1183.741	8.728	46.361	0.850	1960.360
4	1.000	39.013	771.225	1.000	78.027	1542.450	8.728	46.361	0.850	1960.360
5	1.000	39.013	771.225	1.000	78.027	1542.450	8.728	46.361	0.850	1960.360

MEMBER FORCES FOR MEMBER 5

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	7.38	20.26	1.98						
2	0.20	7.36	18.79	1.97						
3	0.20	4.87	18.78	1.77						
4	2.27	4.75	8.81	1.76						
5	4.34	4.63	-0.91	1.75						

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STRESS ANALYSIS FOR MEMBER 6

PT	POSITIVE EXTREMITY						NEGATIVE EXTREMITY						WEB	
	AXIAL STRESS		BENDING STRESS		STRESS	LC	AXIAL STRESS		BENDING STRESS		STRESS	LC	SHEAR	LC
No	COMPUTED (KSI)	ALLOWABLE (KSI)	COMPUTED (KSI)	ALLOWABLE (KSI)	RATIO	No	COMPUTED (KSI)	ALLOWABLE (KSI)	COMPUTED (KSI)	ALLOWABLE (KSI)	RATIO	No	RATIO	No
1	0.38	23.16	1.26	27.47	0.059	1	0.38	23.16	-1.26	30.00	0.026	1	0.148	1
2	0.38	23.16	-1.12	30.00	0.021	1	0.38	23.16	1.12	27.58	0.053	1	0.138	1
3	0.37	23.16	-3.33	30.00	0.095	1	0.37	23.16	3.33	27.58	0.133	1	0.128	1

GEOMETRIC PROPERTIES FOR MEMBER 6

POINT	SECTION DESCRIPTION								FULL SECTION PROPERTIES			
	POSITIVE FLANGE			NEGATIVE FLANGE			WEB			MOM OF	SECTION MODULUS	
No	LOCATION (FT)	WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	THK (IN)	HEIGHT (IN)	AREA (IN2)	INERTIA (IN4)	POSITIVE (IN3)	NEGATIVE (IN3)
1	0.00	6.0	0.187	92.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69
2	2.17	6.0	0.187	120.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69
3	4.34	6.0	0.187	120.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69

	FLANGES	WEB
YIELD STRESSES (KSI)	50.0	50.0

H.63

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 6

PT	POSITIVE FLANGE			NEGATIVE FLANGE						
No	CB	L/RT	LD/AF	CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	59.881	1183.741	1.000	39.013	771.225	8.728	46.361	0.850	1960.360
2	1.000	78.027	1542.450	1.000	39.013	771.225	8.728	46.361	0.850	1960.360
3	1.000	78.027	1542.450	1.000	39.013	771.225	8.728	46.361	0.850	1960.360

MEMBER FORCES FOR MEMBER 6

POINT		ABSOLUTE MAXIMUM	MOMENTS AND AXIAL FORCES							
No	LOCATION (FT)	SHEAR (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	1.86	-2.07	1.52						
2	2.17	1.73	1.83	1.51						
3	4.34	1.61	5.46	1.49						

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STRESS ANALYSIS FOR MEMBER 7

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	POSITIVE EXTREMITY AXIAL STRESS ALLOWABLE (KSI)	POSITIVE EXTREMITY BENDING STRESS COMPUTED (KSI)	POSITIVE EXTREMITY BENDING STRESS ALLOWABLE (KSI)	POSITIVE EXTREMITY STRESS RATIO	POSITIVE EXTREMITY LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	NEGATIVE EXTREMITY AXIAL STRESS ALLOWABLE (KSI)	NEGATIVE EXTREMITY BENDING STRESS COMPUTED (KSI)	NEGATIVE EXTREMITY BENDING STRESS ALLOWABLE (KSI)	NEGATIVE EXTREMITY STRESS RATIO	NEGATIVE EXTREMITY LC No	WEB SHEAR RATIO	WEB LC No
1	0.44	23.16	0.55	27.58	0.036	1	0.44	23.16	-0.55	30.00	0.000	1	0.368	1
2	0.44	23.16	5.26	27.58	0.205	1	0.44	23.16	-5.26	30.00	0.156	1	0.360	1
3	0.43	23.16	9.86	27.58	0.372	1	0.43	23.16	-9.86	30.00	0.310	1	0.353	1
4	0.38	23.16	9.86	27.58	0.370	1	0.38	23.16	-9.86	30.00	0.312	1	0.154	1
5	0.38	23.16	12.70	27.58	0.473	1	0.38	23.16	-12.70	30.00	0.407	1	0.143	1
6	0.38	23.60	15.32	27.58	0.568	1	0.38	23.60	-15.32	30.00	0.495	1	0.131	1
7	0.32	23.60	15.32	27.58	0.566	1	0.32	23.60	-15.32	30.00	0.497	1	0.067	1
8	0.32	23.60	14.20	27.58	0.526	1	0.32	23.60	-14.20	30.00	0.460	1	0.077	1
9	0.32	25.57	12.93	27.58	0.480	1	0.32	25.57	-12.93	30.00	0.419	1	0.086	1
10	0.32	25.57	12.93	27.58	0.479	1	0.32	25.57	-12.93	30.00	0.419	1	0.086	1
11	0.32	25.57	12.82	27.58	0.475	1	0.32	25.57	-12.82	30.00	0.415	1	0.087	1

GEOMETRIC PROPERTIES FOR MEMBER 7

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	POSITIVE FLANGE THK (IN)	POSITIVE FLANGE UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	NEGATIVE FLANGE THK (IN)	NEGATIVE FLANGE UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.00	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69
2	1.68	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69
3	3.37	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69
4	3.37	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69
5	5.87	6.0	0.187	60.2	6.0	0.187	120.4	0.125	14.00	4.0	141.5	19.69	19.69
6	8.37	6.0	0.187	55.7	6.0	0.187	135.5	0.125	14.00	4.0	141.5	19.69	19.69
7	8.37	6.0	0.187	55.7	6.0	0.187	135.5	0.125	14.00	4.0	141.5	19.69	19.69
8	10.40	6.0	0.187	55.7	6.0	0.187	135.5	0.125	14.00	4.0	141.5	19.69	19.69
9	12.44	6.0	0.187	24.0	6.0	0.187	135.5	0.125	14.00	4.0	141.5	19.69	19.69
10	12.44	6.0	0.187	24.0	6.0	0.187	135.5	0.125	14.00	4.0	141.5	19.69	19.69
11	12.60	6.0	0.187	24.0	6.0	0.187	135.5	0.125	14.00	4.0	141.5	19.69	19.69

	FLANGES	WEB
YIELD STRESSES (KSI)	50.0	50.0

H.64

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PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 7

PT	POSITIVE FLANGE			NEGATIVE FLANGE						
No	CB	L/RT	LD/AF	CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	39.013	771.225	1.000	78.027	1542.450	25.444	46.361	0.850	230.658
2	1.000	39.013	771.225	1.000	78.027	1542.450	25.444	46.361	0.850	230.658
3	1.000	39.013	771.225	1.000	78.027	1542.450	25.444	46.361	0.850	230.658
4	1.000	39.013	771.225	1.000	78.027	1542.450	25.444	46.361	0.850	230.658
5	1.000	39.013	771.225	1.000	78.027	1542.450	25.444	46.361	0.850	230.658
6	1.000	36.097	713.575	1.000	87.812	1735.897	25.444	42.896	0.850	230.658
7	1.000	36.097	713.575	1.000	87.812	1735.897	25.444	42.896	0.850	230.658
8	1.000	36.097	713.575	1.000	87.812	1735.897	25.444	42.896	0.850	230.658
9	1.000	15.553	307.465	1.000	87.812	1735.897	25.444	18.483	0.850	230.658
10	1.000	15.553	307.465	1.000	87.812	1735.897	25.444	18.483	0.850	230.658
11	1.000	15.553	307.465	1.000	87.812	1735.897	25.444	18.483	0.850	230.658

MEMBER FORCES FOR MEMBER 7

POINT		ABSOLUTE MAXIMUM	MOMENTS AND AXIAL FORCES							
No	LOCATION (FT)	SHEAR (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	4.63	-0.91	1.75						
2	1.68	4.53	-8.62	1.74						
3	3.37	4.43	-16.17	1.73						
4	3.37	1.94	-16.17	1.52						
5	5.87	1.79	-20.84	1.51						
6	8.37	1.65	-25.14	1.50						
7	8.37	0.84	-25.13	1.29						
8	10.40	0.96	-23.30	1.28						
9	12.44	1.08	-21.22	1.27						
10	12.44	1.08	-21.21	1.27						
11	12.60	1.09	-21.03	1.27						

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STRESS ANALYSIS FOR MEMBER 8

PT	POSITIVE EXTREMITY						NEGATIVE EXTREMITY						WEB	
	AXIAL STRESS		BENDING STRESS		STRESS	LC	AXIAL STRESS		BENDING STRESS		STRESS	LC	SHEAR	LC
No	COMPUTED (KSI)	ALLOWABLE (KSI)	COMPUTED (KSI)	ALLOWABLE (KSI)	RATIO	No	COMPUTED (KSI)	ALLOWABLE (KSI)	COMPUTED (KSI)	ALLOWABLE (KSI)	RATIO	No	RATIO	No
1	0.37	23.16	-3.33	30.00	0.095	1	0.37	23.16	3.33	27.58	0.133	1	0.128	1
2	0.37	23.16	-5.65	30.00	0.172	1	0.37	23.16	5.65	27.58	0.217	1	0.116	1
3	0.37	23.16	-7.75	30.00	0.243	1	0.37	23.16	7.75	27.58	0.293	1	0.105	1
4	0.37	23.60	-9.63	30.00	0.306	1	0.37	23.60	9.63	27.58	0.362	1	0.093	1
5	0.36	23.60	-11.29	30.00	0.361	1	0.36	23.60	11.29	27.58	0.422	1	0.081	1
6	0.36	25.57	-12.73	30.00	0.410	1	0.36	25.57	12.73	27.58	0.474	1	0.070	1
7	0.36	25.57	-12.73	30.00	0.410	1	0.36	25.57	12.73	27.58	0.474	1	0.070	1
8	0.36	25.57	-12.82	30.00	0.413	1	0.36	25.57	12.82	27.58	0.477	1	0.069	1

GEOMETRIC PROPERTIES FOR MEMBER 8

POINT	SECTION DESCRIPTION								FULL SECTION PROPERTIES			
	POSITIVE FLANGE			NEGATIVE FLANGE			WEB			MOM OF	SECTION MODULUS	
No	LOCATION (FT)	WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	THK (IN)	HEIGHT (IN)	AREA (IN2)	INERTIA (IN4)	POSITIVE (IN3)	NEGATIVE (IN3)
1	0.00	6.0	0.187	120.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69
2	2.49	6.0	0.187	120.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69
3	4.97	6.0	0.187	120.4	6.0	0.187	60.2	0.125	14.00	4.0	141.5	19.69	19.69
4	7.46	6.0	0.187	135.5	6.0	0.187	55.7	0.125	14.00	4.0	141.5	19.69	19.69
5	9.95	6.0	0.187	135.5	6.0	0.187	55.7	0.125	14.00	4.0	141.5	19.69	19.69
6	12.44	6.0	0.187	135.5	6.0	0.187	24.0	0.125	14.00	4.0	141.5	19.69	19.69
7	12.44	6.0	0.187	135.5	6.0	0.187	24.0	0.125	14.00	4.0	141.5	19.69	19.69
8	12.60	6.0	0.187	135.5	6.0	0.187	24.0	0.125	14.00	4.0	141.5	19.69	19.69

	FLANGES	WEB
YIELD STRESSES (KSI)	50.0	50.0

H.66

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 8

PT	POSITIVE FLANGE			NEGATIVE FLANGE						
No	CB	L/RT	LD/AF	CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	78.027	1542.450	1.000	39.013	771.225	25.444	46.361	0.850	230.658
2	1.000	78.027	1542.450	1.000	39.013	771.225	25.444	46.361	0.850	230.658
3	1.000	78.027	1542.450	1.000	39.013	771.225	25.444	46.361	0.850	230.658
4	1.000	87.812	1735.897	1.000	36.097	713.575	25.444	42.896	0.850	230.658
5	1.000	87.812	1735.897	1.000	36.097	713.575	25.444	42.896	0.850	230.658
6	1.000	87.812	1735.897	1.000	15.553	307.465	25.444	18.483	0.850	230.658
7	1.000	87.812	1735.897	1.000	15.553	307.465	25.444	18.483	0.850	230.658
8	1.000	87.812	1735.897	1.000	15.553	307.465	25.444	18.483	0.850	230.658

PROJECT No. 4004 50 X 16 X 25 LRF44 UBLL + WIND NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

MEMBER FORCES FOR MEMBER 8

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES							
			MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	1.61	5.46	1.50						
2	2.49	1.46	9.27	1.48						
3	4.97	1.31	12.72	1.47						
4	7.46	1.17	15.81	1.46						
5	9.95	1.02	18.53	1.45						
6	12.44	0.88	20.89	1.44						
7	12.44	0.88	20.89	1.44						
8	12.60	0.87	21.04	1.43						

PROJECT No. 4004 50 X 16 X 25 LRF44 UBLL + WIND NOM GAGES 50 KSI Version: 07/10/85 16:25 Run: 06 Aug 85 16:40

FORCES ACTING ON SUPPORTS

LOADING CONDITION No	LOADING CONDITION DESCRIPTION	SUPPORT No	HORIZONTAL (KIPS)	VERTICAL (KIPS)	MOMENT (K-FT)
1	VERT CONC LOADS UNBAL + WI	1	-6.96	10.47	0.00
1	VERT CONC LOADS UNBAL + WI	9	1.36	2.44	-0.00
	TOTAL FORCES ACTING		-5.60	12.91	-0.00
	TOTAL FORCES APPLIED		-5.60	12.91	0.00

EXTERNAL MEMBER LOADS

LOADING CONDITION No	LOADING CONDITION DESCRIPTION	MEMBER NUMBER	UNIFORMLY DISTRIBUTED LOADS VERTICAL (K/FT)	UNIFORMLY DISTRIBUTED LOADS HORIZONTAL (K/FT)	CONCENTRATED LOADS LOCATION (FT)	CONCENTRATED LOADS VERTICAL (KIPS)	CONCENTRATED LOADS HORIZONTAL (KIPS)	CONCENTRATED LOADS MOMENT (K-FT)
1	VERT CONC LOADS UNBAL + WI	1	0.051	0.000	12.58	-0.00	-5.60	0.00
1	VERT CONC LOADS UNBAL + WI	2	0.051	-0.000				
1	VERT CONC LOADS UNBAL + WI	3	0.059	0.000	2.78	2.50	0.00	0.00
1	VERT CONC LOADS UNBAL + WI	4	0.059	0.000				
1	VERT CONC LOADS UNBAL + WI	5	0.059	-0.000	0.20	2.50	0.00	0.00
1	VERT CONC LOADS UNBAL + WI	6	0.059	-0.000				
1	VERT CONC LOADS UNBAL + WI	7	0.059	0.000	3.37	2.50	-0.00	0.00
					8.37	2.50	-0.00	0.00
1	VERT CONC LOADS UNBAL + WI	8	0.059	-0.000				

MEMBER END TRANSLATIONS

MEMBER NUMBER	LOADING CONDITION No	LOADING CONDITION DESCRIPTION	END TRANSLATIONS JOINT No	VERT (IN)	HORZ (IN)	JOINT No	VERT (IN)	HORZ (IN)
1	1	VERT CONC LOADS UNBAL + WI	1	0.00	0.00	2	0.04	-0.94
2	1	VERT CONC LOADS UNBAL + WI	9	0.00	0.00	8	-0.04	-0.67
3	1	VERT CONC LOADS UNBAL + WI	2	0.04	-0.94	3	-0.31	-0.90
4	1	VERT CONC LOADS UNBAL + WI	8	-0.04	-0.67	7	-0.55	-0.74
5	1	VERT CONC LOADS UNBAL + WI	3	-0.31	-0.90	4	-0.71	-0.87
6	1	VERT CONC LOADS UNBAL + WI	7	-0.55	-0.74	6	-0.88	-0.77
7	1	VERT CONC LOADS UNBAL + WI	4	-0.71	-0.87	5	-1.43	-0.81
8	1	VERT CONC LOADS UNBAL + WI	6	-0.88	-0.77	5	-1.43	-0.81

MODULUS OF ELASTICITY 29000. KSI

APPENDIX I

MESCO FAILURE LOAD COMPUTER ANALYSES

Measured Dimensions

F_y = 67.5 ksi

Full Live Load -- 3.19 kips

* * * G E N E R A L I N P U T * * * Version: 07/10/85 16:25 Run: 30 Aug 85 15:09

4010 8 8 1 50X16X25	LRF44	LIVE LOAD	ULT	MSRD GAGE	67.5KSI	11		HEAD RECORD
1 1 2	11	0.69	13.43	6.56	21.81		0.80	MEMB DESC
2 9 8	11	-0.69	13.43	6.5	22.		0.80	MEMB DESC
3 2 3		7.19	0.96	21.74	14.	0.81		MEMB DESC
4 8 7		-7.19	0.96	21.74	14.	0.81		MEMB DESC
5 3 4		4.33	0.36	14.	14.			MEMB DESC
6 7 6		-4.33	0.36	14.	14.			MEMB DESC
7 4 5		12.56	1.05	14.	14.			MEMB DESC
8 6 5		-12.56	1.05	14.	14.			MEMB DESC
DEG INDT	JT DISPL	NUMBER SUPPORTS	BAND WIDTH					
1	23	2	6					
1 112		67.5	67.5					HEADER
	5.98	0.189	5.99	0.254				FLANGE
86.1	86.1	1.348	120.2	120.2	1.293			BRACING
1	34.	1.0	2	31.7	1.0			BRACING
2	31.7	1.0						BRACING
10.				0.128	0.154			WEB
0.85	1.0	151.8						BUCKLING
2 112		67.5	67.5					HEADER
	5.98	0.313	6.15	0.188				FLANGE
151.9	151.9	1.257	86.1	86.1	1.348			BRACING
1	34.	1.0	1	34.	1.0			BRACING
			2	31.7	1.0			BRACING
10.				0.154	0.129			WEB
0.85	1.0	151.8						BUCKLING
3 121		67.5	67.5					HEADER
0.167	5.99	0.192	6.	0.254				FLANGE
	5.99	0.192	6.	0.254				FLANGE
41.3	53.3	1.0	101.3	92.3	1.0			BRACING
1	60.3	1.0	1	92.3	1.0			BRACING
				0.161				WEB
0.85	1.0	87.1						BUCKLING
4 121		67.5	67.5					HEADER
0.167	5.98	0.254	5.98	0.192				FLANGE
	5.98	0.254	5.98	0.192				FLANGE
101.3	92.3	1.0	41.3	53.3	1.0			BRACING
1	92.3	1.0	1	60.3	1.0			BRACING
				0.156				WEB
0.85	1.0	87.1						BUCKLING
5 111		67.5	67.5					HEADER
	5.99	0.192	6.	0.192				FLANGE
14.22	60.2	1.0	14.22	92.4	1.0			BRACING
1	60.2	1.0	1	120.4	1.			BRACING
				0.125				WEB
0.85	1.0	51.95						BUCKLING
6 111		67.5	67.5					HEADER
	6.	0.192	5.98	0.192				FLANGE
14.22	92.4	1.0	14.22	60.2	1.0			BRACING
1	120.4	1.0	1	60.2	1			BRACING

```
0.85        1.0         51.95                                                   BUCKLING

7 121                   67.5        67.5                                        HEADER
            5.99        0.192       6.          0.192                           FLANGE
0.167       5.99        0.192       6.          0.192                           FLANGE
22.47       60.2        1.0         82.67       120.4       1.0                 BRACING
1           60.2        1.0         1           135.5       1.0                 BRACING
1           55.7        1.0                                                     BRACING
1           24.0        1.0                                                     BRACING
                                                0.125                           WEB
0.85        1.0         151.45                                                  BUCKLING

8 121                   67.5        67.5                                        HEADER
            6.          0.192       5.98        0.192                           FLANGE
0.167       6.          0.192       5.98        0.192                           FLANGE
82.67       120.4       1.0         22.47       60.2        1.0                 BRACING
1           135.5       1.0         1           60.2        1.0                 BRACING
                                    1           55.7        1.0                 BRACING
                                    1           24.0        1.0                 BRACING
                                                0.125                           WEB
0.85        1.0         151.45                                                  BUCKLING
1 8         VERT CONC LOADS ULT                                                 LOADS
3 3                                 3.19                        2.78            LOADS
4 4                                 3.19                        2.78            LOADS
5 5                                 3.19                        0.2             LOADS
6 6                                 3.19                        0.2             LOADS
7 7                                 3.19                        3.37            LOADS
7 7                                 3.19                        8.37            LOADS
8 8                                 3.19                        3.37            LOADS
8 8                                 3.19                        8.37            LOADS

NO ERRORS WERE DETECTED IN INPUT
*---------*---------*---------*---------*---------*---------*---------*---------*
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PROJECT No. 4010 50X16X25 LRF44 LIVE LOAD ULT MSRD GAGE 67.5KSI Version: 07/10/85 16:25 Run: 30 Aug 85 15:09

FRAME GEOMETRY

MEMBER NUMBER	LENGTH (FT)	PROJECTION HORIZ	PROJECTION VERT	INITIAL END JT No	INITIAL END X COORD.	INITIAL END Y COORD.	TERMINAL END JT No	TERMINAL END X COORD.	TERMINAL END Y COORD.
1	13.45	0.69	13.43	1	0.00	0.00	2	0.69	13.43
2	13.45	-0.69	13.43	9	49.54	-0.00	8	48.85	13.43
3	7.25	7.19	0.96	2	0.69	13.43	3	7.88	14.39
4	7.25	-7.19	0.96	8	48.85	13.43	7	41.66	14.39
5	4.34	4.33	0.36	3	7.88	14.39	4	12.21	14.75
6	4.34	-4.33	0.36	7	41.66	14.39	6	37.33	14.75
7	12.60	12.56	1.05	4	12.21	14.75	5	24.77	15.80
8	12.60	-12.56	1.05	6	37.33	14.75	5	24.77	15.80

	X	Y
MINIMUM JOINT COORDINATE	0.00	-0.00
MAXIMUM JOINT COORDINATE	49.54	15.80

PROJECT No. 4010 50X16X25 LRF44 LIVE LOAD ULT MSRD GAGE 67.5KSI Version: 07/10/85 16:25 Run: 30 Aug 85 15:09

STRESS ANALYSIS FOR MEMBER 1

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	POSITIVE EXTREMITY AXIAL STRESS ALLOWABLE (KSI)	POSITIVE EXTREMITY BENDING STRESS COMPUTED (KSI)	POSITIVE EXTREMITY BENDING STRESS ALLOWABLE (KSI)	POSITIVE EXTREMITY STRESS RATIO	POSITIVE EXTREMITY LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	NEGATIVE EXTREMITY AXIAL STRESS ALLOWABLE (KSI)	NEGATIVE EXTREMITY BENDING STRESS COMPUTED (KSI)	NEGATIVE EXTREMITY BENDING STRESS ALLOWABLE (KSI)	NEGATIVE EXTREMITY STRESS RATIO	NEGATIVE EXTREMITY LC No	WEB SHEAR RATIO	WEB LC No
1	3.76	25.75	0.00	34.30	0.146	1	3.76	25.75	-0.00	40.50	0.146	1	0.316	1
2	3.38	25.10	-15.35	40.50	0.244	1	3.38	25.10	12.71	32.53	0.488	1	0.341	1
3	3.08	24.46	-22.22	40.50	0.423	1	3.08	24.46	18.67	32.09	0.658	1	0.448	1
4	2.82	26.04	-25.66	40.50	0.525	1	2.82	26.04	21.85	31.65	0.760	1	0.556	1
5	2.61	24.84	-27.42	40.50	0.572	1	2.61	24.84	23.63	30.97	0.827	1	0.663	1
6	2.38	25.80	-26.02	40.50	0.550	1	2.38	25.80	22.73	30.63	0.801	1	0.381	1
7	2.18	25.02	-26.71	40.50	0.572	1	2.18	25.02	23.58	39.20	0.655	1	0.446	1

GEOMETRIC PROPERTIES FOR MEMBER 1

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	POS FLANGE THK (IN)	POS FLANGE UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	NEG FLANGE THK (IN)	NEG FLANGE UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.00	6.0	0.189	86.1	6.0	0.254	120.2	0.128	6.56	3.5	33.0	8.55	10.51
2	2.50	6.0	0.189	86.1	6.0	0.254	120.2	0.128	9.57	3.9	72.1	13.15	15.89
3	5.00	6.0	0.189	86.1	6.0	0.254	120.2	0.128	12.59	4.3	128.6	18.16	21.62
4	7.50	6.0	0.189	34.0	6.0	0.254	120.2	0.128	15.60	4.6	204.5	23.60	27.71
5	10.00	6.0	0.189	34.0	6.0	0.254	120.2	0.128	18.62	5.0	301.4	29.44	34.17
6	10.00	6.0	0.189	34.0	6.0	0.254	120.2	0.154	18.62	5.5	315.7	31.03	35.53
7	12.65	6.0	0.189	31.7	6.0	0.254	31.7	0.154	21.81	6.0	451.9	38.24	43.31

	FLANGES	WEB
YIELD STRESSES (KSI)	67.5	67.5

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 1

PT No	POSITIVE FLANGE CB	POS FLANGE L/RT	POS FLANGE LD/AF	NEGATIVE FLANGE CB	NEG FLANGE L/RT	NEG FLANGE LD/AF	KL/RX	KL/RY	CM	F'E
1	1.348	53.221	533.488	1.293	72.273	553.258	49.364	57.172	0.850	61.283
2	1.348	54.632	763.103	1.293	73.568	791.384	51.391	60.246	0.850	56.542
3	1.348	55.990	992.719	1.293	74.860	1029.509	53.031	63.170	0.850	53.100
4	1.000	22.628	482.687	1.293	76.143	1267.634	54.436	26.049	0.850	50.395
5	1.000	23.132	573.360	1.293	77.415	1505.759	55.673	27.107	0.850	48.179
6	1.000	23.745	573.421	1.293	78.992	1505.918	56.961	28.377	0.850	46.026
7	1.000	22.701	624.144	1.000	21.249	463.647	58.204	27.608	0.850	44.081

PROJECT No. 4010 50X16X25 LRF44 LIVE LOAD ULT MSRD GAGE 67.5KSI Version: 07/10/85 16:25 Run: 30 Aug 85 15:09

MEMBER FORCES FOR MEMBER 1

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES							
			MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	6.73	-0.00	13.12						
2	2.50	6.73	16.82	13.12						
3	5.00	6.73	33.64	13.12						
4	7.50	6.73	50.46	13.12						
5	10.00	6.73	67.28	13.12						
6	10.00	6.73	67.29	13.12						
7	12.65	6.73	85.10	13.12						

PROJECT No. 4010 50X16X25 LRF44 LIVE LOAD ULT MSRD GAGE 67.5KSI Version: 07/10/85 16:25 Run: 30 Aug 85 15:09

STRESS ANALYSIS FOR MEMBER 2

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	POSITIVE EXTREMITY AXIAL STRESS ALLOWABLE (KSI)	POSITIVE EXTREMITY BENDING STRESS COMPUTED (KSI)	POSITIVE EXTREMITY BENDING STRESS ALLOWABLE (KSI)	POSITIVE EXTREMITY STRESS RATIO	POSITIVE EXTREMITY LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	NEGATIVE EXTREMITY AXIAL STRESS ALLOWABLE (KSI)	NEGATIVE EXTREMITY BENDING STRESS COMPUTED (KSI)	NEGATIVE EXTREMITY BENDING STRESS ALLOWABLE (KSI)	NEGATIVE EXTREMITY STRESS RATIO	NEGATIVE EXTREMITY LC No	WEB SHEAR RATIO	WEB LC No
1	3.26	25.36	0.00	26.55	0.128	1	3.26	25.36	-0.00	40.50	0.128	1	0.249	1
2	2.92	24.69	10.63	24.65	0.506	1	2.92	24.69	-14.29	40.50	0.235	1	0.218	1
3	2.64	24.05	15.58	23.96	0.715	1	2.64	24.05	-20.42	40.50	0.394	1	0.258	1
4	2.41	25.61	18.19	23.25	0.842	1	2.41	25.61	-23.33	40.50	0.482	1	0.321	1
5	2.22	25.36	19.64	22.53	0.927	1	2.22	25.36	-24.72	40.50	0.523	1	0.384	1
6	2.41	24.70	20.24	23.24	0.930	1	2.41	24.70	-26.02	40.50	0.545	1	0.653	1
7	2.24	23.61	21.20	22.42	1.001	1	2.24	23.61	-26.80	40.50	0.567	1	0.766	1

GEOMETRIC PROPERTIES FOR MEMBER 2

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	POS FLANGE THK (IN)	POS FLANGE UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	NEG FLANGE THK (IN)	NEG FLANGE UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.00	6.0	0.313	151.9	6.1	0.188	86.1	0.154	6.50	4.0	36.6	12.46	9.02
2	2.50	6.0	0.313	151.9	6.1	0.188	86.1	0.154	9.56	4.5	81.5	18.98	14.12
3	5.00	6.0	0.313	151.9	6.1	0.188	86.1	0.154	12.63	5.0	147.2	25.92	19.77
4	7.50	6.0	0.313	151.9	6.1	0.188	34.0	0.154	15.69	5.4	236.1	33.29	25.95
5	10.00	6.0	0.313	151.9	6.1	0.188	34.0	0.154	18.75	5.9	350.5	41.11	32.66
6	10.00	6.0	0.313	151.9	6.1	0.188	34.0	0.129	18.76	5.4	336.1	39.89	31.03
7	12.65	6.0	0.313	151.9	6.1	0.188	31.7	0.129	22.00	5.9	478.7	48.16	38.11

YIELD STRESSES (KSI)	FLANGES	WEB
	67.5	67.5

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 2

PT No	POSITIVE FLANGE CB	POS FLANGE L/RT	POS FLANGE LD/AF	NEGATIVE FLANGE CB	NEG FLANGE L/RT	NEG FLANGE LD/AF	KL/RX	KL/RY	CM	F'E
1	1.257	91.108	568.162	1.348	52.502	521.351	50.345	56.903	0.850	58.917
2	1.257	92.672	816.782	1.348	54.176	749.487	52.490	60.140	0.850	54.200
3	1.257	94.248	1065.402	1.348	55.768	977.623	54.193	63.210	0.850	50.846
4	1.257	95.826	1314.021	1.000	22.624	476.142	55.639	26.117	0.850	48.238
5	1.257	97.399	1562.641	1.000	23.204	566.230	56.905	27.224	0.850	46.116
6	1.257	95.842	1562.807	1.000	22.626	566.290	55.764	26.127	0.850	48.022
7	1.257	97.237	1826.055	1.000	21.576	616.919	56.875	25.277	0.850	46.165

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MEMBER FORCES FOR MEMBER 2

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES							
			MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	6.73	-0.00	13.12						
2	2.50	6.73	-16.82	13.12						
3	5.00	6.73	-33.64	13.12						
4	7.50	6.73	-50.46	13.12						
5	10.00	6.73	-67.28	13.12						
6	10.00	6.73	-67.29	13.12						
7	12.65	6.73	-85.10	13.12						

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STRESS ANALYSIS FOR MEMBER 3

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	POSITIVE EXTREMITY AXIAL STRESS ALLOWABLE (KSI)	POSITIVE EXTREMITY BENDING STRESS COMPUTED (KSI)	POSITIVE EXTREMITY BENDING STRESS ALLOWABLE (KSI)	POSITIVE EXTREMITY STRESS RATIO	POSITIVE EXTREMITY LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	NEGATIVE EXTREMITY AXIAL STRESS ALLOWABLE (KSI)	NEGATIVE EXTREMITY BENDING STRESS COMPUTED (KSI)	NEGATIVE EXTREMITY BENDING STRESS ALLOWABLE (KSI)	NEGATIVE EXTREMITY STRESS RATIO	NEGATIVE EXTREMITY LC No	WEB SHEAR RATIO	WEB LC No
1	1.46	28.06	-24.93	40.50	0.563	1	1.46	28.06	22.21	33.36	0.702	1	0.675	1
2	1.47	28.08	-24.64	40.50	0.556	1	1.47	28.08	21.93	33.44	0.692	1	0.669	1
3	1.47	28.08	-24.63	40.50	0.556	1	1.47	28.08	21.93	33.44	0.692	1	0.669	1
4	1.56	28.34	-20.81	40.50	0.459	1	1.56	28.34	18.40	33.85	0.582	1	0.602	1
5	1.48	28.34	-20.81	40.50	0.461	1	1.48	28.34	18.40	33.85	0.580	1	0.438	1
6	1.60	27.56	-16.99	40.50	0.361	1	1.60	27.56	14.88	34.24	0.474	1	0.378	1
7	1.74	27.96	-10.88	40.50	0.206	1	1.74	27.96	9.42	34.62	0.315	1	0.317	1

GEOMETRIC PROPERTIES FOR MEMBER 3

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.81	6.0	0.192	53.3	6.0	0.254	92.3	0.161	21.74	6.2	457.7	39.01	43.79
2	0.98	6.0	0.192	53.3	6.0	0.254	92.3	0.161	21.54	6.1	448.1	38.53	43.28
3	0.98	6.0	0.192	53.3	6.0	0.254	92.3	0.161	21.54	6.1	448.0	38.52	43.27
4	2.78	6.0	0.192	53.3	6.0	0.254	92.3	0.161	19.37	5.8	352.1	33.47	37.85
5	2.78	6.0	0.192	53.3	6.0	0.254	92.3	0.161	19.37	5.8	352.0	33.47	37.85
6	5.02	6.0	0.192	60.3	6.0	0.254	92.3	0.161	16.69	5.4	251.7	27.56	31.46
7	7.25	6.0	0.192	60.3	6.0	0.254	92.3	0.161	14.00	4.9	170.7	22.05	25.45

	FLANGES	WEB
YIELD STRESSES (KSI)	67.5	67.5

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 3

PT No	POSITIVE FLANGE CB	POSITIVE FLANGE L/RT	POSITIVE FLANGE LD/AF	NEGATIVE FLANGE CB	NEGATIVE FLANGE L/RT	NEGATIVE FLANGE LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	38.234	1028.201	1.000	62.126	1343.680	15.006	46.771	0.850	663.138
2	1.000	38.175	1018.951	1.000	62.047	1331.592	14.981	46.649	0.850	665.409
3	1.000	38.174	1018.859	1.000	62.047	1331.470	14.980	46.648	0.850	665.432
4	1.000	37.523	918.584	1.000	61.193	1200.428	14.686	45.308	0.850	692.424
5	1.000	37.523	918.491	1.000	61.192	1200.307	14.685	45.307	0.850	692.451
6	1.000	41.514	898.269	1.000	60.119	1037.609	14.267	49.309	0.850	733.605
7	1.000	40.551	757.420	1.000	59.034	874.912	13.772	47.281	0.850	787.317

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MEMBER FORCES FOR MEMBER 3

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES							
			MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.81	11.67	81.03	9.02						
2	0.98	11.67	79.09	9.02						
3	0.98	11.67	79.07	9.02						
4	2.78	11.67	58.05	9.02						
5	2.78	8.51	58.04	8.59						
6	5.02	8.51	39.01	8.59						
7	7.25	8.51	19.98	8.59						

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STRESS ANALYSIS FOR MEMBER 4

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	WEB SHEAR RATIO	WEB LC No
1	1.49	28.14	22.44	33.21	0.712	1	1.49	28.14	-25.23	40.50	0.570	1	0.742	1
2	1.50	28.16	22.16	33.29	0.703	1	1.50	28.16	-24.93	40.50	0.562	1	0.735	1
3	1.50	28.16	22.16	33.29	0.703	1	1.50	28.16	-24.92	40.50	0.562	1	0.735	1
4	1.58	28.41	18.59	33.85	0.588	1	1.58	28.41	-21.04	40.50	0.464	1	0.661	1
5	1.51	28.41	18.58	33.85	0.586	1	1.51	28.41	-21.04	40.50	0.466	1	0.482	1
6	1.63	27.63	15.01	34.23	0.479	1	1.63	27.63	-17.16	40.50	0.365	1	0.415	1
7	1.77	28.02	9.50	34.61	0.318	1	1.77	28.02	-10.98	40.50	0.208	1	0.348	1

GEOMETRIC PROPERTIES FOR MEMBER 4

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.81	6.0	0.254	92.3	6.0	0.192	53.3	0.156	21.74	6.1	452.6	43.33	38.55
2	0.98	6.0	0.254	92.3	6.0	0.192	53.3	0.156	21.54	6.0	443.1	42.82	38.07
3	0.98	6.0	0.254	92.3	6.0	0.192	53.3	0.156	21.54	6.0	443.0	42.82	38.07
4	2.78	6.0	0.254	92.3	6.0	0.192	53.3	0.156	19.37	5.7	348.4	37.48	33.10
5	2.78	6.0	0.254	92.3	6.0	0.192	53.3	0.156	19.37	5.7	348.3	37.47	33.10
6	5.02	6.0	0.254	92.3	6.0	0.192	60.3	0.156	16.69	5.3	249.2	31.18	27.28
7	7.25	6.0	0.254	92.3	6.0	0.192	60.3	0.156	14.00	4.9	169.2	25.24	21.85

YIELD STRESSES (KSI)	FLANGES	WEB
	67.5	67.5

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 4

PT No	POSITIVE FLANGE CB	L/RT	LD/AF	NEGATIVE FLANGE CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	62.098	1348.174	1.000	38.104	1029.921	14.949	46.515	0.850	668.224
2	1.000	62.022	1336.045	1.000	38.046	1020.656	14.924	46.396	0.850	670.506
3	1.000	62.021	1335.924	1.000	38.046	1020.563	14.923	46.394	0.850	670.529
4	1.000	61.186	1204.443	1.000	37.409	920.120	14.630	45.079	0.850	697.643
5	1.000	61.185	1204.322	1.000	37.409	920.027	14.630	45.077	0.850	697.671
6	1.000	60.136	1041.080	1.000	41.407	899.771	14.216	49.086	0.850	738.966
7	1.000	59.075	877.838	1.000	40.466	758.687	13.724	47.096	0.850	792.801

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MEMBER FORCES FOR MEMBER 4

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES							
			MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.81	11.67	-81.03	9.02						
2	0.98	11.67	-79.09	9.02						
3	0.98	11.67	-79.07	9.02						
4	2.78	11.67	-58.05	9.02						
5	2.78	8.51	-58.03	8.59						
6	5.02	8.51	-39.01	8.59						
7	7.25	8.51	-19.98	8.59						

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STRESS ANALYSIS FOR MEMBER 5

PT	POSITIVE EXTREMITY						NEGATIVE EXTREMITY						WEB	
	AXIAL STRESS		BENDING STRESS		STRESS	LC	AXIAL STRESS		BENDING STRESS		STRESS	LC	SHEAR	LC
No	COMPUTED (KSI)	ALLOWABLE (KSI)	COMPUTED (KSI)	ALLOWABLE (KSI)	RATIO	No	COMPUTED (KSI)	ALLOWABLE (KSI)	COMPUTED (KSI)	ALLOWABLE (KSI)	RATIO	No	RATIO	No
1	2.01	28.16	-11.94	40.50	0.223	1	2.01	28.16	11.93	34.38	0.397	1	0.710	1
2	2.01	28.16	-10.88	40.50	0.197	1	2.01	28.16	10.87	34.38	0.366	1	0.710	1
3	1.95	28.16	-10.87	40.50	0.199	1	1.95	28.16	10.86	34.38	0.364	1	0.457	1
4	1.95	28.16	-3.76	40.50	0.024	1	1.95	28.16	3.75	26.97	0.188	1	0.457	1
5	1.95	28.16	3.36	34.63	0.152	1	1.95	28.16	-3.35	40.50	0.014	1	0.457	1

GEOMETRIC PROPERTIES FOR MEMBER 5

POINT	SECTION DESCRIPTION								FULL SECTION PROPERTIES			
	POSITIVE FLANGE			NEGATIVE FLANGE			WEB			MOM OF	SECTION MODULUS	
No	LOCATION (FT)	WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	THK (IN)	HEIGHT (IN)	AREA (IN2)	INERTIA (IN4)	POSITIVE (IN3)	NEGATIVE (IN3)
1	0.00	6.0	0.192	60.2	6.0	0.192	92.4	0.125	14.00	4.1	144.5	20.08	20.10
2	0.20	6.0	0.192	60.2	6.0	0.192	92.4	0.125	14.00	4.1	144.5	20.08	20.10
3	0.20	6.0	0.192	60.2	6.0	0.192	92.4	0.125	14.00	4.1	144.5	20.08	20.10
4	2.27	6.0	0.192	60.2	6.0	0.192	120.4	0.125	14.00	4.1	144.5	20.08	20.10
5	4.34	6.0	0.192	60.2	6.0	0.192	120.4	0.125	14.00	4.1	144.5	20.08	20.10

	FLANGES	WEB
YIELD STRESSES (KSI)	67.5	67.5

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 5

PT	POSITIVE FLANGE			NEGATIVE FLANGE						
No	CB	L/RT	LD/AF	CB	L/RT	LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	38.982	752.919	1.000	59.717	1153.716	8.699	46.143	0.850	1973.291
2	1.000	38.982	752.919	1.000	59.717	1153.716	8.699	46.143	0.850	1973.291
3	1.000	38.982	752.919	1.000	59.717	1153.716	8.699	46.143	0.850	1973.291
4	1.000	38.982	752.919	1.000	77.813	1503.328	8.699	46.143	0.850	1973.291
5	1.000	38.982	752.919	1.000	77.813	1503.328	8.699	46.143	0.850	1973.291

MEMBER FORCES FOR MEMBER 5

POINT		ABSOLUTE MAXIMUM	MOMENTS AND AXIAL FORCES							
No	LOCATION (FT)	SHEAR (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	8.92	19.98	8.16						
2	0.20	8.92	18.20	8.16						
3	0.20	5.75	18.19	7.90						
4	2.27	5.75	6.29	7.90						
5	4.34	5.75	-5.62	7.90						

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STRESS ANALYSIS FOR MEMBER 6

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	POSITIVE EXTREMITY AXIAL STRESS ALLOWABLE (KSI)	POSITIVE EXTREMITY BENDING STRESS COMPUTED (KSI)	POSITIVE EXTREMITY BENDING STRESS ALLOWABLE (KSI)	POSITIVE EXTREMITY STRESS RATIO	POSITIVE EXTREMITY LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	NEGATIVE EXTREMITY AXIAL STRESS ALLOWABLE (KSI)	NEGATIVE EXTREMITY BENDING STRESS COMPUTED (KSI)	NEGATIVE EXTREMITY BENDING STRESS ALLOWABLE (KSI)	NEGATIVE EXTREMITY STRESS RATIO	NEGATIVE EXTREMITY LC No	WEB SHEAR RATIO	WEB LC No
1	2.01	28.15	11.93	34.38	0.397	1	2.01	28.15	-11.95	40.50	0.223	1	0.710	1
2	2.01	28.15	10.87	34.38	0.366	1	2.01	28.15	-10.89	40.50	0.197	1	0.710	1
3	1.95	28.15	10.86	34.38	0.364	1	1.95	28.15	-10.88	40.50	0.199	1	0.457	1
4	1.95	28.15	3.75	26.97	0.188	1	1.95	28.15	-3.76	40.50	0.024	1	0.457	1
5	1.95	28.15	-3.35	40.50	0.014	1	1.95	28.15	3.36	34.66	0.152	1	0.457	1

GEOMETRIC PROPERTIES FOR MEMBER 6

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.00	6.0	0.192	92.4	6.0	0.192	60.2	0.125	14.00	4.1	144.4	20.10	20.06
2	0.20	6.0	0.192	92.4	6.0	0.192	60.2	0.125	14.00	4.1	144.4	20.10	20.06
3	0.20	6.0	0.192	92.4	6.0	0.192	60.2	0.125	14.00	4.1	144.4	20.10	20.06
4	2.27	6.0	0.192	120.4	6.0	0.192	60.2	0.125	14.00	4.1	144.4	20.10	20.06
5	4.34	6.0	0.192	120.4	6.0	0.192	60.2	0.125	14.00	4.1	144.4	20.10	20.06

	FLANGES	WEB
YIELD STRESSES (KSI)	67.5	67.5

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 6

PT No	POSITIVE FLANGE CB	POSITIVE FLANGE L/RT	POSITIVE FLANGE LD/AF	NEGATIVE FLANGE CB	NEGATIVE FLANGE L/RT	NEGATIVE FLANGE LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	59.714	1153.716	1.000	39.055	754.178	8.700	46.190	0.850	1972.904
2	1.000	59.714	1153.716	1.000	39.055	754.178	8.700	46.190	0.850	1972.904
3	1.000	59.714	1153.716	1.000	39.055	754.178	8.700	46.190	0.850	1972.904
4	1.000	77.809	1503.328	1.000	39.055	754.178	8.700	46.190	0.850	1972.904
5	1.000	77.809	1503.328	1.000	39.055	754.178	8.700	46.190	0.850	1972.904

MEMBER FORCES FOR MEMBER 6

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	8.92	-19.98	8.16						
2	0.20	8.92	-18.20	8.16						
3	0.20	5.75	-18.19	7.90						
4	2.27	5.75	-6.29	7.90						
5	4.34	5.75	5.62	7.90						

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STRESS ANALYSIS FOR MEMBER 7

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	POSITIVE EXTREMITY AXIAL STRESS ALLOWABLE (KSI)	POSITIVE EXTREMITY BENDING STRESS COMPUTED (KSI)	POSITIVE EXTREMITY BENDING STRESS ALLOWABLE (KSI)	POSITIVE EXTREMITY STRESS RATIO	POSITIVE EXTREMITY LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	NEGATIVE EXTREMITY AXIAL STRESS ALLOWABLE (KSI)	NEGATIVE EXTREMITY BENDING STRESS COMPUTED (KSI)	NEGATIVE EXTREMITY BENDING STRESS ALLOWABLE (KSI)	NEGATIVE EXTREMITY STRESS RATIO	NEGATIVE EXTREMITY LC No	WEB SHEAR RATIO	WEB LC No
1	1.95	28.16	3.36	34.63	0.152	1	1.95	28.16	-3.36	40.50	0.014	1	0.457	1
2	1.95	28.16	9.14	34.63	0.312	1	1.95	28.16	-9.13	40.50	0.156	1	0.457	1
3	1.95	28.16	14.92	34.63	0.479	1	1.95	28.16	-14.90	40.50	0.299	1	0.457	1
4	1.88	28.16	14.92	34.63	0.477	1	1.88	28.16	-14.91	40.50	0.301	1	0.204	1
5	1.88	28.16	18.75	34.63	0.588	1	1.88	28.16	-18.73	40.50	0.396	1	0.204	1
6	1.88	28.81	22.58	34.63	0.698	1	1.88	28.81	-22.55	40.50	0.491	1	0.204	1
7	1.82	28.81	22.57	34.63	0.697	1	1.82	28.81	-22.55	40.50	0.494	1	0.049	1
8	1.82	28.81	21.83	34.63	0.675	1	1.82	28.81	-21.81	40.50	0.475	1	0.049	1
9	1.82	31.69	21.08	34.63	0.654	1	1.82	31.69	-21.06	40.50	0.463	1	0.049	1
10	1.82	31.69	21.08	34.63	0.654	1	1.82	31.69	-21.06	40.50	0.463	1	0.049	1
11	1.82	31.69	21.02	34.63	0.652	1	1.82	31.69	-21.00	40.50	0.461	1	0.049	1

GEOMETRIC PROPERTIES FOR MEMBER 7

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	POSITIVE FLANGE THK (IN)	POSITIVE FLANGE UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	NEGATIVE FLANGE THK (IN)	NEGATIVE FLANGE UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.00	6.0	0.192	60.2	6.0	0.192	120.4	0.125	14.00	4.1	144.5	20.08	20.10
2	1.68	6.0	0.192	60.2	6.0	0.192	120.4	0.125	14.00	4.1	144.5	20.08	20.10
3	3.37	6.0	0.192	60.2	6.0	0.192	120.4	0.125	14.00	4.1	144.5	20.08	20.10
4	3.37	6.0	0.192	60.2	6.0	0.192	120.4	0.125	14.00	4.1	144.5	20.08	20.10
5	5.87	6.0	0.192	60.2	6.0	0.192	120.4	0.125	14.00	4.1	144.5	20.08	20.10
6	8.37	6.0	0.192	55.7	6.0	0.192	135.5	0.125	14.00	4.1	144.5	20.08	20.10
7	8.37	6.0	0.192	55.7	6.0	0.192	135.5	0.125	14.00	4.1	144.5	20.08	20.10
8	10.40	6.0	0.192	55.7	6.0	0.192	135.5	0.125	14.00	4.1	144.5	20.08	20.10
9	12.44	6.0	0.192	24.0	6.0	0.192	135.5	0.125	14.00	4.1	144.5	20.08	20.10
10	12.44	6.0	0.192	24.0	6.0	0.192	135.5	0.125	14.00	4.1	144.5	20.08	20.10
11	12.60	6.0	0.192	24.0	6.0	0.192	135.5	0.125	14.00	4.1	144.5	20.08	20.10

	FLANGES	WEB
YIELD STRESSES (KSI)	67.5	67.5

PROJECT No. 4010 50X16X25 LRF44 LIVE LOAD ULT MSRD GAGE 67.5KSI Version: 07/10/85 16:25 Run: 30 Aug 85 15:09

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 7

PT No	POSITIVE FLANGE CB	POSITIVE FLANGE L/RT	POSITIVE FLANGE LD/AF	NEGATIVE FLANGE CB	NEGATIVE FLANGE L/RT	NEGATIVE FLANGE LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	38.982	752.919	1.000	77.813	1503.328	25.361	46.143	0.850	232.179
2	1.000	38.982	752.919	1.000	77.813	1503.328	25.361	46.143	0.850	232.179
3	1.000	38.982	752.919	1.000	77.813	1503.328	25.361	46.143	0.850	232.179
4	1.000	38.982	752.919	1.000	77.813	1503.328	25.361	46.143	0.850	232.179
5	1.000	38.982	752.919	1.000	77.813	1503.328	25.361	46.143	0.850	232.179
6	1.000	36.068	696.637	1.000	87.572	1691.868	25.361	42.694	0.850	232.179
7	1.000	36.068	696.637	1.000	87.572	1691.868	25.361	42.694	0.850	232.179
8	1.000	36.068	696.637	1.000	87.572	1691.868	25.361	42.694	0.850	232.179
9	1.000	15.541	300.167	1.000	87.572	1691.868	25.361	18.396	0.850	232.179
10	1.000	15.541	300.167	1.000	87.572	1691.868	25.361	18.396	0.850	232.179
11	1.000	15.541	300.167	1.000	87.572	1691.868	25.361	18.396	0.850	232.179

MEMBER FORCES FOR MEMBER 7

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES: MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	5.74	-5.62	7.90						
2	1.68	5.74	-15.29	7.90						
3	3.37	5.74	-24.97	7.90						
4	3.37	2.56	-24.97	7.63						
5	5.87	2.56	-31.38	7.63						
6	8.37	2.56	-37.78	7.63						
7	8.37	0.62	-37.78	7.37						
8	10.40	0.62	-36.53	7.37						
9	12.44	0.62	-35.28	7.37						
10	12.44	0.62	-35.28	7.37						
11	12.60	0.62	-35.17	7.37						

PROJECT No. 4010 50X16X25 LRF44 LIVE LOAD ULT MSRD GAGE 67.5KSI Version: 07/10/85 16:25 Run: 30 Aug 85 15:09

STRESS ANALYSIS FOR MEMBER 8

PT No	POSITIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	NEGATIVE EXTREMITY AXIAL STRESS COMPUTED (KSI)	AXIAL STRESS ALLOWABLE (KSI)	BENDING STRESS COMPUTED (KSI)	BENDING STRESS ALLOWABLE (KSI)	STRESS RATIO	LC No	WEB SHEAR RATIO	WEB LC No
1	1.95	28.15	-3.36	40.50	0.014	1	1.95	28.15	3.36	34.66	0.152	1	0.457	1
2	1.95	28.15	-9.13	40.50	0.156	1	1.95	28.15	9.15	34.66	0.312	1	0.457	1
3	1.95	28.15	-14.91	40.50	0.299	1	1.95	28.15	14.93	34.66	0.479	1	0.457	1
4	1.88	28.15	-14.91	40.50	0.301	1	1.88	28.15	14.94	34.66	0.477	1	0.204	1
5	1.88	28.15	-18.73	40.50	0.396	1	1.88	28.15	18.77	34.66	0.588	1	0.204	1
6	1.88	28.80	-22.56	40.50	0.492	1	1.88	28.80	22.60	34.66	0.699	1	0.204	1
7	1.82	28.80	-22.56	40.50	0.494	1	1.82	28.80	22.60	34.66	0.697	1	0.049	1
8	1.82	28.80	-21.81	40.50	0.475	1	1.82	28.80	21.85	34.66	0.675	1	0.049	1
9	1.82	31.69	-21.06	40.50	0.463	1	1.82	31.69	21.10	34.66	0.654	1	0.049	1
10	1.82	31.69	-21.06	40.50	0.463	1	1.82	31.69	21.10	34.66	0.654	1	0.049	1
11	1.82	31.69	-21.00	40.50	0.461	1	1.82	31.69	21.04	34.66	0.652	1	0.049	1

GEOMETRIC PROPERTIES FOR MEMBER 8

POINT No	LOCATION (FT)	SECTION DESCRIPTION POSITIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	NEGATIVE FLANGE WIDTH (IN)	THK (IN)	UNBR LGTH (IN)	WEB THK (IN)	WEB HEIGHT (IN)	FULL SECTION PROPERTIES AREA (IN2)	MOM OF INERTIA (IN4)	SECTION MODULUS POSITIVE (IN3)	SECTION MODULUS NEGATIVE (IN3)
1	0.00	6.0	0.192	120.4	6.0	0.192	60.2	0.125	14.00	4.1	144.4	20.10	20.06
2	1.68	6.0	0.192	120.4	6.0	0.192	60.2	0.125	14.00	4.1	144.4	20.10	20.06
3	3.37	6.0	0.192	120.4	6.0	0.192	60.2	0.125	14.00	4.1	144.4	20.10	20.06
4	3.37	6.0	0.192	120.4	6.0	0.192	60.2	0.125	14.00	4.1	144.4	20.10	20.06
5	5.87	6.0	0.192	120.4	6.0	0.192	60.2	0.125	14.00	4.1	144.4	20.10	20.06
6	8.37	6.0	0.192	135.5	6.0	0.192	55.7	0.125	14.00	4.1	144.4	20.10	20.06
7	8.37	6.0	0.192	135.5	6.0	0.192	55.7	0.125	14.00	4.1	144.4	20.10	20.06
8	10.40	6.0	0.192	135.5	6.0	0.192	55.7	0.125	14.00	4.1	144.4	20.10	20.06
9	12.44	6.0	0.192	135.5	6.0	0.192	24.0	0.125	14.00	4.1	144.4	20.10	20.06
10	12.44	6.0	0.192	135.5	6.0	0.192	24.0	0.125	14.00	4.1	144.4	20.10	20.06
11	12.60	6.0	0.192	135.5	6.0	0.192	24.0	0.125	14.00	4.1	144.4	20.10	20.06

YIELD STRESSES (KSI)	FLANGES	WEB
	67.5	67.5

PROJECT No. 4010 50X16X25 LRF44 LIVE LOAD ULT MSRD GAGE 67.5KSI Version: 07/10/85 16:25 Run: 30 Aug 85 15:09

PROPERTIES FOR STRESS ANALYSIS FOR MEMBER 8

PT No	POSITIVE FLANGE CB	POSITIVE FLANGE L/RT	POSITIVE FLANGE LD/AF	NEGATIVE FLANGE CB	NEGATIVE FLANGE L/RT	NEGATIVE FLANGE LD/AF	KL/RX	KL/RY	CM	F'E
1	1.000	77.809	1503.328	1.000	39.055	754.178	25.363	46.190	0.850	232.134
2	1.000	77.809	1503.328	1.000	39.055	754.178	25.363	46.190	0.850	232.134
3	1.000	77.809	1503.328	1.000	39.055	754.178	25.363	46.190	0.850	232.134
4	1.000	77.809	1503.328	1.000	39.055	754.178	25.363	46.190	0.850	232.134
5	1.000	77.809	1503.328	1.000	39.055	754.178	25.363	46.190	0.850	232.134
6	1.000	87.568	1691.868	1.000	36.136	697.802	25.363	42.737	0.850	232.134
7	1.000	87.568	1691.868	1.000	36.136	697.802	25.363	42.737	0.850	232.134
8	1.000	87.568	1691.868	1.000	36.136	697.802	25.363	42.737	0.850	232.134
9	1.000	87.568	1691.868	1.000	15.570	300.669	25.363	18.414	0.850	232.134
10	1.000	87.568	1691.868	1.000	15.570	300.669	25.363	18.414	0.850	232.134
11	1.000	87.568	1691.868	1.000	15.570	300.669	25.363	18.414	0.850	232.134

MEMBER FORCES FOR MEMBER 8

POINT No	LOCATION (FT)	ABSOLUTE MAXIMUM SHEAR (KIPS)	MOMENTS AND AXIAL FORCES: MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)	MOMENT (K-FT)	AXIAL (KIPS)
1	0.00	5.74	5.62	7.90						
2	1.68	5.74	15.29	7.90						
3	3.37	5.74	24.97	7.90						
4	3.37	2.56	24.97	7.63						
5	5.87	2.56	31.38	7.63						
6	8.37	2.56	37.78	7.63						
7	8.37	0.62	37.78	7.37						
8	10.40	0.62	36.53	7.37						
9	12.44	0.62	35.28	7.37						
10	12.44	0.62	35.28	7.37						
11	12.60	0.62	35.17	7.37						

PROJECT No. 4010 50X16X25 LRF44 LIVE LOAD ULT MSRD GAGE 67.5KSI Version: 07/10/85 16:25 Run: 30 Aug 85 15:09

FORCES ACTING ON SUPPORTS

LOADING CONDITION No	DESCRIPTION	SUPPORT No	HORIZONTAL (KIPS)	VERTICAL (KIPS)	MOMENT (K-FT)
1	VERT CONC LOADS ULT	1	-7.39	12.76	-0.00
1	VERT CONC LOADS ULT	9	7.39	12.76	-0.00
	TOTAL FORCES ACTING		-0.00	25.52	-0.00
	TOTAL FORCES APPLIED		0.00	25.52	0.00

EXTERNAL MEMBER LOADS

LOADING CONDITION No	DESCRIPTION	MEMBER NUMBER	UNIFORMLY DISTRIBUTED LOADS VERTICAL (K/FT)	UNIFORMLY DISTRIBUTED LOADS HORIZONTAL (K/FT)	CONCENTRATED LOADS LOCATION (FT)	CONCENTRATED LOADS VERTICAL (KIPS)	CONCENTRATED LOADS HORIZONTAL (KIPS)	CONCENTRATED LOADS MOMENT (K-FT)
1	VERT CONC LOADS ULT	3	0.000	0.000	2.78	3.19	-0.00	0.00
1	VERT CONC LOADS ULT	4	0.000	0.000	2.78	3.19	-0.00	0.00
1	VERT CONC LOADS ULT	5	0.000	0.000	0.20	3.19	0.00	0.00
1	VERT CONC LOADS ULT	6	0.000	0.000	0.20	3.19	-0.00	0.00
1	VERT CONC LOADS ULT	7	0.000	0.000	3.37	3.19	0.00	0.00
					8.37	3.19	0.00	0.00
1	VERT CONC LOADS ULT	8	0.000	0.000	3.37	3.19	-0.00	0.00
					8.37	3.19	-0.00	0.00

MEMBER END TRANSLATIONS

MEMBER NUMBER	LC No	LOADING CONDITION DESCRIPTION	JOINT No	END TRANSLATIONS VERT (IN)	HORZ (IN)	JOINT No	VERT (IN)	HORZ (IN)
1	1	VERT CONC LOADS ULT	1	0.00	0.00	2	-0.00	-0.28
2	1	VERT CONC LOADS ULT	9	0.00	0.00	8	-0.01	0.17
3	1	VERT CONC LOADS ULT	2	-0.00	-0.28	3	-0.75	-0.19
4	1	VERT CONC LOADS ULT	8	-0.01	0.17	7	-0.75	0.08
5	1	VERT CONC LOADS ULT	3	-0.75	-0.19	4	-1.38	-0.14
6	1	VERT CONC LOADS ULT	7	-0.75	0.08	6	-1.38	0.03
7	1	VERT CONC LOADS ULT	4	-1.38	-0.14	5	-2.47	-0.06
8	1	VERT CONC LOADS ULT	6	-1.38	0.03	5	-2.47	-0.06

MODULUS OF ELASTICITY 29000. KSI