Final Report

JEFFERSON COUNTY BAR JOIST TESTING PROGRAM VOLUME I

by

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CHAPTER I

INTRODUCTION

1.1 Scope of Program

This report documents the results of a series of load tests conducted at the Fears Structural Engineering Laboratory, University of Oklahoma, using bar joists removed from the Jefferson County Airport Terminal Building, Beaumont, Texas. The testing program followed the "Scope of Work" provided by the sponsors. This document is found in Appendix A, Volume I of this report.

The primary purpose of the program was to observe and record the response of bar joist test assemblies with various loading and longitudinal restraint conditions. Two tests included the intentional cutting of one or both bottom chord angles of each bar joist in the test assembly.

Each bar joist test assembly was composed of two 55 ft. 2 $\pm$ in. long, 28H8 bar joists and welded steel decking. The decking provided lateral stability to the bar joist top chords and a platform for stacking concrete blocks that were used to load the assembly. The two bar joists were cross-braced with angles at specified intervals. The test assembly was built on a heavy, stiff reaction floor (see Appendix B,

Volume I for description) and provision to apply restrain and measure horizontal forces parallel to the top chord of the assembly joists was provided.

Each test assembly was constructed using combinations of "Test Joists" and "New Joists". The Test Joists were bar joists removed from the Jefferson County Airport Terminal Building; the New Joists were bar joists fabricated specifically for the testing program and to the same specifications as the Test Joists.

1.2 Overview of Testing Procedures

General details of the test setup are shown in Figure 1.1 and photographs of an assembly prior to loading and after partial loading are found in Figure 1.2. Basically the test setup consisted of the test assembly (two joists, five sets of cross-bridging and steel deck) four support stands, four rollers, a longitudinal force restraint system and a longitudinal force application/measurement system. The longitudinal force restraint system consisted of two triangular frames (not shown in Figure 1.1; see Figure 2.3 for details) bolted to the reaction floor, a horizontal reaction beam (W14x211), and tab plates welded to the beam. The horizontal force application/measurement system consisted of two triangular frames (not shown in Figure 1.1; see Figure 2.4 for details), two load cells, a horizontal reaction beam (W14x61), and two hydraulic cylinders connected to the reaction beam using "ear" plates and pins. The triangular frames were pinned to the reaction floor in such a manner so the longitudinal force could be measured as a vertical compression force. The bar joist reaction seats were welded to 5/8 in. thick

tab plates. These plates rested on the rollers and were either connected to the restraint system with A325 bolts or to the hydraulic cylinders with ear plates and pins (see Figures 2.5 and 2.6).

Four assemblies were constructed and tested: Preliminary Test; Tests I, II, III and IV. The assembly constructed for the Preliminary Test consisted of two New Joists; all other assemblies consisted of one Test Joist (the east joist) and one New Joist (the west joist). The purpose of the Preliminary Test was verification of the test set-up, instrumentation, procedure and achievement of objectives.

For all tests, gravity loading (dead load in excess of the weight of the assembly and live load) was applied using 4 in. by 8 in. by 16 in. solid, normal weight concrete blocks weighing 33 $\pm$ 0.1 lbs. each. Simulated longitudinal restraint was provided, as required, using two 35 kips capacity hydraulic cylinders.

Data was collected and recorded from all tests using a micro-computer based data acquisition system (HP 85 micro-computer, HP 3479A data acquisition/control unit and HP 3970A plotter).

All tests were performed using the same general procedure. An initial loading of 66 plf in 33 plf increments with the hydraulic cylinders disconnected was first applied and removed. Data was taken at 0, 33, 66, 33 and 0 plf. The assembly was then loaded in uniformly distributed loading increments or in patterns to simulate water ponding until the maximum load was reached. The assembly was then unloaded. All data was recorded at each loading and unloading increment. Longitudinal restraint force was applied as specified for the various tests in the Scope of Work.

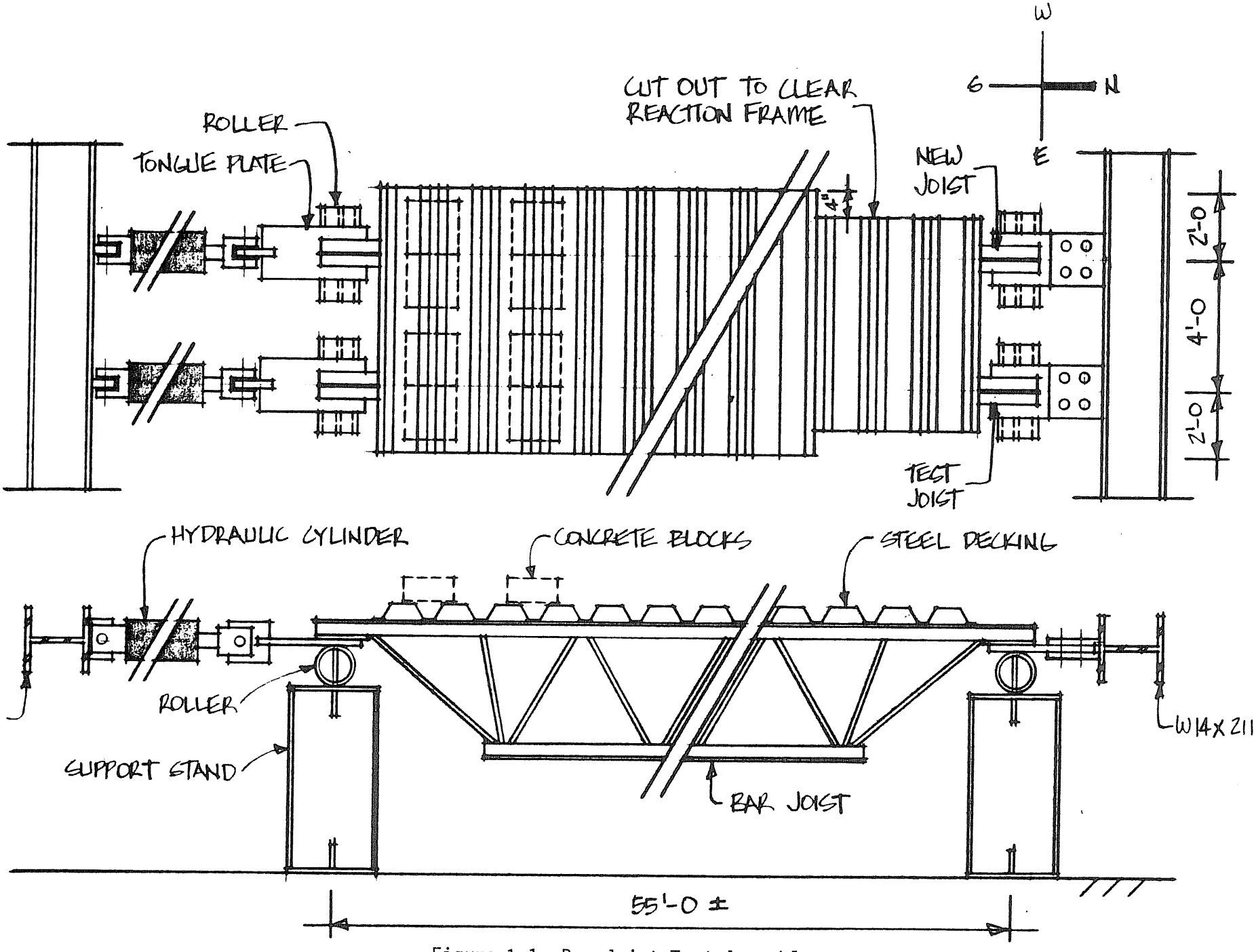
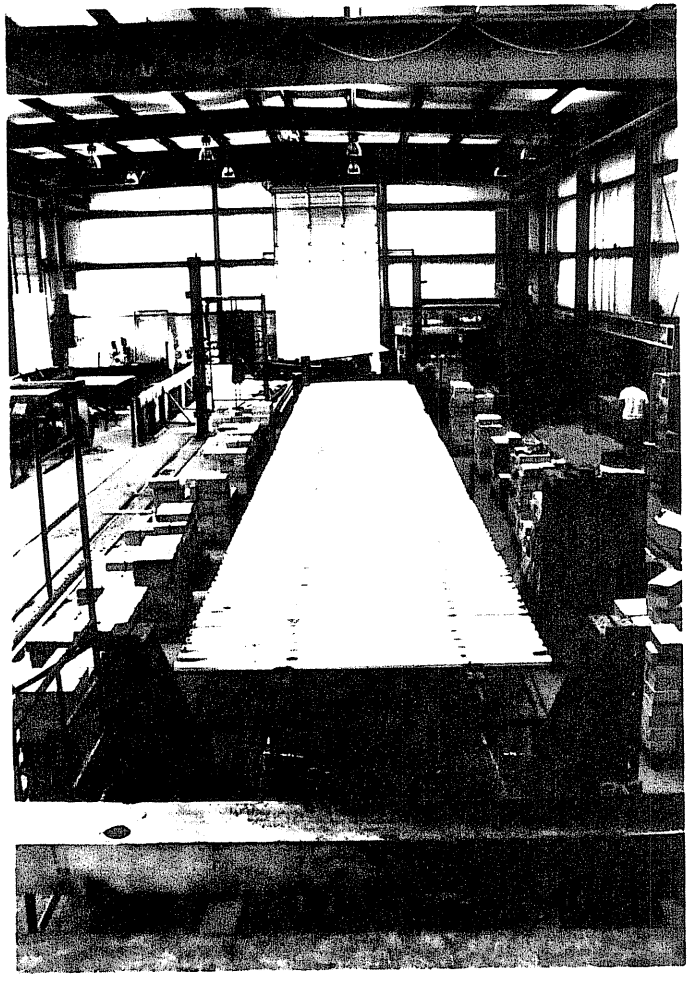
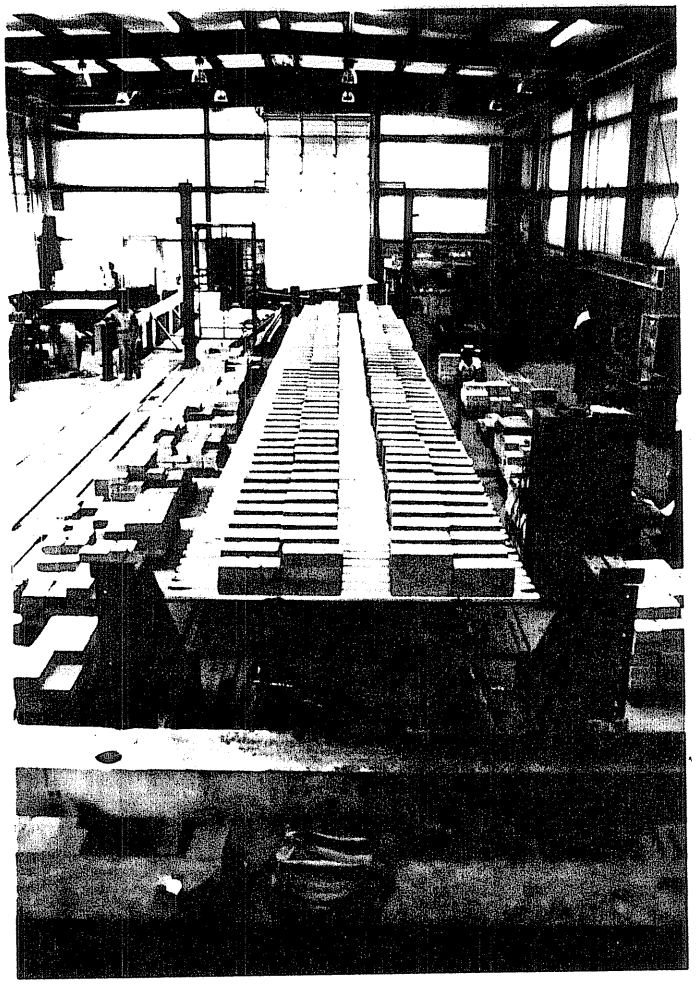


Figure 1.1 Bar Joist Test Assembly



a) Unloaded Test Setup



b) Partially Loaded Test Setup

Figure 1.2 Photographs of Test Setup (Looking North)

1.3 Test Matrix and Loading Sequence

The test matrix, as developed from the Scope of Work, is shown in Table 1.1. A "released", R, condition means that the hydraulic cylinders are disconnected and top chords of the joists are free to move longitudinally. A "fixed", F, condition means that the hydraulic cylinders are connected and activated (pressurized) when the gravity load increment is applied. A "released-fixed" condition, R-F, means that the hydraulic cylinders are deactivated when the gravity loading increment is applied and then activated to bring the resulting longitudinal displacement to zero (the initial condition). Table 1.2 is the gravity loading matrix.

A synopsis of the loading sequence for each test follows:

Preliminary Test

Step 1. Initial Loading (66 plf)

Step 2. Test assembly loaded to working load with hydraulic cylinders disconnected; hydraulic cylinders then activated to simulate longitudinally fixed support.

Step 3. Test assembly loaded to working load plus ponding load with hydraulic cylinders activated to simulate released-fixed support (see Appendix A, Volume I for procedure).

Step 4. Test assembly loaded to 133 plf plus ponding load with hydraulic cylinders disconnected.

Test I

Step 1. Initial Loading (66 plf)

Step 2. Test assembly loaded to 1.65 times working load with hydraulic cylinders disconnected.

Test II

Step 1. Initial Loading (66 plf)

Step 2. Test assembly loaded to working load with hydraulic cylinders disconnected; hydraulic cylinders then activated to simulate longitudinally fixed support.

Step 3. Unload; interior bottom chord angles of both the Test Joist and New Joist cut at test assembly centerline.

Step 4. Test assembly loaded to 132 plf with hydraulic cylinders released; hydraulic cylinders activated to simulate longitudinally fixed support. Test assembly loaded to 156.5 plf with rams activated.

Test III

Step 1. Initial Loading (66 plf)

Step 2. Test assembly loaded to working load with hydraulic cylinders disconnected; hydraulic cylinders then activated to simulate longitudinally fixed support.

Step 3. Test assembly unloaded to 82.5 plf before a series of ponding loads were incrementally applied. Hydraulic cylinders were activated to simulate fixed support after each increment (see Appendix A, Volume I for procedure).

Test IV

Step 1. Initial Loading (66 plf)

Step 2. Test assembly loaded to working load with hydraulic cylinders activated to simulate longitudinally fixed support.

Step 3. The bottom chord angles of both the Test Joist and New Joist

cut at test assembly centerline. Test assembly temporarily supported by overhead crane.

Step 4. Hydraulic cylinders activated to simulate longitudinally fixed support.

Step 5. Test assembly loaded incrementally with hydraulic cylinders activated to simulate fixed support.

A complete description of the specific testing procedures is found in Chapter II. Test results are described in Chapter III. Detailed results and other data are found in Appendices A thru F of Volume II.

Table 1.1

Test Matrix

Test No. (Joist)	Condition for Loading				
	W_w	W_u	$W_d + P_w$	$W_w + P_u$	$W_d + P_u$
Preliminary (New)					
I (B18)	R	R			
II (B21)	R-F R-F				F
III (B20)	R-F				
IV (B19)	F		R-F		

F = fixed
R = released
R-F = released-fixed

W_d = working dead load
W_w = SJI working load
W_u = 1.65 W_w
P_w = working ponding load
P_u = ultimate ponding load

Table 1.2
Uniform Gravity Loadings

Test No. (Joist)	Deck Gage	Assembly Wt. (plf)	Net Working Loads		Max Load[3] (plf)	Load[2] Factor[4]
			Dead[1] (plf)	SJI[2] (Plf)		
Pre-liminary (new)	22	18.22	81.78	167.8	183.2	0.98
I (B18)	16	24.88	75.12	161.1	302.2	1.63
II (B21)	18	21.85	78.15	164.2	186.9	1.00
III (B20)	18	21.85	78.15	164.2	186.9	1.00
IV (B19)	18	21.85	78.15	164.2	186.9	1.00

[1]Based on dead load of 100 plf

[2]Based on SJI total working load of 186 plf

[3]Max. applied uniform loading during test plus assembly weight

[4]Max. load/SJI total working load

CHAPTER II

TEST DETAILS

2.1 Description of the Test Components

Test Joists. The Test Joists were bar joists removed from the Jefferson County Airport Terminal Building specifically for this testing. These joists are Steel Joist Institute (SJI) designated 28H8. The test joists were 55'-2 ± long with a 5 in. long seat at one end and a 7 in. long seat at the other. The seats had been cut to facilitate removal from the Airport Terminal Building, but were restored to original length with comparable material prior to testing. Pertinent test joist cross-section dimensions were measured before testing. These measurements together with locations of chord splices are found in the appropriate appendix of Volume II.

New Joists. The New Joists were bar joists fabricated to the identical specification as the Test Joists. New Joists are also SJI 28H8.

Cross-Bracing (Bridging). The bar joist test assemblies were cross-braced with 1 1/4 x 1 1/4 x 1/8 angles at five cross sections spaced 9 ft. 2 in. each side of the assembly centerline. Cross-bracing was bolted with 3/8" diameter bolts. See cross-bracing detail Figure 2.1.

Decking. Steel decking was spot welded to the top chords of the bar joists. These welds were made in each valley of the decking. Thick-

nesses and suppliers of the decking are listed in Figure 2.2. Decking weights were measured and are recorded in the appendices of Volume II.

2.2 General Construction of the Test Set-ups

General details of the test set-up are shown in Figures 1.1, 1.2, 2.3, 2.4, 2.5 and 2.6. The test set-up was constructed by first bolting the reaction frames to the laboratory reaction floor. Support stands were then positioned to receive the bar joist test assembly. In an adjacent staging area, the bar joists were temporarily braced between bar joist top chords with three horizontal angles. These braces established the 4'-0 spacing between the bar joists while the cross-bracing was installed with bolts at five places. See cross-bracing installation photo Figure 2.7. The cross-braced bar joists were then lifted into the test set-up with an overhead crane. Next, tongue plates were bolted to the north reaction frame. After aligning the cross-braced bar joists, tongue plates and support stands with the reaction frames, at both ends of the test assembly, the bar joist seats were welded to the tongue plates, each with two fillet welds 2 1/2 in. long. See test assembly support photo Figure 2.8. The hydraulic rams were installed at the south reaction frame with pins. Finally, the steel decking was set, aligned and welded to the cross-braced bar joists. Spot welds were made in each valley of the steel decking along each joist top chord.

Specific Test Joist measurements were made and recorded. These measurements included top and bottom chord cross-section dimensions at the test assembly centerline, south end diagonal diameter, and camber with the deck installed in the test assembly configuration. This data is found in the appendices of Volume II.

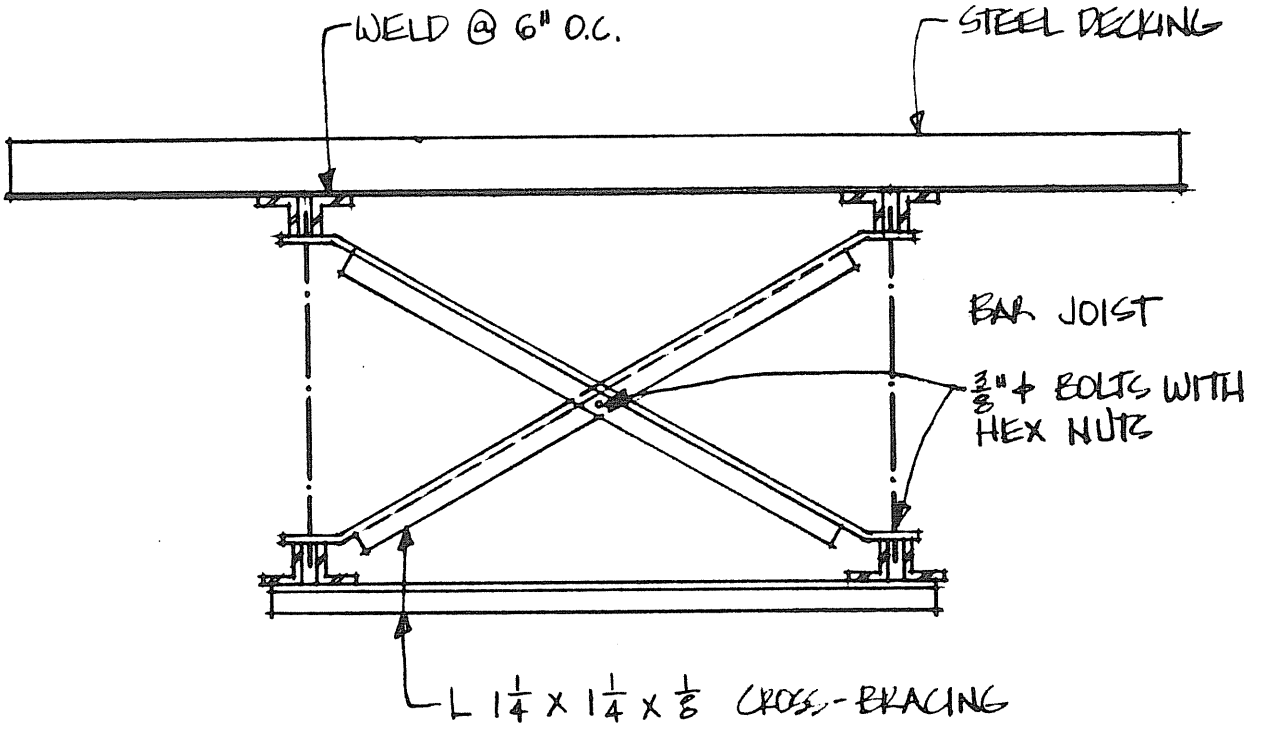


Figure 2.1 Bar Joist Test Assembly Cross-Bracing

Test	Decking Thickness (Gage)	Supplier
Preliminary	22	Robberson Steel Company Oklahoma City, Oklahoma
I	16	Haag Engineering Company Carrollton, Texas
II	18	Roll-Form Company Houston, Texas
III	18	Roll-Form Company Houston, Texas
IV	18	Roll-Form Company Houston, Texas

Figure 2.2 Decking Thickness and Supplier

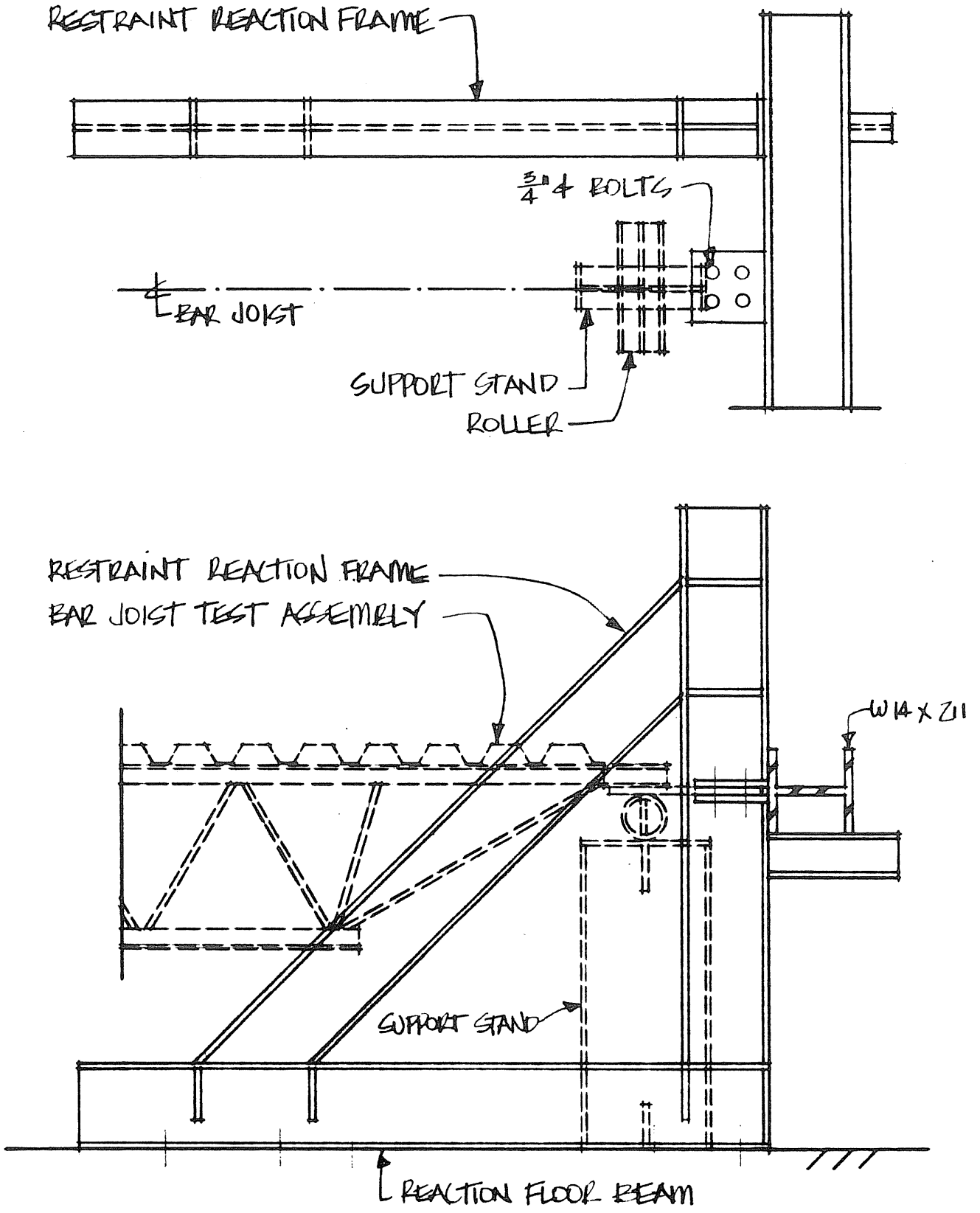


Figure 2.3 Longitudinal Force Restraint Reaction Frame

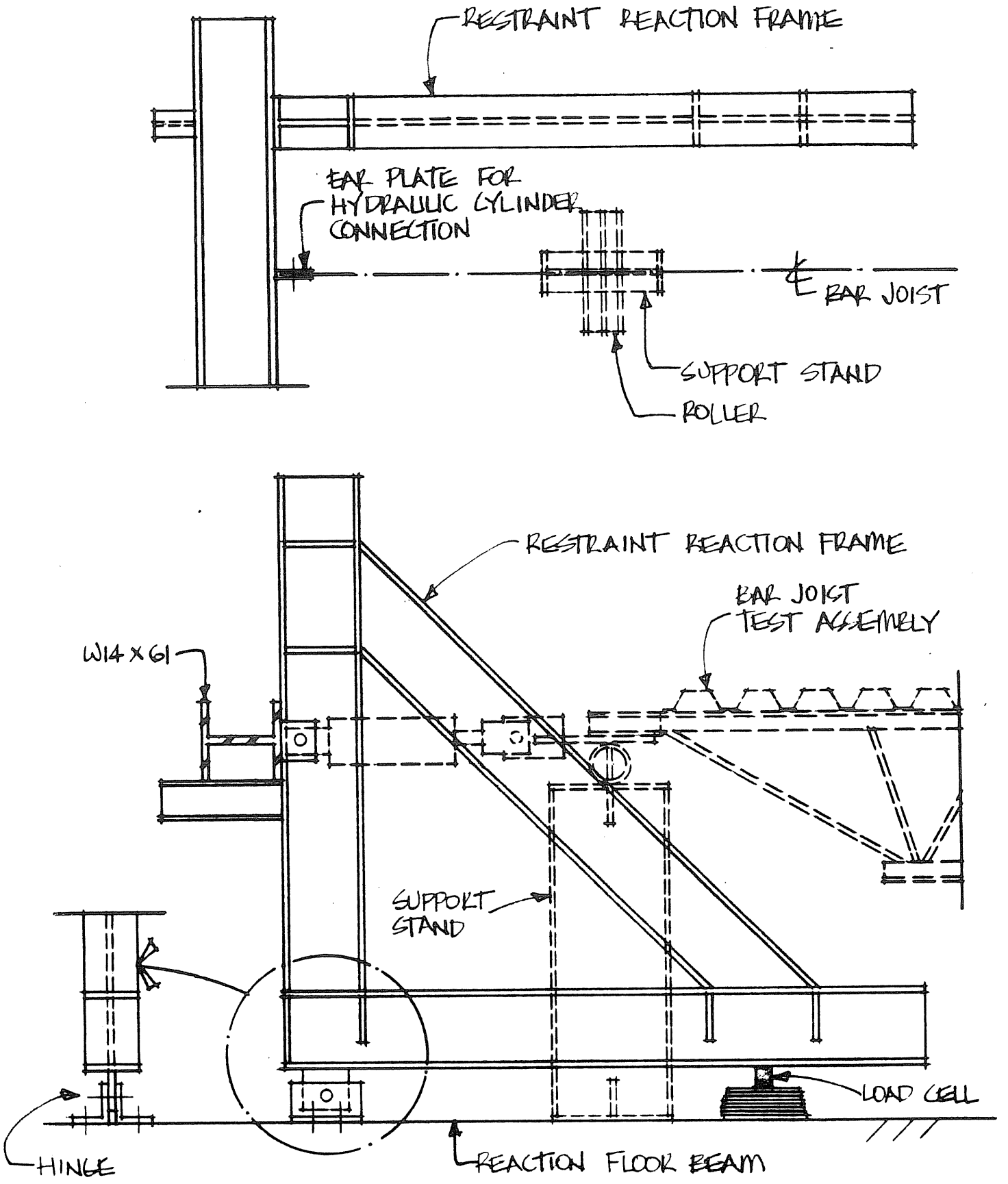
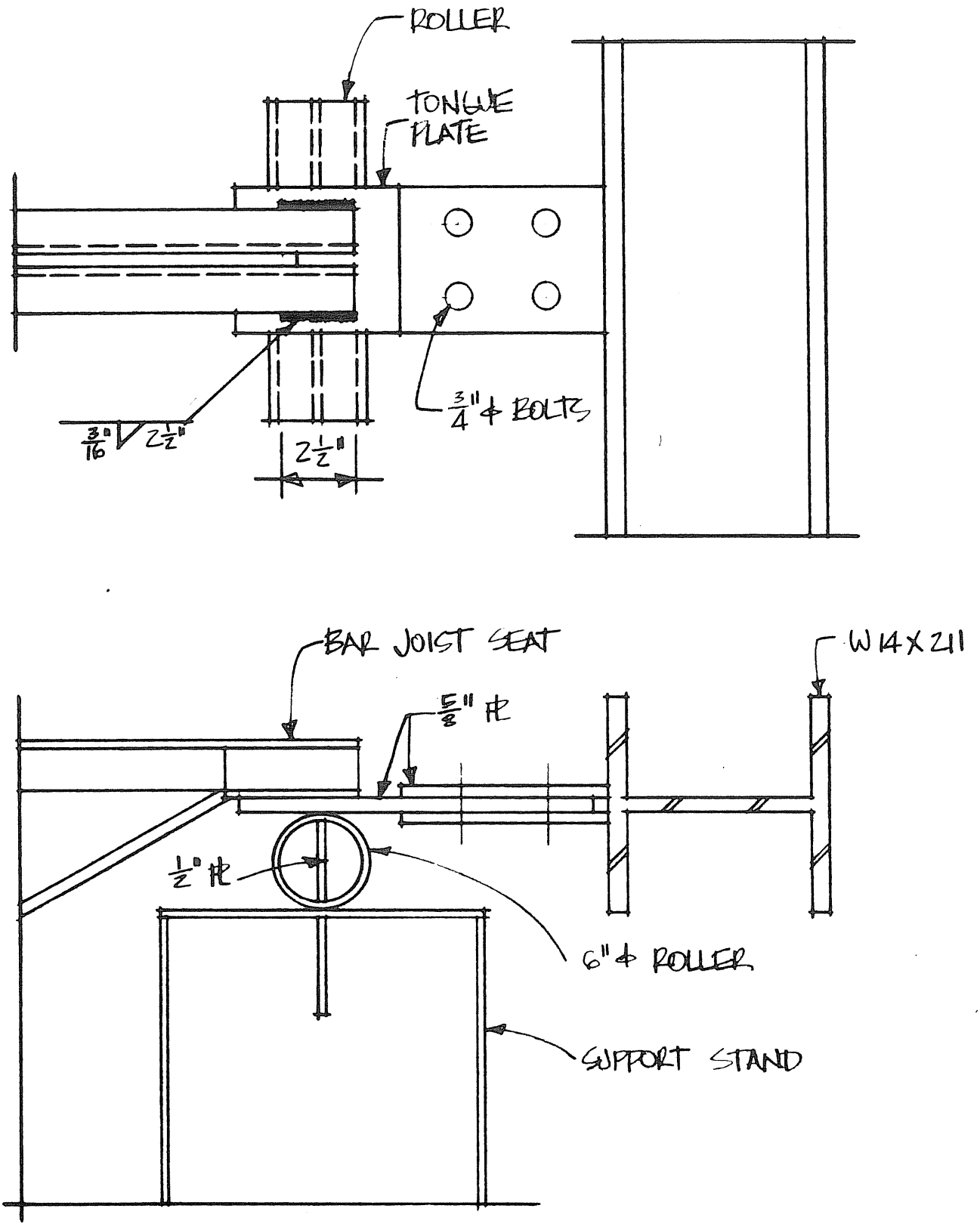
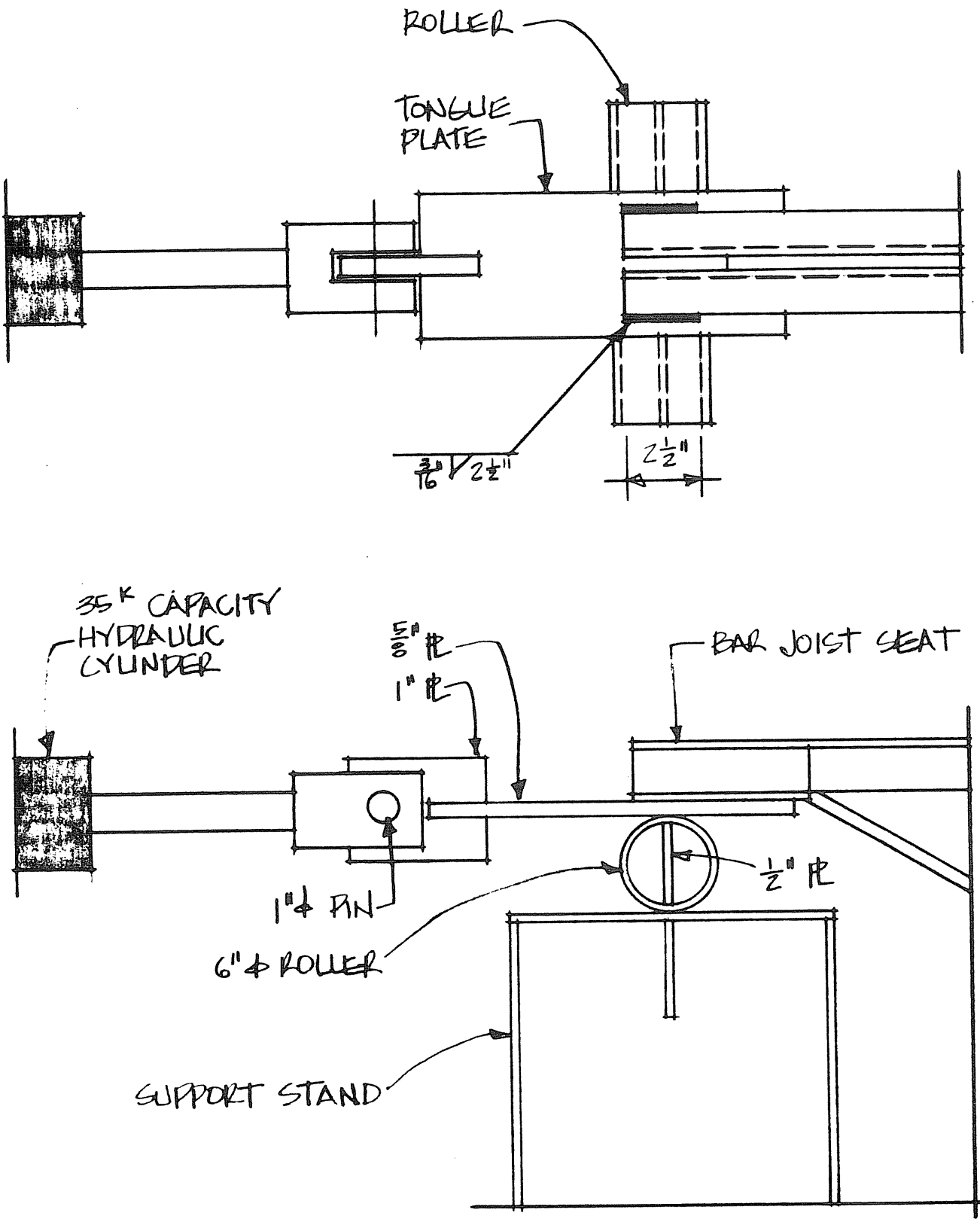


Figure 2.4 Longitudinal Force Application Reaction Frame



NOTE: STEEL DECKING NOT SHOWN FOR CLARITY.

Figure 2.5 North Support Stand



NOTE: STEEL DECKING NOT SHOWN FOR CLARITY.

Figure 2.6 South Support Stand

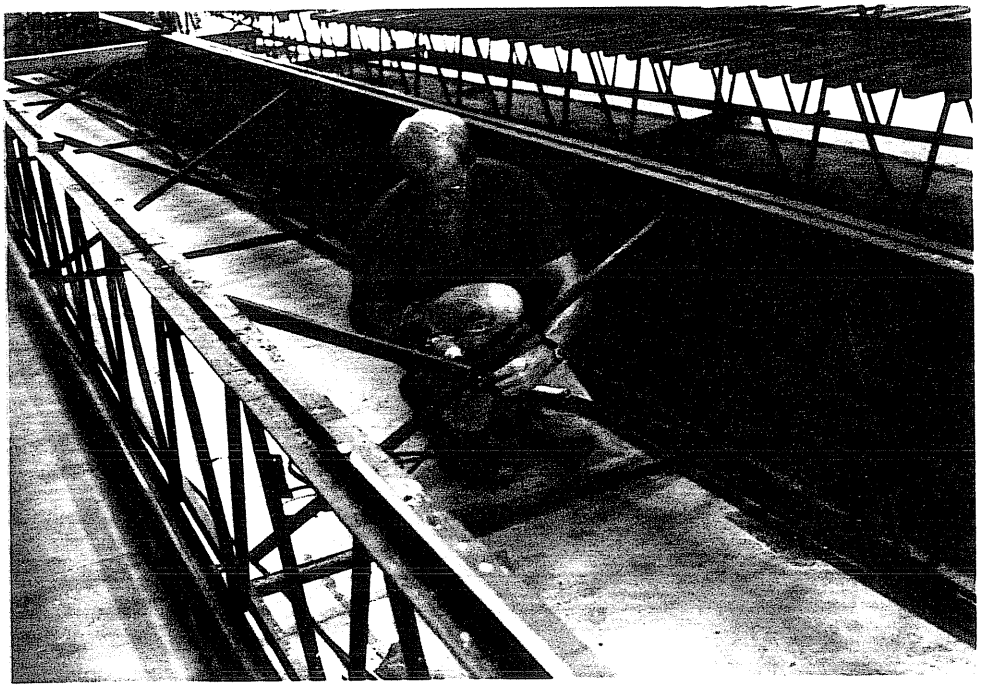


Figure 2.7 Photograph of Cross-Bracing Installation

Figure 2.8 Photograph of Bar Joist Test Assembly
South Support

2.3 Instrumentation

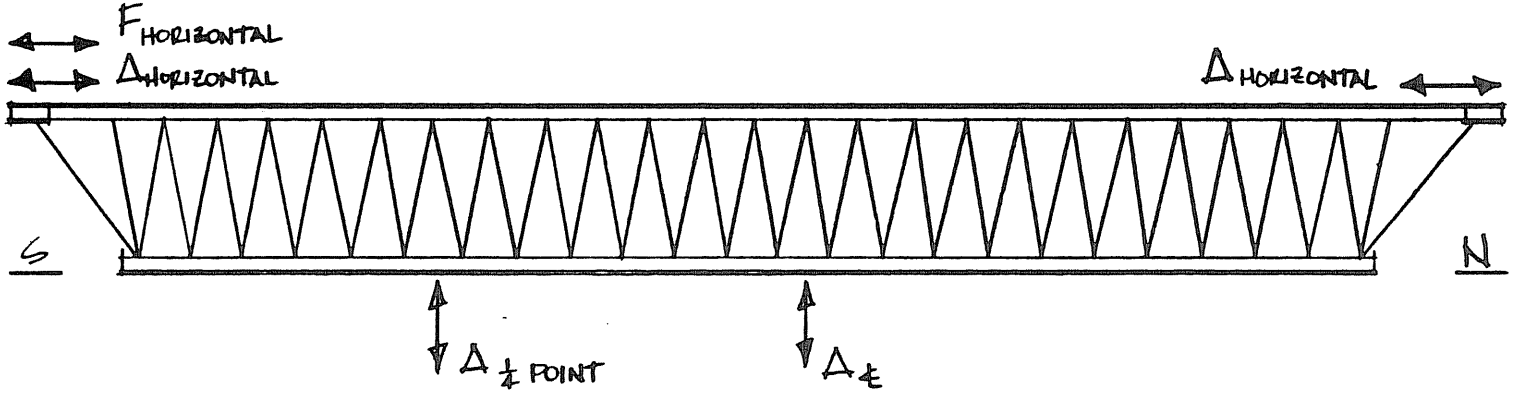
The test set-up was monitored with twelve displacement transducers, two strain gages, two load cells and two or more clip gages. Measurements were taken, processed and recorded with a micro-computer controlled data acquisition system. See test set-up instrumentation schematic Figure 2.9.

The linear displacement transducers were placed at various locations in the test set-up. Both the Test Joist and New Joist vertical displacements were measured at the test assembly centerline and the south quarter points. Similarly, both the Test Joist and New Joist longitudinal displacements were measured at the north and south ends of the test assembly. Linear displacement transducers were also used to measure chord angle elongation at the Test Joist centerline. These measurements were made on both angles of the top and bottom chords of the Test Joist. See photograph Figure 2.10.

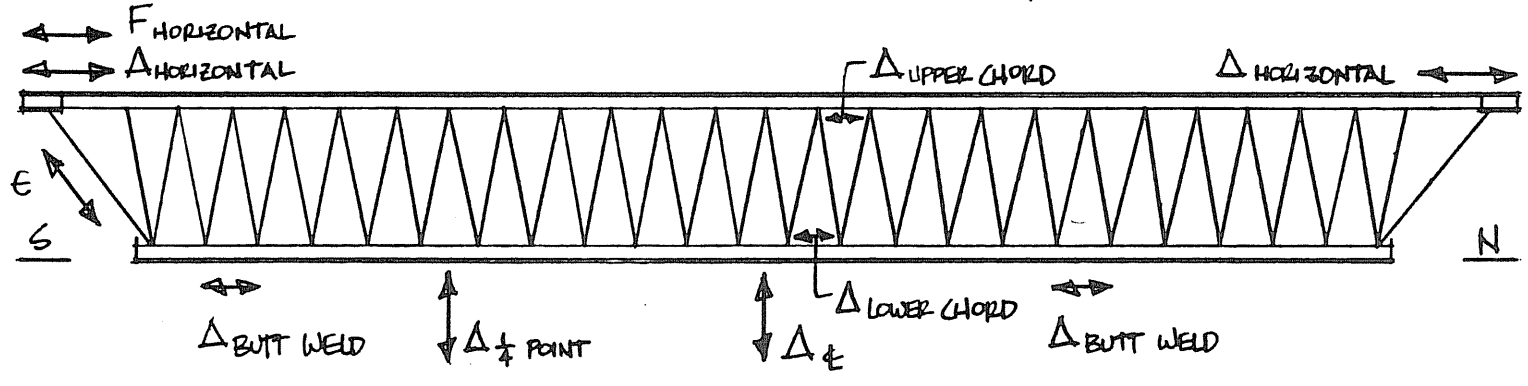
Two strain gages were placed on the Test Joist south end diagonal. These strain gages were located at the midlength of the diagonal and oriented parallel with the axis of the diagonal.

Two load cells were located in the south reaction frame. Longitudinal restraint forces were calculated from the measured vertical compression force and configuration geometry. See south reaction frame Figure 2.4.

Clip gages were installed at all Test Joist bottom chord butt



New Joist



Test Joist

Figure 2.9 Test Set-up Instrumentation Schematic

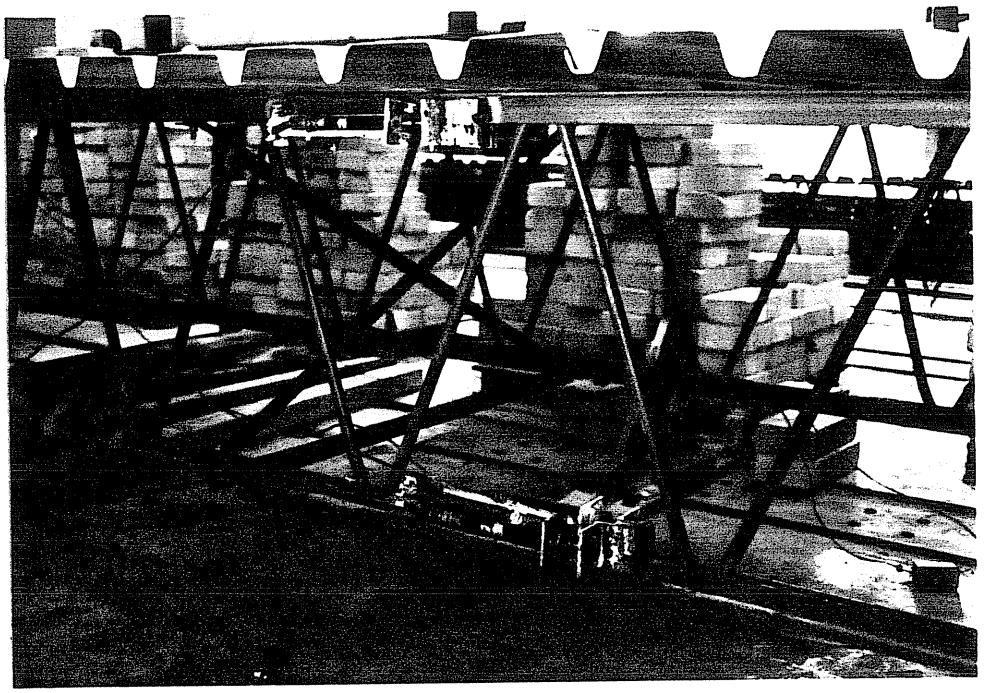


Figure 2.10 Photograph Showing Method of Measurement for Chord Elongation

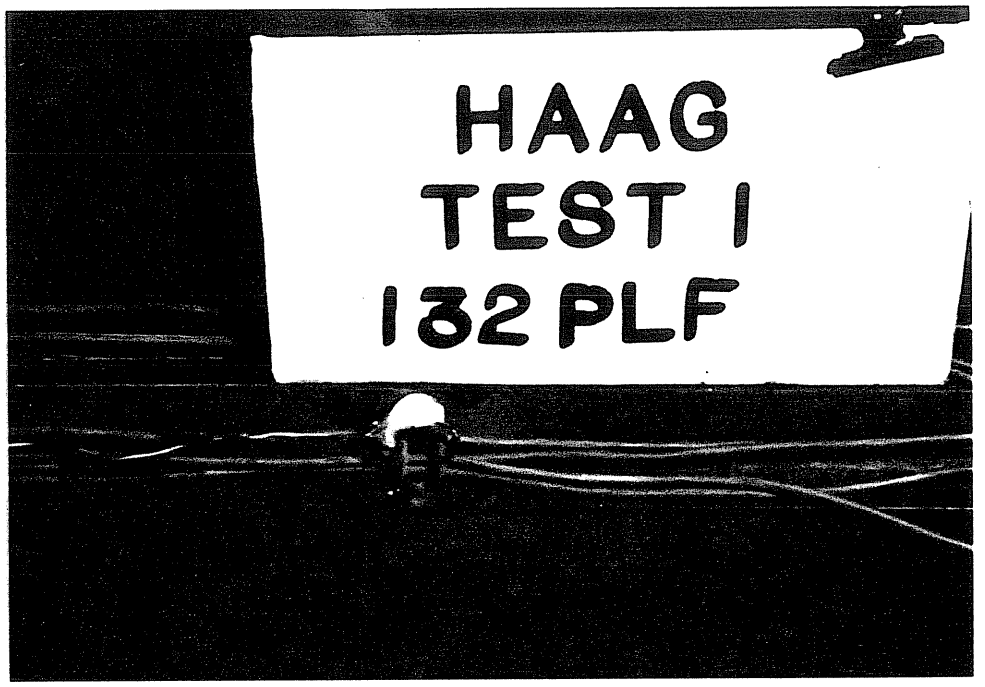


Figure 2.11 Photograph of Clip Gage

welds. These gages measured the elongation at the splice. See photograph Figure 2.11.

All data for each test was taken, processed and printed with the computer based data acquisition system. Selected data were plotted by the system as the test progressed to permit effective monitoring of test. This system consists of a HP 85 micro-computer, HP 3497A Data Acquisition/Control Unit and a HP 7470A two pen graphic plotter.

2.4 Testing Procedure

The initial phase of each test was a 'warm-up' phase. This permitted assessment of the bar joist test assembly response and instrumentation/data acquisition system performance. The initial phase consisted of first initializing the data acquisition system, then loading the bar joist test assembly with concrete blocks to 66 plf in 33 plf increments with the hydraulic cylinders disconnected. The test assembly was then unloaded in the reverse manner. Data points were taken prior to loading, at each loading or unloading step, and after unloading. When satisfied with the initial phase results, the procedures specific to the particular test began. Again, loading and unloading were done incrementally. Data points were taken prior to loading, at each loading or unloading step, and after unloading. Ponding load locations are shown in Figure 2.12. The specific testing procedures follow:

Preliminary Test

Step 1. Test assembly loaded to 66 plf in 16.5 plf increments with hydraulic rams disconnected and subsequently unloaded to 0 plf in 33 plf increments.

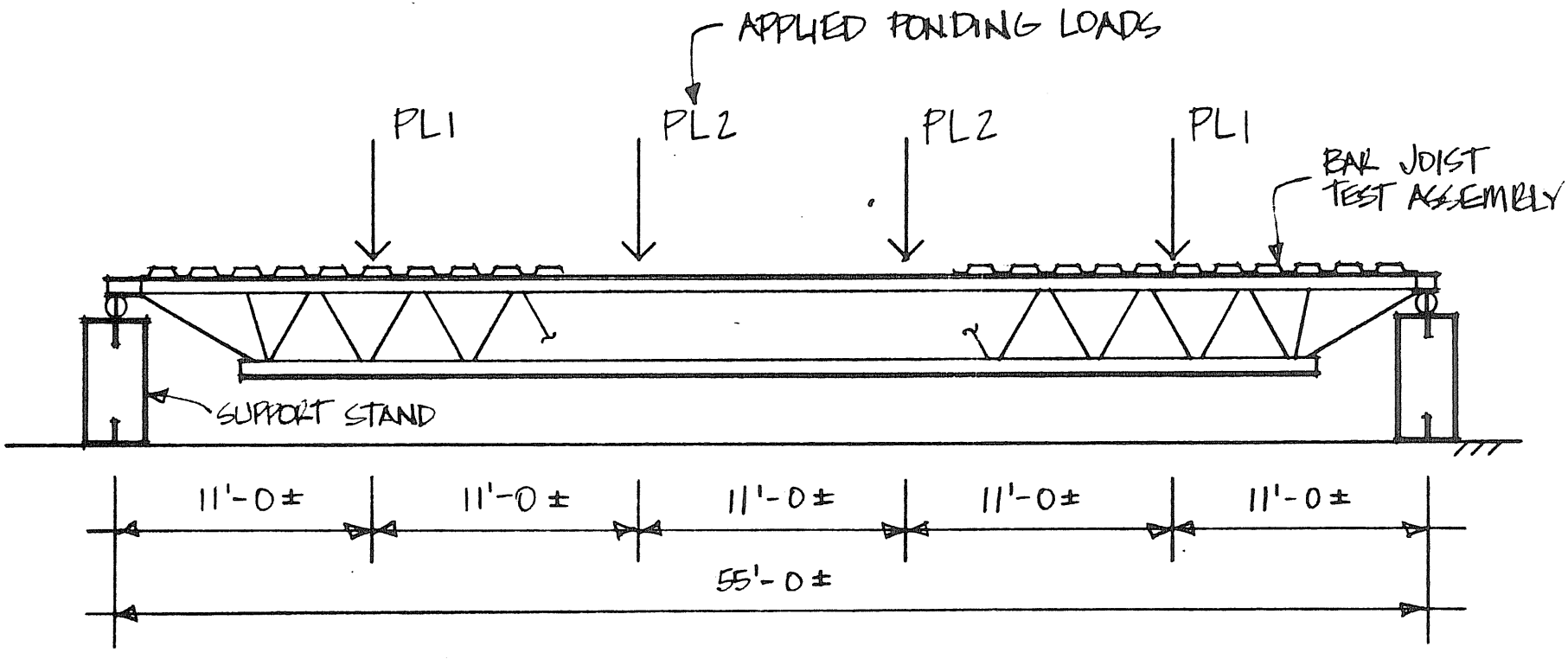


Figure 2.12 Ponding Load Locations

Step 2. Test assembly loaded to 165 plf in 16.5 plf increments with hydraulic cylinders disconnected.

Step 3. Hydraulic cylinders activated and longitudinal displacement of top chords brought to reference position (zero chord shortening).

Step 4. Test assembly unloaded to 0 plf in 33 plf increments, then hydraulic cylinders released.

Step 5. Hydraulic cylinders activated and test assembly loaded to 33 plf in single increment.

Step 6. Hydraulic cylinder loads increased; test assembly load increased to 165 plf in 33 plf increments.

Step 7. Hydraulic cylinder loads increased; test assembly subsequently loaded with ponding load.

Step 8. Test assembly unloaded to 0 plf: ponding load removed then 33 plf increments. Hydraulic cylinders disconnected.

Step 9. Test assembly loaded to 133 plf in 33 plf increments with hydraulic cylinders disconnected.

Step 10. Test assembly loaded with ponding load with hydraulic cylinders disconnected.

Step 11. Test assembly unloaded to 0 plf: ponding load removed then 33 plf increments.

Test I

Step 1. Test assembly loaded to 66 plf in 33 plf increments with hydraulic cylinders disconnected and subsequently unloaded to 0 plf in 33 plf increments.

Step 2. Test assembly loaded to 277.3 plf in 33 plf increments with hydraulic cylinders released.

Step 3. Test assembly unloaded to 0 plf in 33 plf increments with rams released.

Test II

Step 1. Test assembly loaded to 66 plf in 33 plf increments with hydraulic cylinders disconnected and subsequently unloaded to 0 plf in 33 plf increments with hydraulic cylinders disconnected.

Step 2. Test assembly loaded to 165 plf in 33 plf increments with hydraulic cylinders disconnected.

Step 3. Hydraulic cylinders activated so that test assembly horizontal displacement equalled zero (with respect to reference, no load positioning).

Step 4. Hydraulic cylinders released.

Step 5. Hydraulic cylinders activated so that test assembly horizontal displacement equalled zero.

Step 6. Test assembly unloaded to 0 plf in 33 plf increments, then hydraulic cylinders released.

Step 7. The interior bottom chord angles of the Test Joist and the New Joist cut cleanly at the test assembly centerline.

Step 8. Test assembly loaded to 142 plf incrementally with hydraulic cylinders released.

Step 9. Hydraulic cylinders activated so that test assembly horizontal displacement equalled zero.

Step 10. Test assembly loaded to 156.5 plf, incrementally with hy-

draulic cylinders activated to maintain test assembly horizontal displacement equal to zero.

Step 11. Test assembly unloaded to 0 plf incrementally, then hydraulic cylinders released.

Test III

Step 1. Test assembly loaded to 66 plf in 33 plf increments with hydraulic cylinders disconnected and subsequently unloaded to 0 plf in 33 plf increments.

Step 2. Test assembly loaded to 165 plf in 33 plf increments with hydraulic cylinders disconnected.

Step 3. Hydraulic cylinders activated so that test assembly horizontal displacement equalled zero.

Step 4. Test assembly unloaded to 82.5 plf in 33 plf increments; zero horizontal displacement maintained.

Step 5. Test assembly loaded with ponding load as indicated in Figure 2.12 and Table 3.1 horizontal displacement maintained.

Step 6. Test assembly unloaded to 0 plf; ponding load removed then 33 plf increments. Hydraulic cylinders released.

Test IV

Step 1. Test assembly loaded to 66 plf in 33 plf increments with hydraulic cylinders disconnected and subsequently unloaded to 0 plf in 33 plf increments.

Step 2. Test assembly loaded to 165 plf in 33 plf increments with hydraulic cylinders activated so that horizontal displacement maintained at zero.

Step 3. Test assembly unloaded to 132 plf in 33 plf increments, then hydraulic cylinders released.

Step 4. Hydraulic cylinders activated so that horizontal displacement equalled zero.

Step 5. Test assembly unloaded to 0 plf in 33 plf increments, then hydraulic cylinders released.

Step 6. The bottom chord angles of the Test Joist and New Joist cut cleanly at the test assembly centerline. Overhead crane provided test assembly support during cutting.

Step 7. Overhead crane support removed as hydraulic cylinders activated so that horizontal displacement equalled zero.

Step 8. Hydraulic cylinders released.

Step 9. Test assembly loaded incrementally. Hydraulic cylinders activated so that horizontal displacement maintained at zero.

Step 10. Test assembly unloaded to 0 plf incrementally, then hydraulic cylinders released.

Test results are presented in Chapter III.

Table 3.1

Ponding Loading, Test III Step 5

Step	Uniform Loading (plf)	Ponding Load @ 1 (Blocks)	Ponding Load @ 2 (Blocks)
1	99.	2	2
2	99.	2	3
3	132.		
4	132.	4	5
5	132.	5	6
6	132.	5	7
7	165.		
8	165.	7	9
9	165.	8	11
10	165.	9	11
11	198.		
12	198.	9	12
13	198.	11	15
14	198.	12	16
15	231.		
16	231.	11	15
17	231.	14	19
18	231.	15	20
19	247.5		
20	247.5	13	18
21	247.5	17	22

Note: Each block weighs 33 $\pm$ 0.1 lbs.

CHAPTER III

TEST RESULTS

3.1 Bar Joist Test Assembly Results

The bar joist test assembly results for Tests I, II, II-1 (cut angle), III, IV and IV-2 (two cut angles) are presented in Appendices A, B, C, D, E and F, respectively. The test matrix for these tests is shown in Table 1.1.

Each appendix contains a similar presentation of results for a particular test. The first sheet summarizes measurements made prior to testing. Measurements include the cross-section dimensions of the Test Joist top and bottom chords at its centerline plus the diameter of the south end diagonal. Camber measurements were made by tightly stretching a string between reference points with respect to the top chord at each end of the Test Joist. Measurements recorded were the distances between the top chord and string at each end of the Test Joist, and the distance between the steel decking and string at the Test Joist centerline. Also recorded was the weight of a typical concrete block used to apply load to the bar joist test assembly and the weight of a sheet, roughly 4'-0 x 8'-0, of steel decking used in the test. A typical measurement sheet is shown in Figure 3.1.

The second sheet indicates the locations of Test Joist bottom chord butt welds. The designations for these welds, for example B18-3, are

identical to those marked (by the sponsor) on the Test Joists. Measurements pertinent to the clip gages at those butt welds were also recorded. A typical bottom chord butt weld data sheet is shown in Figure 3.2.

Calculated cross-section properties appear on the third sheet. Properties for the Test Joist include the areas of the top and bottom chords, the area of the south end diagonal and the location of the cross-section neutral axis. Note that all Test Joist neutral axes are calculated with a distance from bottom chord centroid to top chord centroid of 2.254 ft. Camber was calculated by subtracting the sum of the Test Joist steel deck to string distance and the steel deck thickness from the average top chord to string distance at the reference points. A typical calculated quantities sheet is shown in Figure 3.3.

Synopses of the plane frame single joist computer analyses follow the calculated quantities sheet. One sheet is provided for each computer analysis performed. The synopsis includes boundary conditions, top and bottom chord cross-sectional areas, applied loading, reactions, top and bottom chord forces at bar joist centerline and deflections appropriate to the analysis. A typical computer analysis summary sheet is shown in Figure 3.4.

Following the computer analysis summary sheets are plots of theoretical values and experimental data. The theoretical values were obtained from the plane frame computer analyses whereas the experimental data were collected during testing. The plots have ordinates of applied load or centerline moment and abscissas of centerline vertical deflection, top chord force, bottom chord force, end diagonal force, weld strain, chord shortening or ram load. Note that centerline moments were calculated by summing the product of the top chord force and its distance from the neutral axis with the

product of the bottom chord force and its distance from the neutral axis. Subtracted from this sum was the product of the ram load, when present, and its distance from the neutral axis. A typical plot of theoretical values and experimental data is shown in Figure 3.5.

The next sheet records information specific to the data acquisition system. This information was designated 'I', channel number, calibration factor, and instrument. The 'I' was a label to which channel numbers were assigned. Channel numbers represented the specific data acquisition system analog ports to which instrumentation was attached. The calibration factor was the value relating an instrument's output response to its input excitation. Typically these factors were in terms of millivolt response to volt excitation. Finally, instrument designation described the type or location of the instrument in the test set up. Additional information, bridge size and gage factor, were recorded for those channels used with strain gages. A typical data collection information sheet is shown in Figure 3.6.

The next portion of each appendix is the output from the data acquisition system. Each sheet is one reading of all instrumentation in the test set-up, i.e., one data point. The output includes both raw data (actual channel voltages) and processed information. Processed information includes:

a. vertical load and/or centerline moment,
b. ram loads,
c. top chord force,
d. bottom chord force,
e. south end diagonal force,
f. centerline vertical deflection,
g. quarter-point vertical deflections,
h. joist end horizontal displacements, and
i. weld strains.

The information presented is mostly self-descriptive. Note that 'LOAD END' was the south end of the bar joist test assembly while the 'SUP END' was the

north end of the test assembly. Further, 'W1' was the relative joist end horizontal displacement of the east or Test Joist while 'W2' was the relative joist end horizontal displacement of the west or New Joist.

The final portion of each appendix is a handwritten list of the status of the test assembly at each data point, e.g. load magnitude, load type, level of restraint provided, etc. These lists were developed as the tests progressed.

3.2 Summary

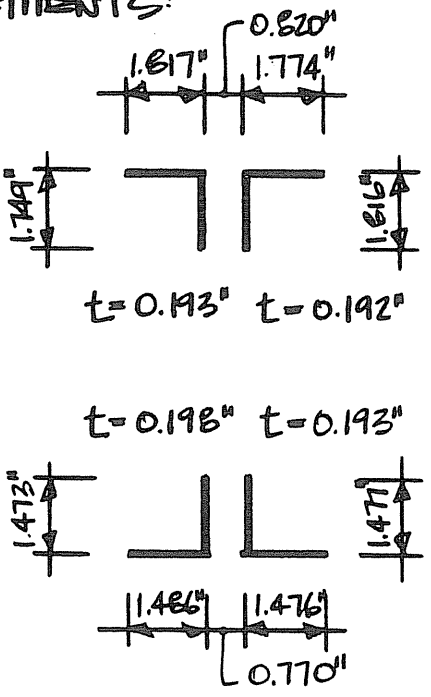
Five tests of two bar joist assemblies are reported herein. All raw and some processed test data is presented in Volume II. Following the Scope of Work for the project, no conclusions are drawn.

PROJECT HAAG JOISTS

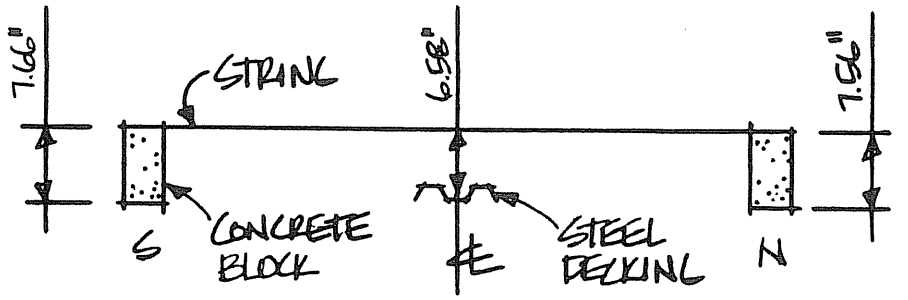
TEST I

TEST JOIST B18

MEASUREMENTS:



+ SOUTH END DIAGONAL = 0.950"



WT. CONCRETE BLOCK = 33 LB ±

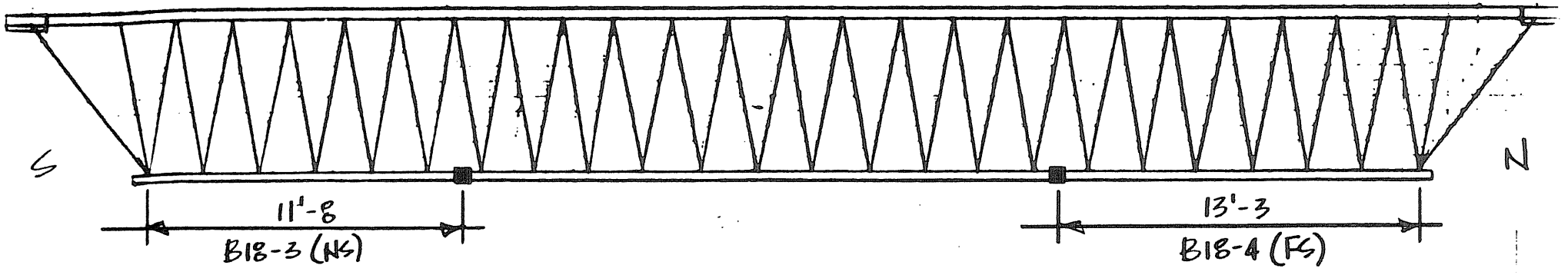
WT STEEL DECKING (1 SHEET) = 103.0 LB ±

Figure 3.1 Typical Measurement Data Sheet

DATE 8-20-84

BY SJM

LOWER CHORD BUTT WELD LOCATIONS:

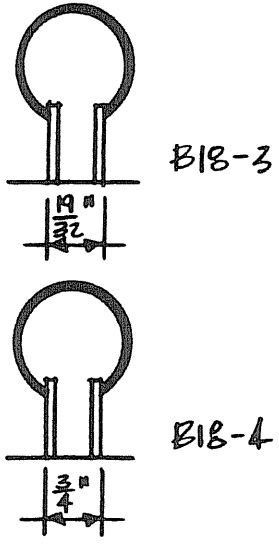


PROJECT HAAG JOISTS

TEST 1

TEST JOIST B18

CLIP GAGES:



DATE 8-20-84

BY SJM

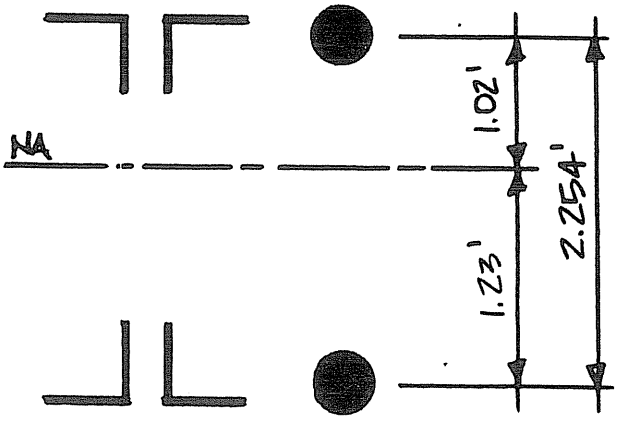
Figure 3.2 Typical Bottom Chord Butt Weld Data Sheet

PROJECT HAAG JOISTS

TEST I

TEST JOIST B18

CALCULATED QUANTITIES:



$A_{\text{TOP CHORD}} = 1.303$ in²

$A_{\text{BOT CHORD}} = 1.079$ in²

$A_{\text{SOUTH END DIAGONAL}} = 0.709$ in²

CAMBER = + 0.97"

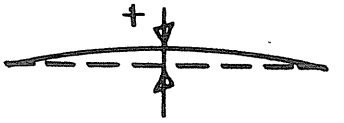


Figure 3.3 Typical Calculated Quantities Sheet

DATE 8-20-84

BY CJM

Figure 3.4 Typical Computer Analysis Summary Sheet

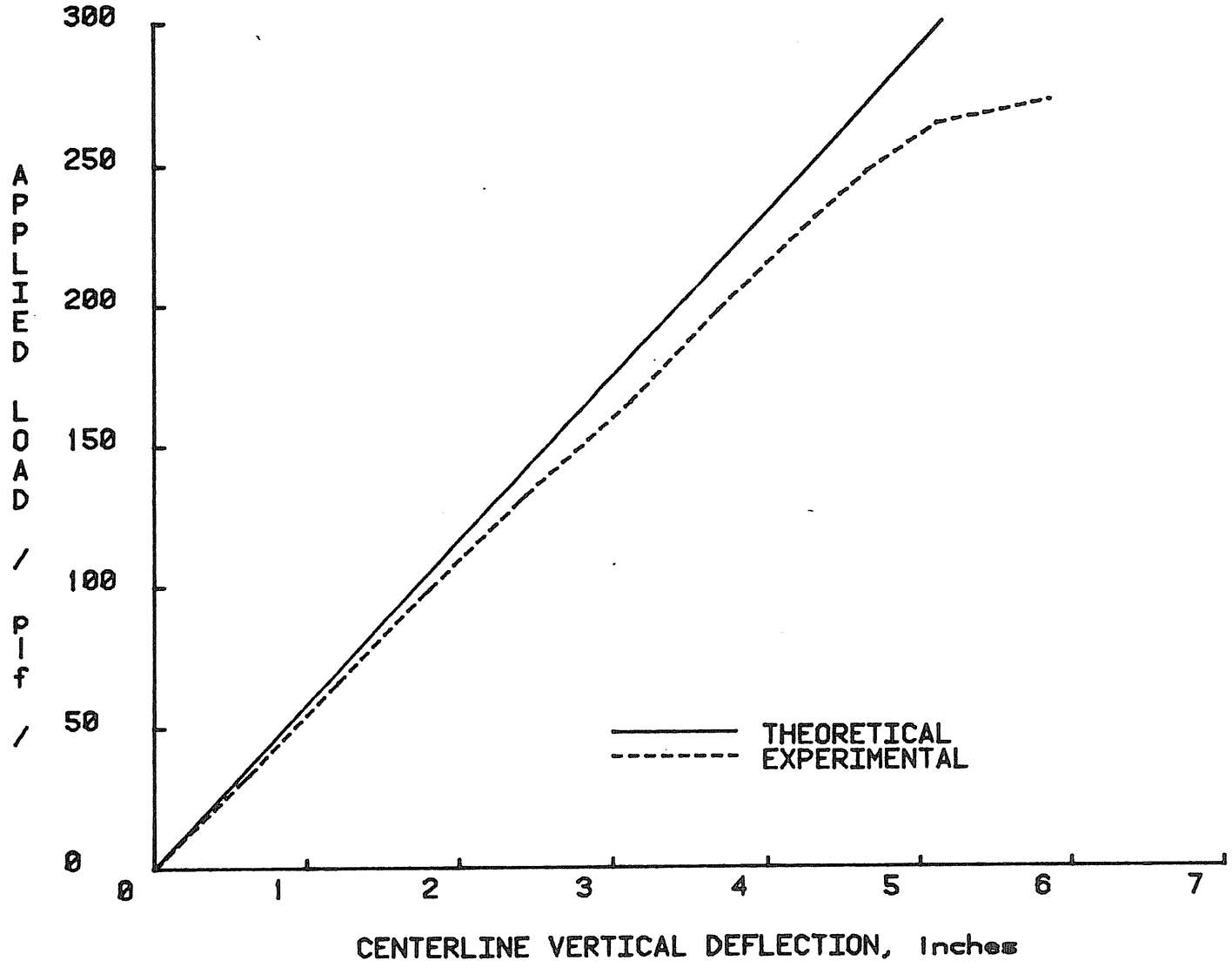


Figure 3.5 Typical Plot of Theoretical and Experimental Data

HAAG JOISTS
TEST I
8-20-84

```
TEST:                    TEST I
Project Name:            HAAG JOISTS
Conducted by:            AA
-------------------------
I=0
CHANNEL NUMBER:0
CALIBRATION FACTOR: .09389
INSTRUMENT:VER CENTER EAST

-------------------------
I=1
CHANNEL NUMBER:1
CALIBRATION FACTOR: .09445
INSTRUMENT:VER CENTER WEST

-------------------------
I=2
CHANNEL NUMBER:2
CALIBRATION FACTOR: .09385
INSTRUMENT:VER 1/4 PT EAST

-------------------------
I=3
CHANNEL NUMBER:3
CALIBRATION FACTOR: .09401
INSTRUMENT:VER 1/4 PT WEST

-------------------------
I=4
CHANNEL NUMBER:5
CALIBRATION FACTOR: 1.283
INSTRUMENT:HOR. NE   END

-------------------------
I=5
CHANNEL NUMBER:6
CALIBRATION FACTOR: 1.35
INSTRUMENT:HOR. NW   END

-------------------------
I=6
CHANNEL NUMBER:7
CALIBRATION FACTOR: .0942
INSTRUMENT:HOR. SE   END

-------------------------
I=7
CHANNEL NUMBER:8
CALIBRATION FACTOR: .09441
INSTRUMENT:HOR. SW   END

-------------------------
I=8
CHANNEL NUMBER:4
CALIBRATION FACTOR: 1
INSTRUMENT:EXCIT.

-------------------------
I=9
CHANNEL NUMBER:10
CALIBRATION FACTOR: 1.25
INSTRUMENT:TOP CHORD AXIAL EAST

-------------------------
I=10
CHANNEL NUMBER:11
CALIBRATION FACTOR: 1.3
INSTRUMENT:TOP CHORD AXIAL WEST

-------------------------
I=11
CHANNEL NUMBER:12
CALIBRATION FACTOR: 1.283
INSTRUMENT:BOT CHORD AXIAL EAST

-------------------------
I=12
CHANNEL NUMBER:13
CALIBRATION FACTOR: 1.35
INSTRUMENT:BOT CHORD AXIAL WEST

-------------------------
I=13
CHANNEL NUMBER:19
CALIBRATION FACTOR: 1
INSTRUMENT:EXCIT.

-------------------------
I=14
CHANNEL NUMBER:20
CALIBRATION FACTOR: 1
INSTRUMENT:BUDD BOX READINGS

-------------------------
I=15
CHANNEL NUMBER:21
CALIBRATION FACTOR: -26388
INSTRUMENT:LOAD CELL WEST

-------------------------
I=16
CHANNEL NUMBER:24
CALIBRATION FACTOR: .0229274
INSTRUMENT:WELD CLIP GAGE NORTH

-------------------------
I=17
CHANNEL NUMBER:25
CALIBRATION FACTOR: .027957474
INSTRUMENT:WELD CLIP GAGE SOUTH

-------------------------
I=18
CHANNEL NUMBER:30
CALIBRATION FACTOR: 1
INSTRUMENT:EXCIT.

-------------------------
I=19
CHANNEL NUMBER:22
BRIDGE SIZE:.5
GAGE FACTOR:2.11
LOCATION:GAGE ON END DIAG. OF EA
ST JOIST
-------------------------
I=20
CHANNEL NUMBER:23
BRIDGE SIZE:.5
GAGE FACTOR:2.11
LOCATION:GAGE ON END DIAG. OF EA
ST JOIST
```

Figure 3.6 Typical Data Acquisition System Information Sheet

HAAG JOISTS
TEST I
8-20-84

VOLTAGE READINGS

VER LOAD= 0
VER DISP= 0

CH.	VOLT
0	1.797900
1	3.008400
2	1.874300
3	1.491700
4	-1.302300
5	-1.332300
6	1.548600
7	2.782900
8	5.172700
9	-.662140
10	-.508410
11	.817940
12	.388430
13	15.100000
14	8.695100
15	-.000043
16	.001480
17	.003685
18	5.003600
19	.003499
20	.002017

==========

DATA POINT: 1

FORCES
======

VERT LOAD= 0.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	0.000	0.000

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: -.001
BOT CHORD, MIDSPAN: -.003
DIAGONAL, END: .008

DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
0.00000	0.00000	0.00000

1/4 SPAN (VERT.)

EAST	WEST	AVER.
0.00000	0.00000	0.00000

LOAD END (HOR.)

EAST	WEST	AVER.
0.00000	0.00000	0.00000

SUP. END (HOR.)

EAST	WEST	AVER.
-.00002	0.00000	-.00001

W1=
1.50680155885E-5
W2= 0

WELD STRAINS
STRAIN IN NORTH WELD=-1.16225479
266E-5
STRAIN IN SOUTH WELD=2.406927655
2E-5

Figure 3.7 Typical Data Point Sheet

REFERENCES

1. Standard Specifications for Open Web Steel Joists, H Series, Steel Joist Institute, Richmond, Virginia, 1978.

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

APPENDIX A

SCOPE OF WORK

SCOPE OF WORK

The bar joist testing program includes the following items:

1. Computer modeling and analysis of the bar joist that will be tested. The computer model and analysis will be used only as an aid in designing the test set-up and checking test data.

2. Testing a mock-up of the bar joist bearing seat for load capacity in the direction of the bar joist longitudinal axis for the purpose of determining the required horizontal force capacity of the test set-up.

3. Setting-up all tests. A schematic drawing of the test set-up is given in the attached Fig. 1. The test set-ups are to include the following items:

   A. Two joists per set-up. The two joist are to be spaced four feet apart with at least 18 inches floor clearance to the bottom chord. One joist is to be a Jefferson County Airport Sample Joist (referred to here as Test Joist), the other is to be a similar but new joist fabricated by Tex-Ark Joist Company specifically for this test to the same specifications as the Jefferson County Airport joist including camber as originally fabricated.

   B. An 18-gauge metal deck is to be welded to both joist in a manner similar to the specified welding of the deck at Jefferson County Airport. The purpose of the deck is to provide lateral stability to the top chords of the joists. Additional means may be employed during the test if the deck does not fulfill this purpose. The second purpose of the deck is to provide a platform for stacking the concrete blocks that will be used to load the joists.

   C. Bracing between the two test joist is to be built the same as the bracing formerly in place at Jefferson County Airport.

   D. Each joist end is to be supported at the bottom of the joist bearing seat. The type of joist support is shown schematically in the attached Fig. 4. The center-to-center distance between the simple supports to be 55'-0". One end of each joist to be free to move horizontally along the longitudinal axis of the joist but connected to a device capable of pulling the end back to a position equivalent to zero relative movement between the joist ends. The other end shall be restrained against joist translational movements.

E. Concrete blocks are to be available and ready for the purpose of applying loads as required to the joist. Documentation is to be provided certifying the weight of the concrete blocks.

F. In Test Procedures E, F and G, two load actuator rams are to be positioned over the test assembly along with load distributing beams capable of applying the required ponding loads to each joist in the form of four-point concentrated loading. The location and magnitude of loads are to be given to the Testing Agent.

G. New joist end bearing seats are to be fabricated on the Test Joist to restore the old seats that were cut during the joists' removal from the airport structure.

H. All joists, bracing, angles for end seats and the mock-up of the joist bearing seat are to be provided to the Testing Agent.

I. The decking is to be obtained locally by the Testing Agent.

4. Providing all necessary test fixtures and instrumentation. A schematic drawing showing the test instrumentation is given in the attached Fig. 2. Test instrumentation is to include the following:

A. Horizontal force measurement at one end of both joists in test.

B. Force measurement of the vertical ponding load applied in test procedures E, F, and G.

C. Resistance strain gage(s) on one end diagonal of both joist in test to measure average axial strain.

D. Extensionmeter strain devices at the bottom chord in midspan of both joists to measure average axial strain. In Test Procedures C and G, these devices are to be on the uncut angle in the same panel as the cut angle.

E. Extensionmeter strain devices to measure the average axial strain in the two top chord panels, directly above the cut bottom chord panel of both joists in Test Procedure D only .

F. Devices to measure the average elongation across all bottom chord butt welds on the Test Joist only.

G. Horizontal movement measurement of one joist end relative to the other end, or of each end to a fixed object, for both joists in test.

H. Vertical movement measurement of the joist bottom chords at a panel point near midspan and near quarterspan on one side of both joists in test.

5. Conducting all tests, recording all data, programming data processing software, plotting data, observing and recording joist behavior.

6. Conducting a test series prior to the actual tests using two of the new bar joist for the purpose of verifying test set-up, instrumentation, procedures, and achievement of objectives.

7. The test procedures for each of the four Test Joist (identified by Roman numerals) are as follows:

Procedure	Load	Joist	Lateral End Restraint	Bottom Chord
A	W_u	I	Released	None cut
B	W_w	I	Released	None cut
B	W_w	II	Released-Fixed	None cut
B	W_w	III	Released-Fixed	None cut
B	W_w	IV	Fixed	None cut
C	W_w	II	Released-Fixed	One angle cut
D	W_d	1st Available	Released-Fixed	Both angles cut
E	$W_d + P_w$	IV	Released-Fixed	None cut
F	$W_w + P_u$	III	Fixed	None cut
G	$W_d + P_u$	II	Fixed	One angle cut

Bottom chord cutting refers to intentional cutting of bottom chord angles at one midspan panel of both joists at the beginning of the test.

Lateral end restraint refers to the movement of one joist end relative to the other end along the joist's longitudinal axis. For released joists, this movement is not restrained; for released-fixed joists, this movement is allowed during the application of the load and then the joist end is pulled back to the starting position after each load increment. Data sets are to be taken at the released condition, midway between the released and fixed condition, and at the fixed condition; for fixed joists, this movement is

not intentionally allowed. Some movement may be allowed during load application due to the test set-up reaction stiffness but the joist end is to be pulled back to the original position as soon as possible and data sets are taken both prior to, and after, the repositioning.

Test loads are to be applied equally to both joists in the following approximate increments for all test procedures: 20% (to be applied as a "warm-up" to settle out any initial slack in the set-up), 50%, 75%, 100%, plus 10% for each increment beyond 100% until joist failure (for tests to failure). The weight of the joist, decking, and other items attached to the joist are to be measured and included as load in the initial 20% load increment. Data sets are to be taken at each load increment and at any point of significant joist behavior. Prior to loading the joist with any weight, the initial camber of both joist in test are to be measured.

Loads for each procedure are as follows:

A. W_w signifies a test load equal to the total safe uniformly distributed load carrying capacity given in the SJI Standard Load Table.

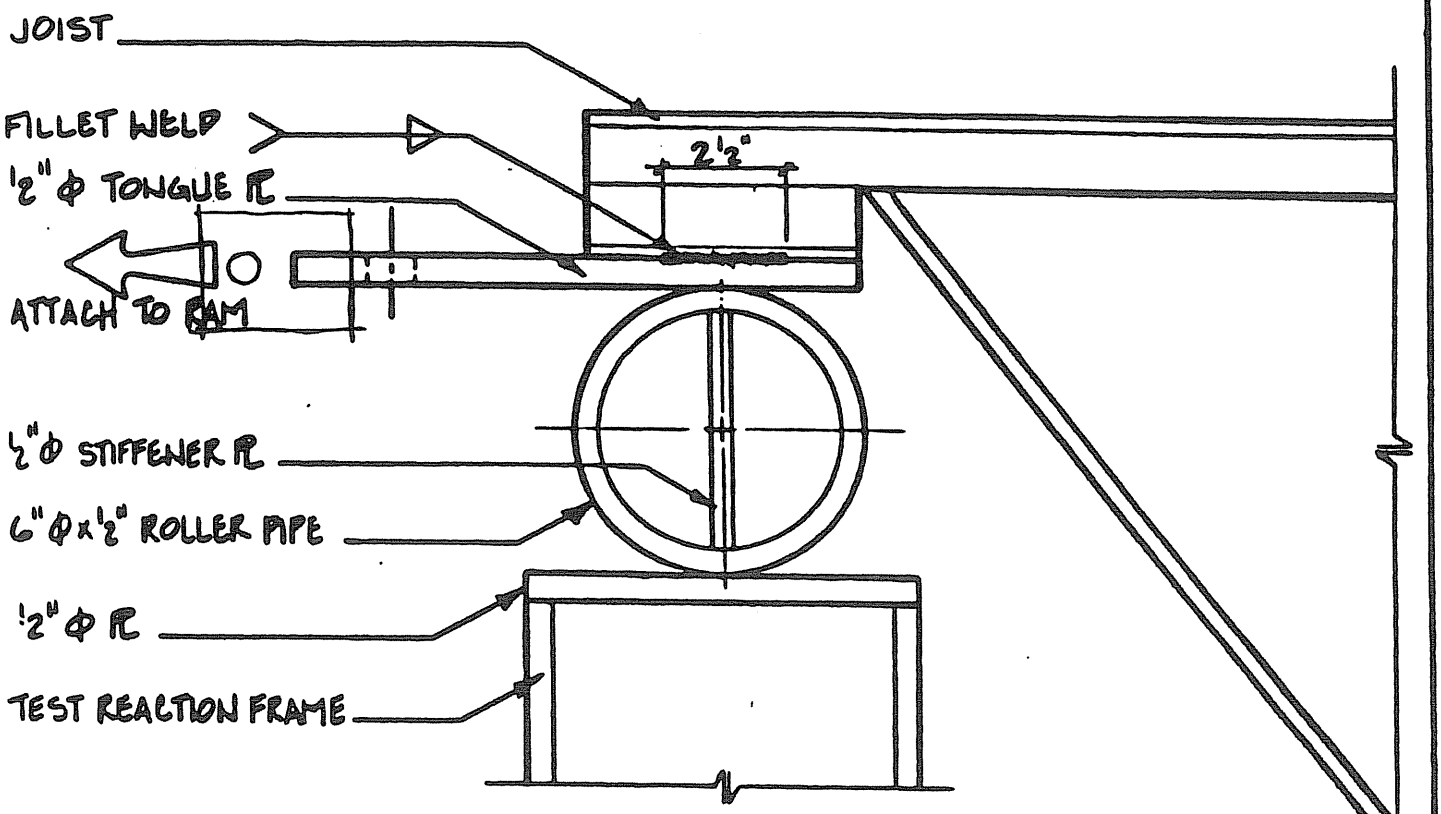
B. W_u signifies a test load equal to W_w multiplied by 1.65.

C. W_d signifies a test load equal to 100 pounds per lineal foot, per joist.

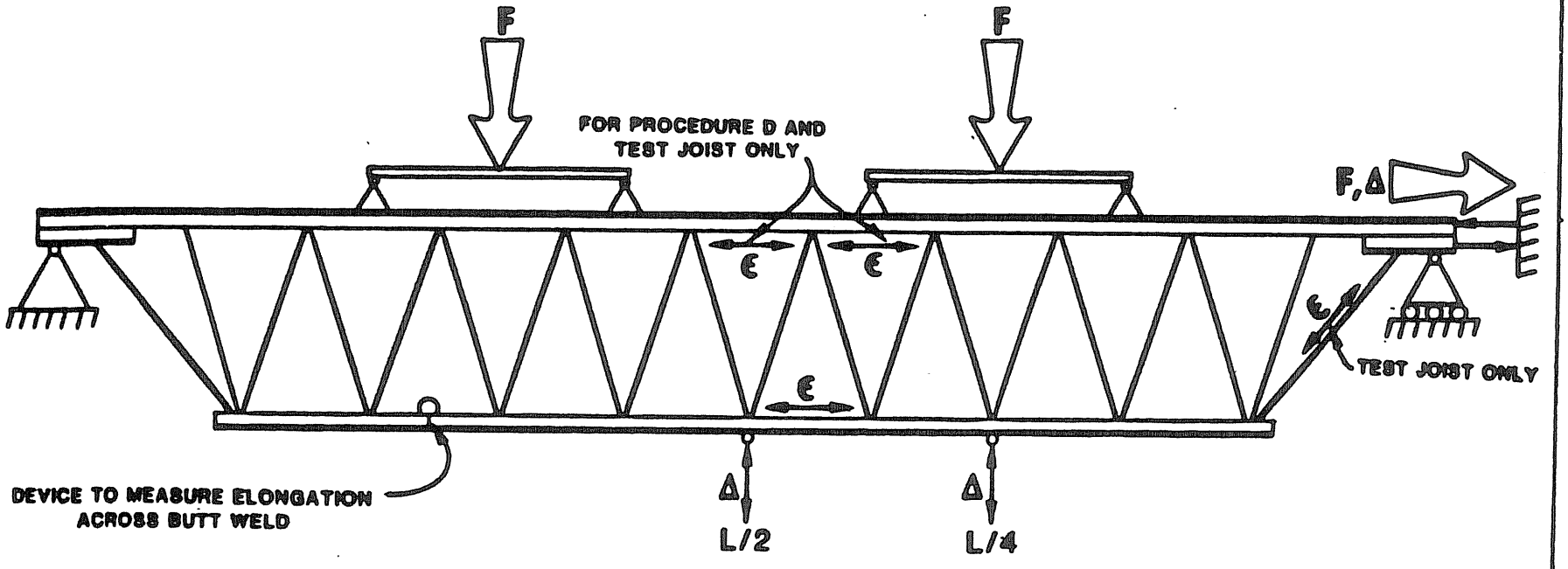
D. P_w signifies a total ponding load equal to 4,400 pounds per joist distributed as though it was fluid over the joists and filling the joist low points due to joist deflection (4,400 is computed as 20 pounds per square foot over the joist load tributary area).

E. P_u signifies a ponding load equal to and distributed as though it were water filling the joist/deck depression between the joist ends up to failure of the joists.

8. Preparing a report containing the test results. The report will contain an explanation of the test set-up and instrumentation, a review of test procedures and test results, all test data, and photographs. The photographs will explain the work done and show any visible test results. The report is to be distributed, two copies to each one of the Principal parties or their agents and to no one else.



SCHEMATIC BAR JOIST "SIMPLE" SUPPORT

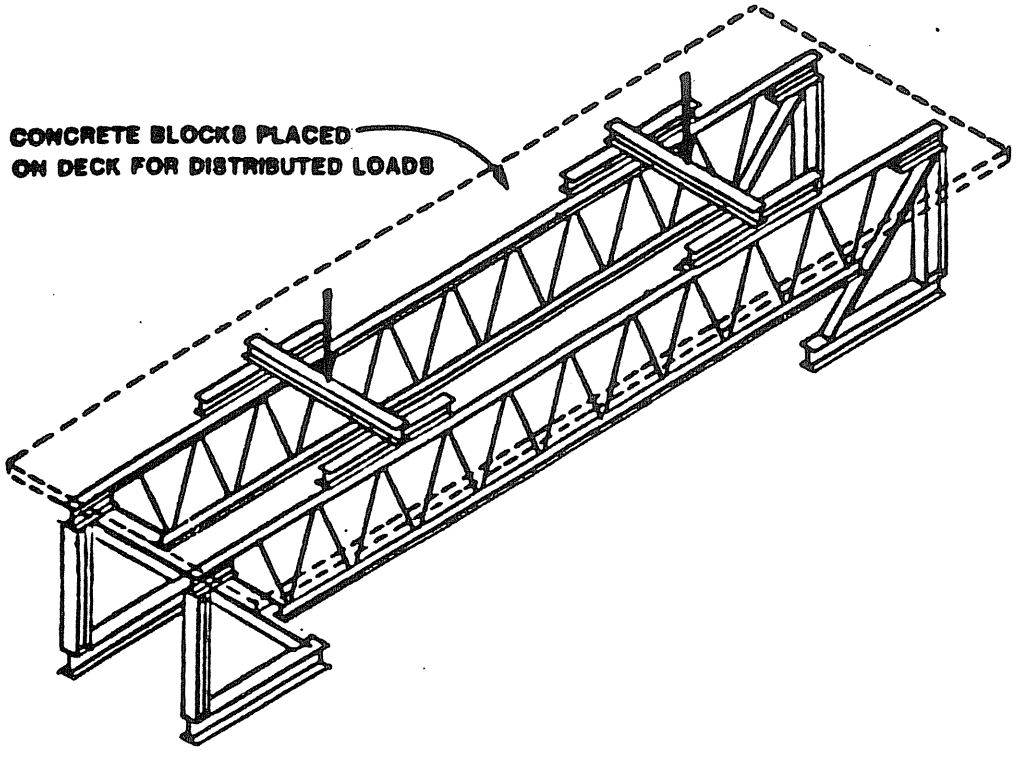


ALL INSTRUMENTATION ON BOTH JOISTS EXCEPT AS NOTED

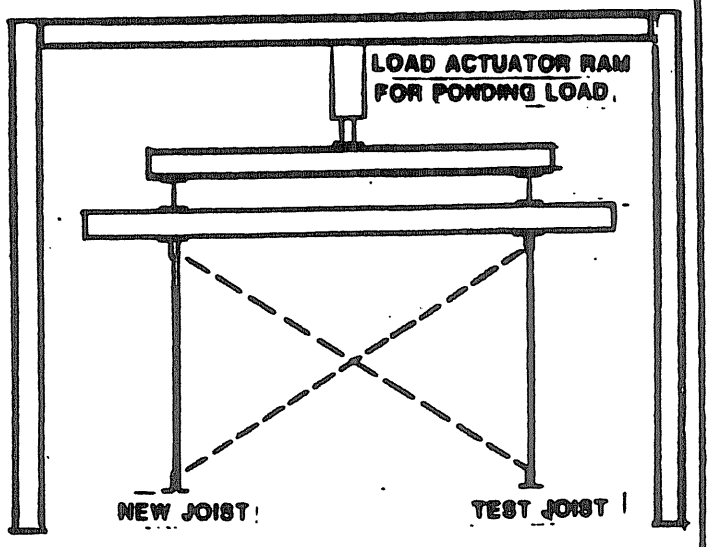
$\bar{\Delta}$ = MOVEMENT MEASURMENT

ε = STRAIN MEASUREMENT

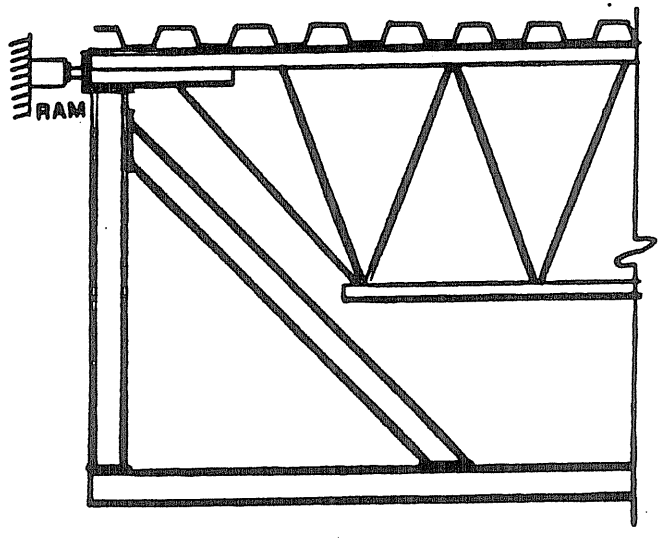
F = FORCE MEASUREMENT



SCHEMATIC REPRESENTATION OF
PRELIMINARY TEST SET-UP CONCEPT



END VIEW

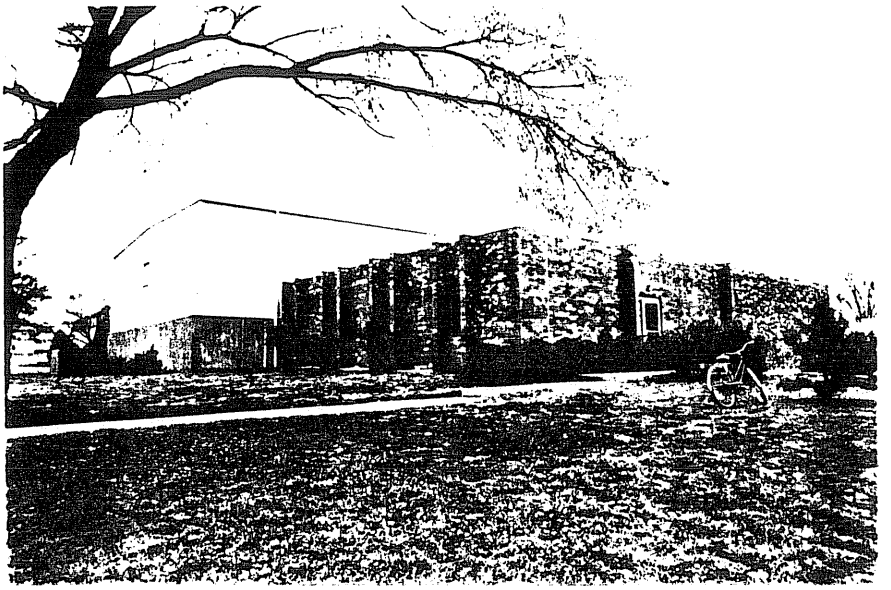


ELEVATION AT END WITH RAM

APPENDIX B

DESCRIPTION OF FEARS STRUCTURAL ENGINEERING LABORATORY

FEARS
STRUCTURAL
ENGINEERING
LABORATORY



SCHOOL OF

Civil Engineering and Environmental Science

The University of Oklahoma

FEARS STRUCTURAL ENGINEERING LABORATORY

The Fears Structural Engineering Laboratory is a research facility located on the Norman Campus of the University of Oklahoma. The laboratory is part of the School of Civil Engineering and Environmental Science and is under the direction of Dr. Thomas M. Murray, Professor-in-Charge.

The Laboratory was originally built without cost to the University. Initial funds were provided by Mr. and Mrs. Donald G. Fears in October 1977 with additional funds provided by twenty-nine construction related companies and associations. The facility was dedicated on April 29, 1979. In 1982 the laboratory area was increased 40% because of expanding research programs.

Test Facilities

The Fears structural Engineering Laboratory has the capacity to test full-scale structural components. The laboratory occupies 3,500 square feet of office space and 8,400 of laboratory space. A fenced area, north of the laboratory building, is used for preparation of test specimens and for storage purposes.

The office space contains a reception area, an office for the professor-in-charge, three offices for structural engineering faculty and four offices for graduate students. In addition, the office space houses a conference/library and computing room.

The laboratory space includes an 1,800 square feet reaction floor, a vacuum chamber and a wide variety of structural test equipment. The reaction floor is 30 ft by 60 ft, weighs one million pounds and is capable of reacting 320,000 pounds of uplift at any location. Four W36 x 150 x 58 feet steel beams are buried in the concrete with top flanges exposed for attaching test set-ups. Test assemblies up to 22 ft in height can be accommodated. The vacuum chamber is used for uniform loading of large flat structural components such as roof systems.

The laboratory space is served by a 5 ton capacity overhead bridge crane. An instrumentation shop is located inside the laboratory space. The shop is equipped with electronic equipment necessary for developing instrumentation for experimental projects. A mechanical shop equipped with machining, welding, drilling and other mechanical tools is located inside the laboratory space.

Loading Systems

The laboratory is equipped with a wide range of static and dynamic loading systems. Basic loading equipment consists of a 200,000 pound capacity universal testing machine, two 55,000 pound capacity closed-loop hydraulic testing systems, the vacuum chamber, and gravity load simulators. A large self contained test set-up enables dynamic testing of full-scale structural components. Other test set-ups are assembled on the reaction floor of the laboratory.

Data Acquisition and Processing Systems

Two data acquisition systems are available. One system consists of 60 channels of analog or strain gage acquisition with expansion capability to 1100 channels. This system is currently controlled by a HP-85 micro-computer. The second system is capable of 20,000 pieces of data acquisition per second in up to 16 channels and is controlled by a Tektronix 4052-64K Graphics System. Time-sharing computer terminals are available for remote data processing using the University of Oklahoma's IBM 3081 and VAX 11/780 computer systems. For real-time data processing the laboratory uses the HP-85 micro-computer and the Tektronix 4052-64K Graphics System. Both machines are capable of interchanging information with the mainframe computers. A video tape system is used to record the qualitative behavior of test specimens during experiments.

Staff of the Laboratory

The staff of the laboratory currently includes five structural engineering faculty, a secretary, three technicians and graduate students, working toward both M.S. and Ph.D. degrees. In addition to the staff of the laboratory, experienced faculty are available for consultation in other schools of the University of Oklahoma if such a need arises.

FACULTY OF STRUCTURAL ENGINEERING

Thomas M. Murray, Ph.D. (Kansas), P.E.
Professor of Civil Engineering and
Professor-in-Charge of Fears Structural Engineering Laboratory
Structural analysis and design (steel structures)

Leon R.L. Wang Sc.D. (MIT), P.E.
Professor of Civil Engineering
Structural engineering and earthquake engineering

Anant R. Kukreti, Ph.D. (Colorado)
Assistant Professor of Civil Engineering
Structural mechanics

Abolhassan Astaneh-Asl, Ph.D. (Michigan), P.E.
Assistant Professor of Civil Engineering
Structural analysis and design, static and cyclic behavior, (steel structures)

Clifford Clottey, Ph.D. (Oklahoma State)
Assistant Professor of Civil Engineering
Structural analysis and design (concrete structures)

Sponsored Research Projects 1982-83

1. "Experimental Testing of Composite Prestress Bridge Unit"
   Sponsor: Oklahoma Department of Transportation

2. "Investigation of Flush End-Plate Connections"
   Sponsor: Metal Building Manufacturers Association

3. "Standing Seam Roof Systems Supported by Steel Joists"
   Sponsor: VULCRAFT

4. "Experimental Investigation of the Effective Coefficient of Friction of Sliding Bridge Bearings"
   Sponsor: Port Authority of New York and New Jersey

5. "Column Web Crippling at End-Plate Connections"
   Sponsor: American Institute of Steel Construction

6. "Experimental Investigation of the Capacity of Steel Deck/-Joist Roof Systems to Provide Lateral Supports"
   Sponsor: Nielsen & Nielsen

7. "Stiffened End-Plate Moment Connections"
   Sponsor: American Institute of Steel Construction

8. "Parameters Affecting the Behavior of Metal Building Roof System"
   Sponsor: Metal Building Manufacturers Association

9. "Field Investigation and Analysis of Buried Pipelines Under Various Seismic Environments"
   Sponsor: National Science Foundation

10. "Development for Seismic Performance Evaluation of Buried Pipelines"
    Sponsor: National Science Foundation

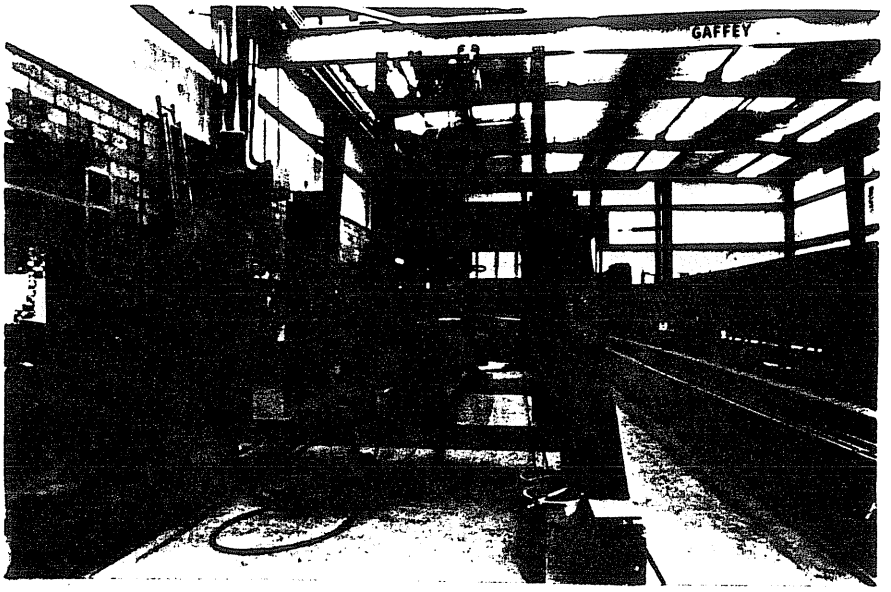
11. "Properties of Fiber Reinforced Shotcrete Used in Reservoir Linings"
    Sponsor: Dramix Steel Fibers

12. "Tests on Tempered Glass Panels"
    Sponsor: U.S. Postal Service

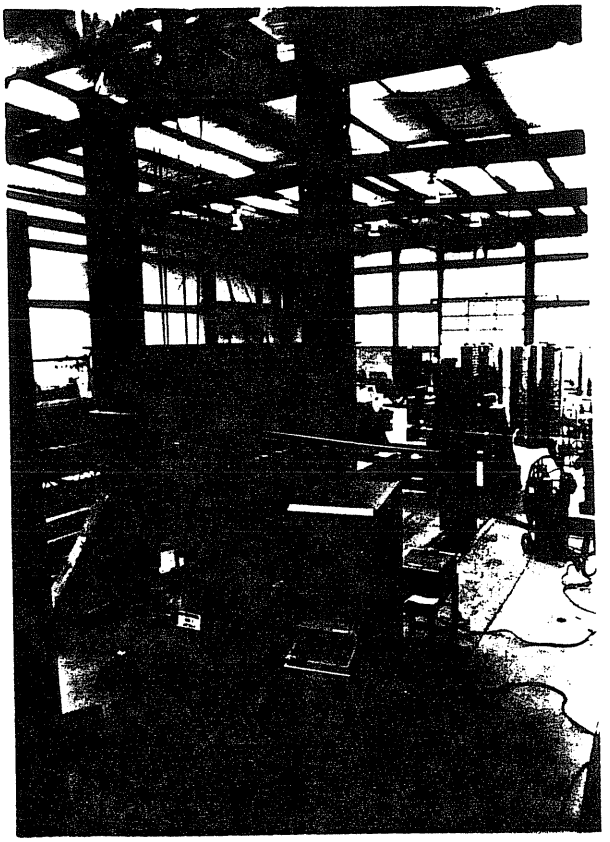
13. "Study of Seismic Resistant Characteristics of Reinforced Masonry Walls"
    Sponsor: Acme Brick Company

14. "Dynamic Joint Resistant Characteristics of Buried Pipelines"
    Sponsor: O.U. Research Fund

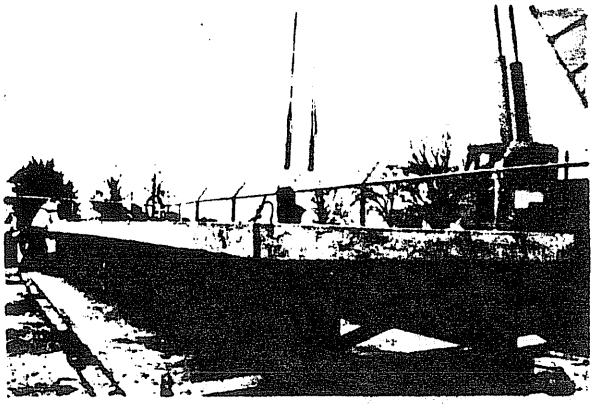
15. "Development of a Finite Element Program to Study Fracture of Oil Shale, Coal and Rocks"
    Sponsor: Energy Research Institute

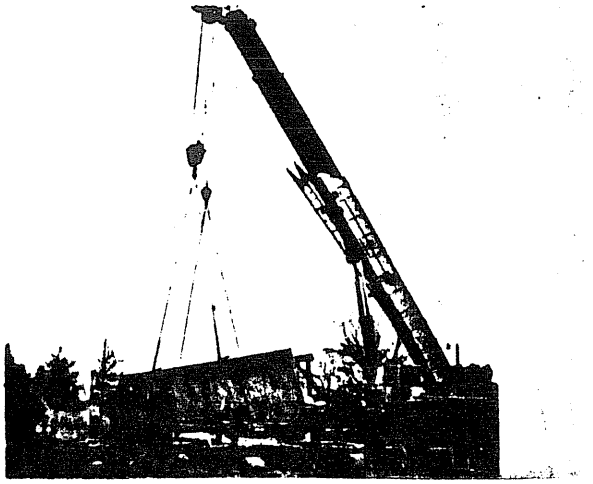


General View of North
Area of Laboratory

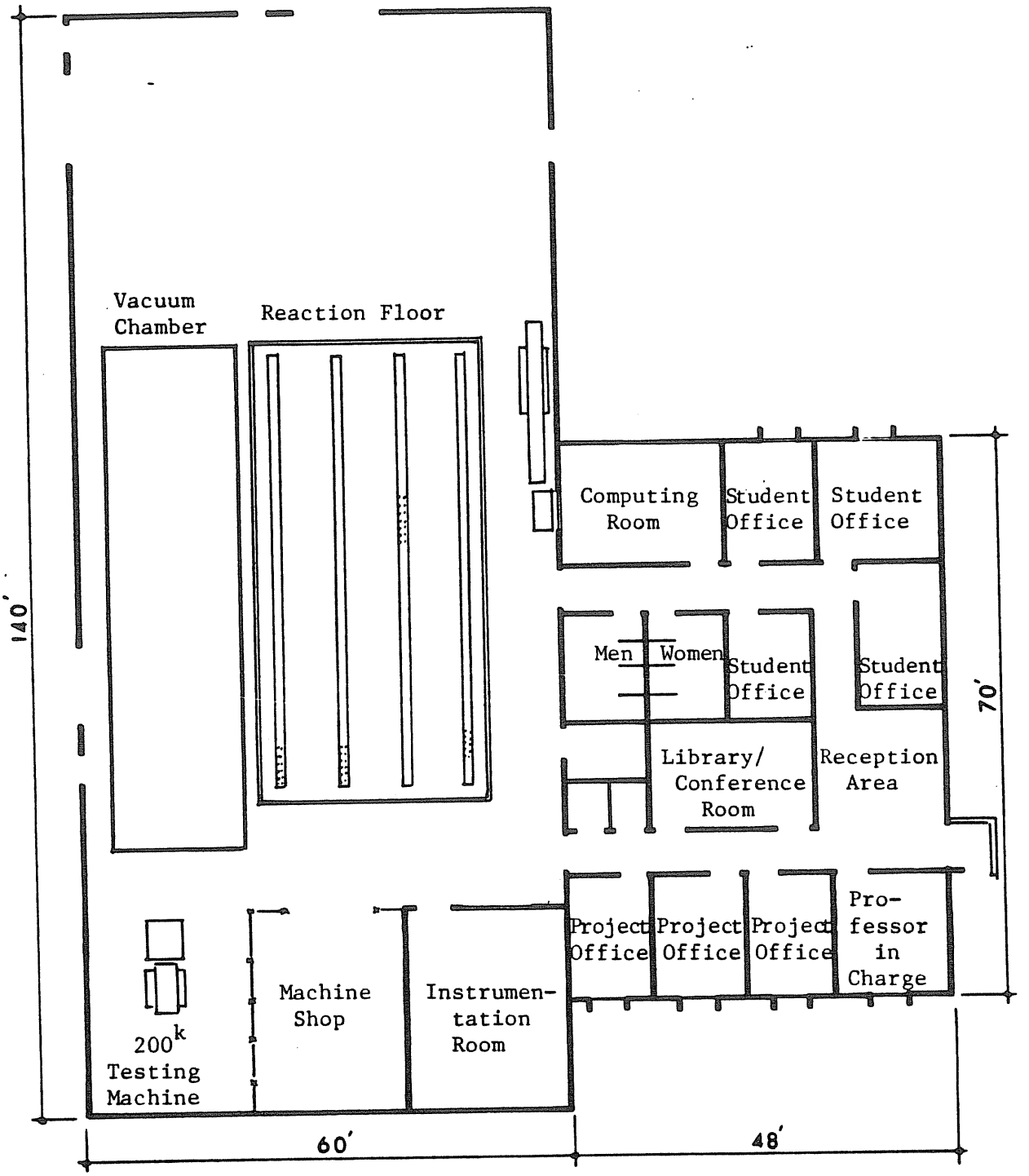


Test Set-up Assembled
on Reaction Floor





Bridge Unit Under Investigation



Floor Plan of Laboratory and Offices

Final Report

JEFFERSON COUNTY BAR JOIST TESTING PROGRAM VOLUME II

by

Scott J. Morrison
and
Thomas M. Murray
Principal Investigator

Sponsored by

Haag Engineering Company
Carrollton, Texas

Report No. FSEL/HAAG 84-01

October 1984

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

TABLE OF CONTENTS

VOLUME II

APPENDIX A

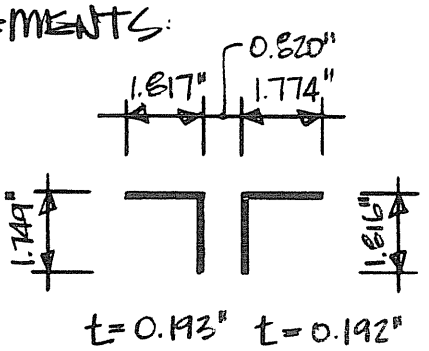
RESULTS FROM TEST I

PROJECT HAAG JOISTS

TEST I

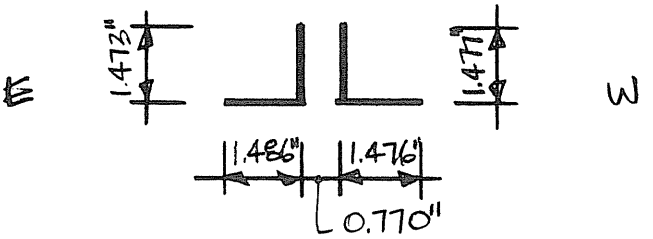
TEST JOIST B18

MEASUREMENTS:

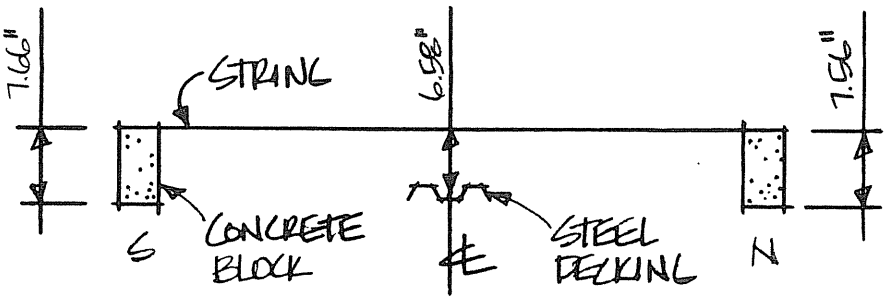


t = 0.193" t = 0.192"

t = 0.198" t = 0.193"



SOUTH END DIAGONAL = 0.950"



WT. CONCRETE BLOCK = 33 LB ±

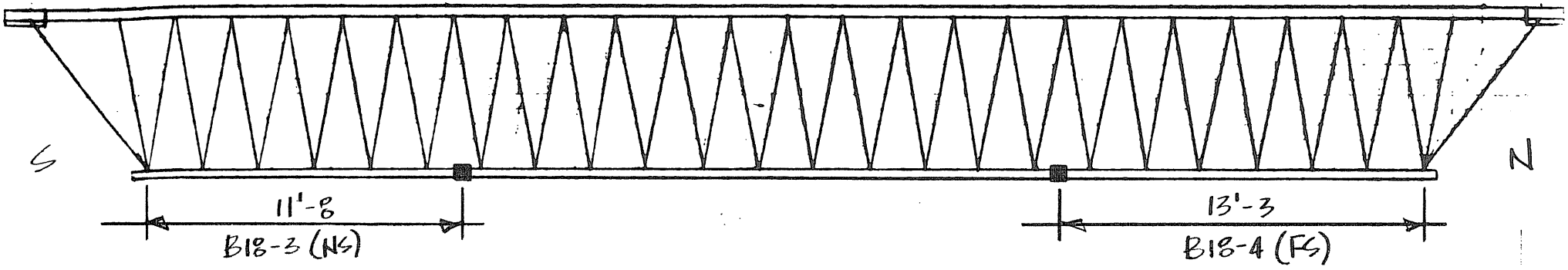
WT STEEL DECKING (1 SHEET) = 102.0 LB ±

A.1

DATE 8-20-84

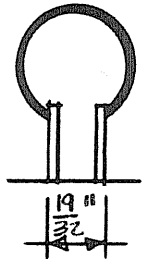
BY GJM

LOWER CHORD BUTT WELD LOCATIONS:

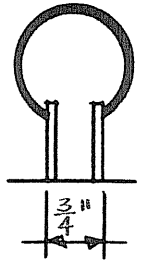


A.2

CLIP GAGES:



B18-3



B18-4

PROJECT HAAG JOISTS

TEST 1

TEST JOIST B18

DATE 8-20-94

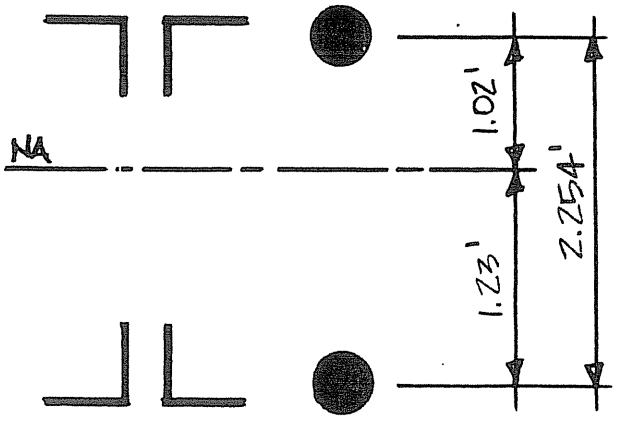
BY SJM

PROJECT HAAG JOISTS

TEST I

TEST JOIST B18

CALCULATED QUANTITIES:

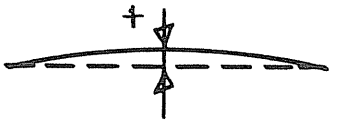


$A_{\text{TOP CHORD}} = 1.303$ in²

$A_{\text{BOT CHORD}} = 1.079$ in²

$A_{\text{SOUTH END DIAGONAL}} = 0.709$ in²

CAMBER = + 0.97"

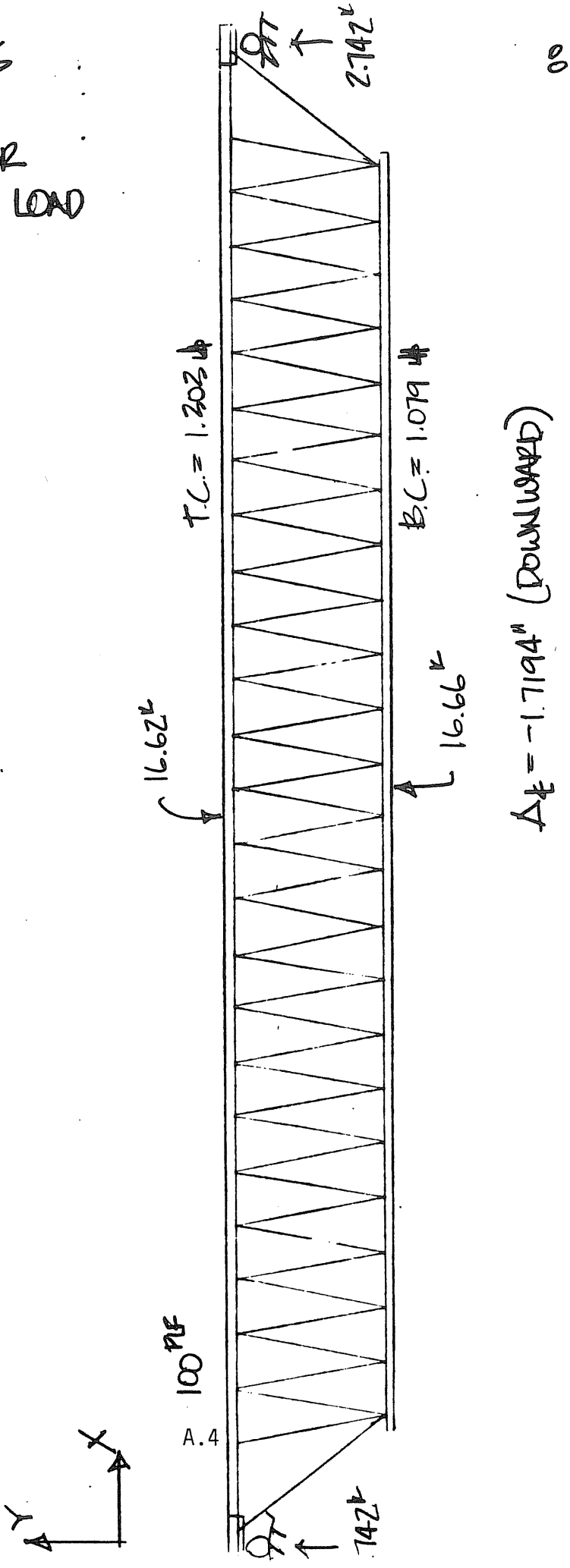


DATE 8-20-84

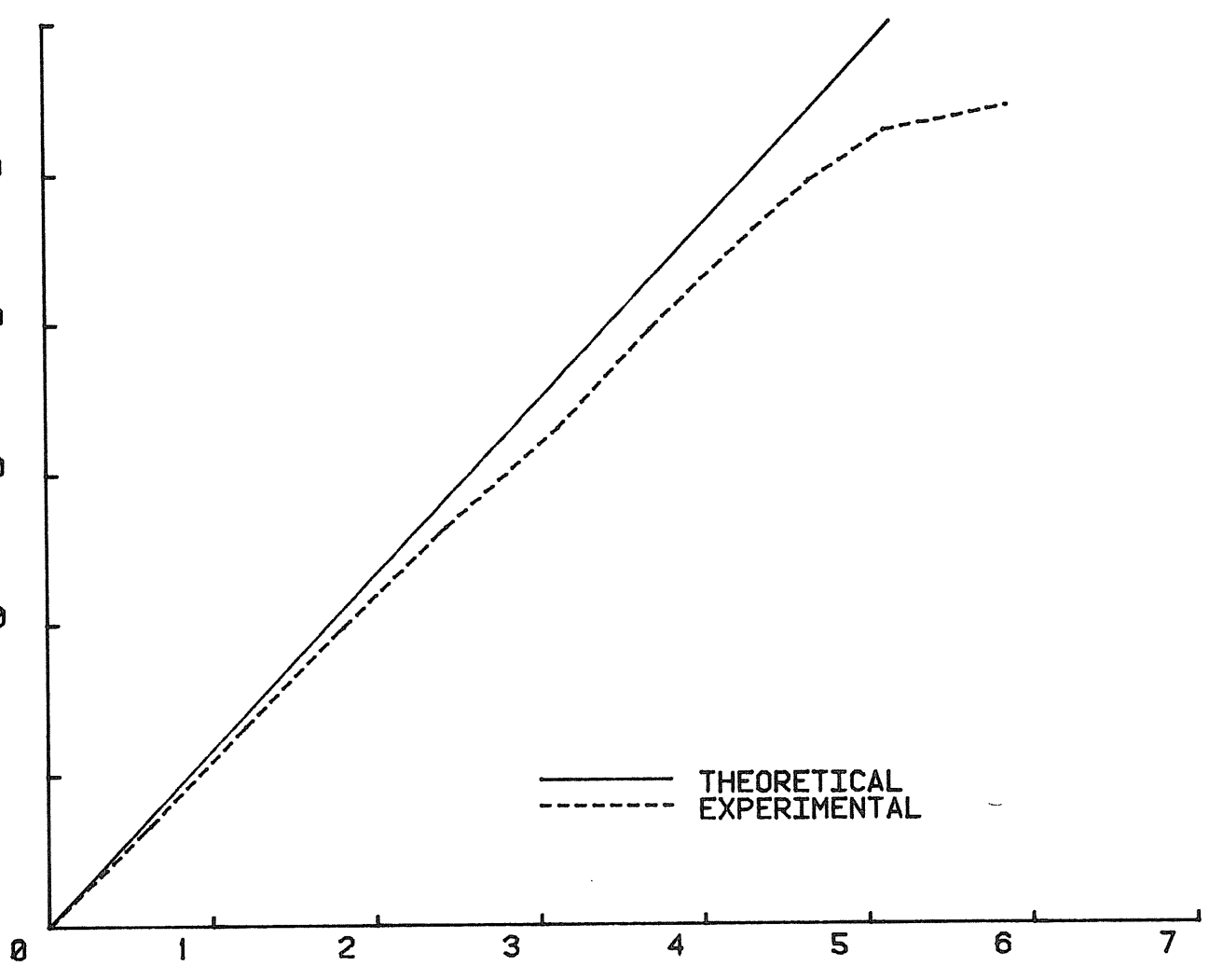
BY CJM

HAAG JOISTS
TEST I
ROLLER-ROLLER
UNIFORM -Y LOAD

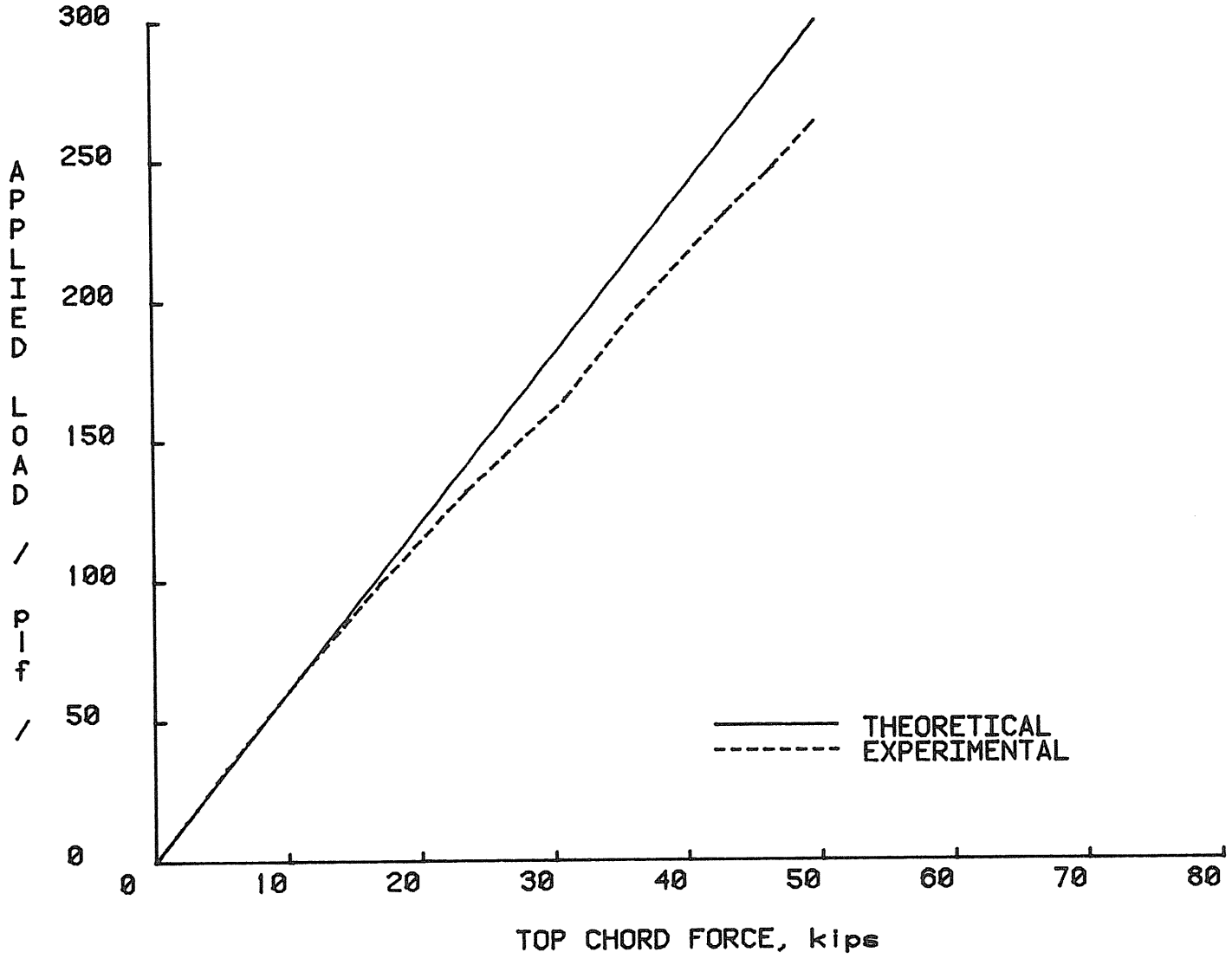
8-24-84 (FRI)



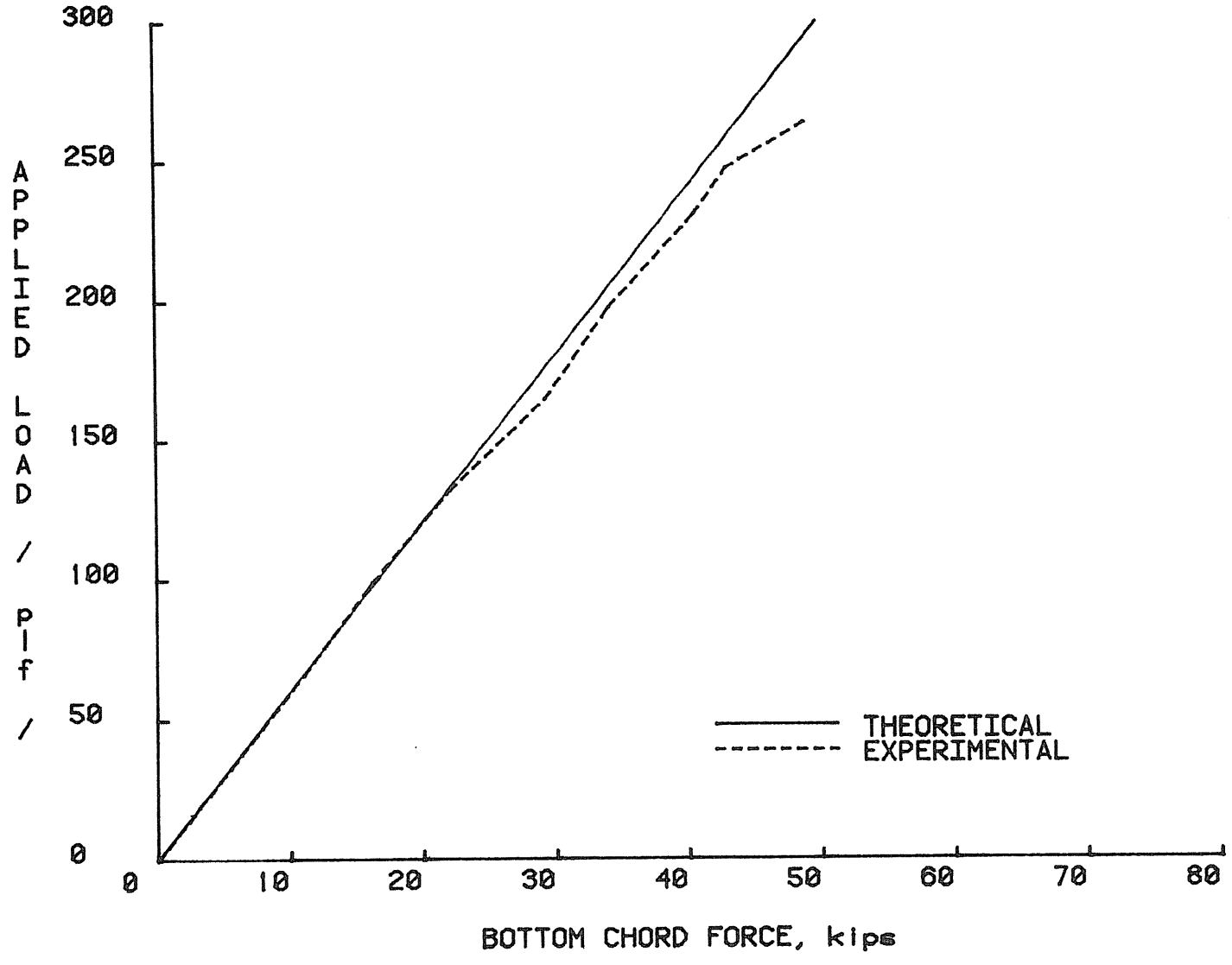
$\Delta_t = -1.7194"$ (DOWNWARD)



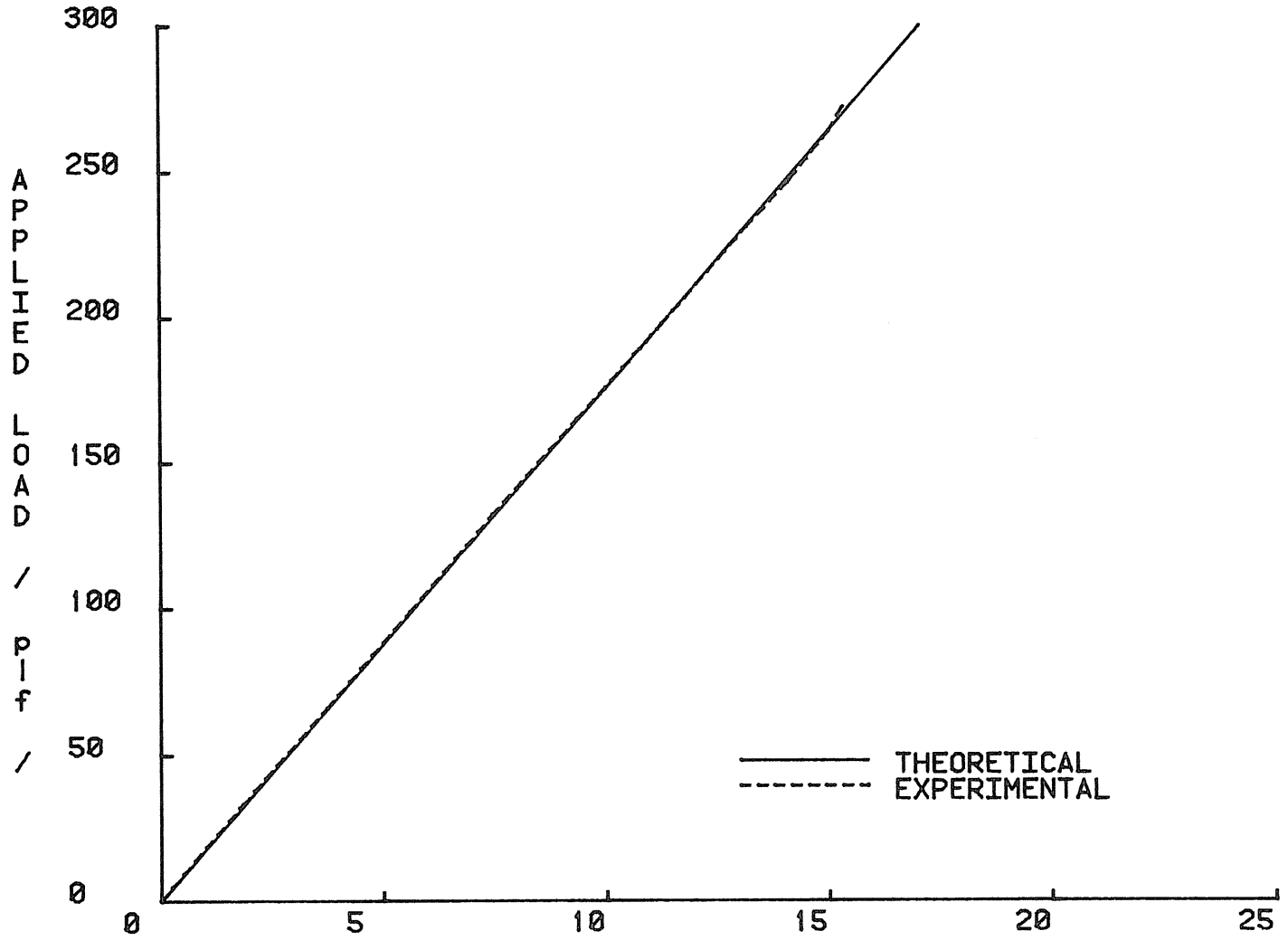
APPLIED LOAD VS CENTERLINE VERTICAL DEFLECTION, TEST 1



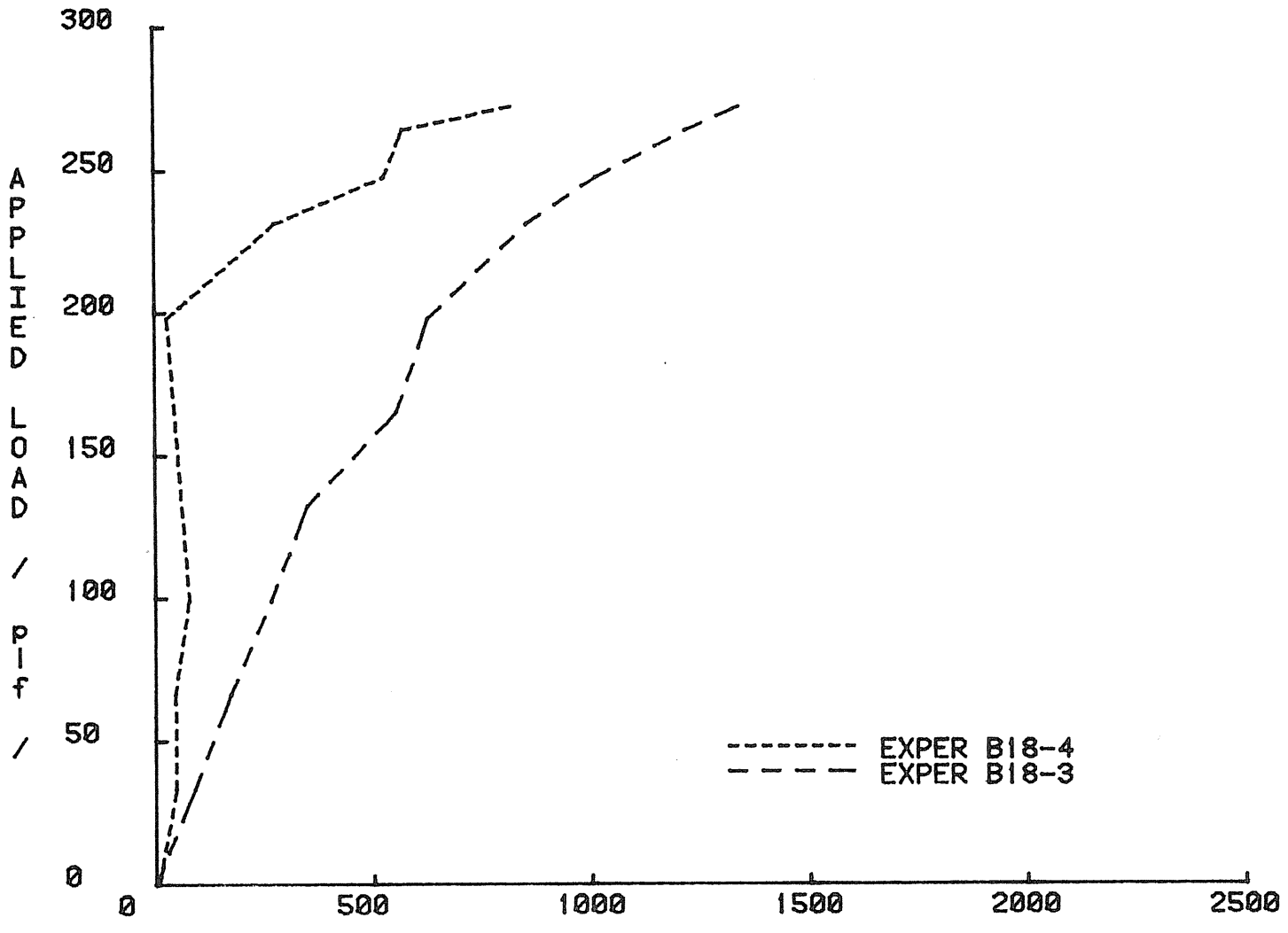
APPLIED LOAD VS TOP CHORD FORCE, TEST 1



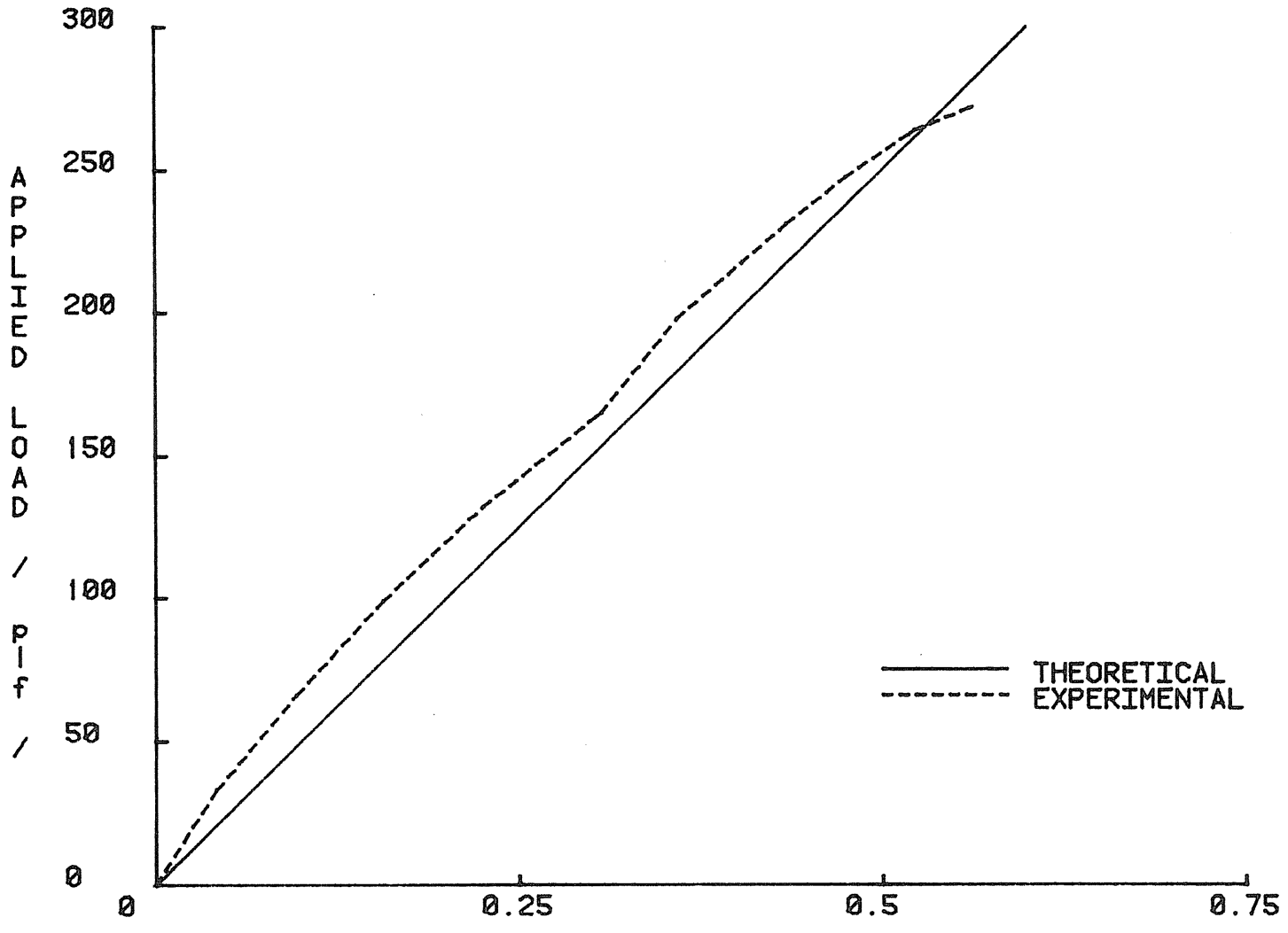
APPLIED LOAD VS BOTTOM CHORD FORCE, TEST 1



APPLIED LOAD VS END DIAGONAL FORCE, TEST 1



APPLIED LOAD VS WELD STRAIN, TEST 1



APPLIED LOAD VS CHORD SHORTENING, TEST 1

HAAG JOISTS
TEST I
8-20-84

TEST: TEST I
Project Name: HAAG JOISTS
Conducted by: AA

I=0
CHANNEL NUMBER:0
CALIBRATION FACTOR: .09389
INSTRUMENT:VER CENTER EAST

I=1
CHANNEL NUMBER:1
CALIBRATION FACTOR: .09445
INSTRUMENT:VER CENTER WEST

I=2
CHANNEL NUMBER:2
CALIBRATION FACTOR: .09385
INSTRUMENT:VER 1/4 PT EAST

I=3
CHANNEL NUMBER:3
CALIBRATION FACTOR: .09401
INSTRUMENT:VER 1/4 PT WEST

I=4
CHANNEL NUMBER:5
CALIBRATION FACTOR: 1.283
INSTRUMENT:HOR. NE END

I=5
CHANNEL NUMBER:6
CALIBRATION FACTOR: 1.35
INSTRUMENT:HOR. NW END

I=6
CHANNEL NUMBER:7
CALIBRATION FACTOR: .0942
INSTRUMENT:HOR. SE END

I=7
CHANNEL NUMBER:8
CALIBRATION FACTOR: .09441
INSTRUMENT:HOR. SW END

I=8
CHANNEL NUMBER:4
CALIBRATION FACTOR: 1
INSTRUMENT:EXCIT.

I=9
CHANNEL NUMBER:10
CALIBRATION FACTOR: 1.25
INSTRUMENT:TOP CHORD AXIAL EAST

I=10
CHANNEL NUMBER:11
CALIBRATION FACTOR: 1.3
INSTRUMENT:TOP CHORD AXIAL WEST

I=11
CHANNEL NUMBER:12
CALIBRATION FACTOR: 1.283
INSTRUMENT:BOT CHORD AXIAL EAST

I=12
CHANNEL NUMBER:13
CALIBRATION FACTOR: 1.35
INSTRUMENT:BOT CHORD AXIAL WEST

I=13
CHANNEL NUMBER:19
CALIBRATION FACTOR: 1
INSTRUMENT:EXCIT.

I=14
CHANNEL NUMBER:20
CALIBRATION FACTOR: 1
INSTRUMENT:BUDD BOX READINGS

I=15
CHANNEL NUMBER:21
CALIBRATION FACTOR: -26388
INSTRUMENT:LOAD CELL WEST

I=16
CHANNEL NUMBER:24
CALIBRATION FACTOR: .0229274
INSTRUMENT:WELD CLIP GAGE NORTH

I=17
CHANNEL NUMBER:25
CALIBRATION FACTOR: .027957474
INSTRUMENT:WELD CLIP GAGE SOUTH

I=18
CHANNEL NUMBER:30
CALIBRATION FACTOR: 1
INSTRUMENT:EXCIT.

I=19
CHANNEL NUMBER:22
BRIDGE SIZE:.5
GAGE FACTOR:2.11
LOCATION:GAGE ON END DIAG. OF EA
ST JOIST

I=20
CHANNEL NUMBER:23
BRIDGE SIZE:.5
GAGE FACTOR:2.11
LOCATION:GAGE ON END DIAG. OF EA
ST JOIST

HAAG JOISTS
TEST I
8-20-84

VOLTAGE READINGS

VER LOAD= 0
VER DISP= 0

CH.	VOLT
0	1.797900
1	3.008400
2	1.874300
3	1.491700
4	-1.302300
5	-1.332300
6	1.548600
7	2.782900
8	5.172700
9	-.662140
10	-.508410
11	.817940
12	.388430
13	15.100000
14	8.695100
15	-.000043
16	.001480
17	.003685
18	5.003600
19	.003499
20	.002017

==========

DATA POINT: 1

FORCES
======

VERT LOAD= 0.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	0.000	0.000

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: -.001
BOT CHORD, MIDSPAN: -.003
DIAGONAL, END: .008
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
0.00000	0.00000	0.00000

1/4 SPAN (VERT.)

EAST	WEST	AVER.
0.00000	0.00000	0.00000

LOAD END (HOR.)

EAST	WEST	AVER.
0.00000	0.00000	0.00000

SUP. END (HOR.)

EAST	WEST	AVER.
-.00002	0.00000	-.00001

W1=
1.50680155885E-5
W2= 0

WELD STRAINS
STRAIN IN NORTH WELD=-1.16225479
266E-5
STRAIN IN SOUTH WELD=2.406927655
2E-5

VOLTAGE READINGS

VER LOAD= 0
VER DISP=
2.04682515617E-3

CH.	VOLT
0	1.799900
1	3.009400
2	1.877500
3	1.492600
4	-1.303200
5	-1.336000
6	1.548300
7	2.782800
8	5.172700
9	-.662910
10	-.508290
11	.818090
12	.388980
13	15.100000
14	8.687800
15	-.000044
16	.001489
17	.003682
18	5.003500
19	.003500
20	.002017

==========
DATA POINT: 2

FORCES
======

VERT LOAD= 0.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	.006	.003

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: -.041
BOT CHORD, MIDSPAN: .031
DIAGONAL, END: .003
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
.00412	.00205	.00308

1/4 SPAN (VERT.)

EAST	WEST	AVER.
.00659	.00185	.00422

LOAD END (HOR.)

EAST	WEST	AVER.
-.00062	-.00020	-.00041

SUP. END (HOR.)

EAST	WEST	AVER.
-.00015	-.00053	-.00034

W1=
-4.6499703407E-4 .
W2=
3.25077984638E-4

WELD STRAINS
STRAIN IN NORTH WELD=9.33262605732E-5
STRAIN IN SOUTH WELD=-1.11490274401E-5

VOLTAGE READINGS

VER LOAD= 33
VER DISP=
-.644438658952

CH.	VOLT
0	1.508400
1	2.693500
2	1.654100
3	1.254700
4	-1.301300
5	-1.335600
6	1.568800
7	2.803300
8	5.172600
9	-.611760
10	-.469070
11	.754050
12	.339430
13	15.100000
14	8.686300
15	-.000041
16	.001529
17	.003777
18	5.003600
19	.003262
20	.001786

DATA POINT: 3

FORCES

VERT LOAD= 33.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	-.012	-.006

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 5.394
BOT CHORD, MIDSPAN: -5.532
DIAGONAL, END: 1.830
DISPLACEMENTS, (in.)

MIDSPAN (VERT.)

EAST	WEST	AVER.
-.59603	-.64444	-.62023

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-.45353	-.48732	-.47042

LOAD END (HOR.)

EAST	WEST	AVER.
.04152	.04188	.04170

SUP. END (HOR.)

EAST	WEST	AVER.
.00013	-.00048	-.00017

W1=
4.13860187354E-2
W2=
4.23601633157E-2

WELD STRAINS
STRAIN IN NORTH WELD=5.57882299373E-4
STRAIN IN SOUTH WELD=1.13125599855E-3

```
--------------------
VOLTAGE READINGS

VER LOAD=                    66
VER DISP=
-1.21305768046

CH.        VOLT
 0       1.214400
 1       2.415700
 2       1.423700
 3       1.044970
 4      -1.298600
 5      -1.340400
 6       1.596100
 7       2.829500
 8       5.172600
 9       -.557750
10       -.430360
11         .691010
12         .289860
13      15.100000
14       8.687000
15       -.000042
16         .001527
17         .003864
18       5.003500
19         .003016
20         .001545
```

```
==================================
DATA POINT: 4

FORCES
======

VERT LOAD= 66.000 lb/ft

RAM LOADS    ,kips
------------------
 EAST       WEST      AVERAGE
  0.000      -.006      -.003

MEMBER FORCES ,kips
-------------------
TOP CHORD, MIDSPAN: 10.974
BOT CHORD, MIDSPAN:-11.046
DIAGONAL,  END:     3.727
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
      EAST         WEST       AVER.
  -1.20140    -1.21306    -1.20723

1/4 SPAN (VERT.)
----------------
      EAST         WEST       AVER.
   -.92814     -.91862     -.92338

LOAD END (HOR. )
----------------
      EAST         WEST       AVER.
     .09755      .09553      .09654

SUP. END (HOR. )
----------------
      EAST         WEST       AVER.
     .00054     -.00116     -.00031

W1=
 9.70068814528E-2
W2=
 9.66981231195E-2

 WELD STRAINS
STRAIN IN NORTH WELD=5.349919078
48E-4
STRAIN IN SOUTH WELD=2.179198915
35E-3
```

```
--------------------
VOLTAGE READINGS

VER LOAD=                99
VER DISP=
-1.82936865014

CH.       VOLT
 0         .928320
 1        2.114600
 2        1.191900
 3         .810480
 4       -1.305100
 5       -1.345600
 6        1.624600
 7        2.858700
 8        5.172600
 9        -.503700
10        -.383590
11         .633460
12         .241000
13       15.100000
14        8.687700
15        -.000043
16         .001559
17         .003962
18        5.003500
19         .002766
20         .001314
```

```
==================================
DATA POINT: 5

FORCES
======

VERT LOAD= 99.000 lb/ft

RAM LOADS   ,kips
--------------------
  EAST       WEST      AVERAGE
  0.000       .000       .000

MEMBER FORCEC ,kips
--------------------
TOP CHORD, MIDSPAN: 17.029
BOT CHORD, MIDSPAN:-16.255
DIAGONAL,  END:     5.601
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
      EAST         WEST        AVER.
   -1.79046    -1.82937    -1.80991

1/4 SPAN (VERT.)
----------------
      EAST         WEST        AVER.
   -1.40564    -1.40083    -1.40323

LOAD END (HOR. )
----------------
      EAST         WEST        AVER.
     .15604      .15533      .15568

SUP. END (HOR. )
----------------
      EAST         WEST        AVER.
    -.00044     -.00191     -.00117

W1=
 .156476784725
W2=
 .157236560659

 WELD STRAINS
STRAIN IN NORTH WELD=9.069208740
05E-4
STRAIN IN SOUTH WELD=3.358617038
4E-3
```

```
--------------------
VOLTAGE READINGS

VER LOAD=                    132
VER DISP=
-2.42050318366

CH.        VOLT
 0          .624820
 1         1.825800
 2          .959150
 3          .587840
 4        -1.315700
 5        -1.353800
 6         1.656600
 7         2.887700
 8         5.172600
 9         -.445640
10         -.337370
11          .576350
12          .185560
13        15.100000
14         8.687000
15         -.000038
16          .001601
17          .004049
18         5.003600
19          .002527
20          .001076
```

```
==================================
DATA POINT: 6

FORCES
======

VERT LOAD=132.000 lb/ft

RAM LOADS   ,kips
--------------------
 EAST       WEST       AVERAGE
  0.000      -.030       -.015

MEMBER FORCES ,kips
--------------------
TOP CHORD, MIDSPAN: 23.298
BOT CHORD, MIDSPAN:-21.760
DIAGONAL,  END:     7.460
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
      EAST          WEST        AVER.
  -2.41539      -2.42050      -2.41794

1/4 SPAN (VERT.)
----------------
      EAST          WEST        AVER.
  -1.88509      -1.85868      -1.87188

LOAD END (HOR. )
----------------
      EAST          WEST        AVER.
     .22171        .21471        .21821

SUP. END (HOR. )
----------------
      EAST          WEST        AVER.
    -.00204       -.00308       -.00256

W1=
 .223747527931
W2=
 .217795065981

 WELD STRAINS
STRAIN IN NORTH WELD=1.394705748
4E-3
STRAIN IN SOUTH WELD=4.404677611
3E-3
```

```
--------------------
VOLTAGE READINGS

VER LOAD=                    132
VER DISP=
-2.43503592323

CH.       VOLT
 0         .615730
 1        1.818700
 2         .952290
 3         .580790
 4       -1.316200
 5       -1.354400
 6        1.658500
 7        2.890500
 8        5.172600
 9        -.443600
10        -.335560
11         .573200
12         .181760
13       15.100000
14        8.687200
15        -.000040
16         .001474
17         .004050
18        5.003700
19         .002533
20         .001070
```

```
==================================
DATA POINT: 7

FORCES
======

VERT LOAD=132.000 lb/ft

RAM LOADS    ,kips
-------------------
 EAST        WEST        AVERAGE
  0.000       -.018        -.009

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 23.529
BOT CHORD, MIDSPAN:-22.099
DIAGONAL,  END:     7.460
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
      EAST          WEST        AVER.
  -2.43410      -2.43504      -2.43457

1/4 SPAN (VERT.)
----------------
      EAST          WEST        AVER.
  -1.89922      -1.87318      -1.88620

LOAD END (HOR. )
----------------
      EAST          WEST        AVER.
     .22561        .22045        .22303

SUP. END (HOR. )
----------------
      EAST          WEST        AVER.
    -.00211       -.00317       -.00264

W1=
 .227722233689
W2=
 .223614638279

 WELD STRAINS
STRAIN IN NORTH WELD=-8.17002147
067E-5
STRAIN IN SOUTH WELD=4.415738164
71E-3
```

```
-----------------
VOLTAGE READINGS

VER LOAD=                    165
VER DISP=
-3.0340089313

CH.       VOLT
 0         .302770
 1        1.526100
 2         .712620
 3         .354590
 4       -1.329600
 5       -1.362300
 6        1.688900
 7        2.919400
 8        5.172700
 9        -.382080
10        -.293900
11         .511610
12         .120480
13       15.100000
14        8.687300
15        -.000045
16         .001354
17         .004190
18        5.003600
19         .002276
20         .000834
```

```
==================================
DATA POINT: 8

FORCES
======

VERT LOAD=165.000 lb/ft

RAM LOADS   ,kips
-------------------
 EAST       WEST      AVERAGE
  0.000      .012       .006

MEMBER FORCES ,kips
-------------------
TOP CHORD, MIDSPAN: 29.743
BOT CHORD, MIDSPAN:-28.109
DIAGONAL,  END:     9.381
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -3.07852   -3.03401   -3.05627

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -2.39296   -2.33836   -2.36566

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .28793     .27951     .28372

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
   -.00413    -.00430    -.00421

W1=
 .292060333121
W2=
 .283806066356

 WELD STRAINS
STRAIN IN NORTH WELD=-1.47606358
377E-3
STRAIN IN SOUTH WELD=6.101561609
14E-3
```

VOID

DATA POINT 9

Discard this data point

FORCES

VERT LOAD=198.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	.006	.003

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 35.893
BOT CHORD, MIDSPAN:-34.119
DIAGONAL, END: 11.295
DISPLACEMENTS, (in.)

MIDSPAN (VERT.)

EAST	WEST	AVER.
-3.66603	-3.63086	-3.64845

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-2.88231	-2.80627	-2.84429

LOAD END (HOR.)

EAST	WEST	AVER.
.35566	.34688	.35127

SUP. END (HOR.)

EAST	WEST	AVER.
-.00621	-.00481	-.00551

W1=
.361864209603
W2=
.35169067218

WELD STRAINS
STRAIN IN NORTH WELD=-5.11725892804E-4
STRAIN IN SOUTH WELD=7.881644721E-3

VOLTAGE READINGS

VER LOAD= 198
VER DISP=
-3.63086314728

CH.	VOLT
0	.017437
1	1.234500
2	.475060
3	.127050
4	-1.743400
5	-1.365900
6	1.721900
7	2.952300
8	5.172700
9	-.322300
10	-.251480
11	.449960
12	.059197
13	15.099000
14	8.686900
15	-.000044
16	.001437
17	.004338
18	5.003700
19	.002023
20	.000596

VOLTAGE READINGS

VER LOAD= 165
VER DISP=
-3.08804511547

CH.	VOLT
0	.268590
1	1.499700
2	.689850
3	.334760
4	-1.349900
5	-1.369200
6	1.698600
7	2.925900
8	5.172700
9	-.372350
10	-.283940
11	.497690
12	.111140
13	15.099000
14	8.686700
15	-.000043
16	.001471
17	.004263
18	5.003600
19	.002276
20	.000831

==========

DATA POINT: 10

FORCES
======

VERT LOAD=165.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	0.000	0.000

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 30.921
BOT CHORD, MIDSPAN:-29.247
DIAGONAL, END: 9.393
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-3.14890	-3.08805	-3.11847

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-2.43986	-2.37914	-2.40950

LOAD END (HOR.)

EAST	WEST	AVER.
.30784	.29282	.30033

SUP. END (HOR.)

EAST	WEST	AVER.
-.00719	-.00528	-.00624

W1=
.315026035882
W2=
.2981041602

WELD STRAINS
STRAIN IN NORTH WELD=-1.16225479
034E-4
STRAIN IN SOUTH WELD=6.980090203
75E-3

---

channels 0, 1, 2, 3 wire Trans. reset. ↓
(℄ and 1/4 verticals)
ADD -1.075" to ℄ Av. ↓

VOLTAGE READINGS

VER LOAD=
VER DISP=
-2.81377054433

CH.	VOLT
0	1.179520
1	1.633700
2	1.185100
3	1.414900
4	-1.350100
5	-1.370200
6	1.698600
7	2.925900
8	5.172700
9	-.372250
10	-.283250
11	.498070
12	.109378
13	15.099000
14	8.686400
15	-.000051
16	.001473
17	.004267
18	5.003500
19	.002276
20	.000840

165

==========
DATA POINT 11

FORCES
======

VERT LOAD=165.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	.048	.024

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 30.968
BOT CHORD, MIDSPAN:-29.313
DIAGONAL, END: 9.357
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-1.27327	-2.81377	-2.04352 → -3.118

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.41969	-.15793	-.78881

LOAD END (HOR.)

EAST	WEST	AVER.
.30784	.29282	.30033

SUP. END (HOR.)

EAST	WEST	AVER.
-.00722	-.00543	-.00632

W1=
.315056171913
W2=
.298247362152

WELD STRAINS
STRAIN IN NORTH WELD=-9.26382225
052E-5
STRAIN IN SOUTH WELD=7.029255074
44E-3

```
------------
VOLTAGE READINGS

VER LOAD=                198
VER DISP=
-3.3778755578

CH.       VOLT
 0        .900450
 1       1.358100
 2        .955810
 3       1.196170
 4      -1.347400
 5      -1.370600
 6       1.723300
 7       2.952800
 8       5.172700
 9       -.318380
10       -.246060
11        .450550
12        .057856
13      15.099000
14       8.686800
15       -.000044
16        .001509
17        .004343
18       5.003500
19        .002033
20        .000596
```

```
==================================
DATA POINT: 12

FORCES
======

VERT LOAD=198.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  0.000      .006       .003

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 36.451
BOT CHORD, MIDSPAN:-34.155
DIAGONAL,  END:  11.256
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -1.84788   -3.37788   -2.61288 ⇒ -3.6879

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -1.89201    -.60773   -1.24987

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
     .35853     .34790     .35322

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
   -.00681    -.00548    -.00615

W1=
 .365340090415
W2=
 .35338756754

 WELD STRAINS
STRAIN IN NORTH WELD=3.257818644
36E-4
STRAIN IN SOUTH WELD=7.943905863
77E-3
--------   --------
```

```
--------
VOLTAGE READINGS

VER LOAD=                    231
VER DISP=
-3.98645808195

CH.        VOLT
 0          .581890
 1         1.060770
 2          .713650
 3          .963560
 4        -1.356600
 5        -1.376200
 6         1.760500
 7         2.988300
 8         5.172700
 9         -.257630
10         -.196150
11          .387740
12         -.008598
13        15.099000
14         8.686200
15         -.000038
16          .001743
17          .004566
18         5.002500
19          .001772
20          .000353
```

```
==================================
DATA POINT: 13

FORCES
======

VERT LOAD=231.000 lb/ft

RAM LOADS    ,kips
------------------
 EAST       WEST       AVERAGE
  0.000      -.030       -.015

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 43.102
BOT CHORD, MIDSPAN:-40.475
DIAGONAL,  END:  13.219
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
      EAST         WEST        AVER.
  -2.50381    -3.98646    -3.24513⇒-4.3201

1/4 SPAN (VERT.)
----------------
      EAST         WEST        AVER.
  -2.39084    -1.08607    -1.73845

LOAD END (HOR. )
----------------
      EAST         WEST        AVER.
     .43487      .42060      .42773

SUP. END (HOR. )
----------------
      EAST         WEST        AVER.
   -.00820     -.00629     -.00724

W1=
 .443070318788
W2=
 .426882577418

 WELD STRAINS
STRAIN IN NORTH WELD=3.049562105
67E-3
STRAIN IN SOUTH WELD=1.063866859
66E-2
          ------------
```

```
--------------------
VOLTAGE READINGS

VER LOAD=                    231
VER DISP=
-3.98641714544

CH.        VOLT
 0          .580590
 1         1.060790
 2          .713210
 3          .963550
 4        -1.356600
 5        -1.376200
 6         1.760500
 7         2.988300
 8         5.172700
 9         -.257310
10         -.197150
11          .385060
12         -.008385
13        15.099000
14         8.688300
15         -.000049
16          .001758
17          .004577
18         5.002500
19          .001785
20          .000353
```

```
==================================
DATA POINT: 14

FORCES
======

VERT LOAD=231.000 lb/ft

RAM LOADS    ,kips
-------------------
 EAST       WEST       AVERAGE
  0.000      .036        .018

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 43.063
BOT CHORD, MIDSPAN:-40.597
DIAGONAL,  END:  13.169
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
      EAST          WEST          AVER.
  -2.50648      -3.98642      -3.24645 → -4.3215

1/4 SPAN (VERT.)
----------------
      EAST          WEST          AVER.
  -2.39174      -1.08609      -1.73892

LOAD END (HOR. )
----------------
      EAST          WEST          AVER.
     .43487        .42060        .42773

SUP. END (HOR. )
----------------
      EAST          WEST          AVER.
    -.00820       -.00629       -.00724

W1=
 .443070318788
W2=
 .426882577418

 WELD STRAINS
STRAIN IN NORTH WELD=3.223938659
48E-3
STRAIN IN SOUTH WELD=.0107710787
27
```

```
VOLTAGE READINGS

VER LOAD=                    247.5
VER DISP=
-4.30682715564

CH.       VOLT
 0        .410550
 1        .904250
 2        .586880
 3        .843380
 4      -1.364600
 5      -1.381800
 6       1.779400
 7       3.007100
 8       5.172700
 9       -.224890
10       -.174540
11        .355380
12       -.025530
13      15.099000
14       8.686100
15       -.000050
16        .001967
17        .004732
18       5.003200
19        .001657
20        .000235
```

```
==================================
DATA POINT: 15

FORCES
======

VERT LOAD=247.500 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  0.000      .042       .021

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 46.376
BOT CHORD, MIDSPAN:-42.894
DIAGONAL,  END:   14.129
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -2.85660   -4.30683   -3.58171→-4.6567

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -2.65197   -1.33321   -1.99259

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .47366      .45909     .46638

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
   -.00940     -.00709    -.00825

W1=
 .483063422676
W2=
 .466181124813

 WELD STRAINS
STRAIN IN NORTH WELD=5.650386035
57E-3
STRAIN IN SOUTH WELD=.0126288884
77
```

```
---------------------
VOLTAGE READINGS

VER LOAD=                    247.5
VER DISP=
-4.31036816316

CH.        VOLT
 0         .408370
 1         .902520
 2         .585750
 3         .842980
 4       -1.364600
 5       -1.381900
 6        1.779400
 7        3.007100
 8        5.172700
 9        -.223400
10        -.174250
11         .354050
12        -.024060
13       15.099000
14        8.687900
15        -.000037
16         .001969
17         .004730
18        5.003200
19         .001645
20         .000254
```

```
==================================
DATA POINT: 16

FORCES
======

VERT LOAD=247.500 lb/ft

RAM LOADS    ,kips
------------------
 EAST       WEST      AVERAGE
  0.000      -.036      -.018

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 46.484
BOT CHORD, MIDSPAN:-42.889
DIAGONAL,  END:   14.102
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST        AVER.
  -2.86109    -4.31037    -3.58573⇒-4.4607

1/4 SPAN (VERT.)
----------------
     EAST         WEST        AVER.
  -2.65430    -1.33403    -1.99416

LOAD END (HOR. )
----------------
     EAST         WEST        AVER.
    .47366      .45909      .46638

SUP. END (HOR. )
----------------
     EAST         WEST        AVER.
   -.00940     -.00710     -.00825

W1=
 .483063422676
W2=
 .466195445008

 WELD STRAINS
STRAIN IN NORTH WELD=5.673632989
76E-3
STRAIN IN SOUTH WELD=1.260481727
61E-2
```

Reset ch.0 cent & Vert. ↓

DATA POINT: 17 :. EAST ... ADD -3.6592%
WEST ... ADD -0.2742%

FORCES
======

VERT LOAD=247.500 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	-.024	-.012

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 46.606
BOT CHORD, MIDSPAN:-43.032
DIAGONAL, END: 14.160
DISPLACEMENTS, (in.)

MIDSPAN (VERT.)

EAST	WEST	AVER.
-1.07714	-4.31887	-2.69815 → -4.6649

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-2.66462	-1.34060	-2.00261

LOAD END (HOR.)

EAST	WEST	AVER.
.47414	.46003	.46709

SUP. END (HOR.)

EAST	WEST	AVER.
-.00939	-.00708	-.00823

W1=
.483533387567
W2=
.467108765553

WELD STRAINS
STRAIN IN NORTH WELD=6.173442505
65E-3
STRAIN IN SOUTH WELD=1.279738688
31E-2

VOLTAGE READINGS

247.5

VER LOAD=
VER DISP=
-4.31886787588

CH.	VOLT
0	1.274600
1	.898350
2	.580730
3	.839770
4	-1.364500
5	-1.381700
6	1.779600
7	3.007500
8	5.172600
9	-.222000
10	-.173640
11	.354370
12	-.027350
13	15.099000
14	8.686100
15	-.000039
16	.002012
17	.004746
18	5.003200
19	.001646
20	.000238

VOLTAGE READINGS

VER LOAD= 264
VER DISP=
-4.66160336022

CH.	VOLT
0	1.065300
1	.730920
2	.419990
3	.708000
4	-1.375500
5	-1.387800
6	1.800300
7	3.029800
8	5.172700
9	-.187890
10	-.156240
11	.280990
12	-.044599
13	15.099000
14	8.690100
15	-.000046
16	.002172
17	.004954
18	5.003100
19	.001521
20	.000134

DATA POINT: 18

FORCES

VERT LOAD=264.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	.018	.009

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 49.718
BOT CHORD, MIDSPAN:-47.494
DIAGONAL, END: 15.053
DISPLACEMENTS, (in.)

MIDSPAN (VERT.)

EAST	WEST	AVER.
-1.50845	-4.66160	-3.08503 → -5.0518

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-2.99575	-1.61160	-2.30368

LOAD END (HOR.)

EAST	WEST	AVER.
.51655	.50558	.51106

SUP. END (HOR.)

EAST	WEST	AVER.
-.01104	-.00795	-.00950

W1=
.527598013572
W2=
.513522953211

WELD STRAINS
STRAIN IN NORTH WELD=8.033703454
67E-3
STRAIN IN SOUTH WELD=1.530198352
25E-2

```
--------------------
VOLTAGE READINGS

VER LOAD=                    264
VER DISP=
-4.67441648571

CH.       VOLT
 0      1.023670
 1       .724660
 2       .396070
 3       .701660
 4     -1.375500
 5     -1.388400
 6      1.801800
 7      3.030600
 8      5.172700
 9      -.187310
10      -.156250
11       .256930
12      -.054710
13     15.099000
14      8.687700
15      -.000039
16       .002038
17       .004965
18      5.003100
19       .001514
20       .000138
```

```
==============================
DATA POINT: 19

FORCES
======

VERT LOAD=264.000 lb/ft

RAM LOADS    ,kips
------------------
 EAST       WEST      AVERAGE
  0.000      -.024      -.012

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 49.753
BOT CHORD, MIDSPAN:-49.173
DIAGONAL,  END:   15.065
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
  -1.59417    -4.67442    -3.13429 -> -5.1011

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
  -3.04502    -1.62464    -2.33483

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
    .51963      .50721      .51342

SUP. END (HOR. )
----------------
     EAST         WEST       AVER.
   -.01104     -.00803     -.00954

W1=
 .530676399506
W2=
 .515247028276

 WELD STRAINS
STRAIN IN NORTH WELD=6.476126389
91E-3
STRAIN IN SOUTH WELD=1.543437777
35E-2
```

```
-------------------
VOLTAGE READINGS

VER LOAD=                264
VER DISP=
-4.67441648571

CH.      VOLT
 0      1.001530
 1       .724660
 2       .385410
 3       .701670
 4     -1.375500
 5     -1.388400
 6      1.801800
 7      3.030700
 8      5.172700
 9      -.186730
10      -.156320
11       .262370
12      -.055149
13     15.099000
14      8.687400
15      -.000043
16       .002055
17       .004966
18      5.003200
19       .001528
20       .000133
```

```
==================================
DATA POINT: 20

FORCES
======

VERT LOAD=264.000 lb/ft

RAM LOADS   ,kips
-------------------
 EAST       WEST      AVERAGE
  0.000       .000      .000

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 49.784
BOT CHORD, MIDSPAN:-48.925
DIAGONAL,  END:   15.030
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -1.63975   -4.67442   -3.15708⇒-5.1229

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -3.06698   -1.62462   -2.34580

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .51963      .50742     .51352

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
   -.01104    -.00803    -.00954

W1=
 .530676399506
W2=
 .515451797506

 WELD STRAINS
STRAIN IN NORTH WELD=6.673252021
48E-3
STRAIN IN SOUTH WELD=1.544521897
94E-2
```

VOLTAGE READINGS

VER LOAD= 272.25
VER DISP=
-4.89893273726

CH.	VOLT
0	.379080
1	.614970
2	.050403
3	.609400
4	-1.392200
5	-1.398400
6	1.819000
7	3.050400
8	5.172700
9	-.202770
10	-.204370
11	-.235650
12	-.046981
13	15.099000
14	8.686300
15	-.000039
16	.002303
17	.005091
18	5.003100
19	.001487
20	.000095

==========

DATA POINT: 21

FORCES
======

VERT LOAD=272.250 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	-.024	-.012

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: ~~45.986~~
BOT CHORD, MIDSPAN: ~~73.154~~
DIAGONAL, END: 15.338
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-2.92140	-4.89893	-3.91017 ⇒ -5.876

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-3.75707	-1.81437	-2.78572

LOAD END (HOR.)

EAST	WEST	AVER.
.55493	.54776	.55134

SUP. END (HOR.)

EAST	WEST	AVER.
-.01356	-.00947	-.01151

W1=
.568491583335
W2=
.557223356616

WELD STRAINS
STRAIN IN NORTH WELD=9.556409391
09E-3
STRAIN IN SOUTH WELD=1.695089373
94E-2

VOLTAGE READINGS

VER LOAD= 264
VER DISP=
-4.80320272464

CH.	VOLT
0	.272660
1	.661740
2	.025155
3	.637060
4	-1.393100
5	-1.400100
6	1.822400
7	3.049600
8	5.172700
9	-.221790
10	-.235400
11	-.628890
12	-.160160
13	15.099000
14	8.686300
15	-.000034
16	.002433
17	.005056
18	5.003100
19	.001526
20	.000138

==========

DATA POINT: 22

FORCES
======

VERT LOAD=264.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	-.054	-.027

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: ~~43.002~~
BOT CHORD, MIDSPAN: ~~98.072~~
DIAGONAL, END: 15.018
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-3.14052	-4.80320	-3.97186 ⇒ ~~-5.938~~

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-3.80907	-1.75749	-2.78328

LOAD END (HOR.)

EAST	WEST	AVER.
.56191	.54612	.55401

SUP. END (HOR.)

EAST	WEST	AVER.
-.01370	-.00971	-.01170

W1=
.575604870239
W2=
.555828646042

WELD STRAINS
STRAIN IN NORTH WELD=1.106749161
81E-2
STRAIN IN SOUTH WELD=1.652963930
43E-2

```
----------
VOLTAGE READINGS

VER LOAD=                231
VER DISP=
-4.1993074301

CH.       VOLT
 0         .552890
 1         .956780
 2         .218170
 3         .870340
 4       -1.390800
 5       -1.399700
 6        1.783900
 7        3.013200
 8        5.172700
 9        -.272760
10        -.271240
11        -.570070
12        -.100393
13       15.099000
14        8.687500
15        -.000042
16         .002391
17         .004982
18        5.003000
19         .001771
20         .000387
```

```
==================================
DATA POINT: 23

FORCES
======

VERT LOAD=231.000 lb/ft

RAM LOADS    ,kips
------------------
 EAST       WEST       AVERAGE
  0.000      -.006       -.003

MEMBER FORCES ,kips
-------------------
TOP CHORD, MIDSPAN: -37.775
BOT CHORD, MIDSPAN: -92.273
DIAGONAL, END:   13.091
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST          WEST        AVER.
  -2.56352     -4.19931     -3.38141 => -5.2482

1/4 SPAN (VERT.)
----------------
     EAST          WEST        AVER.
  -3.41148     -1.27777     -2.34462

LOAD END (HOR. )
----------------
     EAST          WEST        AVER.
    .48290       .47158       .47724

SUP. END (HOR. )
----------------
     EAST          WEST        AVER.
   -.01335      -.00965      -.01150

W1=
 .496246400453
W2=
 .481235363197

 WELD STRAINS
STRAIN IN NORTH WELD=1.057985133
41E-2
STRAIN IN SOUTH WELD=1.564018560
26E-2
          ----------
```

```
--------------------
VOLTAGE READINGS

VER LOAD=                198
VER DISP=
-3.61366981597

CH.       VOLT
 0        .846380
 1       1.242900
 2        .442190
 3       1.094840
 4      -1.390900
 5      -1.396600
 6       1.744400
 7       2.977900
 8       5.172700
 9       -.322370
10       -.314790
11       -.505840
12       -.042535
13      15.099000
14       8.687100
15       -.000050
16        .002360
17        .004881
18       5.002800
19        .002018
20        .000623
```

```
==================================
DATA POINT: 24

FORCES
======

VERT LOAD=198.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  0.000      .042       .021

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: -32.181
BOT CHORD, MIDSPAN: -86.299
DIAGONAL,  END:   11.208
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -1.95921   -3.61367   -2.78644 ⇒ -4.7622

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -2.95002    -.81610   -1.88306

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .40183     .39930     .40057

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
   -.01337    -.00921    -.01129

W1=
 .415197305761
W2=
 .40850789667

 WELD STRAINS
STRAIN IN NORTH WELD=1.022060582
51E-2
STRAIN IN SOUTH WELD=1.442688997
31E-2
```

VOLTAGE READINGS

VER LOAD= 165
VER DISP=
-3.02664036073

CH.	VOLT
0	1.135080
1	1.529700
2	.666190
3	1.318500
4	-1.389900
5	-1.392700
6	1.708000
7	2.943600
8	5.172700
9	-.377460
10	-.351700
11	-.439530
12	.019557
13	15.099000
14	8.688000
15	-.000041
16	.002340
17	.004801
18	5.003000
19	.002277
20	.000873

DATA POINT: 25

FORCES
======

VERT LOAD=165.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	-.012	-.006

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: ~~26.639~~
BOT CHORD, MIDSPAN: ~~80.016~~
DIAGONAL, END: 9.224
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-1.36477	-3.02664	-2.19570 ⇒ -4.1627

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-2.48860	-.35617	-1.42238

LOAD END (HOR.)

EAST	WEST	AVER.
.32713	.32906	.32810

SUP. END (HOR.)

EAST	WEST	AVER.
-.01321	-.00865	-.01093

W1=
.34034446047
W2=
.337713560946

WELD STRAINS
STRAIN IN NORTH WELD=9.987030303
71E-3
STRAIN IN SOUTH WELD=1.346165483
79E-2

readings of ch 3
invalid ↓ (kicked)
(1/4 Point Ver. on west Joint)

VOLTAGE READINGS

VER LOAD= 132
VER DISP=
-2.42044299805

CH	VOLT
0	1.417400
1	1.825900
2	.905170
3	1.509700
4	-1.388100
5	-1.387600
6	1.670800
7	2.910300
8	5.172800
9	-.426250
10	-.388010
11	-.374020
12	.076392
13	15.098000
14	8.687900
15	-.000041
16	.002301
17	.004711
18	5.002900
19	.002516
20	.001118

==========

DATA POINT: 26

FORCES
======

VERT LOAD=132.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	-.012	-.006

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: ~~21.516~~
BOT CHORD, MIDSPAN: ~~74.029~~
DIAGONAL, END: 7.337

DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-.78352	-2.42044	-1.60198 ~~-3.668~~

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.99636	~~-.03696~~	~~-.97978~~

LOAD END (HOR.)

EAST	WEST	AVER.
.25072	.26076	.25574

SUP. END (HOR.)

EAST	WEST	AVER.
-.01294	-.00792	-.01043

W1=
.263658934451
W2=
.268676027407

WELD STRAINS
STRAIN IN NORTH WELD=9.534231198
31E-3
STRAIN IN SOUTH WELD=1.237954087
86E-2

VOLTAGE READINGS

VER LOAD= 99
VER DISP=
-1.82073482055

CH.	VOLT
0	1.715100
1	2.118900
2	1.132500
3	1.737800
4	-1.386800
5	-1.385600
6	1.637400
7	2.878700
8	5.172800
9	-.478640
10	-.434190
11	-.314020
12	.132180
13	15.099000
14	8.687600
15	-.000043
16	.002262
17	.004615
18	5.002900
19	.002763
20	.001359

DATA POINT: 27

FORCES

VERT LOAD= 99.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	.000	.000

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: ~~15.587~~
BOT CHORD, MIDSPAN: ~~68.363~~
DIAGONAL, END: 5.435
DISPLACEMENTS, (in.)

MIDSPAN (VERT.)

EAST	WEST	AVER.
-.17056	-1.82073	-.99565 → -2.962

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.52809	~~.50601~~	~~-.51104~~

LOAD END (HOR.)

EAST	WEST	AVER.
.18218	.19605	.18912

SUP. END (HOR.)

EAST	WEST	AVER.
-.01274	-.00763	-.01019

W1=
.194918985866
W2=
.203683801223

WELD STRAINS
STRAIN IN NORTH WELD=9.080888407
69E-3
STRAIN IN SOUTH WELD=1.122405395
17E-2

VOLTAGE READINGS

VER LOAD= 66
VER DISP=
-1.20997400087

CH.	VOLT
0	2.006000
1	2.417300
2	1.354400
3	1.971800
4	-1.384800
5	-1.381200
6	1.604600
7	2.847500
8	5.172800
9	-.526220
10	-.477730
11	-.248830
12	.188900
13	15.098000
14	8.687700
15	-.000042
16	.002189
17	.004508
18	5.002200
19	.003003
20	.001608

==========
DATA POINT: 28

FORCES
======

VERT LOAD= 66.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	-.006	-.003

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: ~~-10.126~~
BOT CHORD, MIDSPAN: ~~-62.396~~
DIAGONAL, END: 3.527
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
.42840	-1.20997	-.39078 → -2.3576

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.07100	~~.08720~~	~~.04198~~

LOAD END (HOR.)

EAST	WEST	AVER.
.11486	.13217	.12352

SUP. END (HOR.)

EAST	WEST	AVER.
-.01244	-.00700	-.00972

W1=
.127304893785
W2=
.139166958114

WELD STRAINS
STRAIN IN NORTH WELD=8.235884474
83E-3
STRAIN IN SOUTH WELD=9.943760503
8E-3

```
------
VOLTAGE READINGS

VER LOAD=                    33
VER DISP=
-.591435395956

CH.        VOLT
 0       2.286100
 1       2.719500
 2       1.581900
 3       2.204700
 4      -1.376200
 5      -1.371100
 6       1.574100
 7       2.819500
 8       5.172800
 9       -.579470
10       -.514490
11       -.180730
12         .245880
13      15.099000
14       8.687800
15       -.000052
16         .002131
17         .004414
18       5.002100
19         .003243
20         .001848
```

```
==================================
DATA POINT: 29

FORCES
======

VERT LOAD= 33.000 lb/ft

RAM LOADS   ,kips
-------------------
 EAST       WEST      AVERAGE
  0.000       .054       .027

MEMBER FORCEC ,kips
--------------------
TOP CHORD, MIDSPAN: -4.710-
BOT CHORD, MIDSPAN: -56.273-
DIAGONAL,  END:    1.657
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  1.00513    -.59144      .20685 → -1.159

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
   -.60238   -1.46613-   -.43187-

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .05227     .07483     .06355

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
   -.01115    -.00555    -.00835

W1=
 6.34164324194E-2
W2=
 8.03863685429E-2

 WELD STRAINS
STRAIN IN NORTH WELD=7.562083312
84E-3
STRAIN IN SOUTH WELD=8.813250161
99E-3
   ----------------
```

VOLTAGE READINGS

VER LOAD= 0
VER DISP=
1.83020309264E-2

CH.	VOLT
0	2.584200
1	3.017400
2	1.808700
3	2.431400
4	-1.360300
5	-1.351200
6	1.546000
7	2.792100
8	5.172800
9	-.627160
10	-.555870
11	-.110660
12	.287470
13	15.099000
14	8.688900
15	-.000041
16	.002079
17	.004307
18	5.002200
19	.003476
20	.002098

HAAG
TEST I
8/20/84

==========

DATA POINT: 30

FORCES
======

VERT LOAD= 0.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	-.012	-.006

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: ~~-.639~~
BOT CHORD, MIDSPAN: ~~50.796~~
DIAGONAL, END: -.224

DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
1.61892	.01830	~~.81861~~ ⇒ -1.1482

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-.13520	~~1.93231~~	~~.89855~~

LOAD END (HOR.)

EAST	WEST	AVER.
-.00540	.01873	.00667

SUP. END (HOR.)

EAST	WEST	AVER.
-.00875	-.00270	-.00573

W1=
3.35334946335E-3
W2=
2.14310186398E-2

WELD STRAINS
STRAIN IN NORTH WELD=6.957046388
33E-3
STRAIN IN SOUTH WELD=7.524121197
53E-3

==========

HAAG JOISTS
TEST I 8/20/84

ACTION TAKEN			DATA POINT
Initialized		(No load)	1, 2
33 lb/ft	Vertical load applied		3
66 lb/ft	Vertical load.		4
99 lb/ft	Vertical load.		5
132 lb/ft	Vertical load.		6, 7
165 lb/ft	Vertical load.	(Working Load)	8
165 lb/ft	Vert. ld. Reset on data acq. (℄ Vert. east, 1/4 Pt. east and west)		10, 11
198 lb/ft	Vert. load.		12
231 lb/ft	Vert. load.		13, 14
247.5 lb/ft	Vert. load		15
247.5 lb/ft	Vert. load	Reset Ch. 0 ℄ vert. East	16, 17
264 lb/ft	Vert. load		20
272.25 lb/ft	Vert. load (1.65 * Working Load)	Yielding of East Joist (COLD Joint)	21

HAAG JOISTS
TEST I

8/20/84

ACTION TAKEN				DATA POINT
264	lb/ft	load (unloading)		22
231	lb/ft	load		23
198	lb/ft	load		24
165	lb/ft	load	¼ ver. disp on west Joist invalid from here on	25
132	lb/ft	load		26
99	lb/ft	load		27
66	lb/ft	load		28
33	lb/ft	load		29
0		load	(Totally Unloaded)	30

APPENDIX B

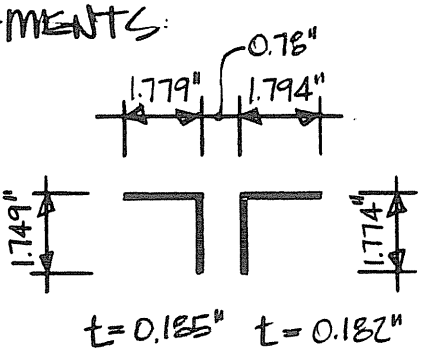
RESULTS FROM TEST II

PROJECT HAAL JOISTS

TEST II

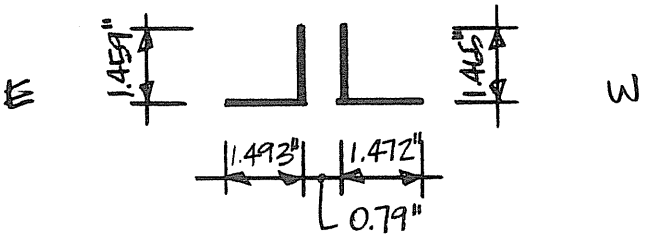
TEST JOIST B21

MEASUREMENTS:

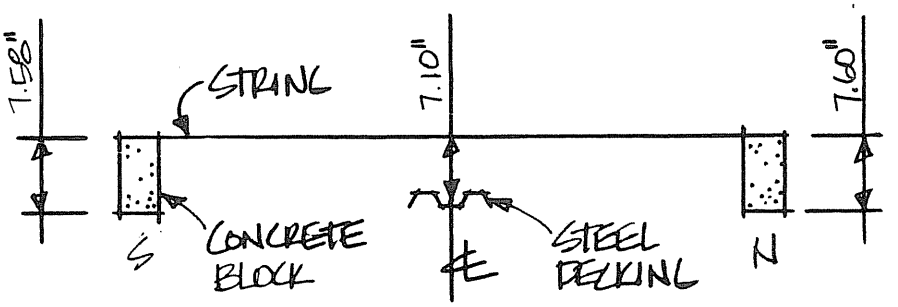


t = 0.185" t = 0.182"

t = 0.185" t = 0.187"



† SOUTH END DIAGONAL = 0.935"



WT. CONCRETE BLOCK = 32 LB ±

WT STEEL DECKING (1 SHEET) = 78.5 LB ±

DATE 8-28-84

BY LEL/SJM

PROJECT HAAG JOISTS

TEST II

TEST JOIST B21

LOWER CHORD BUTT WELD LOCATIONS:

CLIP GAGES:

DATE 8-29-84

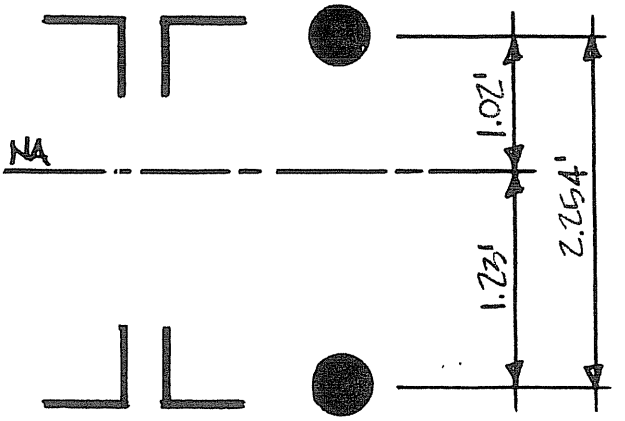
BY GJM

PROJECT HAAG JOIST2

TEST II

TEST JOIST B21

CALCULATED QUANTITIES:

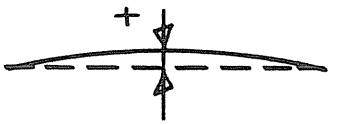


$A_{\text{TOP CHORD}} = 1.234$ in²

$A_{\text{BOT CHORD}} = 1.026$ in²

$A_{\text{SOUTH END DIAGONAL}} = 0.687$ in²

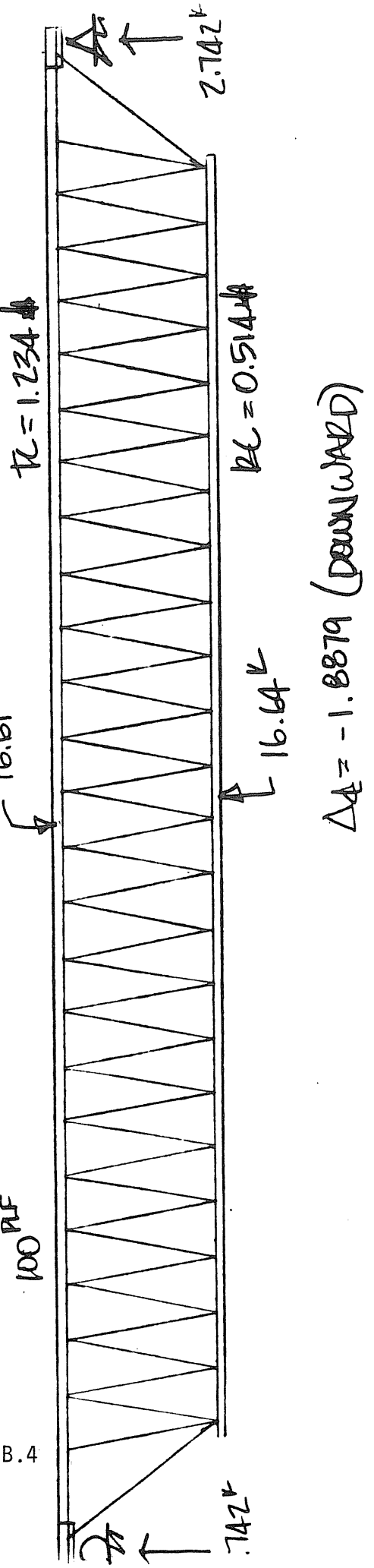
CAMBER = +0.45"



DATE 9-6-84

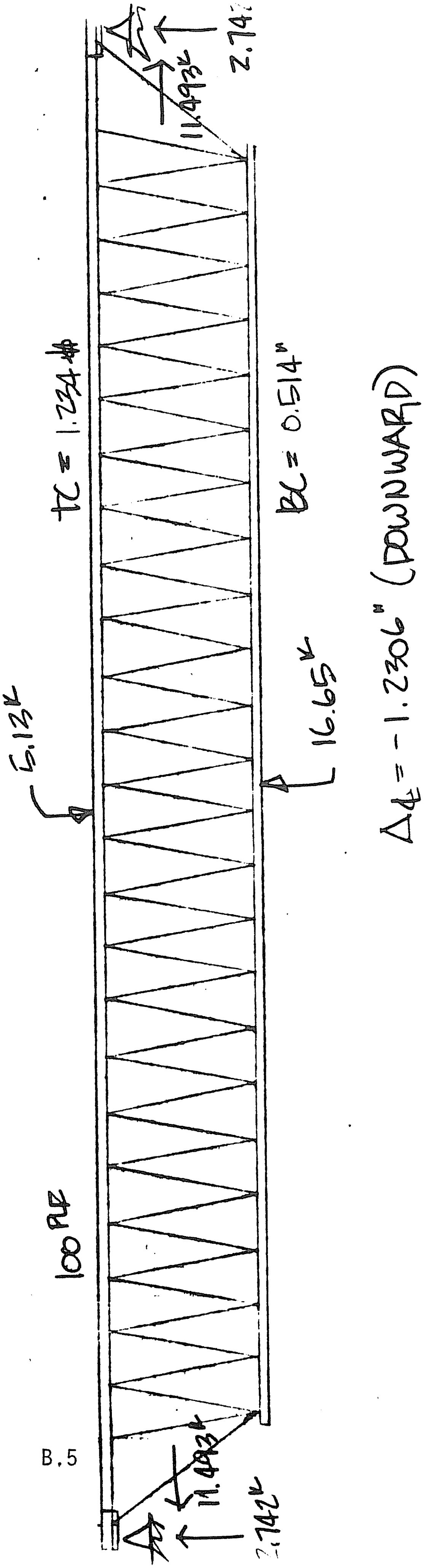
BY SJM

HAAG JOISTS
TEST II
ROLLER-PIN
UNIFORM -Y LOAD

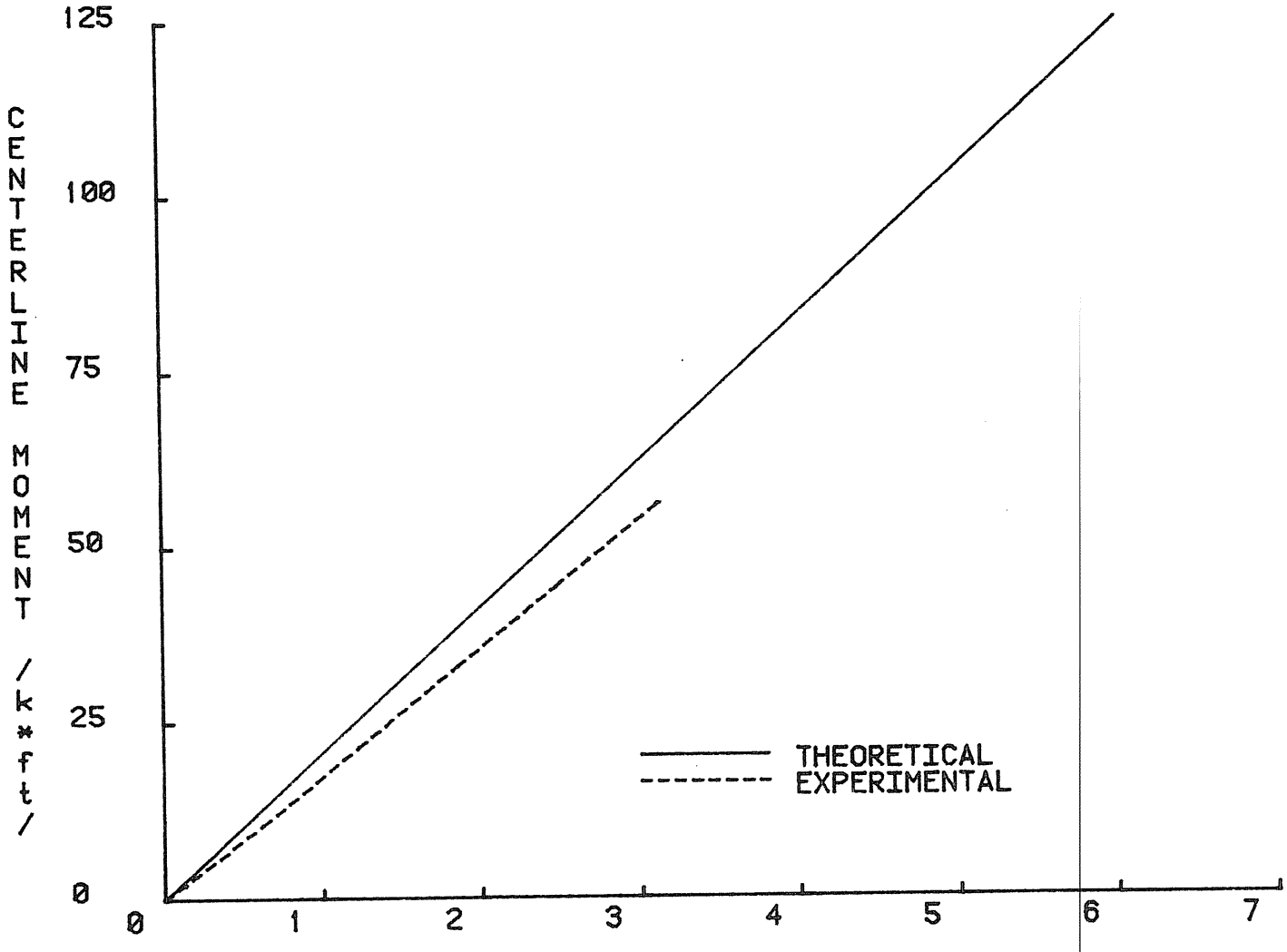


ARUN

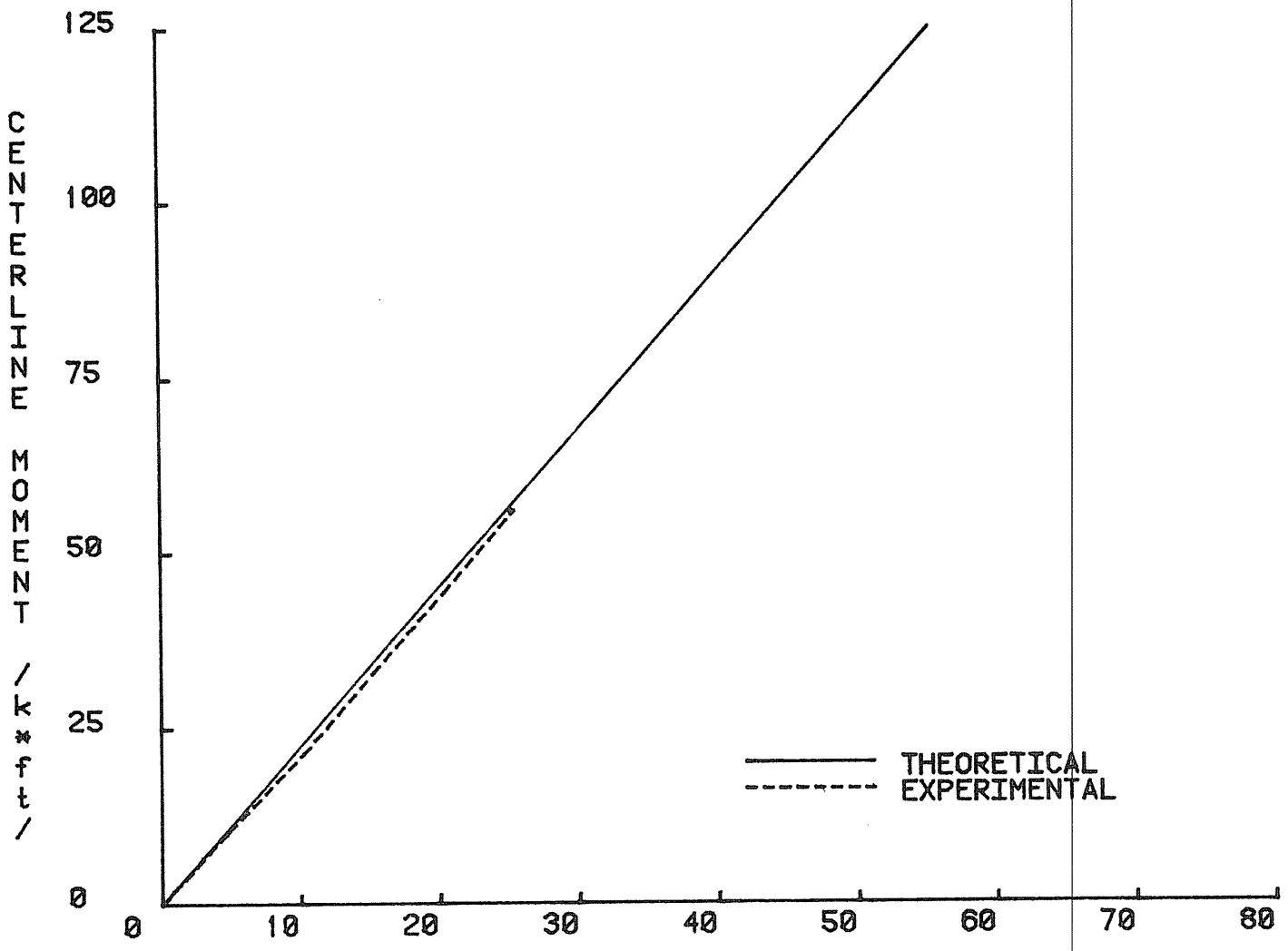
HAAG JOISTS
TEST II
PIN-PIN
UNIFORM -Y LOAD



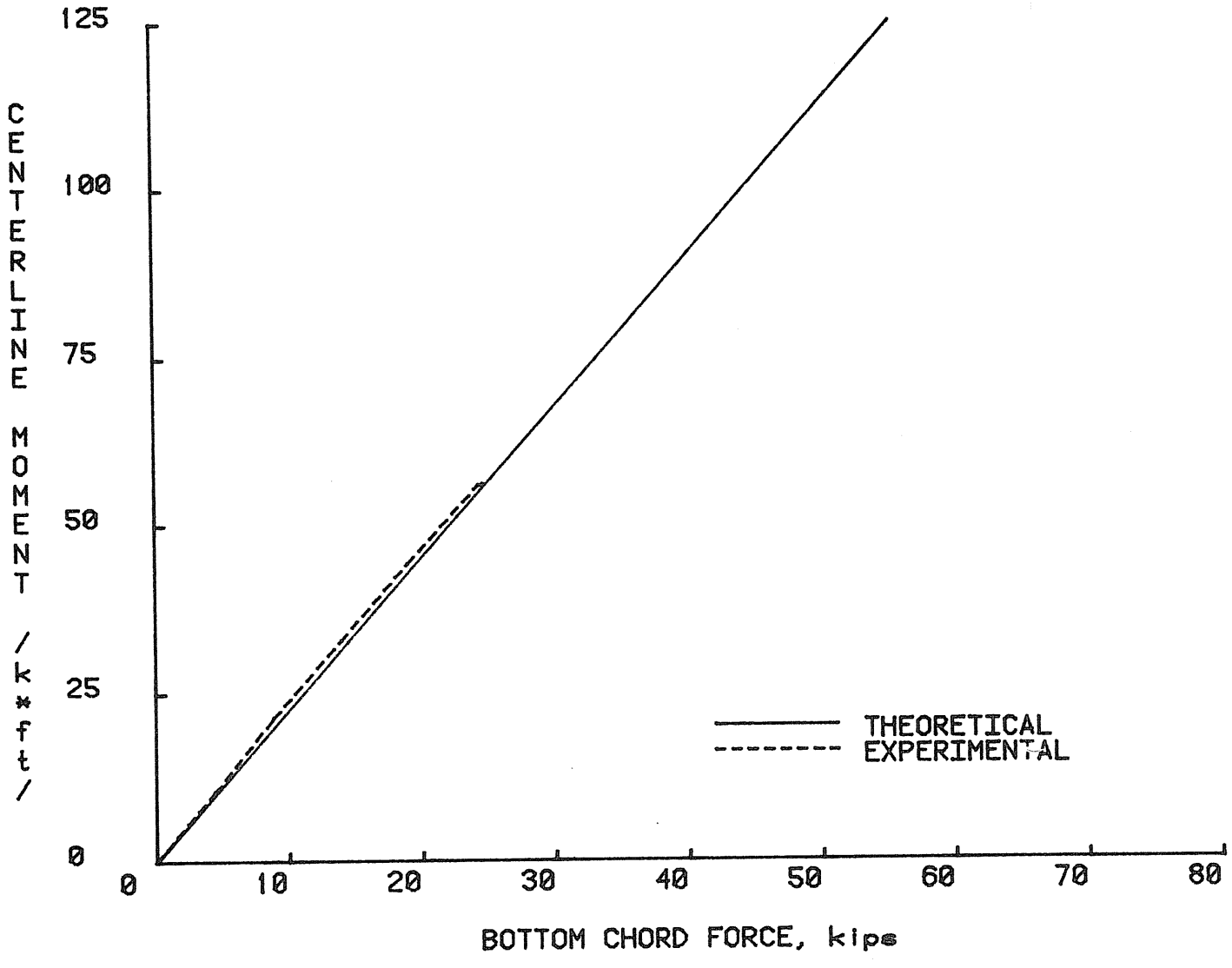
ARUN



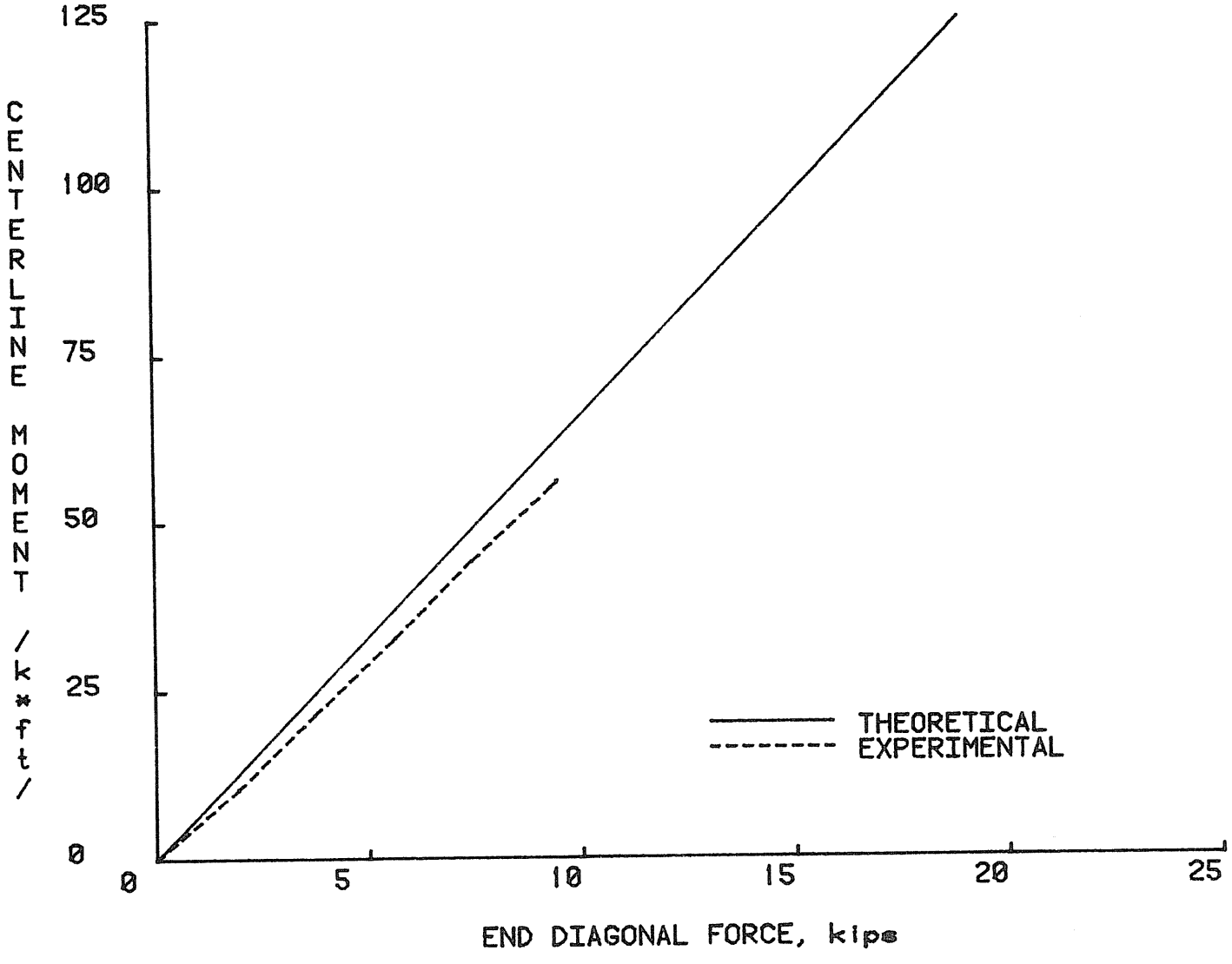
CENTERLINE MOMENT VS CENTERLINE VERTICAL DEFLECTION, TEST 2-A



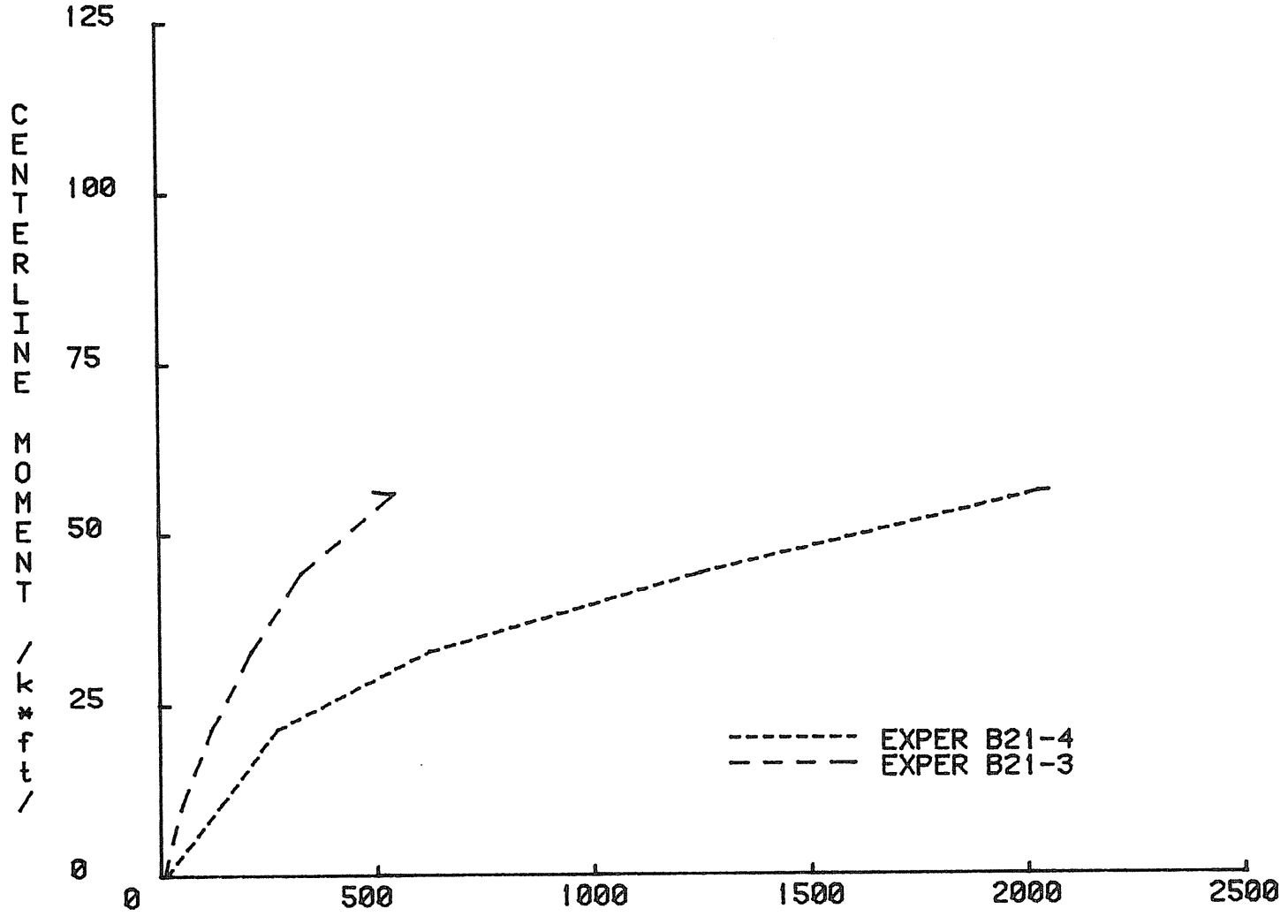
CENTERLINE MOMENT VS TOP CHORD FORCE, TEST 2-A



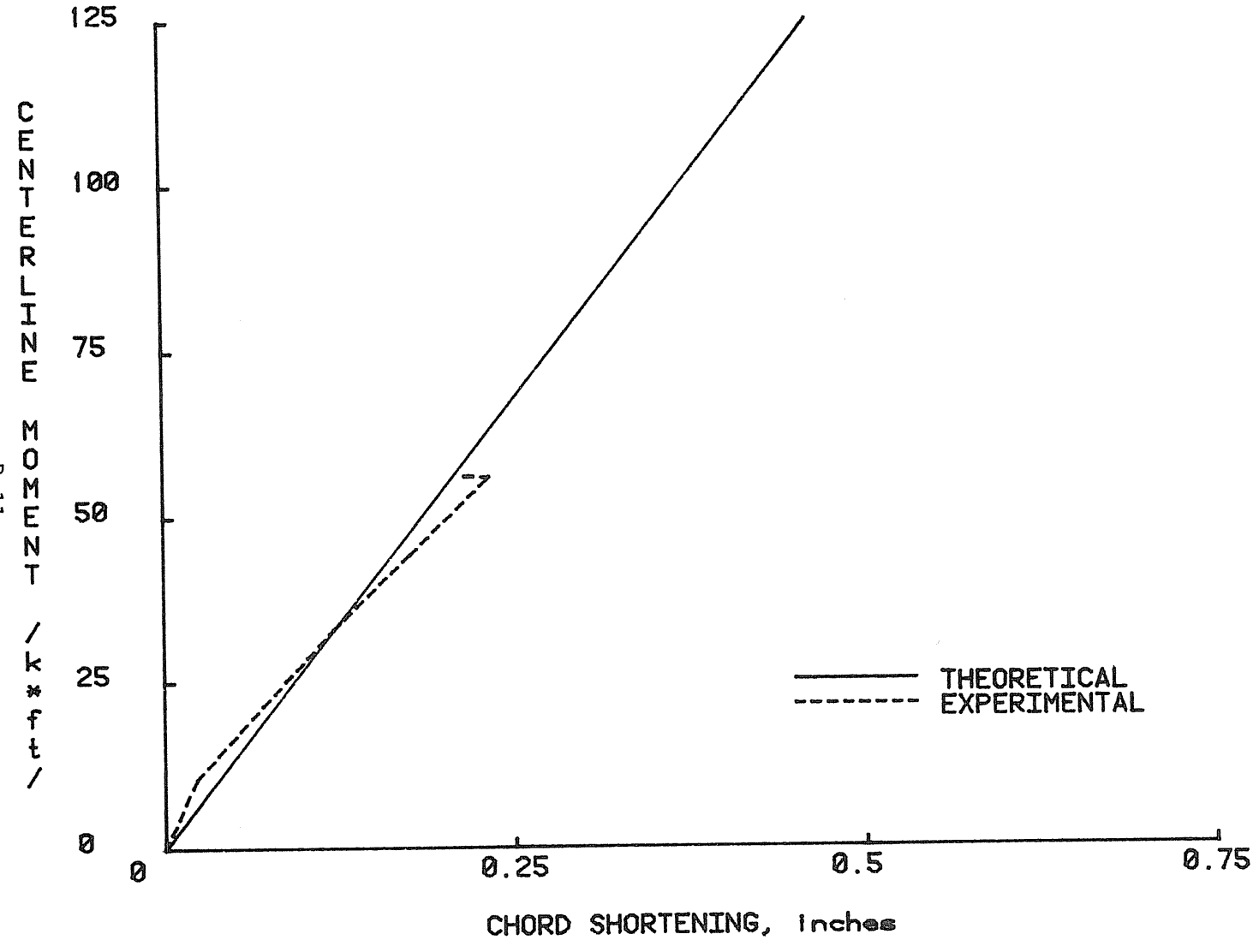
CENTERLINE MOMENT VS BOTTOM CHORD FORCE, TEST 2-A



CENTERLINE MOMENT VS END DIAGONAL FORCE, TEST 2-A



CENTERLINE MOMENT VS WELD STRAIN, TEST 2-A



CENTERLINE MOMENT VS CHORD SHORTENING, TEST 2-A

HAAL JOISTS
TEST II
8-30-84

```
TEST:                    TEST II
Project Name:            HAAG JOISTS
Conducted by:            SJM
---------------------------
I=0
CHANNEL NUMBER:0
CALIBRATION FACTOR: .09445
INSTRUMENT:VER CENTER EAST

---------------------------
I=1
CHANNEL NUMBER:1
CALIBRATION FACTOR: .09401
INSTRUMENT:VER CENTER WEST

---------------------------
I=2
CHANNEL NUMBER:2
CALIBRATION FACTOR: .09389
INSTRUMENT:VER 1/4 PT EAST

---------------------------
I=3
CHANNEL NUMBER:3
CALIBRATION FACTOR: .09385
INSTRUMENT:VER 1/4 PT WEST

---------------------------
I=4
CHANNEL NUMBER:5
CALIBRATION FACTOR: 1.283
INSTRUMENT:HOR. NE   END

---------------------------
I=5
CHANNEL NUMBER:6
CALIBRATION FACTOR: 1.35
INSTRUMENT:HOR. NW   END

---------------------------
I=6
CHANNEL NUMBER:7
CALIBRATION FACTOR: .0942
INSTRUMENT:HOR. SE   END

---------------------------
I=7
CHANNEL NUMBER:8
CALIBRATION FACTOR: .09441
INSTRUMENT:HOR. SW   END

---------------------------
I=8
CHANNEL NUMBER:4
CALIBRATION FACTOR: 1
INSTRUMENT:EXCIT.

---------------------------
I=9
CHANNEL NUMBER:10
CALIBRATION FACTOR: 1.283
INSTRUMENT:TOP CHORD AXIAL EAST

---------------------------
I=10
CHANNEL NUMBER:11
CALIBRATION FACTOR: 1.3
INSTRUMENT:TOP CHORD AXIAL WEST

---------------------------
I=11
CHANNEL NUMBER:12
CALIBRATION FACTOR: 1.25
INSTRUMENT:BOT CHORD AXIAL EAST

---------------------------
I=12
CHANNEL NUMBER:13
CALIBRATION FACTOR: 1.35
INSTRUMENT:BOT CHORD AXIAL WEST

---------------------------
I=13
CHANNEL NUMBER:19
CALIBRATION FACTOR: 1
INSTRUMENT:EXCIT.

---------------------------
I=14
CHANNEL NUMBER:26
CALIBRATION FACTOR: -99409
INSTRUMENT:LOAD CELL EAST

---------------------------
I=15
CHANNEL NUMBER:21
CALIBRATION FACTOR: -26388
INSTRUMENT:LOAD CELL WEST

---------------------------
I=16
CHANNEL NUMBER:24
CALIBRATION FACTOR: .02713
INSTRUMENT:WELD CLIP GAGE NORTH

---------------------------
I=17
CHANNEL NUMBER:25
CALIBRATION FACTOR: .031624
INSTRUMENT:WELD CLIP GAGE SOUTH

---------------------------
I=18
CHANNEL NUMBER:30
CALIBRATION FACTOR: 1
INSTRUMENT:EXCIT.

---------------------------
I=19
CHANNEL NUMBER:22
BRIDGE SIZE:.5
GAGE FACTOR:2.11
LOCATION:GAGE ON END DIAG. OF EA
ST JOIST
---------------------------
I=20
CHANNEL NUMBER 23
BRIDGE SIZE:.5
GAGE FACTOR:2.11
LOCATION:GAGE ON END DIAG. OF EA
ST JOIST
```

HAAL JOICTS
TEST II
8-30-84

==========
DATA POINT: 1

FORCES
======

MOM. EAST= 0
MOM. WEST= 0
VERT LOAD= 0.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
.181	-.096	.042

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: -.006
BOT CHORD, MIDSPAN: .002
DIAGONAL, END: -.003

DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
0.00000	0.00000	0.00000

1/4 SPAN (VERT.)

EAST	WEST	AVER.
0.00000	0.00000	0.00000

LOAD END (HOR.)

EAST	WEST	AVER.
0.00000	.00020	.00010

SUP. END (HOR.)

EAST	WEST	AVER.
-.00002	-.00000	-.00001

W1= .0000150753
W2= .0002077337
W AV.= .0001114045

WELD STRAINS
IN NORTH WELD= - 000143758
IN SOUTH WELD= - 000094280

VOLTAGE READINGS

VER LOAD= 0
VER DISP= 0

CH.	VOLTS
0	4.512000
1	4.990300
2	5.166300
3	4.870700
4	-1.280800
5	-.400250
6	4.391300
7	4.540900
8	5.170200
9	1.408400
10	1.667300
11	1.476500
12	.202170
13	15.114000
14	-.000425
15	-.000083
16	.010218
17	.006428
18	5.006700
19	.004002
20	.004818

```
==================================
DATA POINT: 2

FORCES
======

MOM. EAST= 12.48
MOM. WEST= 12.48
VERT LOAD= 33.000 lb/ft

RAM LOADS  ,kips
------------------
 EAST       WEST      AVERAGE
  -.069      -.139     -.104

MEMBER FORCES ,kips
--------------------
TOP CHORD, MIDSPAN:  4.834
BOT CHORD, MIDSPAN: -4.425
DIAGONAL,  END:     1.931

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
   -.64061    -.60562    -.62312

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
   -.45605    -.45888    -.45747

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .03605     .02837     .03221

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .01917    -.00024     .00946

W1=    .0168786480
W2=    .0286142198
W AV.=    .0227464339

 WELD STRAINS
IN NORTH WELD=   .001410710
IN SOUTH WELD=   .000506991
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 33
VER DISP=-.605622886353

CH.       VOLTS
 0    4.199500
 1    4.696300
 2    4.945300
 3    4.648400
 4   -1.153600
 5    -.401976
 6    4.409200
 7    4.555000
 8    5.170600
 9    1.449300
10    1.709700
11    1.428400
12     .157170
13   15.113000
14    -.000414
15    -.000076
16     .010351
17     .006506
18    5.007200
19     .003757
20     .004551
```

```
==================================
DATA POINT: 3

FORCES
======

MOM. EAST= 24.72
MOM. WEST= 24.72
VERT LOAD= 66.000 lb/ft

RAM LOADS   ,kips
-------------------
 EAST       WEST      AVERAGE
  -.069      -.012      -.041

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 10.253
BOT CHORD, MIDSPAN: -8.856
DIAGONAL,  END:    3.728

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST      AVER.
  -1.24426   -1.21313   -1.22869

1/4 SPAN (VERT.)
----------------
     EAST        WEST      AVER.
   -.92550    -.92008    -.92279

LOAD END (HOR. )
----------------
     EAST        WEST      AVER.
    .08451     .07487     .07969

SUP. END (HOR. )
----------------
     EAST        WEST      AVER.
    .01622    -.00031     .00896

W1=    .0662812612
W2=    .0751801821
W AV.=    .0707307217

 WELD STRAINS
IN NORTH WELD=   .002703841
IN SOUTH WELD=   .001189954

--------------------
VOLTAGE READINGS

VER LOAD= 66
VER DISP=-1.21312592203

CH.      VOLTS
 0    3.904700
 1    4.401000
 2    4.717400
 3    4.424600
 4   -1.159900
 5    -.402420
 6    4.432800
 7    4.577700
 8    5.170600
 9    1.489500
10    1.763200
11    1.382200
12     .110070
13   15.113000
14    -.000414
15    -.000097
16     .010461
17     .006594
18    5.007300
19     .003540
20      004292
```

```
==========================================
DATA POINT: 4

FORCES
======

MOM. EAST= 37.09
MOM. WEST= 37.09
VERT LOAD= 99.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
   .044      -.060      -.008

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 15.285
BOT CHORD, MIDSPAN:-13.973
DIAGONAL,  END:     5.641

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
  -1.88421    -1.82232    -1.85326

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
  -1.42401    -1.39656    -1.41029

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
    .13663      .12524      .13093

SUP. END (HOR. )
----------------
     EAST         WEST       AVER.
    .01899      .00055      .00977

W1=     .1176360654
W2=     .1246900297
W AV.=     .1211630475

 WELD STRAINS
IN NORTH WELD=    .006237200
IN SOUTH WELD=    .002122644
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 99
VER DISP=-1.82231715197

CH.       VOLTS
 0     3.592100
 1     4.104800
 2     4.475300
 3     4.193300
 4    -1.154800
 5     -.396400
 6     4.458100
 7     4.602200
 8     5.170500
 9     1.537400
10     1.801700
11     1.327100
12      .057544
13    15.112000
14     -.000419
15     -.000089
16      .010761
17      .006714
18     5.007300
19      .003266
20      .004059
```

```
==================================
DATA POINT: 5

FORCES
======

MOM. EAST= 49.44
MOM. WEST= 49.44
VERT LOAD=132.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
   .317      -.048       .134

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 20.381
BOT CHORD, MIDSPAN:-19.021
DIAGONAL,  END:    7.452

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -2.51168   -2.43322   -2.47245

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -1.90143   -1.85932   -1.88037

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .19273     .18121     .18697

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .02017     .00134     .01076

W1=    .1725584415
W2=    .1798700051
W AV.=    .1762142233

 WELD STRAINS
IN NORTH WELD=   .012482125
IN SOUTH WELD=   003281800
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 132
VER DISP=-2.43322087685

CH.      VOLTS
 0    3.285800
 1    3.808000
 2    4.243700
 3    3.968900
 4   -1.147000
 5    -.390910
 6    4.485600
 7    4.629700
 8    5.170700
 9    1.584600
10    1.842500
11    1.272800
12     .005844
13   15.113000
14    -.000431
15    -.000091
16     .011291
17     .006863
18    5.007200
19     .003032
20     .003813
```

```
==================================
DATA POINT: 6

FORCES
======

MOM. EAST= 61.81
MOM. WEST= 61.81
VERT LOAD=165.000 lb/ft

RAM LOADS  ,kips
------------------
 EAST       WEST      AVERAGE
  -.160      -.048      -.104

MEMBER FORCEC ,kips
--------------------
TOP CHORD, MIDSPAN: 25.376
BOT CHORD, MIDSPAN:-24.345
DIAGONAL,  END:    9.445

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST      AVER.
  -3.16873   -3.05360   -3.11117

1/4 SPAN (VERT.)
----------------
     EAST        WEST      AVER.
  -2.38908   -2.33566   -2.36237

LOAD END (HOR. )
----------------
     EAST        WEST      AVER.
    .25099     .23853     .24476

SUP. END (HOR. )
----------------
     EAST        WEST      AVER.
    .02099     .00252     .01176

W1=    .2299905355
W2=    .2360028690
W AV.=    .2329967023

 WELD STRAINS
IN NORTH WELD=   .019616855
IN SOUTH WELD=   .005449240
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 165
VER DISP=-3.05359923417

CH.       VOLTS
 0    2.964800
 1    3.506300
 2    4.006800
 3    3.737600
 4   -1.141500
 5    -.382630
 6    4.513800
 7    4.657500
 8    5.170500
 9    1.631500
10    1.881400
11    1.213000
12    -.046046
13   15.112000
14    -.000410
15    -.000091
16     .011897
17     .007142
18    5.007300
19     .002762
20     .003555
```

VOID

DATA POINT- 7

VOID

FORCES
======

MOM. EAST= 61.81
MOM. WEST= 61.81
VERT LOAD=165.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
9.733	9.258	9.495

MEMBER FORCES ,kips

TOP CHORD, MIDSPAN: 15.208
BOT CHORD, MIDSPAN:-24.687
DIAGONAL, END: 9.884

DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-2.66123	-2.58592	-2.62358

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.98736	-1.97683	-1.98209

LOAD END (HOR.)

EAST	WEST	AVER.
.05494	-.04026	.00734

SUP. END (HOR.)

EAST	WEST	AVER.
.05296	.04644	.04970

W1= .0019814244
W2= -.0866956511
W AV.= -.0423571133

WELD STRAINS
IN NORTH WELD= .019908498
IN SOUTH WELD= .005191647

VOLTAGE READINGS

VER LOAD= 165
VER DISP=-2.58592231791

CH.	VOLTS
0	3.212700
1	3.733700
2	4.201900
3	3.911800
4	-.929470
5	-.076099
6	4.418400
7	4.521500
8	5.170600
9	1.544200
10	1.793300
11	1.207800
12	-.047875
13	15.112000
14	-.000846
15	-.001636
16	.011922
17	.007109
18	5.007400
19	.002783
20	.003410

```
==================================
DATA POINT: 8

FORCES
======

MOM. EAST= 42.41
MOM. WEST= 42.41
VERT LOAD=165.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  9.484      9.150     9.317

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 14.611
BOT CHORD, MIDSPAN:-24.581
DIAGONAL,  END:     9.796

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -2.66116   -2.58587   -2.62351

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -1.98732   -1.97678   -1.98205

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .05518    -.04023     .00747

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .05296     .04646     .04971

W1=     .0022169017
W2=   -.0866859043
W AV.=   -.0422345013

 WELD STRAINS
IN NORTH WELD=    .019828857
IN SOUTH WELD=    .005045074
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 165
VER DISP=-2.5858651487

CH.       VOLTS
 0     3.212800
 1     3.733800
 2     4.202000
 3     3.911900
 4     -.929490
 5     -.075989
 6     4.418600
 7     4.521600
 8     5.170700
 9     1.539100
10     1.788100
11     1.207100
12     -.044751
13    15.112000
14     -.000835
15     -.001618
16      .011915
17      .007090
18     5.007300
19      .002791
20      .003433
```

```
==================================
DATA POINT: 9

FORCES
======

MOM. EAST= 57.64
MOM. WEST= 57.64
VERT LOAD=165.000 lb/ft

RAM LOADS   ,kips
-------------------
 EAST       WEST      AVERAGE
  5.263      5.096     5.179

MEMBER FORCEC ,kips
--------------------
TOP CHORD, MIDSPAN: 19.339
BOT CHORD, MIDSPAN:-24.606
DIAGONAL,  END:     9.717

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -2.86928   -2.80070   -2.83499

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -2.15462   -2.14148   -2.14805

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .13686      .05561     .09624

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .04024      .03567     .03796

W1=    .0966193022
W2=    .0199442789
W AV.=    .058281706

 WELD STRAINS
IN NORTH WELD=   .020111525
IN SOUTH WELD=    005239385
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 165
VER DISP=-2.80069819643

CH.       VOLTS
 0    3.111100
 1    3.629300
 2    4.120700
 3    3.831900
 4   -1.013850
 5    -.151270
 6    4.458300
 7    4.568300
 8    5.170600
 9    1.578200
10    1.830600
11    1.208800
12    -.047183
13   15.112000
14    -.000649
15    -.000945
16     .011939
17     .007115
18    5.007300
19     .002763
20     .003482
```

```
==================================
DATA POINT: 10

FORCES
======

MOM. EAST= 61.81
MOM. WEST= 61.81
VERT LOAD=165.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
   .316       .054       .185

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 25.070
BOT CHORD, MIDSPAN:-24.701
DIAGONAL,  END:     9.442

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
  -3.16546   -3.06779   -3.11662

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
  -2.39135   -2.34720   -2.36927

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
    .24524     .21579     .23051

SUP. END (HOR. )
----------------
     EAST         WEST       AVER.
    .01950     .01182     .01566

W1=    .2257341384
W2=    .2039717820
W AV.=    .2148529602

 WELD STRAINS
IN NORTH WELD=   .020276416
IN SOUTH WELD=   .005099481
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 165
VER DISP=-3.0677944662

CH.       VOLTS
 0    2.966400
 1    3.499400
 2    4.005700
 3    3.732000
 4   -1.151400
 5    -.317770
 6    4.511000
 7    4.646400
 8    5.170500
 9    1.627500
10    1.879900
11    1.209600
12    -.050270
13   15.111000
14    -.000431
15    -.000108
16     .011953
17     .007097
18    5.007300
19     .002746
20     .003572
```

VOID

==========

~~DATA POINT 11~~

FORCES VOID

======

MOM. EAST= 0
MOM. WEST= 0
VERT LOAD=165.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
2.926	2.698	2.812

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 21.429
BOT CHORD, MIDSPAN:-24.530
DIAGONAL, END: 9.578

DISPLACEMENTS, (in.)

==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-3.00790	-2.92907	-2.96849

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-2.26503	-2.24369	-2.25436

LOAD END (HOR.)

EAST	WEST	AVER.
.19291	.14247	.16769

SUP. END (HOR.)

EAST	WEST	AVER.
.02962	.02507	.02734

W1= .1632884090
W2= .1174058109
W AV.= .1403471100

WELD STRAINS
IN NORTH WELD= .020202938
~~IN SOUTH WELD= .005075053~~

~~VOLTAGE READINGS~~

VER LOAD= 165
VER DISP=-2.92906998587

CH.	VOLTS
0	3.043400
1	3.566900
2	4.067100
3	3.782300
4	-1.084300
5	-.225290
6	4.485600
7	4.610700
8	5.170600
9	1.596700
10	1.847900
11	1.207500
12	-.044147
13	15.111000
14	-.000546
15	-.000547
16	.011947
17	.007094
18	5.007400
19	.002761
~~20~~	~~.003521~~

```
==================================
DATA POINT: 12

FORCES
======

MOM. EAST= 59.5
MOM. WEST= 59.5
VERT LOAD=165.000 lb/ft

RAM LOADS  ,kips
-------------------
 EAST       WEST      AVERAGE
  2.994      2.644     2.819

MEMBER FORCES ,kips
--------------------
TOP CHORD, MIDSPAN: 22.025
BOT CHORD, MIDSPAN:-24.581
DIAGONAL,  END:     9.608

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -3.01548   -2.93154   -2.97351

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -2.27059   -2.24575   -2.25817

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .19291     .14268     .16779

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .02957     .02478     .02717

W1=    .1633426759
W2=    .1178986162
W AV.=    .1406206460

 WELD STRAINS
IN NORTH WELD=   .020179383
IN SOUTH WELD=   .004942934
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 165
VER DISP=-2.93153867413

CH.       VOLTS
 0    3.039700
 1    3.565700
 2    4.064400
 3    3.781300
 4   -1.084660
 5    -.227300
 6    4.485600
 7    4.610800
 8    5.170600
 9    1.601100
10    1.853800
11    1.208700
12    -.046605
13   15.111000
14    -.000549
15    -.000538
16     .011945
17     .007077
18    5.007400
19     .002754
20     .003520
```

```
==================================
DATA POINT: 13

FORCES
======

MOM. EAST= 57.2
MOM. WEST= 57.2
VERT LOAD=165.000 lb/ft

RAM LOADS  ,kips
------------------
 EAST       WEST      AVERAGE
  6.193      5.602     5.897

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 18.866
BOT CHORD, MIDSPAN:-24.658
DIAGONAL,  END:    9.676

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -2.86141   -2.78089   -2.82115

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -2.14593   -2.13195   -2.13894

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
     .12929     .05871     .09400

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
     .04055     .03626     .03841

W1=    .0887408339
W2=    .0224473629
W AV.=    .0555940984

 WELD STRAINS
IN NORTH WELD=   .020108717
IN SOUTH WELD=   .005028429
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 165
VER DISP=-2.78088774938

CH.       VOLTS
 0    3.115000
 1    3.639000
 2    4.125000
 3    3.836600
 4   -1.011810
 5    -.147130
 6    4.454700
 7    4.569900
 8    5.170700
 9    1.574600
10    1.825800
11    1.207800
12    -.047306
13   15.111000
14    -.000690
15    -.001029
16     .011939
17     .007088
18    5.007400
19     .002778
20     .003478
```

```
==================================
DATA POINT: 14

FORCES
======

MOM. EAST= 42.41
MOM. WEST= 42.41
VERT LOAD=165.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  9.983      9.228     9.605

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 15.208
BOT CHORD, MIDSPAN:-24.734
DIAGONAL,  END:     9.888

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST      AVER.
  -2.66369   -2.59436   -2.62902

1/4 SPAN (VERT.)
----------------
     EAST        WEST      AVER.
  -1.99457   -1.98383   -1.98920

LOAD END (HOR. )
----------------
     EAST        WEST      AVER.
    .05330    -.04067     .00632

SUP. END (HOR. )
----------------
     EAST        WEST      AVER.
    .05248     .04631     .04940

W1=    .0008137871
W2=   -.0869716942
W AV.=  -.0430789536

 WELD STRAINS
IN NORTH WELD=   .020273604
IN SOUTH WELD=   .004834122
```

```
-------------------
VOLTAGE READINGS

VER LOAD= 165
VER DISP=-2.5943570028

CH.      VOLTS
 0    3.211500
 1    3.729600
 2    4.198400
 3    3.908400
 4    -.932620
 5    -.077032
 6    4.417600
 7    4.521300
 8    5.170600
 9    1.543600
10    1.793700
11    1.206700
12    -.047777
13   15.111000
14    -.000857
15    -.001631
16     .011953
17     .007063
18    5.007400
19     .002776
20     .003424
```

==========
DATA POINT: 15

FORCES
======

MOM. EAST= 42.41
MOM. WEST= 42.41
VERT LOAD=165.000 lb/ft

RAM LOADS , kips

EAST	WEST	AVERAGE
9.417	8.952	9.184

MEMBER FORCEC , kips

TOP CHORD, MIDSPAN: 15.331
BOT CHORD, MIDSPAN:-24.750
DIAGONAL, END: 9.878

DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-2.66755	-2.59892	-2.63324

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.99796	-1.98925	-1.99360

LOAD END (HOR.)

EAST	WEST	AVER.
.05339	-.04079	.00630

SUP. END (HOR.)

EAST	WEST	AVER.
.05156	.04560	.04858

W1= .0018283585
W2= -.0863909098
W AV.= -.0422812756

WELD STRAINS
IN NORTH WELD= 020358335
IN SOUTH WELD= 004862924

VOLTAGE READINGS

VER LOAD= 165
VER DISP=-2.59891639042

CH.	VOLTS
0	3.209800
1	3.727600
2	4.197000
3	3.906000
4	-.938810
5	-.081982
6	4.417900
7	4.521500
8	5.170900
9	1.544500
10	1.794700
11	1.205900
12	-.047340
13	15.110000
14	-.000832
15	-.001585
16	.011959
17	.007066
18	5.006900
19	.002784
20	.003418

```
==================================
DATA POINT: 16

FORCES
======

MOM. EAST= 61.81
MOM. WEST= 61.81
VERT LOAD=165.000 lb/ft

RAM LOADS  ,kips
-------------------
 EAST       WEST      AVERAGE
   .317      -.121       .098

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 25.270
BOT CHORD, MIDSPAN:-24.663
DIAGONAL,  END:     9.462

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -3.18251   -3.08337   -3.13294

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -2.40599   -2.36366   -2.38483

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .24514     .22079     .23296

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .01787     .00985     .01386

W1=     .2272631432
W2=     .2109400635
W AV.=     .0704210434

 WELD STRAINS
IN NORTH WELD=    .020526055
IN SOUTH WELD=    004988392
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 165
VER DISP=-3.08336835312

CH.       VOLTS
 0    2.957900
 1    3.492200
 2    3.998900
 3    3.724300
 4   -1.162300
 5    -.331540
 6    4.511300
 7    4.649200
 8    5.170900
 9    1.629500
10    1.881100
11    1.208300
12    -.048066
13   15.110000
14    -.000431
15    -.000079
16     .011973
17     .007082
18    5.006800
19     .002747
20     .003565
```

```
==================================
DATA POINT: 17

FORCES
======

MOM. EAST= 49.44
MOM. WEST= 49.44
VERT LOAD=132.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
    .249      -.163       .043

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 20.372
BOT CHORD, MIDSPAN:-19.840
DIAGONAL,  END:     7.540

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -2.57091   -2.49174   -2.53133

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -1.93822   -1.91280   -1.92551

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .18950     .17388     .18169

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .01722     .00911     .01317

W1=     .1722757609
W2=     .1647650343
W AV.=     .1685203976

 WELD STRAINS
IN NORTH WELD=    .018947664
IN SOUTH WELD=    .004234392
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 132
VER DISP=-2.49174039358

CH.       VOLTS
 0     3.257000
 1     3.779700
 2     4.226000
 3     3.943100
 4    -1.166600
 5     -.336660
 6     4.484200
 7     4.626300
 8     5.170900
 9     1.582100
10     1.844000
11     1.257400
12      .004398
13    15.109000
14     -.000428
15     -.000072
16      .011839
17      .006985
18     5.006800
19      .002997
20      .003824
```

DATA POINT- 16

VOID

FORCES
======

MOM. EAST= 49.44
MOM. WEST= 49.44
VERT LOAD=132.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
.340	-.163	.089

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 15.436
BOT CHORD, MIDSPAN:-15.225
DIAGONAL, END: 5.631

DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-1.95331	-1.89719	-1.92525

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.47558	-1.45653	-1.46605

LOAD END (HOR.)

EAST	WEST	AVER.
.13206	.11900	.12553

SUP END (HOR.)

EAST	WEST	AVER.
.01760	.00867	.01314

W1= .1144407038
W2= .1103306852
W AV.= .1123856945

WELD STRAINS
IN NORTH WELD= .017201615
IN SOUTH WELD= .003440457

VOLTAGE READINGS

VER LOAD= 132
VER DISP=-1.897188861722

CH.	VOLTS
0	3.558700
1	4.068800
2	4.450700
3	4.164600
4	-1.164100
5	-.339740
6	4.456300
7	4.599600
8	5.171000
9	1.536700
10	1.804400
11	1.305500
12	.051207
13	15.109000
14	-.000432
15	-.000072
16	.011691
17	.006883
18	5.006900
19	.003246
20	.004001

==========

DATA POINT: 19

FORCES
======

MOM. EAST= 24.72
MOM. WEST= 24.72
VERT LOAD= 66.000 lb/ft

RAM LOADS (kips)

EAST	WEST	AVERAGE
.135	-.145	-.005

MEMBER FORCES (kips)

TOP CHORD, MIDSPAN: 10.440
BOT CHORD, MIDSPAN:-10.758
DIAGONAL, END: 3.734

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)

EAST	WEST	AVER.
-1.33926	-1.29261	-1.31594

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-.98289	-.98548	-.98419

LOAD END (HOR.)

EAST	WEST	AVER.
.07662	.06677	.07169

SUP. END (HOR.)

EAST	WEST	AVER.
.01809	.00763	.01286

W1= .0585292055
W2= .0591387839
W AV.= .0588339947

WELD STRAINS
IN NORTH WELD= .015337851
IN SOUTH WELD= .002638782

VOLTAGE READINGS

VER LOAD= 66
VER DISP=-1.29261248814

CH.	VOLTS
0	3.858600
1	4.362700
2	4.689900
3	4.393200
4	-1.160900
5	-.347010
6	4.429300
7	4.574100
8	5.171000
9	1.490100
10	1.765000
11	1.353700
12	.099069
13	15.109000
14	-.000423
15	-.000075
16	.011533
17	.006780
18	5.007000
19	.003492
20	.004338

```
==================================
DATA POINT: 20

FORCES
======

MOM. EAST= 12.36
MOM. WEST= 12.36
VERT LOAD= 33.000 lb/ft

RAM LOADS  ,kips
------------------
 EAST       WEST      AVERAGE
   .340      -.127       .107

MEMBER FORCES ,kips
--------------------
TOP CHORD, MIDSPAN:  5.123
BOT CHORD, MIDSPAN: -6.471
DIAGONAL,  END:     1.867

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST      AVER.
   -.72706    -.69565    -.71136

1/4 SPAN (VERT.)
----------------
     EAST        WEST      AVER.
   -.49762    -.51546    -.50654

LOAD END (HOR. )
----------------
     EAST        WEST      AVER.
    .02427     .01823     .02125

SUP. END (HOR. )
----------------
     EAST        WEST      AVER.
    .01875     .00627     .01251

W1=    .0055162294
W2=    .0119591160
W AV.=    .0087376727

 WELD STRAINS
IN NORTH WELD=   .013263730
IN SOUTH WELD=   001772359
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 33
VER DISP=-.695647559047

CH.       VOLTS
 0    4.157800
 1    4.652900
 2    4.925500
 3    4.621300
 4   -1.156500
 5    -.356550
 6    4.403800
 7    4.550400
 8    5.171000
 9    1.447400
10    1.715900
11    1.400500
12     .142270
13   15.109000
14    -.000432
15    -.000078
16     .011356
17     .006668
18    5.006600
19     .003726
20     .004598
```

```
==================================
DATA POINT: 21

FORCES
======

MOM  EAST= 0
MOM. WEST= 0
VERT LOAD=  0.000 lb/ft

RAM LOADS   ,kips
-------------------
 EAST       WEST      AVERAGE
   .341      -.120       .110

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN:   -.245
BOT CHORD, MIDSPAN: -2.053
DIAGONAL,  END:       .045

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST      AVER.
   -.09117    -.07525    -.08321

1/4 SPAN (VERT.)
----------------
     EAST        WEST      AVER.
   -.00886    -.04423    -.02654

LOAD END (HOR. )
----------------
     EAST        WEST      AVER.
   -.02281    -.03078    -.02680

SUP. END (HOR. )
----------------
     EAST        WEST      AVER.
    .01448     .00595     .01021

W1=   -.0372860930
W2=   -.0367336129
W AV.=   -.0370098529

 WELD STRAINS
IN NORTH WELD=   .010780876
IN SOUTH WELD=   000856103
```

```
-------------------
VOLTAGE READINGS

VER LOAD= 0
VER DISP=-7.52491315392E-2

CH       VOLTS
 0    4.468000
 1    4.954300
 2    5.162600
 3    4.849800
 4   -1.184800
 5    -.358730
 6    4.380700
 7    4.526300
 8    5.170800
 9    1.404700
10    1.665900
11    1.447400
12     .188250
13   15.109000
14    -.000432
15    -.000079
16     .011145
17     .006550
18    5.006500
19     .003949
20     .004858
```

TEST II

END PART A

HAAG JOISTS
TEST II

8-30-84 (TH:JL)

ACTION TAKEN	Moment k-ft	Ram Load	Data Point
Initialized (No Load)	0	0	1
33 PLF ; FREE	12.36	0.	2
66 PLF ; "	24.72	0.	3
99 PLF ; "	37.09	0.	4
132 PLF ; "	49.44	0.	5
165 PLF ; "	61.81	0.	6
165 PLF ; BALANCED VOID	42.41	—	7
165 PLF ; BALANCED	42.41	9.32	8
165 PLF ; RELEASING RAMS	±57.64	5.18	9
165 PLF ; RELEASED	61.81	0.	10
165 PLF ; VOID	—	—	11
165 PLF ; ACTUATED RAM	±59.5	2.82	12
165 PLF ; " "	±57.2	5.90	13

HAAG JOISTS
TEST II

8-30-84 (THUR.)

ACTION TAKEN	MOMENT (K')	RAM LOAD (K)	DATA POINT
165 PLF ; BALANCED	42.41	9.61	14
165 PLF BALANCED (Same as pt. 14)	42.41	9.61	15
165 PLF ; RELEASED	61.81	0.	16
132 PLF ; FREE	49.44	0.	17
99 PLF ; " VOID (132/49.44)	37.09	0.	18
66 PLF ; "	24.72	0.	19
33 PLF ; "	12.36	0.	20
0 PLF ; " (NO LOAD)	0.	0.	21

APPENDIX C

RESULTS FROM TEST II-1

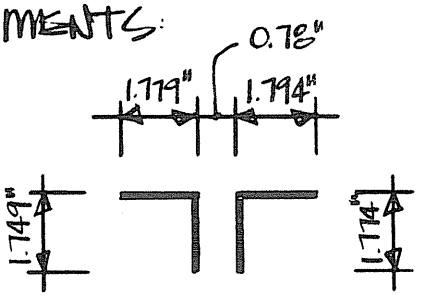
(Cut Angle)

PROJECT HAAG JOISTS

TEST II-1 ANGLE CUT

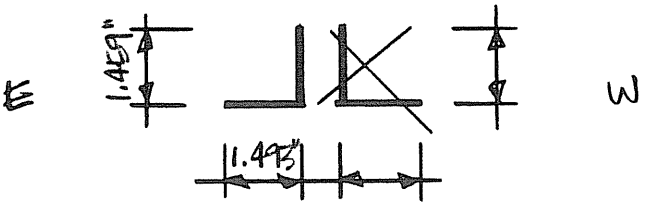
TEST JOIST BZ1

MEASUREMENTS:

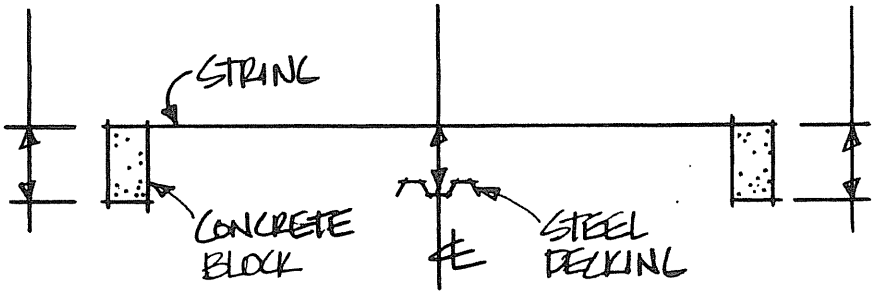


t=0.185" t=0.182"

t=0.185" t=



$\dagger_{\text{SOUTH END DIAGONAL}} = 0.935"$



$WT._{\text{CONCRETE BLOCK}} = 33^{LB} \pm$

$WT_{\text{STEEL DECKING (1 SHEET)}} = 78.5^{LB} \pm$

DATE 8-28-84

BY LEL/SJM

PROJECT HAAG JOISTS

TEST II-1 ANGLE CUT

TEST JOIST B21

LOWER CHORD BUTT WELD LOCATIONS:

CLIP GAGES:

DATE 8-29-84

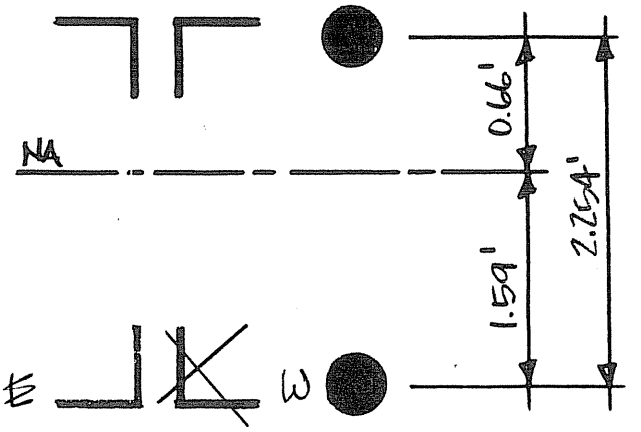
BY GJM

PROJECT HAAG JOISTS

TEST II-1 ANGLE CUT

TEST JOIST B21

CALCULATED QUANTITIES:

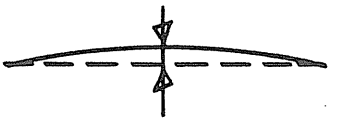


$A_{TOP\ CHORD} = 1.234$ in²

$A_{BOT\ CHORD} = 0.514$ in²

$A_{SOUTH\ END\ DIAGONAL} = 0.687$ in²

CAMBER = NA

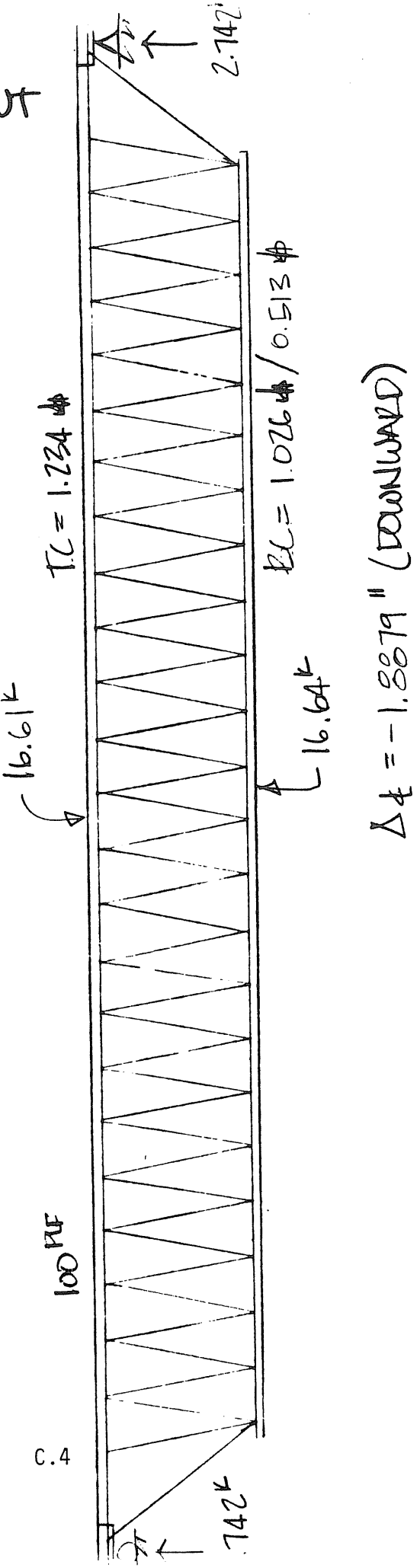


DATE 9-6-84

BY SJM

HAAG JOISTS
TEST II-1 ANGLE CUT
ROLLER-PIN
UNIFORM -Y LOAD

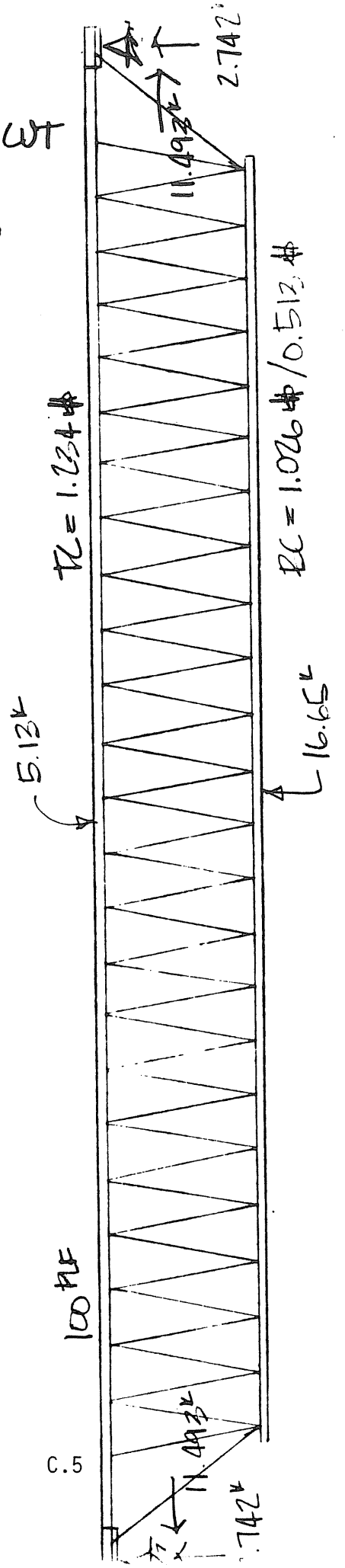
8-30-84 (THUR)



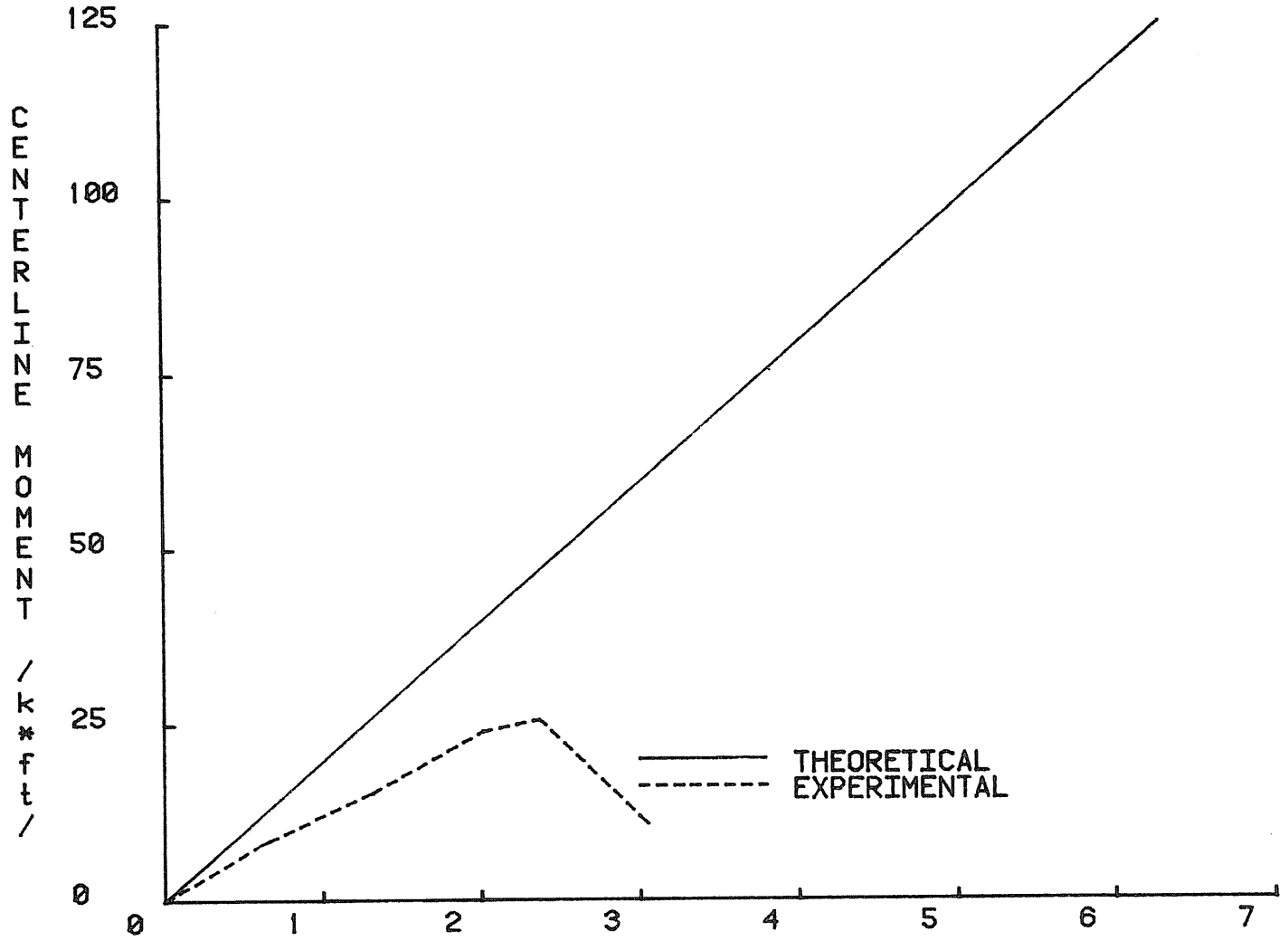
$\Delta_t = -1.8879''$ (DOWNWARD)

HAAG JOISTS
TEST II - 1 ANGLE CUT
PIN-PIN
UNIFORM -Y LOAD

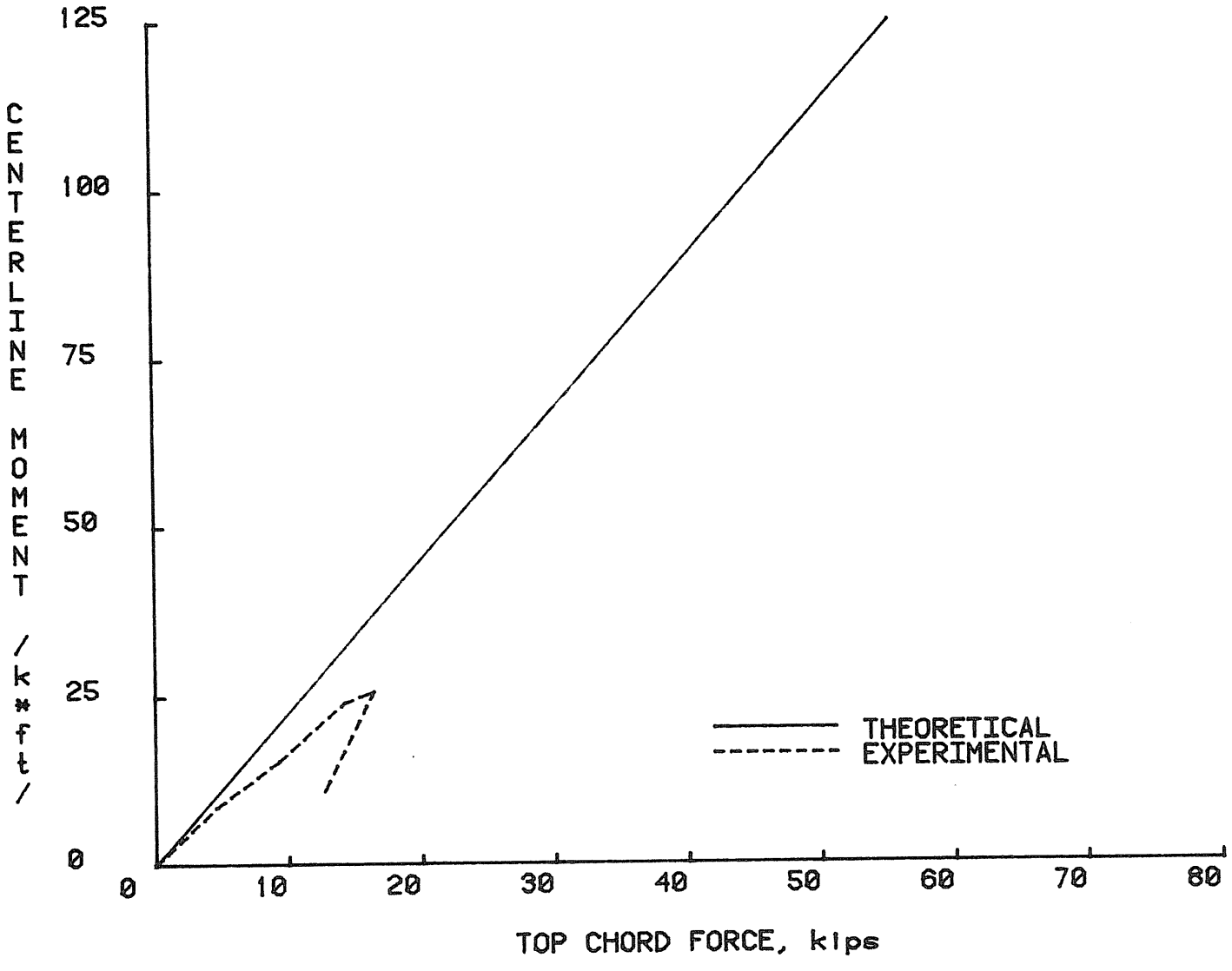
8-30-84 (THUR)



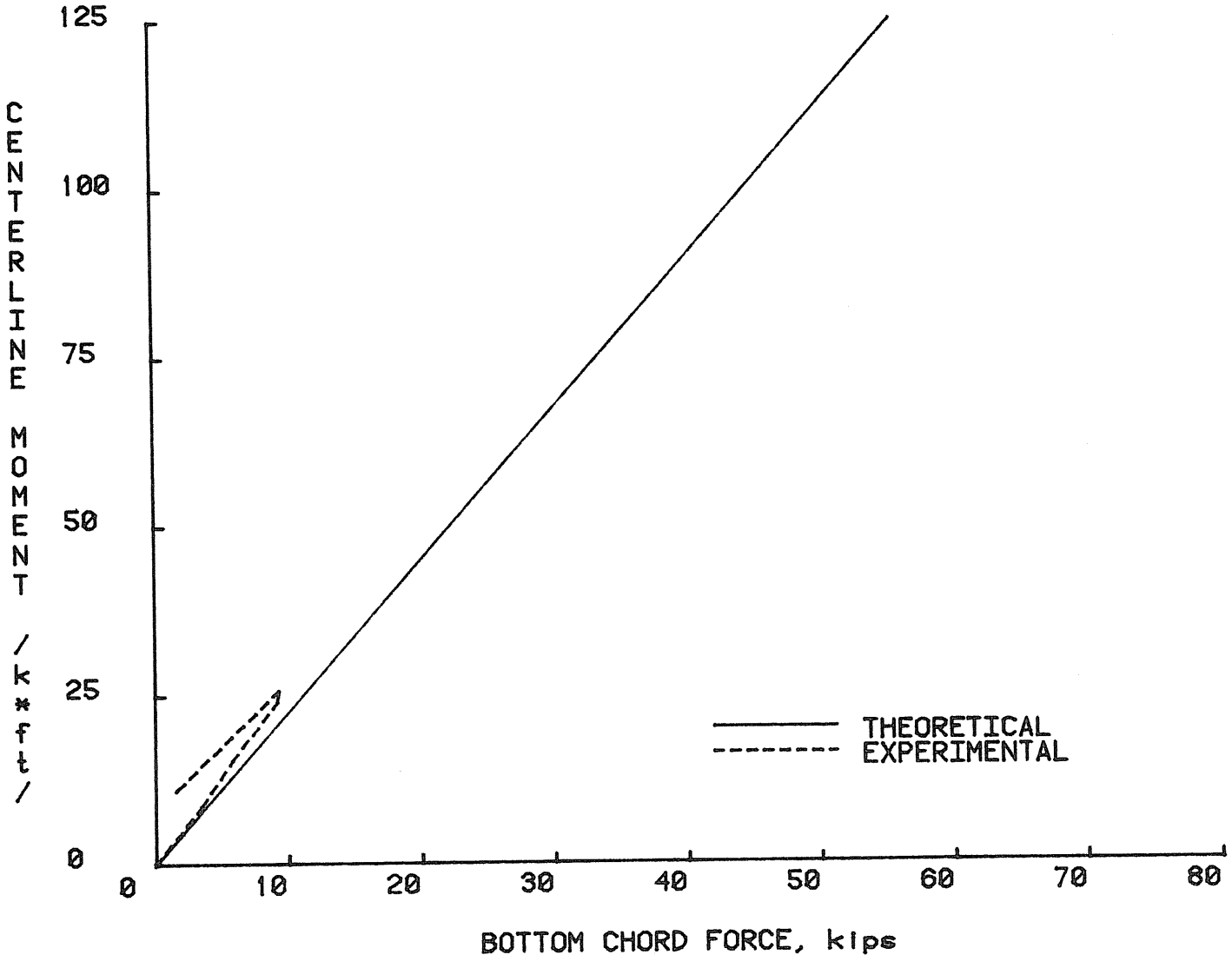
$\Delta_L = -1.2306"$ (DOWNWARD)



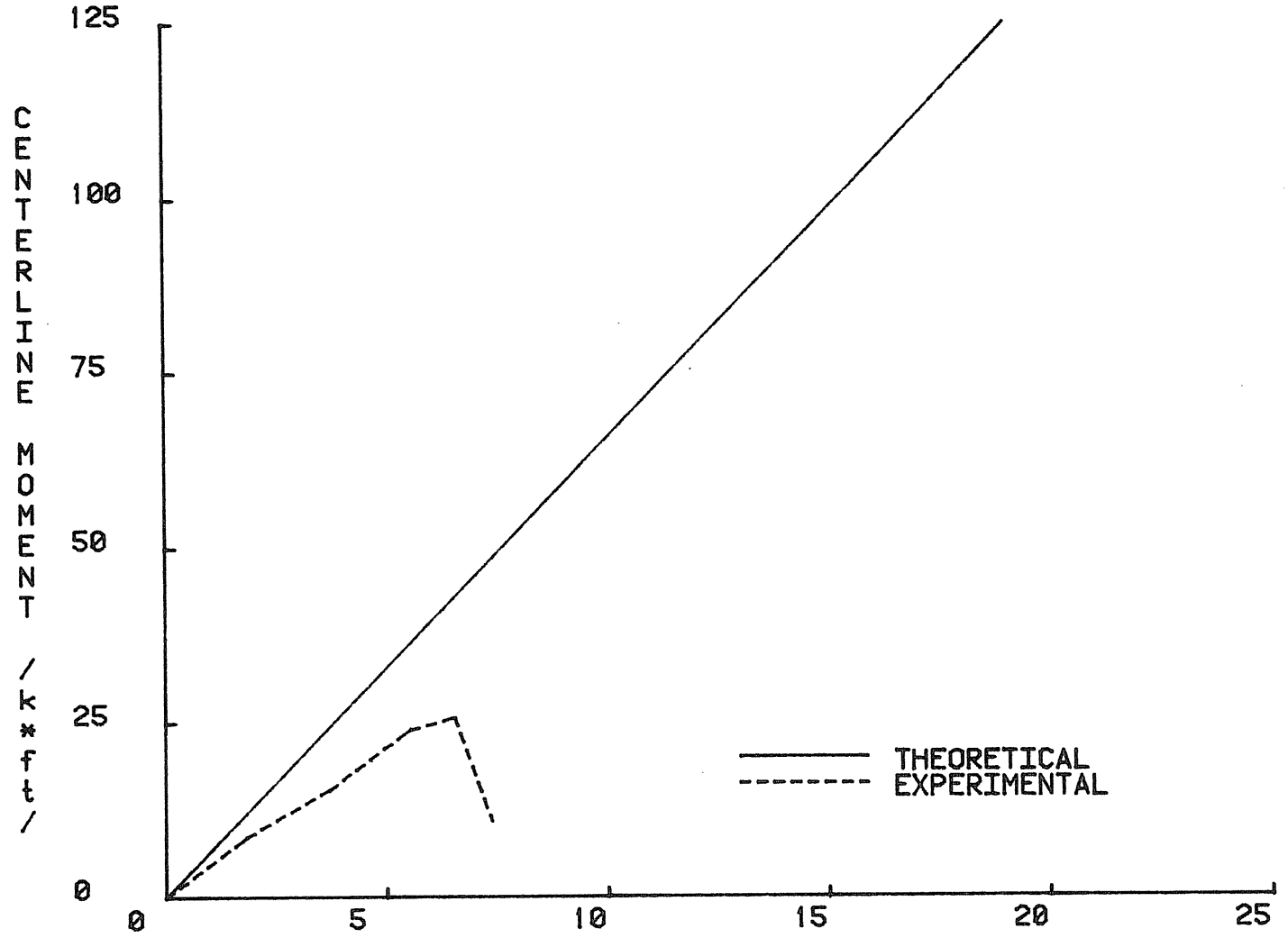
CENTERLINE MOMENT VS CENTERLINE VERTICAL DEFLECTION, TEST 2-B



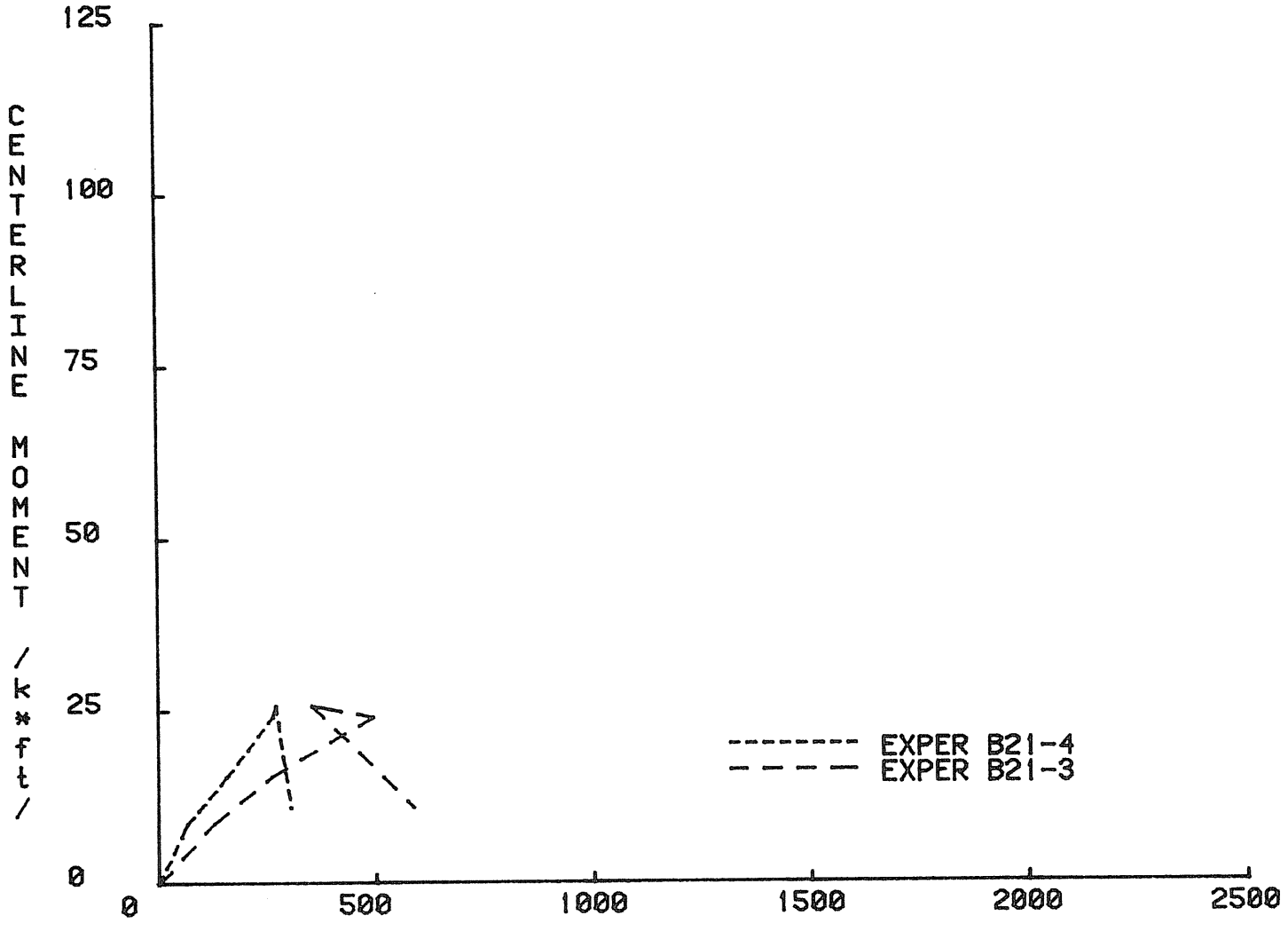
CENTERLINE MOMENT VS TOP CHORD FORCE, TEST 2-B



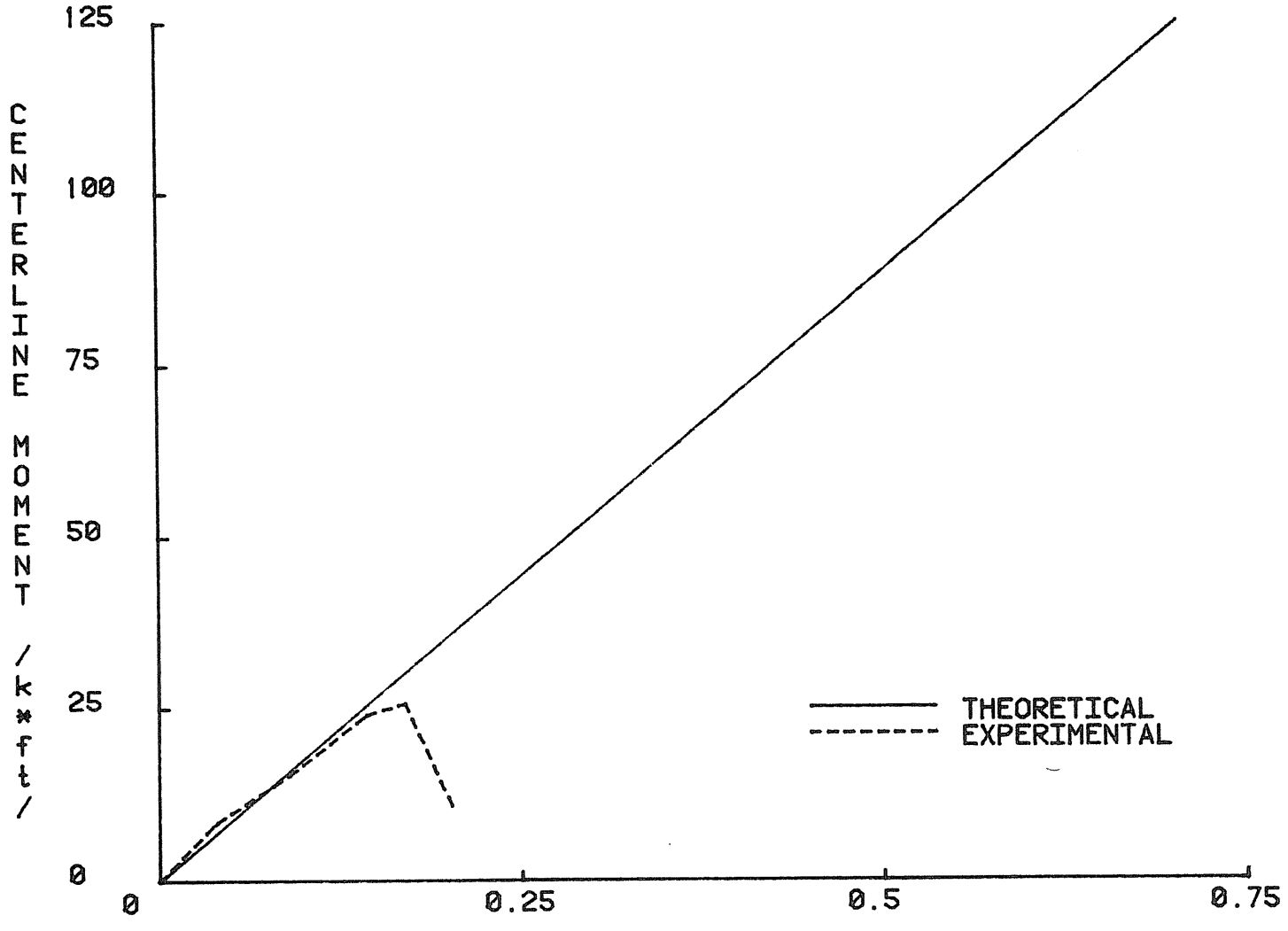
CENTERLINE MOMENT VS BOTTOM CHORD FORCE, TEST 2-B



CENTERLINE MOMENT VS END DIAGONAL FORCE, TEST 2-B



CENTERLINE MOMENT VS WELD STRAIN, TEST 2-B



CENTERLINE MOMENT VS CHORD SHORTENING, TEST 2-B

HAAG JOISTS
TEST II - 1 ANGLE CUT
8-20-84

```
TEST:                    TEST II
Project Name:            HAAG JOISTS
Conducted by:            SJM
TEST:                    TEST II
Project Name:            HAAG JOISTS
Conducted by:            SJM
----------------------------
I=0
CHANNEL NUMBER:0
CALIBRATION FACTOR: .09445
INSTRUMENT:VER CENTER EAST

----------------------------
I=1
CHANNEL NUMBER:1
CALIBRATION FACTOR: .09401
INSTRUMENT:VER CENTER WEST

----------------------------
I=2
CHANNEL NUMBER:2
CALIBRATION FACTOR: .09389
INSTRUMENT:VER 1/4 PT EAST

----------------------------
I=3
CHANNEL NUMBER:3
CALIBRATION FACTOR: .09385
INSTRUMENT:VER 1/4 PT WEST

----------------------------
I=4
CHANNEL NUMBER:5
CALIBRATION FACTOR: 1.283
INSTRUMENT:HOR. NE   END

----------------------------
I=5
CHANNEL NUMBER:6
CALIBRATION FACTOR: 1.35
INSTRUMENT:HOR. NW   END

----------------------------
I=6
CHANNEL NUMBER:7
CALIBRATION FACTOR: .0942
INSTRUMENT:HOR. SE   END

----------------------------
I=7
CHANNEL NUMBER:8
CALIBRATION FACTOR: .09441
INSTRUMENT:HOR. SW   END

----------------------------
I=8
CHANNEL NUMBER:4
CALIBRATION FACTOR: 1
INSTRUMENT:EXCIT.

----------------------------
I=9
CHANNEL NUMBER:10
CALIBRATION FACTOR: 1.283
INSTRUMENT:TOP CHORD AXIAL EAST

----------------------------
I=10
CHANNEL NUMBER:11
CALIBRATION FACTOR: 1.3
INSTRUMENT:TOP CHORD AXIAL WEST

----------------------------
I=11
CHANNEL NUMBER:12
CALIBRATION FACTOR: 1.25
INSTRUMENT:BOT CHORD AXIAL EAST

----------------------------
I=12
CHANNEL NUMBER:13
CALIBRATION FACTOR: 1.35
INSTRUMENT:BOT CHORD AXIAL WEST

----------------------------
I=13
CHANNEL NUMBER:19
CALIBRATION FACTOR: 1
INSTRUMENT:EXCIT.

----------------------------
I=14
CHANNEL NUMBER:26
CALIBRATION FACTOR: -99409
INSTRUMENT:LOAD CELL EAST

----------------------------
I=15
CHANNEL NUMBER:21
CALIBRATION FACTOR: -26388
INSTRUMENT:LOAD CELL WEST

----------------------------
I=16
CHANNEL NUMBER:24
CALIBRATION FACTOR: .02713
INSTRUMENT:WELD CLIP GAGE NORTH

----------------------------
I=17
CHANNEL NUMBER:25
CALIBRATION FACTOR: .031624
INSTRUMENT:WELD CLIP GAGE SOUTH

----------------------------
I=18
CHANNEL NUMBER:30
CALIBRATION FACTOR: 1
INSTRUMENT:EXCIT.

----------------------------
I=19
CHANNEL NUMBER:22
BRIDGE SIZE: .5
GAGE FACTOR:2.11
LOCATION:GAGE ON END DIAG. OF EA
ST JOIST
----------------------------
I=20
CHANNEL NUMBER:23
BRIDGE SIZE: .5
GAGE FACTOR:2.11
LOCATION:GAGE ON END DIAG. OF EA
ST JOIST
```

HAAG JOISTS
TEST II - 1 ANGLE CUT
8-20-84

==========
DATA POINT: 1

FORCES
======

MOM. EAST= 0
MOM. WEST= 0
VERT LOAD= 0.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
.068	.006	.037

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: -.006
BOT CHORD, MIDSPAN: .006
DIAGONAL, END: -.015

DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
.00287	.00494	.00390

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-.00021	.00515	00247

LOAD END (HOR.)

EAST	WEST	AVER.
0.00000	0.00000	0.00000

SUP. END (HOR.)

EAST	WEST	AVER.
0.00000	-.00003	-.00001

W1= 0.0000000000
W2= .0000257833
W AV.= .0000128917

WELD STRAINS
IN NORTH WELD= -.000011782
IN SOUTH WELD= -.000031100

VOLTAGE READINGS

VER LOAD= 0
VER DISP= 4.93670817998E-3

CH.	VOLTS
0	4.870800
1	4.910900
2	5.156300
3	4.840900
4	-1.132600
5	-.386700
6	4.373300
7	4.516900
8	5.171300
9	1.396600
10	1.654100
11	1.399600
12	.289390
13	15.106000
14	-.000429
15	-.000089
16	.011091
17	.006532
18	5.005700
19	.003958
20	.004866

```
==================================
DATA POINT: 2

FORCES
======

MOM. EAST= 12.36
MOM. WEST= 12.36
VERT LOAD= 33.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  -.000      -.066     -.033

MEMBER FORCEC ,kips
--------------------
TOP CHORD, MIDSPAN:   4.649
BOT CHORD, MIDSPAN:  -3.483
DIAGONAL,  END:      1.834

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
   -.67218     -.64653     -.65935

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
   -.55363     -.49969     -.52666

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
    .04061      .03725      .03893

SUP. END (HOR. )
----------------
     EAST         WEST       AVER.
   -.00192     -.00015     -.00103

W1=     .0425322970
W2=     .0373986379
W AV.=     .0399654674

 WELD STRAINS
IN NORTH WELD=    .000680710
IN SOUTH WELD=    .001281818
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 33
VER DISP=-.646526031124

CH.       VOLTS
 0     4.541000
 1     4.594100
 2     4.887500
 3     4.595800
 4    -1.145300
 5     -.387530
 6     4.393000
 7     4.535000
 8     5.171200
 9     1.437500
10     1.693200
11     1.277500
12      .347390
13    15.105000
14     -.000426
15     -.000077
16      .011150
17      .006701
18     5.005800
19      .003733
20      .004601
```

```
==================================
DATA POINT: 3

FORCES
======

MOM. EAST= 24.72
MOM. WEST= 24.72
VERT LOAD= 66.000 lb/ft

RAM LOADS  ,kips
-------------------
 EAST       WEST      AVERAGE
  -.001      -.072      -.037

MEMBER FORCEC ,kips
--------------------
TOP CHORD, MIDSPAN:  9.327
BOT CHORD, MIDSPAN: -5.793
DIAGONAL,  END:    3.702

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -1.32933   -1.30613   -1.31773

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -1.06335   -1.00115   -1.03225

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .08851     .09035     .08943

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
   -.00184    -.00019    -.00101

W1=    .0903416603
W2=    .0905427211
W AV.=    .0904421907

 WELD STRAINS
IN NORTH WELD=   .001583806
IN SOUTH WELD=   .002620445

--------------------
VOLTAGE READINGS

VER LOAD= 66
VER DISP=-1.30613499584

CH.       VOLTS
 0    4.220200
 1    4.273600
 2    4.640200
 3    4.352600
 4   -1.144800
 5    -.387860
 6    4.416500
 7    4.561100
 8    5.171400
 9    1.479200
10    1.732100
11    1.162300
12     .424000
13   15.105000
14    -.000426
15    -.000076
16     .011228
17     .006874
18    5.006400
19     .003501
20     .004339
```

```
==================================
DATA POINT: 4

FORCES
======

MOM. EAST= 37.09
MOM. WEST= 37.09
VERT LOAD= 99.000 lb/ft

RAM LOADS  ,kips
------------------
 EAST      WEST      AVERAGE
  -.070     -.048     -.059

MEMBER FORCES ,kips
-------------------
TOP CHORD, MIDSPAN: 14.242
BOT CHORD, MIDSPAN: -9.190
DIAGONAL,  END:    5.550

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST      AVER.
  -2.04528   -1.97895   -2.01212

1/4 SPAN (VERT.)
----------------
     EAST        WEST      AVER.
  -1.61922   -1.50946   -1.56434

LOAD END (HOR. )
----------------
     EAST        WEST      AVER.
    .14393     .14197     .14295

SUP. END (HOR. )
----------------
     EAST        WEST      AVER.
   -.00168     .00067    -.00051

W1=    .1456158183
W2=    .1413009776
W AV.=    .1434583979

 WELD STRAINS
IN NORTH WELD=   .002633352
IN SOUTH WELD=   .004948134
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 99
VER DISP=-1.97895417116

CH.      VOLTS
 0    3.870500
 1    3.946500
 2    4.370300
 3    4.105900
 4   -1.143800
 5    -.381880
 6    4.443500
 7    4.586300
 8    5.171400
 9    1.532900
10    1.762700
11    1.030640
12     .494790
13   15.105000
14    -.000423
15    -.000080
16     .011318
17     .007174
18    5.006800
19     .003259
20     .004092
```

```
==================================
DATA POINT: 5

FORCES
======

MOM. EAST= 43.67
MOM. WEST= 43.67
VERT LOAD=115.500 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST       AVERAGE
   .134      -.109        .013

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN:  16.322
BOT CHORD, MIDSPAN:  -9.842
DIAGONAL,  END:       6.482

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST        AVER.
 -2.39716    -2.31047    -2.35382

1/4 SPAN (VERT.)
----------------
     EAST         WEST        AVER.
 -1.87065    -1.76222    -1.81644

LOAD END (HOR. )
----------------
     EAST         WEST        AVER.
    .17065      .16862      .16963

SUP. END (HOR. )
----------------
     EAST         WEST        AVER.
   -.00185      .00123     -.00031

W1=     .1724927001
W2=     .1673834919
W AV.=     .1699380960

 WELD STRAINS
IN NORTH WELD=    002889823
IN SOUTH WELD=    005413403
```

```
-------------------
VOLTAGE READINGS

VER LOAD= 115.5
VER DISP=-2.31047486121

CH.        VOLTS
 0     3.696700
 1     3.785400
 2     4.248300
 3     3.983300
 4    -1.144900
 5     -.377930
 6     4.456600
 7     4.599400
 8     5.171500
 9     1.552300
10     1.779100
11      .962360
12      .556100
13    15.105000
14     -.000432
15     -.000070
16      .011340
17      .007234
18     5.006900
19      .003144
20      .003960
```

```
==================================
DATA POINT: 6

FORCES
======

MOM. EAST= 43.67
MOM. WEST= 43.67
VERT LOAD=115.500 lb/ft

RAM LOADS   ,kips
-------------------
 EAST       WEST      AVERAGE
  -.138      -.060      -.099

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 16.320
BOT CHORD, MIDSPAN: -9 343
DIAGONAL,  END:    6.561

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -2.41667   -2.31691   -2.36679

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -1.88058   -1.76598   -1.82328

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .17041     .16839      .16940

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
   -.00184     .00122    -.00031

W1=     .1722473104
W2=     .1671656538
W AV.=     .1697064821

 WELD STRAINS
IN NORTH WELD=    .002845375
IN SOUTH WELD=    .003805474
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 115.5
VER DISP=-2.3169064503

CH.       VOLTS
 0     3.689100
 1     3.782200
 2     4.243400
 3     3.981400
 4    -1.144800
 5     -.377990
 6     4.456400
 7     4.599200
 8     5.171400
 9     1.551200
10     1.780200
11      .958070
12      .571950
13    15.105000
14     -.000420
15     -.000078
16      .011336
17      .007027
18     5.006800
19      .003131
20      .003952
```

```
==================================
DATA POINT: 7

FORCES
======

MOM. EAST= 43.67
MOM. WEST= 43.67
VERT LOAD=115.500 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
   .157      -.048       .054

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 16.453
BOT CHORD, MIDSPAN: -9.326
DIAGONAL,  END:    6.542

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -2.41673   -2.31676   -2.36674

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -1.88061   -1.76582   -1.82322

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .17059     .16878     .16968

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
   -.00182     .00123    -.00030

W1=    .1724124739
W2=    .1675422276
W AV.=    .1699773508

 WELD STRAINS
IN NORTH WELD=   .002704027
IN SOUTH WELD=   .003525639
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 115.5
VER DISP=-2.31675601056

CH.       VOLTS
 0    3.689000
 1    3.782200
 2    4.243300
 3    3.981400
 4   -1.144700
 5    -.377910
 6    4.456400
 7    4.599300
 8    5.171300
 9    1.552400
10    1.781300
11     .956520
12     .574030
13   15.105000
14    -.000433
15    -.000080
16     .011324
17     .006991
18    5.006800
19     .003132
20     .003956
```

```
==================================
DATA POINT: 8

FORCES
======

MOM. EAST= 49.44
MOM. WEST= 49.44
VERT LOAD=132.000 lb/ft

RAM LOADS   ,kips
-------------------
 EAST       WEST      AVERAGE
   .179      -.036       .072

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 15.565
BOT CHORD, MIDSPAN: -2.495
DIAGONAL,  END:    7.437

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST      AVER.
  -3.11939   -2.69071   -2.90505

1/4 SPAN (VERT.)
----------------
     EAST        WEST      AVER.
  -2.32734   -2.03801   -2.18267

LOAD END (HOR. )
----------------
     EAST        WEST      AVER.
    .20138     .19807     .19972

SUP. END (HOR. )
----------------
     EAST        WEST      AVER.
   -.00232     .00142    -.00045

W1=    .2037020462
W2=    .1966488077
W AV.=    .2001754270

 WELD STRAINS
IN NORTH WELD=   .003175188
IN SOUTH WELD= - 005242525

--------------------
VOLTAGE READINGS

VER LOAD= 132
VER DISP=-2.69071165535

CH.       VOLTS
 0    3.345800
 1    3.600400
 2    4.026400
 3    3.849300
 4   -1.148000
 5    -.376630
 6    4.471400
 7    4.613600
 8    5.171300
 9    1.547200
10    1.771100
11     .974920
12     .705180
13   15.105000
14    -.000434
15    -.000082
16     .011364
17     .005863
18    5.006800
19     .003009
20     .003842
```

```
==================================
DATA POINT: 9

FORCES
======

MOM. EAST= 49.44
MOM. WEST= 49.44
VERT LOAD=132.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
   .157      -.084       .036

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 14.417
BOT CHORD, MIDSPAN: -1.960
DIAGONAL,  END:    7.430

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -3.22570   -2.70355   -2.96462

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -2.38738   -2.04738   -2.21738

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .20144     .19893     .20018

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
   -.00240     .00143    -.00049

W1=    .2038413484
W2=    .1974987065
W AV.=    .2006700274

 WELD STRAINS
IN NORTH WELD=   .003172515
IN SOUTH WELD= - 005632087
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 132
VER DISP=-2.70354504321

CH.       VOLTS
 0    3.294000
 1    3.594300
 2    3.997400
 3    3.844900
 4   -1.148600
 5    -.376550
 6    4.471600
 7    4.614200
 8    5.171500
 9    1.537600
10    1.760900
11     .982510
12     .708620
13   15.105000
14    -.000433
15    -.000074
16     .011364
17     .005813
18    5.006900
19     .003010
20     .003843
```

```
==================================
DATA POINT: 10

FORCES
======

MOM. EAST= 49.44
MOM. WEST= 49.44
VERT LOAD=132.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  -.138      -.084      -.111

MEMBER FORCEC ,kips
--------------------
TOP CHORD, MIDSPAN: 13.450
BOT CHORD, MIDSPAN: -1.768
DIAGONAL,  END:    7.376

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -3.31143   -2.71025   -3.01084

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -2.43073   -2.05037   -2.24055

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .20138     .20052     .20095

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
   -.00240     .00142    -.00049

W1=    .2037774067
W2=    .1990995417
W AV.=    .2014384742

 WELD STRAINS
IN NORTH WELD=   .003045619
IN SOUTH WELD= - 005856607
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 132
VER DISP=-2.71025279191

CH.       VOLTS
 0    3.252000
 1    3.590900
 2    3.976200
 3    3.843300
 4   -1.148500
 5    -.376580
 6    4.471400
 7    4.614800
 8    5.171300
 9    1.529800
10    1.752000
11     .984840
12     .710310
13   15.105000
14    -.000420
15    -.000074
16     .011353
17     .005784
18    5.006800
19     .003023
20     .003844
```

```
==================================
DATA POINT: 11

FORCES
======

MOM. EAST= 49.44
MOM. WEST= 49.44
VERT LOAD=132.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  -.206      -.072      -.139

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 12.712
BOT CHORD, MIDSPAN: -1.519
DIAGONAL,  END:    7.376

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST      AVER.
  -3.37825   -2.71957   -3.04891

1/4 SPAN (VERT.)
----------------
     EAST        WEST      AVER.
  -2.47835   -2.05681   -2.26758

LOAD END (HOR. )
----------------
     EAST        WEST      AVER.
    .20135     .20173     .20154

SUP  END (HOR. )
----------------
     EAST        WEST      AVER.
   -.00241     .00154    -.00044

W1=    .2037774067
W2=    .1990995417
W AV.=    .2014384742

 WELD STRAINS
IN NORTH WELD=   .003045619
IN SOUTH WELD= - 005856607
```

```
-------------------
VOLTAGE READINGS

VER LOAD= 132
VER DISP=-2.71957216273

CH.       VOLTS
 0    3.219300
 1    3.586300
 2    3.953000
 3    3.840100
 4   -1.148600
 5    -.375740
 6    4.471300
 7    4.615300
 8    5.171200
 9    1.525000
10    1.743800
11     .987810
12     .712410
13   15.104000
14    -.000417
15    -.000076
16     .011367
17     .005771
18    5.006800
19     .003007
20     .003833
```

```
==================================
DATA POINT: 12

FORCES
======

MOM. EAST= 53.03
MOM. WEST= 53.03
VERT LOAD=140.250 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  -.184      -.078     -.131

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 12.712
BOT CHORD, MIDSPAN: -1.519
DIAGONAL,  END:    7.376

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST      AVER.
  -4.73631   -2.96744   -3.85187

1/4 SPAN (VERT.)
----------------
     EAST        WEST      AVER.
  -3.29623   -2.22763   -2.76193

LOAD END (HOR. )
----------------
     EAST        WEST      AVER.
    .21901     .23041     .22471

SUP. END (HOR. )
----------------
     EAST        WEST      AVER.
   -.00293    -.00020    -.00156

W1=    .2215636303
W2=    .1990995417
W AV.=    .2103315860

 WELD STRAINS
IN NORTH WELD=   .003045619
IN SOUTH WELD= -.005856607
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 140.25
VER DISP=-2.71957216273

CH.      VOLTS
 0    2.556000
 1    3.465800
 2    3.555900
 3    3.757200
 4   -1.152000
 5    -.387890
 6    4.479900
 7    4.629300
 8    5.171200
 9    1.438800
10    1.599600
11    1.007270
12     .734670
13   15.104000
14    -.000434
15    -.000075
16     .011372
17     .005847
18    5.007000
19     .002952
20      003773
```

```
==================================
DATA POINT: 13

FORCES
======

MOM. EAST= 53.03
MOM. WEST= 53.03
VERT LOAD=140.250 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  -.207      -.024      -.115

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: -3.486
BOT CHORD, MIDSPAN:    .917
DIAGONAL,  END:    7.864

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -4.95067   -2.98410   -3.96739

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -3.42867   -2.23876   -2.83371

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .22044      .23368     .22706

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
   -.00291     -.00024    -.00157

W1=    .2233569603
W2=    .2339209733
W AV.=    .2286389668

 WELD STRAINS
IN NORTH WELD=   .003322963
IN SOUTH WELD= -.005749583
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 140.25
VER DISP=-2.98410255816

CH.       VOLTS
 0    2.451300
 1    3.457700
 2    3.491600
 3    3.751800
 4   -1.151900
 5    -.388170
 6    4.480600
 7    4.630900
 8    5.171200
 9    1.420200
10    1.568100
11    1.016110
12     .735040
13   15.104000
14    -.000417
15    -.000084
16     .011377
17     .005798
18    5.007000
19     .002951
20     .003787
```

```
==================================
DATA POINT: 14

FORCES
======

MOM. EAST= 53.03
MOM. WEST= 53.03
VERT LOAD=140.250 lb/ft

RAM LOADS  ,kips
------------------
 EAST       WEST      AVERAGE
   .293      -.060       .116

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: -5.229
BOT CHORD, MIDSPAN:  1.406
DIAGONAL,  END:    7.804

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -5.09068   -3.02846   -4.05957

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -3.51346   -2.26655   -2.89000

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .23492      .24770     .24131

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
   -.00317    -.00044    -.00180

W1=     .2380933229
W2=     .2481343622
W AV.=     .2431138426

 WELD STRAINS
IN NORTH WELD=   .003299406
IN SOUTH WELD= -.006332549
```

```
-------------------
VOLTAGE READINGS

VER LOAD= 140.25
VER DISP=-3.02846342115

CH.       VOLTS
 0     2.383100
 1     3.436400
 2     3.450700
 3     3.738600
 4    -1.153700
 5     -.389600
 6     4.488000
 7     4.638100
 8     5.171600
 9     1.409500
10     1.548600
11     1.022310
12      .739010
13    15.104000
14     -.000439
15     -.000078
16      .011375
17      .005723
18     5.007000
19      .002969
20      .003785
```

```
==================================
DATA POINT: 15

FORCES
======

MOM. EAST= 50.28
MOM. WEST= 50.28
VERT LOAD=140.250 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  3.674      3.452     3.563

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: -9.140
BOT CHORD, MIDSPAN:  1.623
DIAGONAL,  END:     7.981

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -4.88412   -2.84266   -3.86339

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -3.32844   -2.11976   -2.72410

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .14927      .12845     .13886

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .01017      .01825     .01421

W1=     .1390975482
W2=     .1102003521
W AV.=     .1246489502

 WELD STRAINS
IN NORTH WELD=    .003393634
IN SOUTH WELD= - .006472461

--------------------
VOLTAGE READINGS

VER LOAD= 140.25
VER DISP=-2.84265570501

CH.       VOLTS
 0     2.483900
 1     3.526600
 2     3.540400
 3     3.809700
 4    -1.065140
 5     -.259130
 6     4.446100
 7     4.579700
 8     5.171400
 9     1.375600
10     1.515100
11     1.030690
12      .734520
13    15.104000
14     -.000588
15     -.000661
16      .011383
17      .005705
18     5.007000
19      .002988
20      .003719
```

```
==================================
DATA POINT: 16

FORCES
======

MOM. EAST= 47.78
MOM. WEST= 47.78
VERT LOAD=140.250 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  6.125      6.144     6.135

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN:-11.896
BOT CHORD, MIDSPAN:  1.757
DIAGONAL,  END:    8.072

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -4.74664   -2.71008   -3.72836

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -3.20620   -2.01565   -2.61093

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .09173     .05217     .07195

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .01923     .02647     .02285

W1=    .0725003816
W2=    .0257021249
W AV.=    .0491012532

 WELD STRAINS
IN NORTH WELD=   .003372755
IN SOUTH WELD= -.006642582
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 140.25
VER DISP=-2.71008133136

CH.       VOLTS
 0    2.551300
 1    3.591400
 2    3.600100
 3    3.860600
 4   -1.005100
 5    -.201730
 6    4.418500
 7    4.542900
 8    5.171900
 9    1.351500
10    1.491700
11    1.035410
12     .732250
13   15.104000
14    -.000696
15    -.001108
16     .011381
17     .005683
18    5.006900
19     .003020
20     .003663
```

```
==================================
DATA POINT: 17

FORCES
======

MOM. EAST= 45.24
MOM. WEST= 45.24
VERT LOAD=140.250 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  9.393      9.078     9.235

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN:-14.803
BOT CHORD, MIDSPAN:  1.881
DIAGONAL,  END:    8.140

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST      AVER.
  -4.59402   -2.56876   -3.58139

1/4 SPAN (VERT.)
----------------
     EAST        WEST      AVER.
  -3.08159   -1.90352   -2.49255

LOAD END (HOR. )
----------------
     EAST        WEST      AVER.
    .03006    -.03454    -.00224

SUP. END (HOR. )
----------------
     EAST        WEST      AVER.
    .02766     .03306     .03036

W1=    .0024078078
W2=   -.0675939955
W AV.=  -.0325930938

 WELD STRAINS
IN NORTH WELD=   .003054727
IN SOUTH WELD= -.006712540
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 140.25
VER DISP=-2.56875914028

CH.      VOLTS
 0    2.625700
 1    3.659900
 2    3.660400
 3    3.914800
 4    -.949160
 5    -.155740
 6    4.388200
 7    4.500300
 8    5.171600
 9    1.326300
10    1.466800
11    1.040020
12     .729900
13   15.104000
14    -.000840
15    -.001595
16     .011354
17     .005674
18    5.006900
19     .003038
20     .003627
```

```
==================================
DATA POINT: 18

FORCES
======

MOM. EAST= 48.5
MOM. WEST= 48.5
VERT LOAD=148.500 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  9.711      9.410     9.560

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN:-14.803
BOT CHORD, MIDSPAN:  1.881
DIAGONAL,  END:    8.140

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST      AVER.
  -4.70713   -2.75229   -3.72971

1/4 SPAN (VERT.)
----------------
     EAST        WEST      AVER.
  -3.16835   -2.03358   -2.60096

LOAD END (HOR. )
----------------
     EAST        WEST      AVER.
     .03003    -.03456    -.00226

SUP. END (HOR. )
----------------
     EAST        WEST      AVER.
     .02874     .03453     .03163

W1=    .0010996068
W2=   -.0675939955
W AV.=  -.0332471944

 WELD STRAINS
IN NORTH WELD=   .003054727
IN SOUTH WELD= -.006712540
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 148.5
VER DISP=-2.56875914028

CH.      VOLTS
 0    2.570400
 1    3.570600
 2    3.618200
 3    3.851600
 4    -.941970
 5    -.145470
 6    4.388100
 7    4.500200
 8    5.171500
 9    3.387700
10    2.557200
11    2.244600
12    1.009790
13   15.238000
14    -.000856
15    -.001650
16     .011385
17     .005720
18    5.006800
19     .002964
20     .003563
```

```
==================================
DATA POINT: 19

FORCES
======

MOM. EAST= 48.5
MOM. WEST= 48.5
VERT LOAD=148.500 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  9.711      9.410     9.560

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN:-14.803
BOT CHORD, MIDSPAN:  1.881
DIAGONAL,  END:    8.140

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST      AVER.
  -4.72586   -2.82579   -3.77583

1/4 SPAN (VERT.)
----------------
     EAST        WEST      AVER.
  -3.17336   -2.06618   -2.61977

LOAD END (HOR. )
----------------
     EAST        WEST      AVER.
    .03000    -.03459    -.00229

SUP. END (HOR. )
----------------
     EAST        WEST      AVER.
    .02875     .03452     .03163

W1=    .0010996068
W2=   -.0675939955
W AV.=  -.0332471944

 WELD STRAINS
IN NORTH WELD=   .003054727
IN SOUTH WELD= -.006712540
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 148.5
VER DISP=-2.56875914028

CH.      VOLTS
 0    2.561200
 1    3.534800
 2    3.615700
 3    3.835700
 4    -.941900
 5    -.145520
 6    4.388000
 7    4.500100
 8    5.171400
 9    3.307000
10    2.571400
11    2.156800
12    1.523700
13   15.238000
14    -.000856
15    -.001644
16     .011387
17     .005726
18    5.006800
19     .002962
20     .003563
```

VOID

==========

~~DATA POINT 20~~ VOID

FORCES
======

MOM. EAST= 0
MOM. WEST= 0
VERT LOAD=156.750 lb/ft.

RAM LOADS ,kips

EAST	WEST	AVERAGE
10.255	9.807	10.031

MEMBER FORCES ,kips

TOP CHORD, MIDSPAN 163.992
BOT CHORD, MIDSPAN 157.229
DIAGONAL, END 9.113

DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-5.23611	-3.58871	-4.41241

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-3.49163	-2.52391	-3.00777

LOAD END (HOR.)

EAST	WEST	AVER.
.03693	-.03466	.00114

SUP. END (HOR.)

EAST	WEST	AVER.
.03206	.03800	.03503

W1= .0048687577
W2= -.0726572726
W AV.= -.0338942575

WELD STRAINS
IN NORTH WELD= 003667225
~~IN SOUTH WELD= 007301021~~

~~VOLTAGE READINGS~~

VER LOAD= 156.75
VER DISP=-3.58871344447

CH.	VOLTS
0	2.312200
1	3.164200
2	3.461500
3	3.613900
4	-.919980
5	-.121270
6	4.391800
7	4.500500
8	5.171900
9	3.263400
10	2.549900
11	2.052200
12	1.533500
13	15.238000
14	-.000878
15	-.001716
16	.011406
17	.005588
18	5.006900
19	.002900
~~20~~	~~.003507~~

```
==================================
DATA POINT: 21

FORCES
======

MOM. EAST= 50.87
MOM. WEST= 50.87
VERT LOAD=156.750 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
 10.277      9.831    10.054

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN:176.011
BOT CHORD, MIDSPAN:112.403
DIAGONAL,  END:    9.099

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -5.36440   -3.79464   -4.57952

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -3.55938   -2.63123   -3.09531

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .03828    -.03454     .00187

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .03214     .03799     .03507

W1=    .0061379092
W2=   -.0725297844
W AV.=   -.0331959376

 WELD STRAINS
IN NORTH WELD=   .003558534
IN SOUTH WELD= - 008384591
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 156.75
VER DISP=-3.79463722256

CH.       VOLTS
 0    2.249400
 1    3.063900
 2    3.428400
 3    3.561600
 4    -.919430
 5    -.121280
 6    4.392200
 7    4.500300
 8    5.171600
 9    3.284800
10    2.840600
11    2.270300
12    1.854900
13   15.238000
14    -.000879
15    -.001720
16     .011397
17     .005459
18    5.007000
19     .002901
20     .003510
```

```
==================================
DATA POINT: 22

FORCES
======

MOM. EAST= 50.87
MOM. WEST= 50.87
VERT LOAD=156.750 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
 10.300      9.837    10.068

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN:170.360
BOT CHORD, MIDSPAN: 99.588
DIAGONAL,  END:    9.096

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
  -5.44530   -3.95422   -4.69976

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
  -3.60277   -2.71769   -3.16023

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
    .03924    -.03459     .00233

SUP. END (HOR. )
----------------
     EAST         WEST       AVER.
    .03237     .03800     .03518

W1=    .0068726610
W2=   -.0725894480
W AV.=   -.0328583935

 WELD STRAINS
IN NORTH WELD=   .003332065
IN SOUTH WELD= -.009061666

--------------------
VOLTAGE READINGS

VER LOAD= 156.75
VER DISP=-3.95421633585

CH.      VOLTS
 0    2.209800
 1    2.986200
 2    3.407200
 3    3.519500
 4    -.917870
 5    -.121230
 6    4.392500
 7    4.500100
 8    5.171400
 9    3.279700
10    2.745800
11    2.156100
12    1.694800
13   15.238000
14    -.000880
15    -.001721
16     .011378
17     .005372
18    5.007100
19     .002902
20     .003510
```

==========
DATA POINT: 23

FORCES
======

MOM. EAST= 42.81
MOM. WEST= 42.81
VERT LOAD=132.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
8.666	8.427	8.546

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 164.843
BOT CHORD, MIDSPAN: 84.488
DIAGONAL, END: 7.676

DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-5.14065	-3.66193	-4.40129

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-3.34759	-2.49434	-2.92097

LOAD END (HOR.)

EAST	WEST	AVER.
.03554	-.03746	-.00096

SUP. END (HOR.)

EAST	WEST	AVER.
.02774	.03411	.03092

W1= .0078077272
W2= -.0715637305
W AV.= -.0318780016

WELD STRAINS
IN NORTH WELD= .002519360
IN SOUTH WELD= -.010452984

VOLTAGE READINGS

VER LOAD= 132
VER DISP=-3.66192772437

CH.	VOLTS
0	2.358000
1	3.128300
2	3.531100
3	3.627900
4	-.948590
5	-.148410
6	4.390700
7	4.498700
8	5.171400
9	3.297500
10	2.629600
11	2.011600
12	1.517200
13	15.238000
14	-.000808
15	-.001487
16	.011309
17	.005193
18	5.007100
19	.003095
20	.003693

```
==================================
DATA POINT: 24

FORCES
======

MOM. EAST= 31.92
MOM. WEST= 31.92
VERT LOAD= 99.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  6.670      6.614     6.642

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN:168.177
BOT CHORD, MIDSPAN: 89.044
DIAGONAL,  END:    5.803

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST      AVER.
  -4.62114   -3.12877   -3.87496

1/4 SPAN (VERT.)
----------------
     EAST        WEST      AVER.
  -2.95343   -2.08127   -2.51735

LOAD END (HOR. )
----------------
     EAST        WEST      AVER.
    .01142    -.05007    -.01933

SUP. END (HOR. )
----------------
     EAST        WEST      AVER.
    .02155     .02886     .02520

W1=   -.0101287409
W2=   -.0789381165
W AV.=   -.0445334287

 WELD STRAINS
IN NORTH WELD=   .001570597
IN SOUTH WELD= -.012161441
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 99
VER DISP=-3.12876637958

CH.       VOLTS
 0    2.612500
 1    3.387700
 2    3.722700
 3    3.828600
 4    -.989730
 5    -.185030
 6    4.379200
 7    4.492800
 8    5.171700
 9    3.320900
10    2.664400
11    2.046900
12    1.580000
13   15.238000
14    -.000720
15    -.001186
16     .011228
17     .004973
18    5.006900
19     .003345
20     .003939
```

==========
DATA POINT: 25

FORCES
======

MOM. EAST= 20.95
MOM. WEST= 20.95
VERT LOAD= 66.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
4.809	4.976	4.892

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN:175.011
BOT CHORD, MIDSPAN:108.158
DIAGONAL, END: 3.863

DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-4.06571	-2.55154	-3.30863

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-2.53320	-1.64890	-2.09105

LOAD END (HOR.)

EAST	WEST	AVER.
-.01225	-.06590	-.03908

SUP. END (HOR.)

EAST	WEST	AVER.
.01503	.02355	.01929

W1= -.0272844400
W2= -.0894462973
W AV.= -.0583653687

WELD STRAINS
IN NORTH WELD= .000595578
IN SOUTH WELD= -.014228339

VOLTAGE READINGS

VER LOAD= 66
VER DISP=-2.55154145418

CH.	VOLTS
0	2.883700
1	3.668200
2	3.926600
3	4.038300
4	-1.032910
5	-.222140
6	4.367500
7	4.484900
8	5.171500
9	3.381100
10	2.723000
11	2.239200
12	1.794400
13	15.238000
14	-.000638
15	-.000914
16	.011145
17	.004707
18	5.006800
19	.003592
20	.004206

```
==================================
DATA POINT: 26

FORCES
======

MOM. EAST=-1.66
MOM. WEST=-1.66
VERT LOAD=  0.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  1.882      2.277     2.080

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN:163.273
BOT CHORD, MIDSPAN: 94.626
DIAGONAL,  END:      .032

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -2.89875   -1.29952   -2.09913

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -1.66676    -.71246   -1.18961

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
   -.07384    -.09314    -.08349

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .00660     .01099     .00879

W1=   -.0804339339
W2=   -.1041294969
W AV.=   -.0922817154

 WELD STRAINS
IN NORTH WELD= -.000833685
IN SOUTH WELD= -.020312923
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 0
VER DISP=-1.29951726356

CH.       VOLTS
 0    3.453700
 1    4.276900
 2    4.347300
 3    4.492800
 4   -1.088860
 5    -.309810
 6    4.337500
 7    4.471600
 8    5.171500
 9    3.329500
10    2.568600
11    2.054700
12    1.696300
13   15.238000
14    -.000509
15    -.000466
16     .011023
17     .003924
18    5.006500
19     .004037
20     .004776
```

==========

DATA POINT: 27

FORCES
======

MOM. EAST= 0
MOM. WEST= 0
VERT LOAD= 0.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
-.047	-.078	-.063

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 169.325
BOT CHORD, MIDSPAN: 98.340
DIAGONAL, END: -.146

DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-2.99177	-1.39335	-2.19256

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.74423	-.78398	-1.26411

LOAD END (HOR.)

EAST	WEST	AVER.
-.03117	-.01902	-.02510

SUP. END (HOR.)

EAST	WEST	AVER.
-.00081	-.00017	-.00049

W1= -.0303598990
W2= -.0188573218
W AV.= -.0246086104

WELD STRAINS
IN NORTH WELD= -.000810125
IN SOUTH WELD= -.020849306

VOLTAGE READINGS

VER LOAD= 0
VER DISP=-1.39334848722

CH.	VOLTS
0	3.408200
1	4.231200
2	4.309600
3	4.458000
4	-1.138000
5	-.387680
6	4.358200
7	4.507700
8	5.171400
9	3.283900
10	2.723100
11	2.080400
12	1.750900
13	15.238000
14	-.000424
15	-.000075
16	.011025
17	.003855
18	5.006500
19	.003966
20	.004894

TEST II
LVDT PART B

HAAG JOISTS 8-30-84 (THUR)

TEST II INSIDE ANGLES CUT

ACTION TAKEN		MOMENT ('K')	RAM LOAD K	DATA POINT
INITIALIZED	(NO LOAD)	0.	0.	1
33 PLF ; FREE		12.36	0.	2
66 PLF ; "		24.72	0.	3
99 PLF ; "		37.09	0.	4
115.5 PLF ; "		43.67	0.	5
115.5 PLF ; "	(SAME AS DATA PT. 5)	43.67	0.	6
115.5 PLF ; "	(SAME AS DATA PT. 5)	43.67	0.	7
132 PLF ; "		49.44	0.	8
132 PLF ; "		49.44	0.	9
132 PLF ; "		49.44	0.	10
132 PLF ; "		49.44	0.	11
140.25 ; "		53.03	0.	12
140.25 "		53.03	0	13

HAAG JOISTS
TEST II — INSIDE ANGLES CUT — 8-30-84 (THUR)

ACTION TAKEN	MOMENT	RAM LOAD	DATA POINT
140.25 PLF: RAMS ATTACHED	53.03	0.	14
140.25 PLF: RAMS ACTUATED	50.28	3.3	15
140.25 PLF: " "	47.78	6.3	16
140.25 PLF: " " BALANCED	45.24	9.34	17
148.5 PLF: " " "	48.50	9.56	18
148.5 PLF: " " "	48.50	9.56	19
156.75 PLF: " " VOID	———	———	20
156.75 PLF: " " BALANCED	50.37	10.08	21
156.75 PLF: " " "	50.87	10.07	22
132 PLF: " "	42.81	8.52	23
99 PLF: " "	31.92	6.62	24
66 PLF: " "	20.95	4.8	25
0 PLF: " "	-1.66	2.0	26
0 : RAMS RELEASED (NO LOAD)	0.	0.	27

APPENDIX D

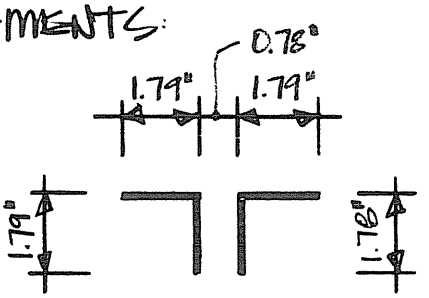
RESULTS FROM TEST III

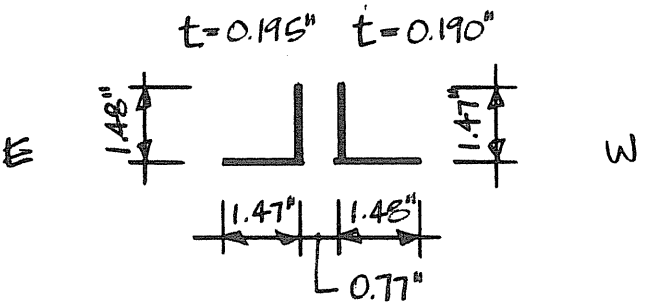
PROJECT HAAG JOISTS

TEST III

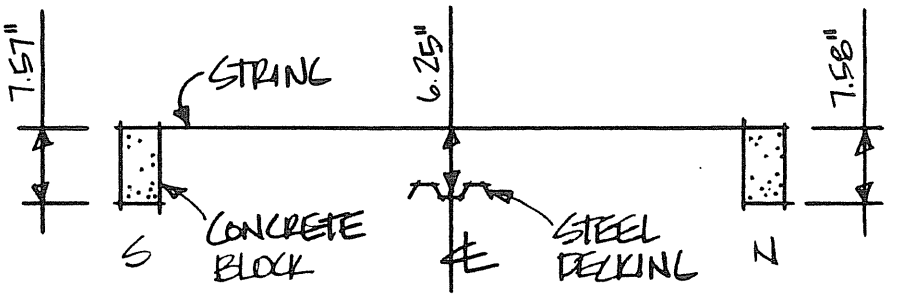
TEST JOIST B20

MEASUREMENTS:





$\pm$ SOUTH END DIAGONAL = 0.935"



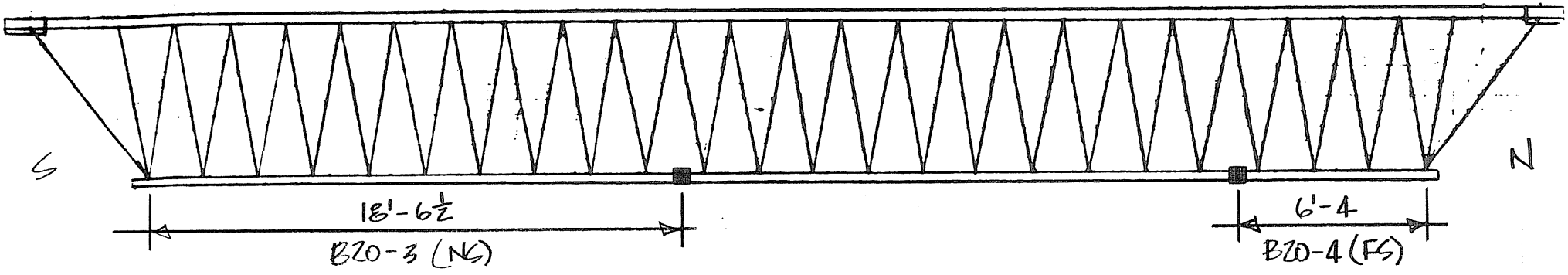
WT. CONCRETE BLOCK = 32 LB $\pm$

WT STEEL DECKING (1 SHEET) = 78.5 LB $\pm$

DATE 8-23-84

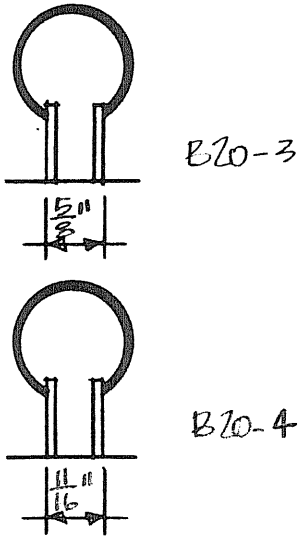
BY LEL

LOWER CHORD BUTT WELD LOCATIONS:



D.2

CLIP GAGES:



PROJECT HAAG JOISTS

TEST III

TEST JOIST B20

DATE 8-24-84

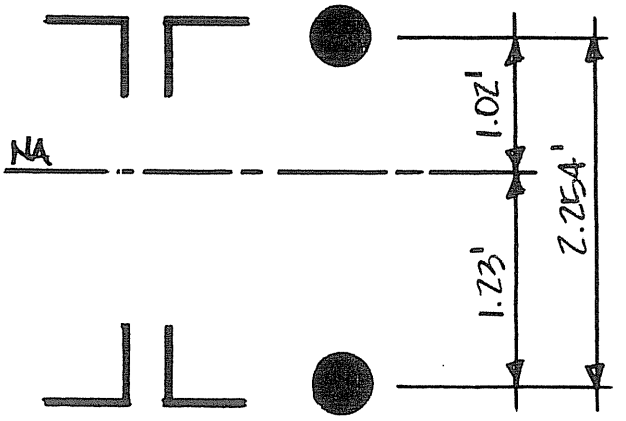
BY SJM

PROJECT HAAG JOISTS

TEST III

TEST JOIST B20

CALCULATED QUANTITIES:

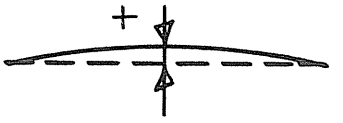


$A_{\text{TOP CHORD}} = 1.277$ in²

$A_{\text{BOT CHORD}} = 1.062$ in²

$A_{\text{SOUTH END DIAGONAL}} = 0.687$ in²

CAMBER = +1.33"

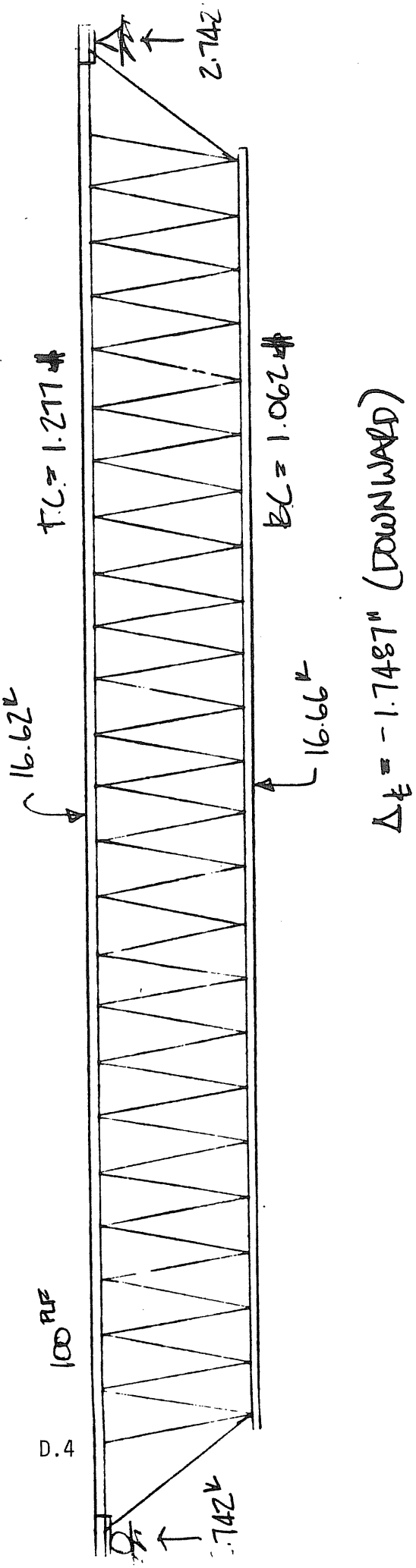


DATE 9-6-84

BY SJM

HAAG JOISTS
TEST III
ROLLER-PIN
UNIFORM -Y LOAD

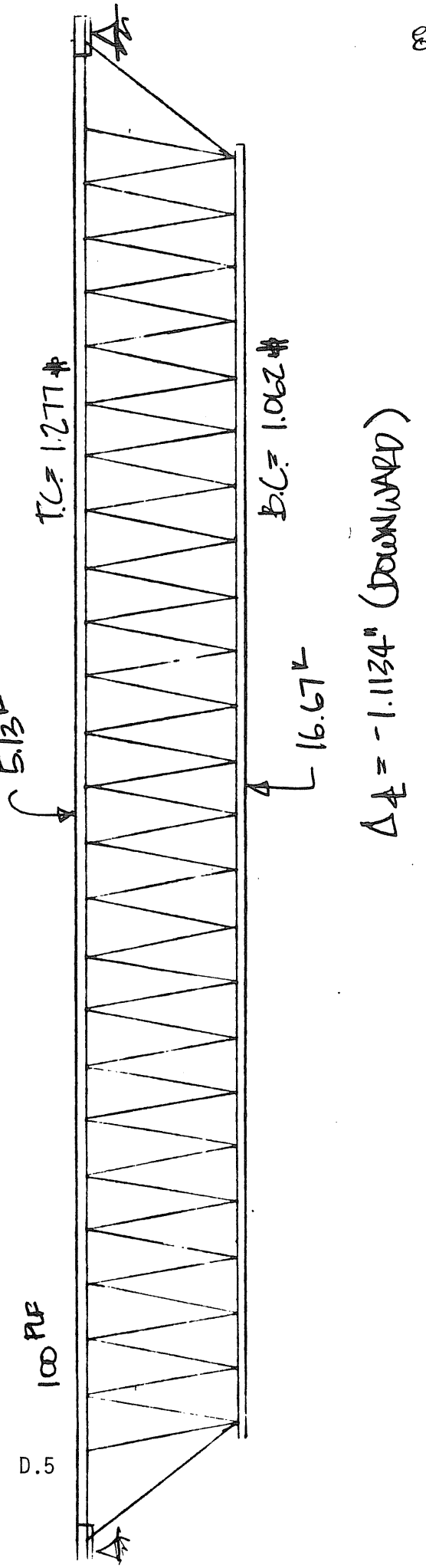
8-28-84 (TUE)



SJN

HAAG JOISTS
TEST III
PIN-PIN
UNIFORM -Y LOAD

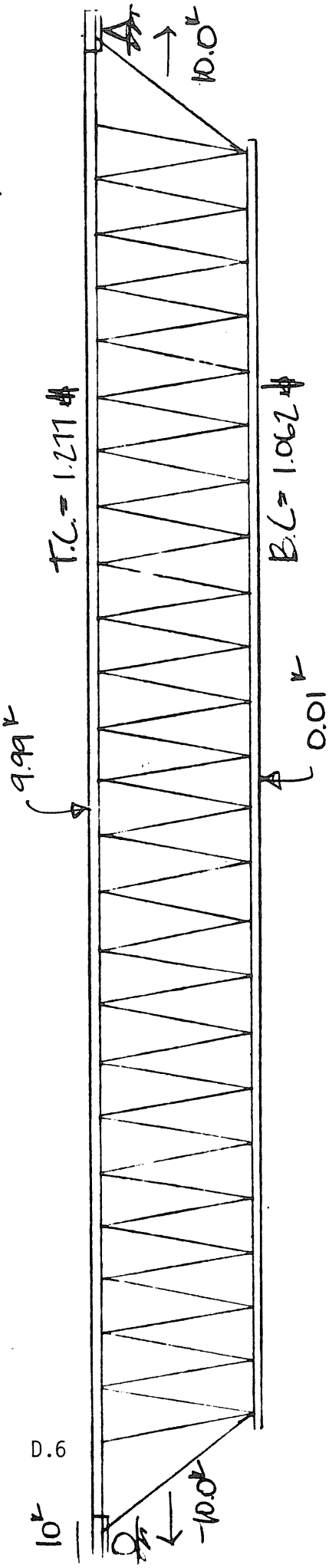
8-28-84 (TUE)



SJM

HAAG JOISTS
TEST III
ROLLER-PIN
CONCENTRATED -X
LOAD

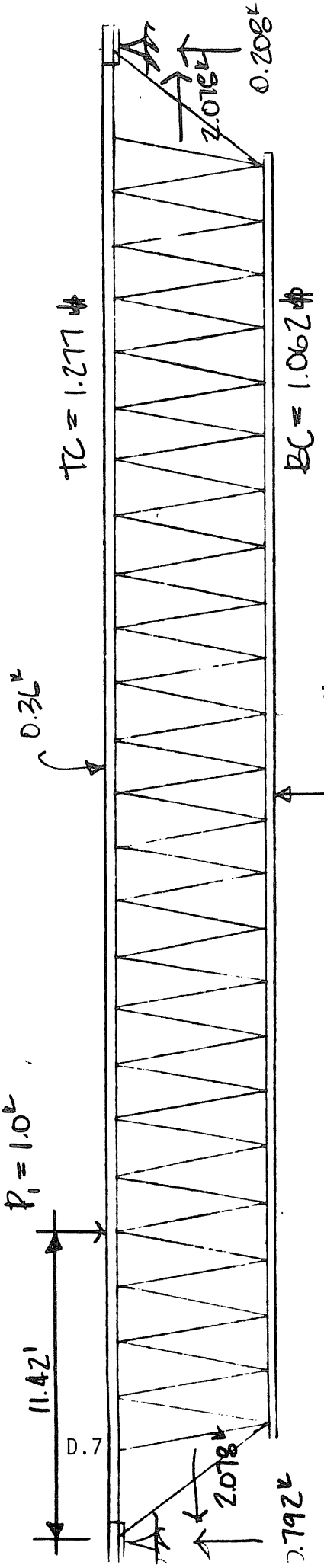
8-28-84 (TUE)



$\Delta_{lower} = -0.1770"$ (LEFTWARD)

HAAG JOISTS
TEST III
PIN-PIN
$P_1 = 1.0^k$

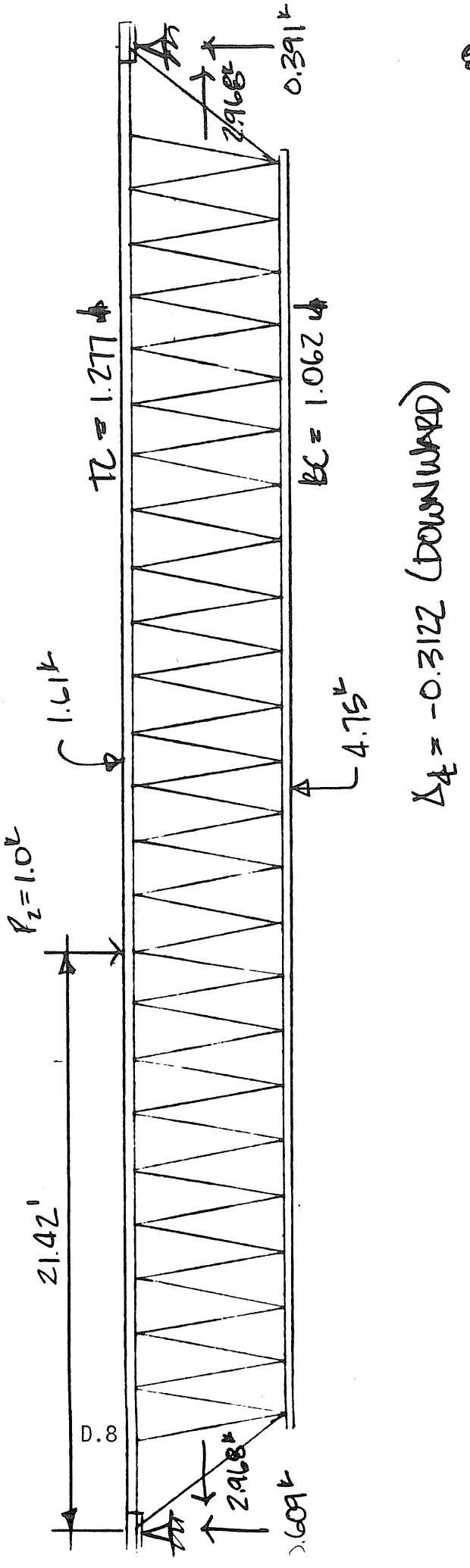
8-20-84 (TUE)



$\Delta_L = -0.1835$ (DOWNWARD)

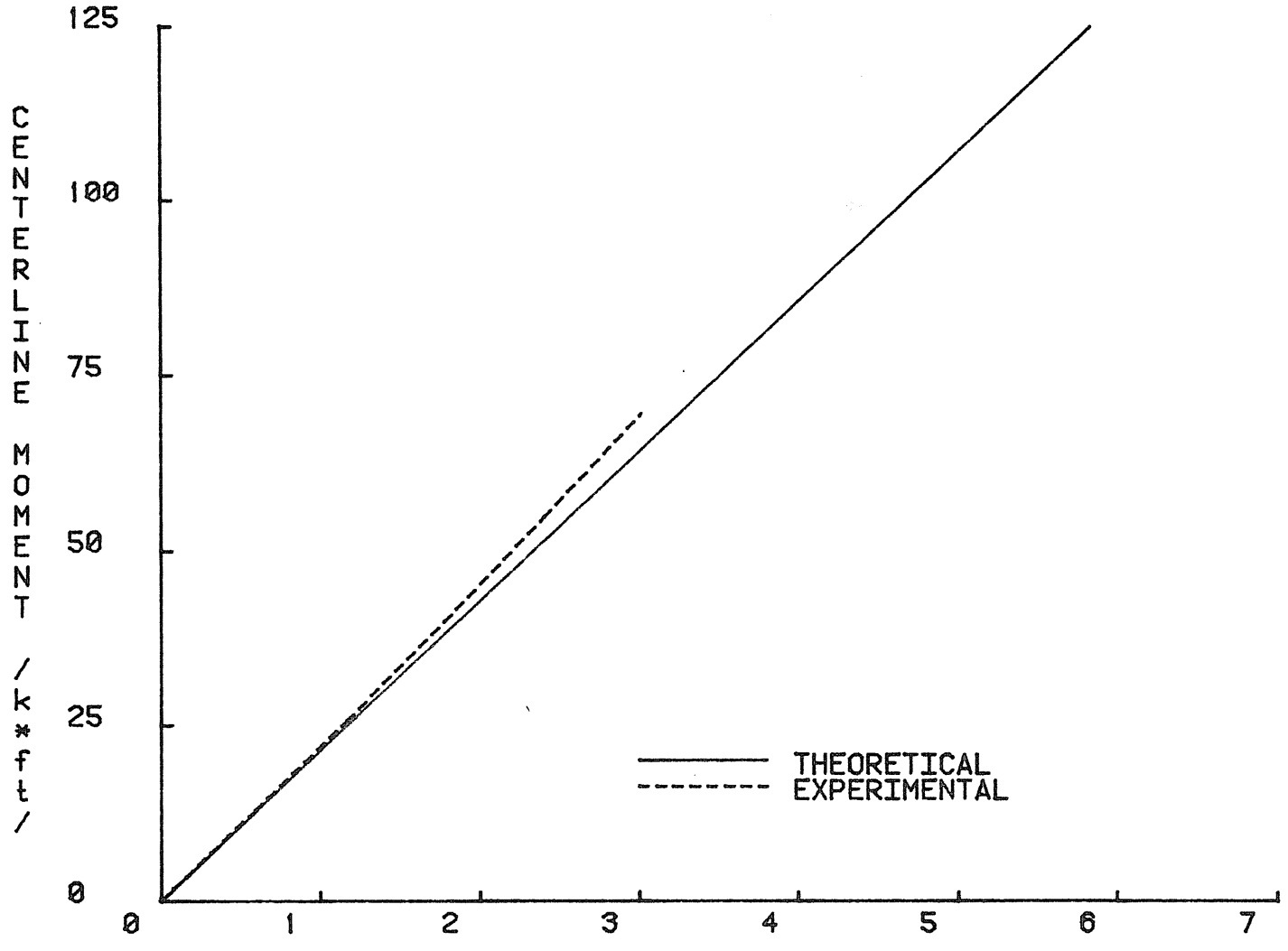
HAAG JOISTS
TEST III
PIN-PIN
$P_2 = 1.0^k$

8-28-84 (TUE)

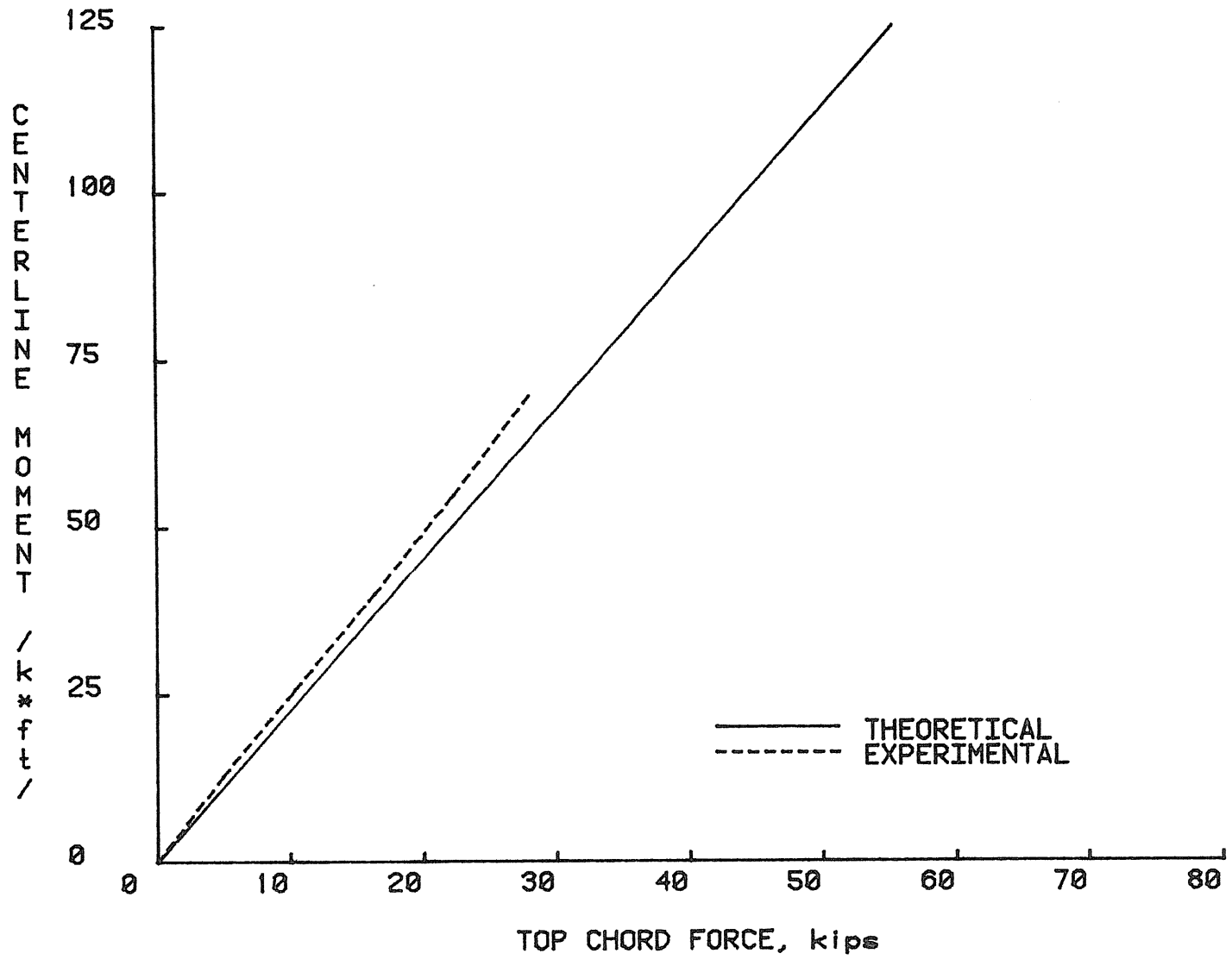


$\Delta_4 = -0.3122$ (DOWNWARD)

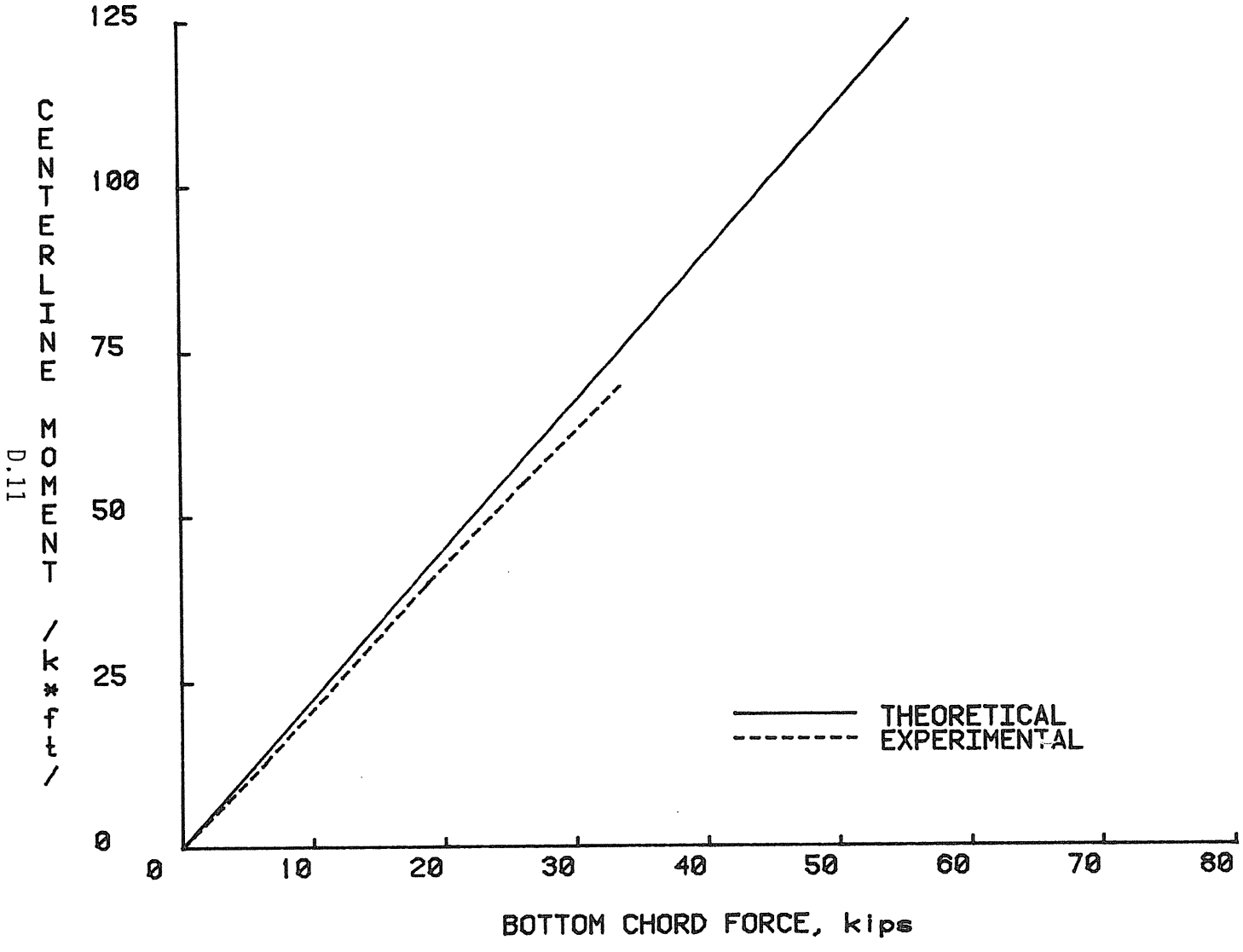
SJM



CENTERLINE MOMENT VS CENTERLINE VERTICAL DEFLECTION, TEST 3-A

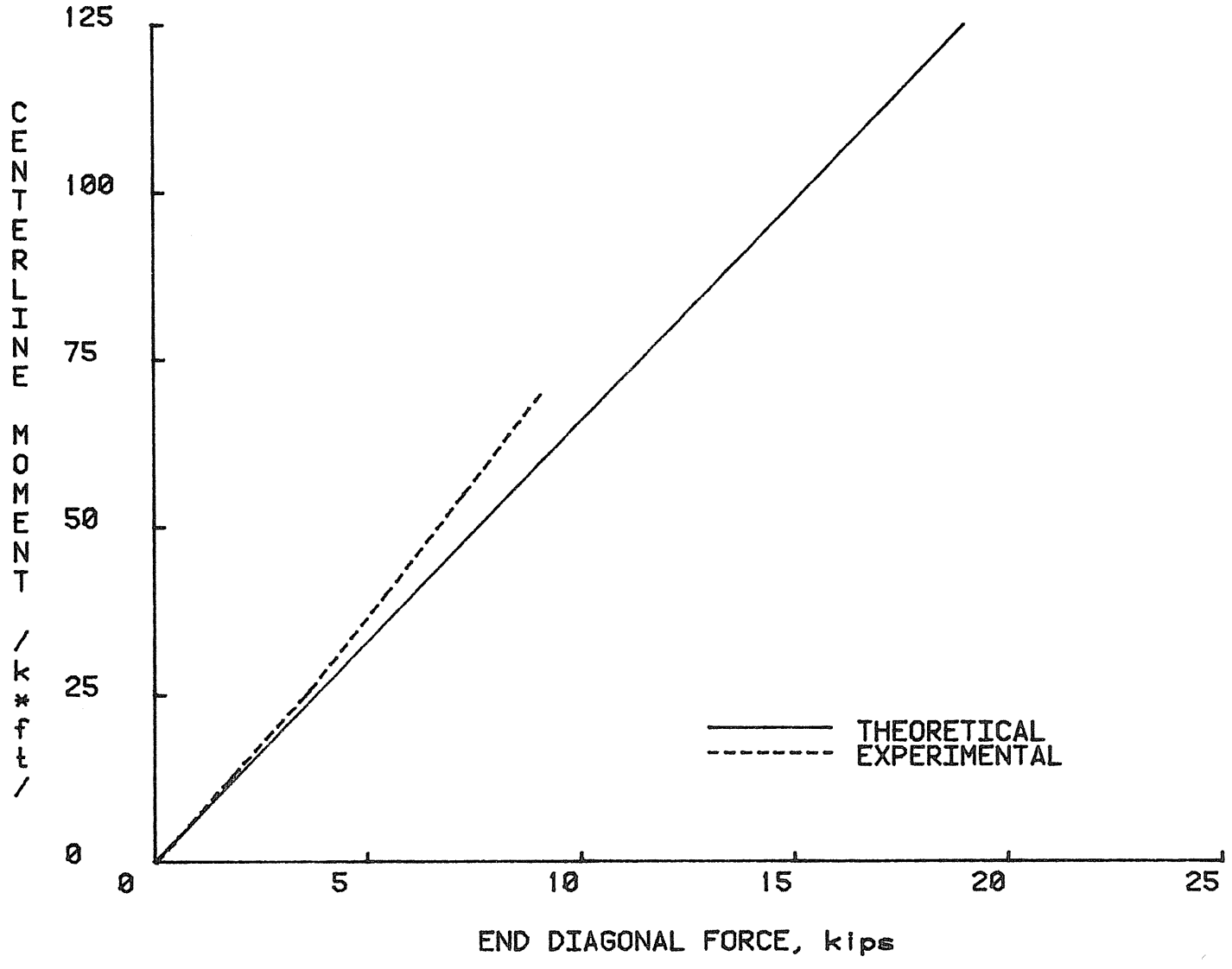


CENTERLINE MOMENT VS TOP CHORD FORCE, TEST 3-A

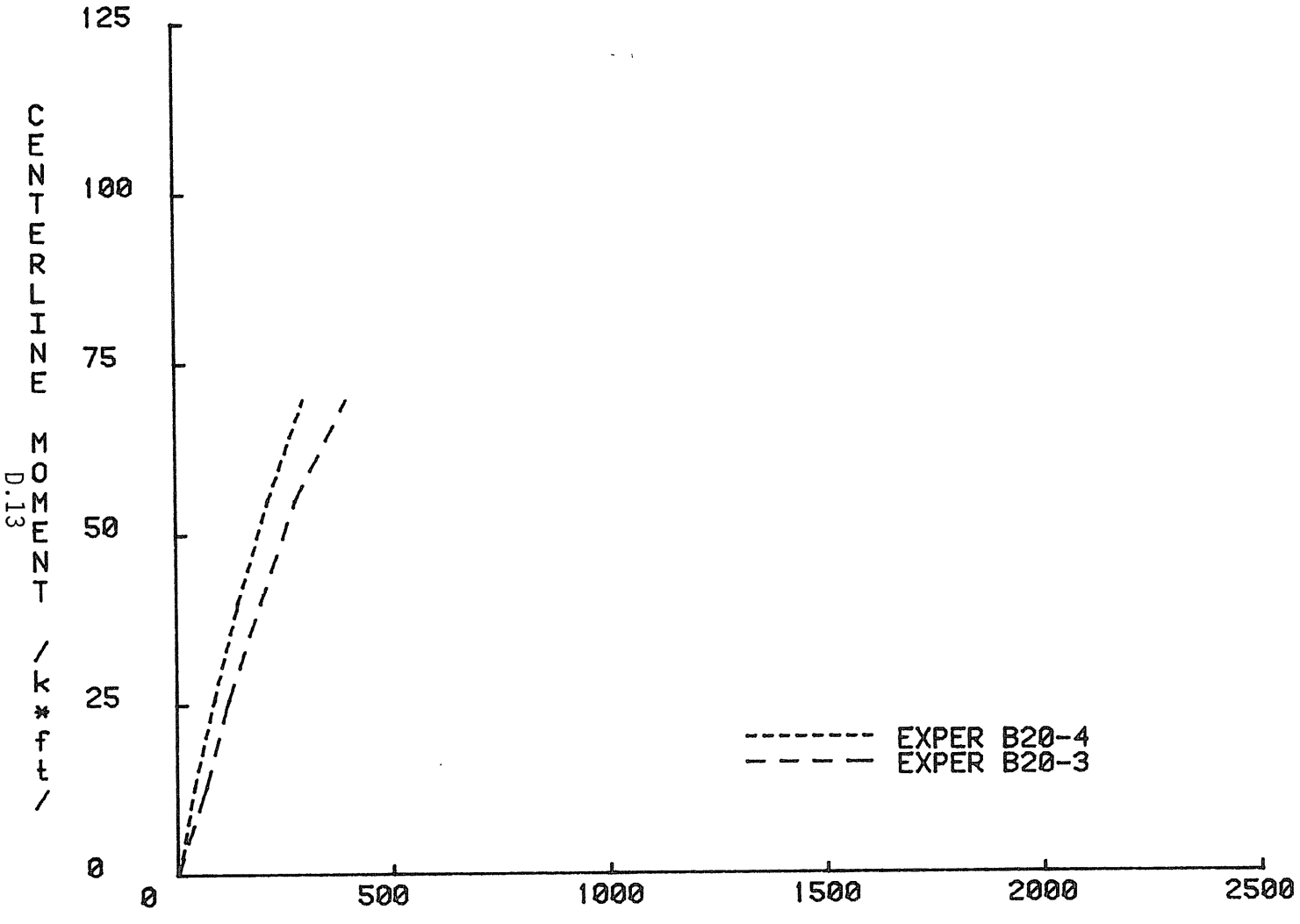


D.11

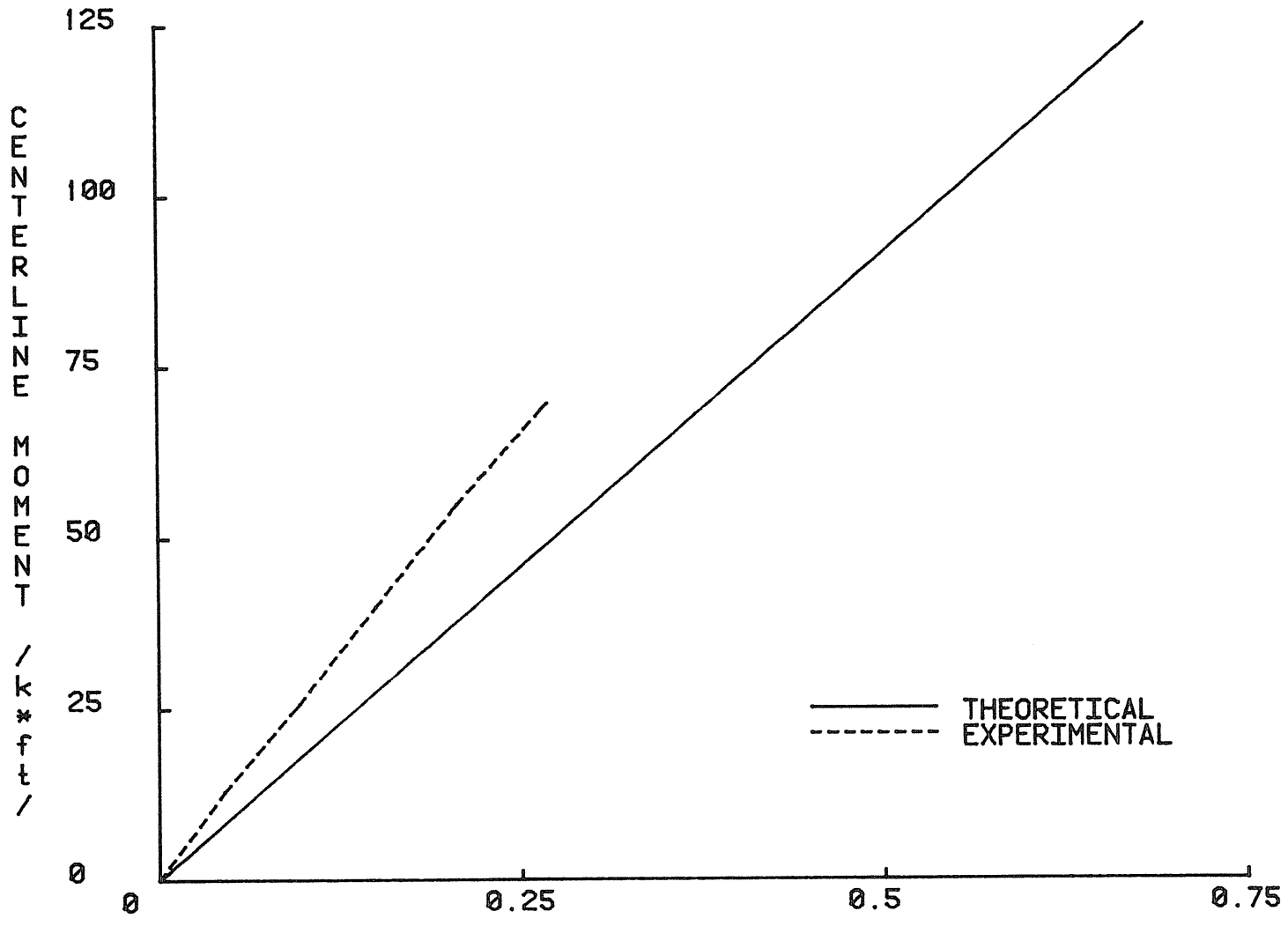
CENTERLINE MOMENT VS BOTTOM CHORD FORCE, TEST 3-A



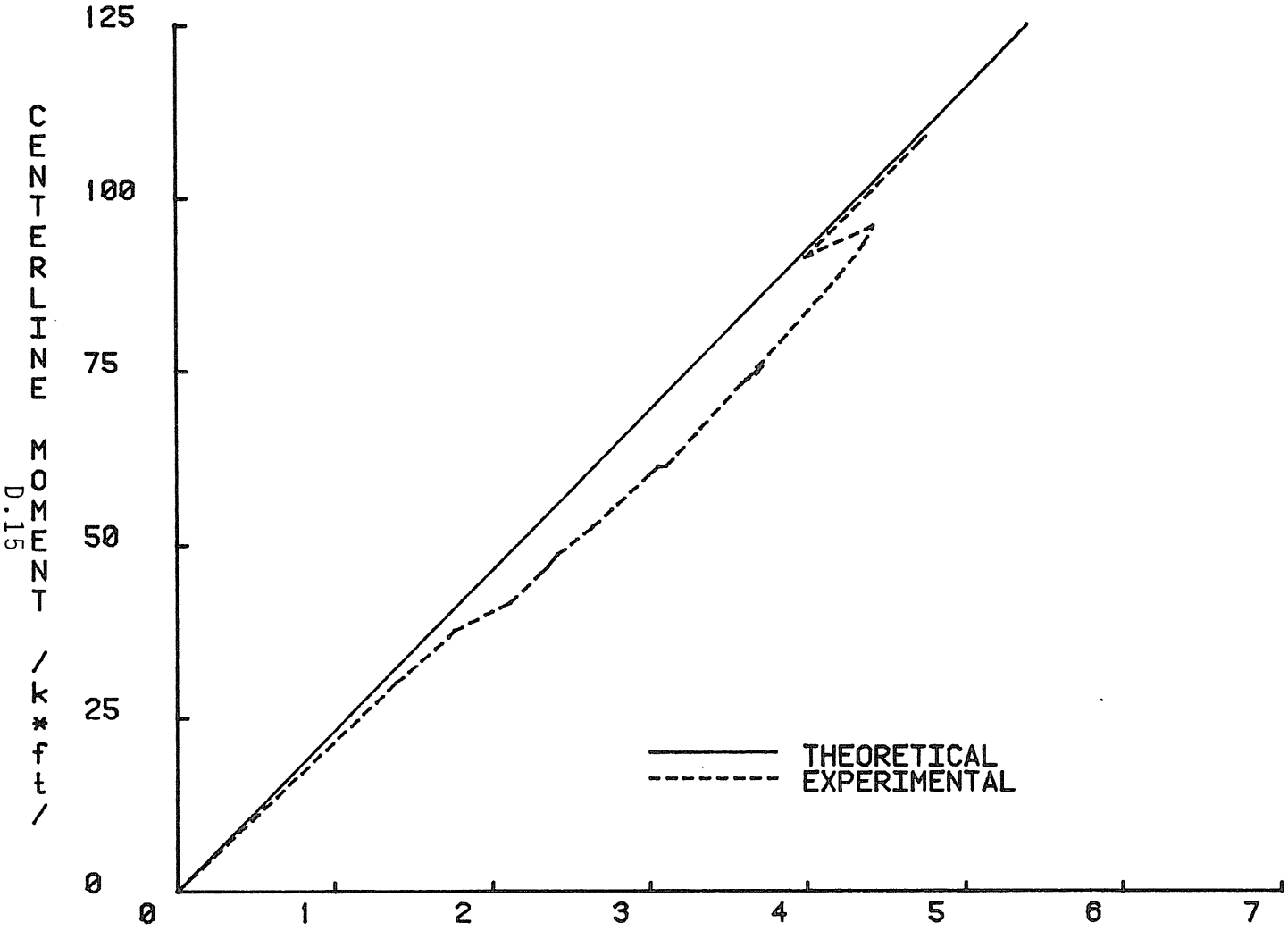
CENTERLINE MOMENT VS END DIAGONAL FORCE, TEST 3-A



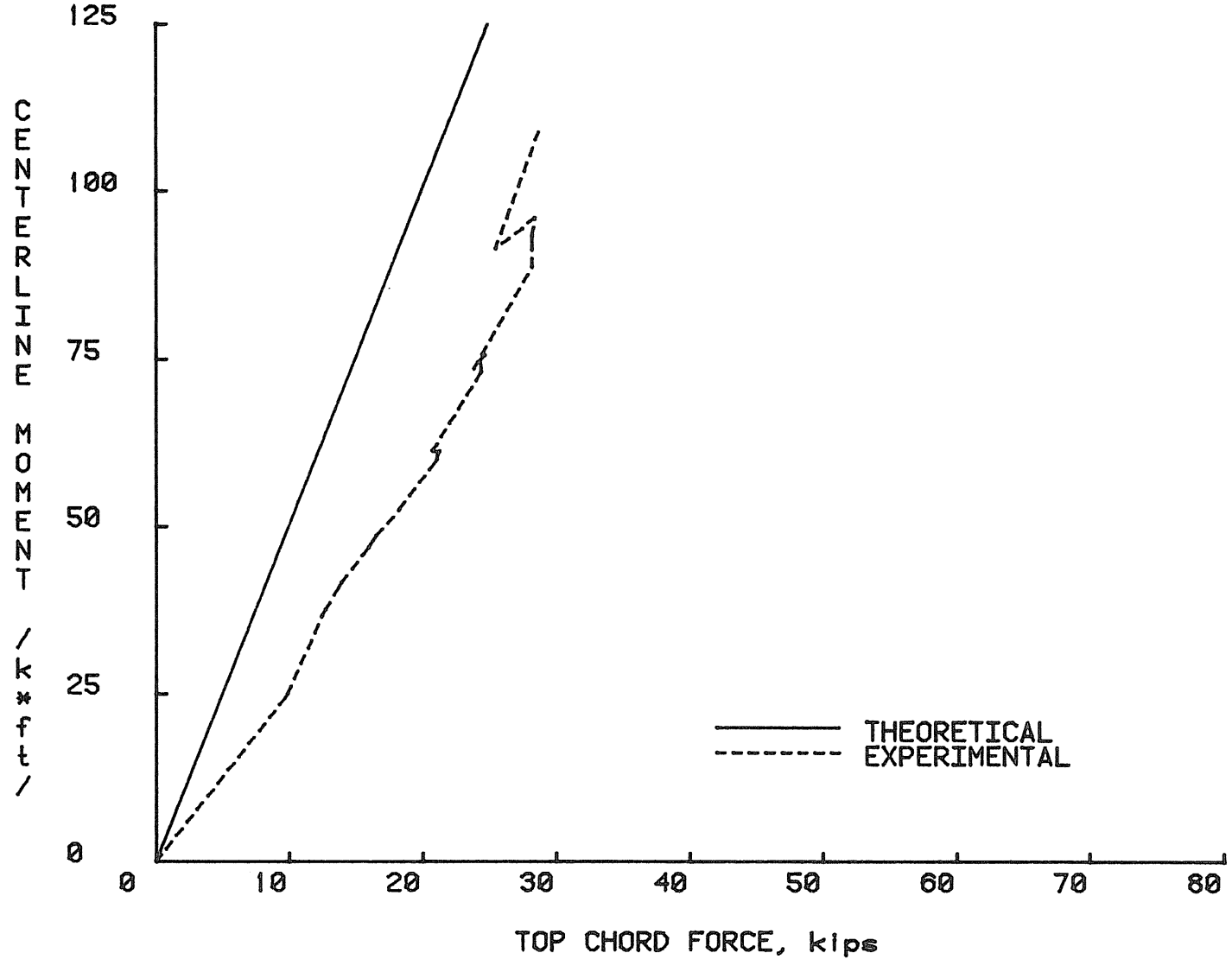
CENTERLINE MOMENT VS WELD STRAIN, TEST 3-A



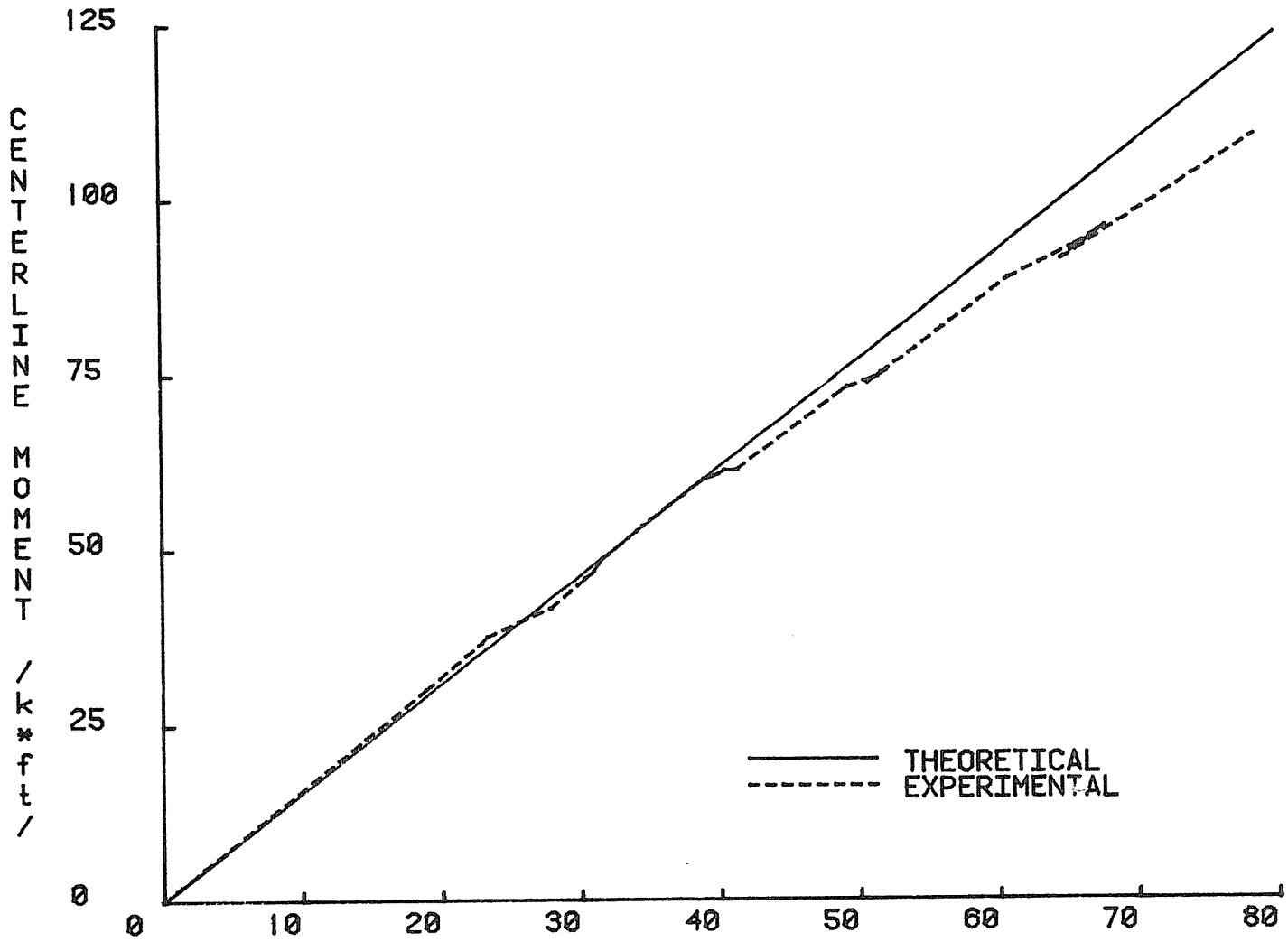
CENTERLINE MOMENT VS CHORD SHORTENING, TEST 3-A



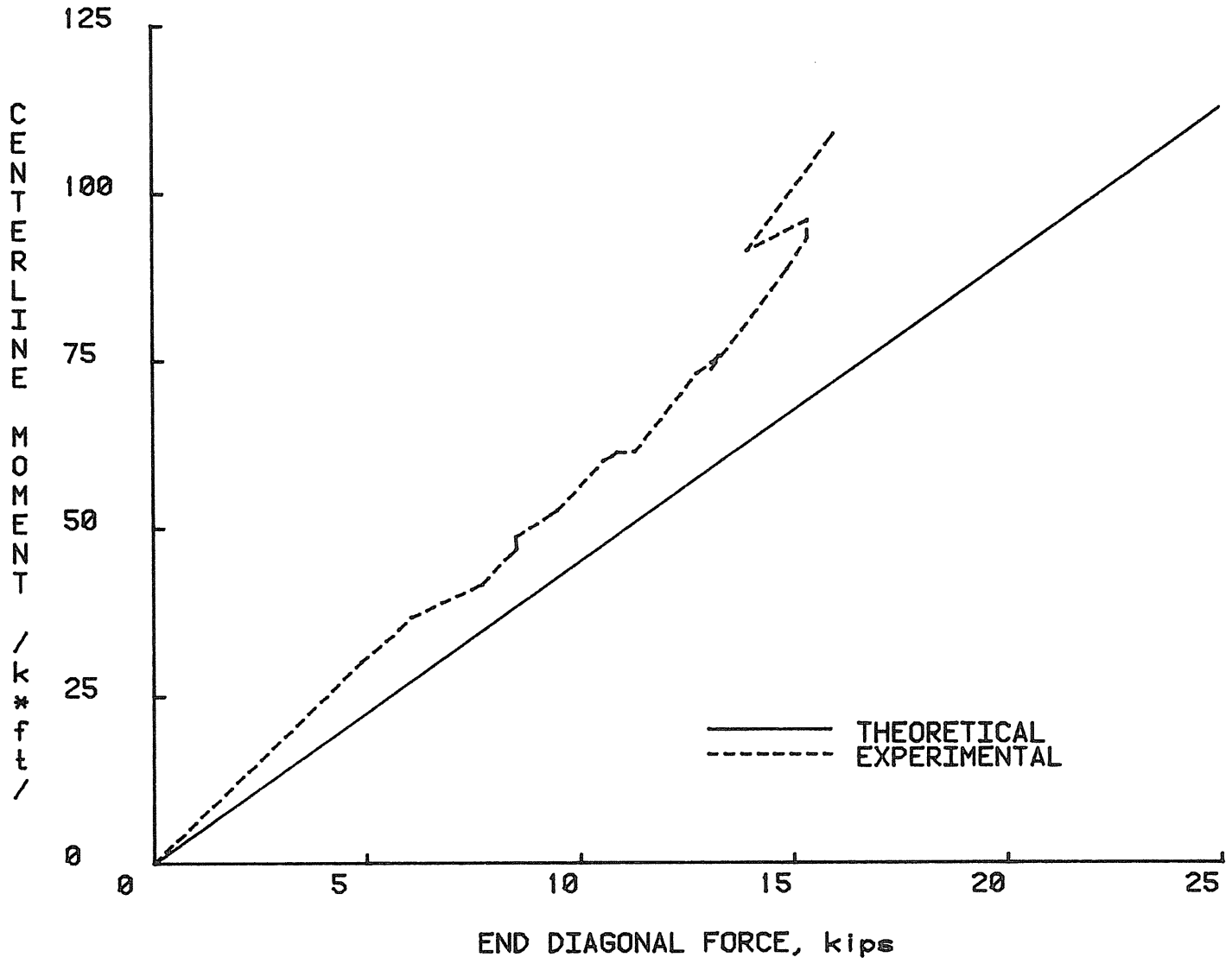
CENTERLINE MOMENT VS CENTERLINE VERTICAL DEFLECTION, TEST 3-B



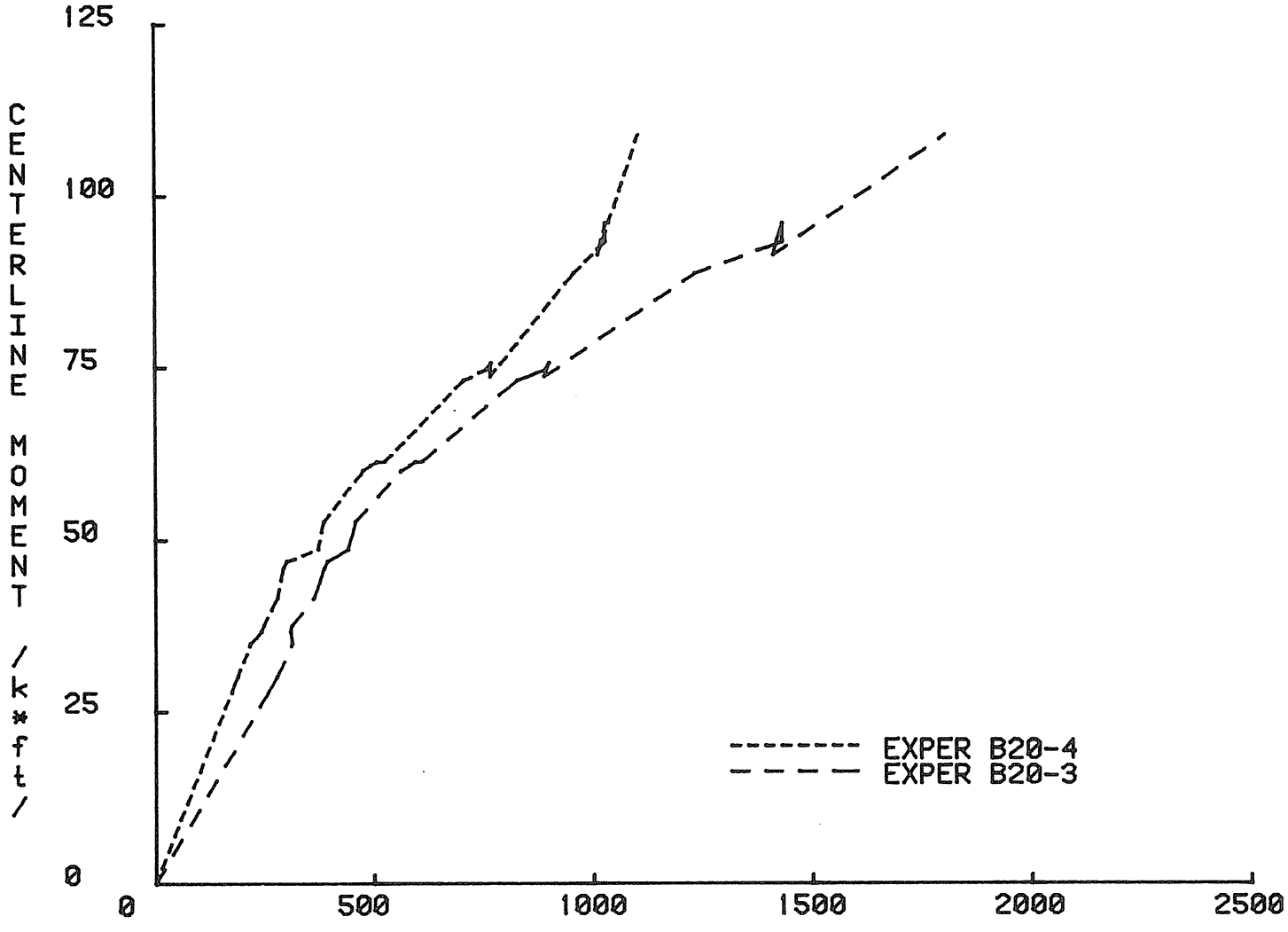
CENTERLINE MOMENT VS TOP CHORD FORCE, TEST 3-B



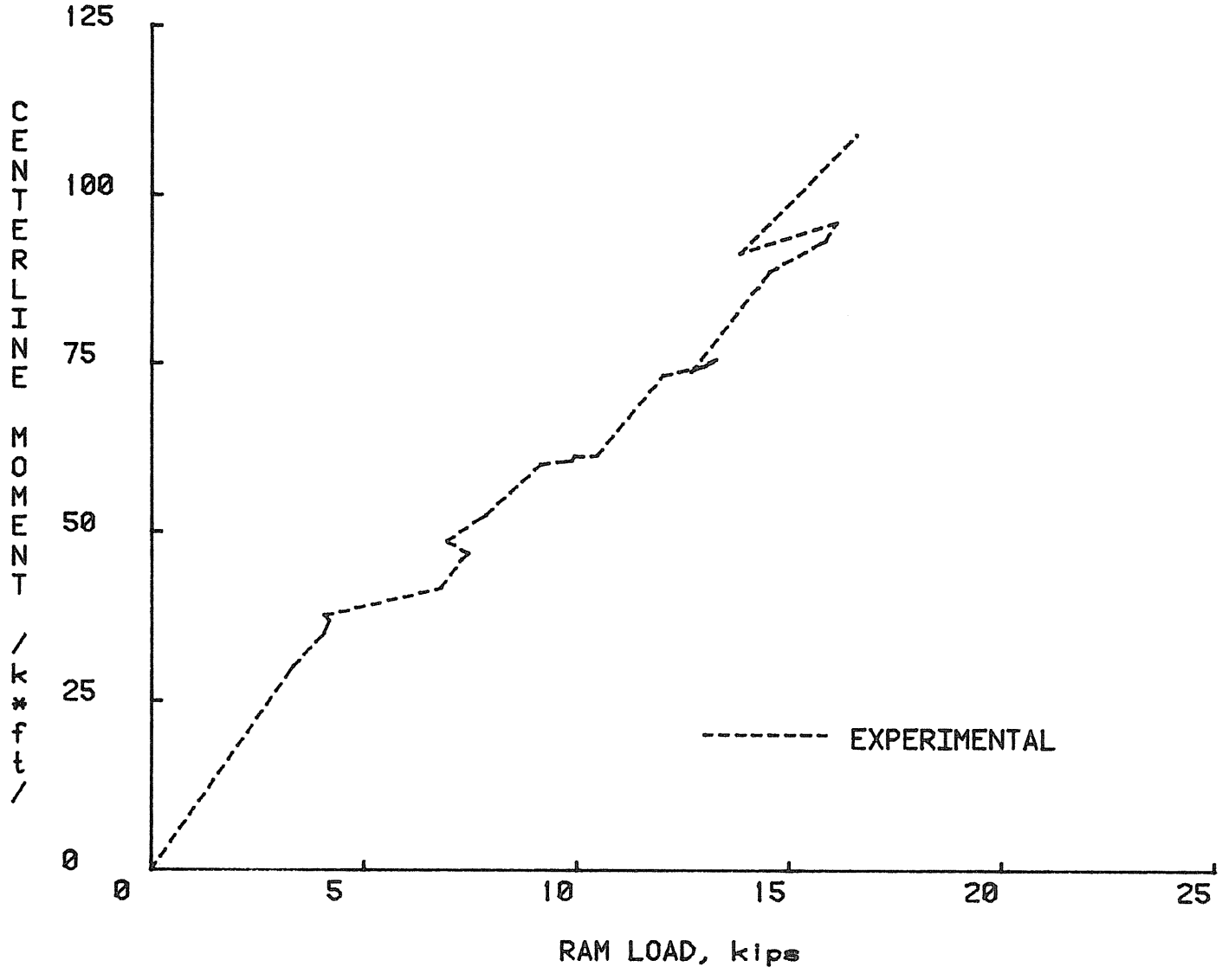
CENTERLINE MOMENT VS BOTTOM CHORD FORCE, TEST 3-B



CENTERLINE MOMENT VS END DIAGONAL FORCE, TEST 3-B



CENTERLINE MOMENT VS WELD STRAIN, TEST 3-B



CENTERLINE MOMENT VS RAM LOAD, TEST 3-B

HAAG JOISTS
TEST III
8-28-84

```
TEST:                    TEST III
Project Name:            HAAG JOISTS
Conducted by:            SJM
---------------------------
I=0
CHANNEL NUMBER:0
CALIBRATION FACTOR: .09445
INSTRUMENT:VER CENTER EAST

---------------------------
I=1
CHANNEL NUMBER:1
CALIBRATION FACTOR: .09389
INSTRUMENT:VER CENTER WEST

---------------------------
I=2
CHANNEL NUMBER:2
CALIBRATION FACTOR: .09401
INSTRUMENT:VER 1/4 PT EAST

---------------------------
I=3
CHANNEL NUMBER:3
CALIBRATION FACTOR: .09385
INSTRUMENT:VER 1/4 PT WEST

---------------------------
I=4
CHANNEL NUMBER:5
CALIBRATION FACTOR: 1.283
INSTRUMENT:HOR. NE   END

---------------------------
I=5
CHANNEL NUMBER:6
CALIBRATION FACTOR: 1.35
INSTRUMENT:HOR. NW   END

---------------------------
I=6
CHANNEL NUMBER:7
CALIBRATION FACTOR: .0942
INSTRUMENT:HOR. SE   END

---------------------------
I=7
CHANNEL NUMBER:8
CALIBRATION FACTOR: .09441
INSTRUMENT:HOR. SW   END

---------------------------
I=8
CHANNEL NUMBER:4
CALIBRATION FACTOR: 1
INSTRUMENT:EXCIT.

---------------------------
I=9
CHANNEL NUMBER:10
CALIBRATION FACTOR: 1.35
INSTRUMENT:TOP CHORD AXIAL EAST
```



```
---------------------------
I=10
CHANNEL NUMBER:11
CALIBRATION FACTOR: 1.3
INSTRUMENT:TOP CHORD AXIAL WEST

---------------------------
I=11
CHANNEL NUMBER:12
CALIBRATION FACTOR: 1.25
INSTRUMENT:BOT CHORD AXIAL EAST

---------------------------
I=12
CHANNEL NUMBER:13
CALIBRATION FACTOR: 1.283
INSTRUMENT:BOT CHORD AXIAL WEST

---------------------------
I=13
CHANNEL NUMBER:19
CALIBRATION FACTOR: 1
INSTRUMENT:EXCIT.

---------------------------
I=14
CHANNEL NUMBER:26
CALIBRATION FACTOR: -99409
INSTRUMENT:LOAD CELL EAST

---------------------------
I=15
CHANNEL NUMBER:21
CALIBRATION FACTOR: -26388
INSTRUMENT:LOAD CELL WEST

---------------------------
I=16
CHANNEL NUMBER:24
CALIBRATION FACTOR: .031624
INSTRUMENT:WELD CLIP GAGE NORTH

---------------------------
I=17
CHANNEL NUMBER:25
CALIBRATION FACTOR: .02713
INSTRUMENT:WELD CLIP GAGE SOUTH

---------------------------
I=18
CHANNEL NUMBER:30
CALIBRATION FACTOR: 1
INSTRUMENT:EXCIT.

---------------------------
I=19
CHANNEL NUMBER:22
BRIDGE SIZE: .5
GAGE FACTOR:2.11
LOCATION:GAGE ON END DIAG. OF EA
ST JOIST
---------------------------
I=20
CHANNEL NUMBER:23
BRIDGE SIZE: .5
GAGE FACTOR:2.11
LOCATION:GAGE ON END DIAG. OF EA
ST JOIST
```

HAAG JOIST C
TEST III
8-28-84

==========
DATA POINT: 1

FORCES
======

MOM. EAST= 0
MOM. WEST= 0
VERT LOAD= 0.000 lb/ft

RAM LOADS (kips)

EAST	WEST	AVERAGE
-.068	.060	-.004

MEMBER FORCES (kips)

TOP CHORD, MIDSPAN: .004
BOT CHORD, MIDSPAN: -.010
DIAGONAL, END: .060

DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
0 00000	0.00000	0.00000

1/4 SPAN (VERT.)

EAST	WEST	AVER.
0.00000	0.00000	0.00000

LOAD END (HOR.)

EAST	WEST	AVER.
0.00000	0.00000	0.00000

SUP. END (HOR.)

EAST	WEST	AVER.
.00000	0.00000	00000

W1= -.0000015069
W2= 0.0000000000
W AV.= -.0000007534

WELD STRAINS
IN NORTH WELD= 000054453
IN SOUTH WELD= - 000019646

VOLTAGE READINGS

VER LOAD= 0
VER DISP= 0

CH.	VOLTS
0	4.973700
1	4.617800
2	4.385900
3	4.681600
4	-.842060
5	-1.249000
6	3.783900
7	4.247200
8	5.172400
9	.452780
10	1.932800
11	1.700900
12	1.570500
13	15.114000
14	-.000439
15	-.000071
16	.010485
17	005256
18	5.003100
19	.002453
20	.002990

```
==================================
DATA POINT: 2

FORCES
======

MOM. EAST= 12.36
MOM. WEST= 12.36
VERT LOAD= 33.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  -.435       .030      -.203

MEMBER FORCES ,kips
-------------------
TOP CHORD, MIDSPAN:   4.948
BOT CHORD, MIDSPAN:  -6.354
DIAGONAL,  END:      1.835

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
   -.59441     -.58744     -.59093

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
   -.44869     -.46657     -.45763

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
    .04398      .04529      .04463

SUP. END (HOR. )
----------------
     EAST         WEST       AVER.
   -.00049     -.00100     -.00074

W1=     .0444653878
W2=     .0462913744
W AV.=     .0453783811

 WELD STRAINS
IN NORTH WELD=    .000410653
IN SOUTH WELD=    .000686344
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 33
VER DISP=-.587442834934

CH.       VOLTS
 0     4.683400
 1     4.332600
 2     4.167800
 3     4.455200
 4     -.845340
 5    -1.256000
 6     3.805400
 7     4.269400
 8     5.172500
 9      .495610
10     1.976300
11     1.651300
12     1.496200
13    15.113000
14     -.000423
15     -.000066
16      .010535
17      .005330
18     5.005100
19      .002191
20      .002784
```

```
==================================
DATA POINT: 3

FORCES
======

MOM  EAST= 24.72
MOM. WEST= 24.72
VERT LOAD= 66.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  -.323       .060      -.132

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 10.381
BOT CHORD, MIDSPAN:-12.242
DIAGONAL,  END:    3.656

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -1.17307   -1.16852   -1.17080

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
   -.89331    -.94510    -.91920

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .09631     .09587     .09609

SUP  END (HOR. )
----------------
     EAST        WEST       AVER.
   -.00093    -.00094    -.00094

W1=    .0972414819
W2=    .0968140484
W AV.=    .0970277652

 WELD STRAINS
IN NORTH WELD=   .000873457
IN SOUTH WELD=   .001209188

--------------------
VOLTAGE READINGS

VER LOAD= 66
VER DISP=-1.16852449827

CH.       VOLTS
 0    4.400700
 1    4.050400
 2    3.951600
 3    4.222900
 4    -.848270
 5   -1.255600
 6    3.830900
 7    4.294100
 8    5.172500
 9     .545900
10    2.021200
11    1.600600
12    1.432300
13   15.113000
14    -.000428
15    -.000071
16     .010596
17     .005384
18    5.005800
19     .001938
20     .002555
```

```
==================================
DATA POINT: 4

FORCES
======

MOM. EAST= 37.09
MOM. WEST= 37.09
VERT LOAD= 99.000 lb/ft

RAM LOADS   ,kips
-------------------
 EAST       WEST      AVERAGE
  -.188       .036      -.076

MEMBER FORCES ,kips
--------------------
TOP CHORD, MIDSPAN: 16.386
BOT CHORD, MIDSPAN:-18.825
DIAGONAL,  END:     5.443

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
      EAST         WEST       AVER.
  -1.77671    -1.78914    -1.78292

1/4 SPAN (VERT.)
----------------
      EAST         WEST       AVER.
  -1.35026    -1.41231    -1.38128

LOAD END (HOR. )
----------------
      EAST         WEST       AVER.
     .15029      .14850      .14939

SUP. END (HOR. )
----------------
      EAST         WEST       AVER.
    -.00116     -.00030     -.00073

W1=     .1514454713
W2=     .1487973433
W AV.=     .1501214073

 WELD STRAINS
IN NORTH WELD=    .001437190
IN SOUTH WELD=    .001957664

--------------------
VOLTAGE READINGS

VER LOAD= 99
VER DISP=-1.78914112949

CH.       VOLTS
 0     4.105800
 1     3.749000
 2     3.729400
 3     3.996100
 4     -.849780
 5    -1.251100
 6     3.857200
 7     4.319800
 8     5.172500
 9      .611500
10     2.061300
11     1.548500
12     1.356100
13    15.113000
14     -.000434
15     -.000067
16      .010670
17      .005461
18     5.006500
19      .001687
20      .002333
```

```
==================================
DATA POINT: 5

FORCES
======

MOM. EAST= 49.44
MOM. WEST= 49.44
VERT LOAD=132.000 lb/ft

RAM LOADS    ,kips
-------------------
 EAST       WEST      AVERAGE
  -.305       .054      -.125

MEMBER FORCEC ,kips
--------------------
TOP CHORD, MIDSPAN: 22.367
BOT CHORD, MIDSPAN:-26.046
DIAGONAL,  END:     7.278

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -2.40429   -2.40893   -2.40661

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -1.82962   -1.88549   -1.85756

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .20796     .20277     .20536

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
   -.00185     .00010    -.00087

W1=     .2098032588
W2=     .2026623082
W AV.=     .2062327835

 WELD STRAINS
IN NORTH WELD=    002135080
IN SOUTH WELD=    002775756
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 132
VER DISP=-2.40893411555

CH.       VOLTS
 0     3.799200
 1     3.448000
 2     3.496300
 3     3.766400
 4     -.854340
 5    -1.248300
 6     3.885300
 7     4.346300
 8     5.172500
 9      .677330
10     2.100700
11     1.490000
12     1.273900
13    15.113000
14     -.000429
15     -.000070
16      .010763
17      .005546
18     5.008000
19      .001429
20      .002106
```

```
==================================
DATA POINT: 6

FORCES
======

MOM. EAST= 61.81
MOM. WEST= 61.81
VERT LOAD=165.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  -.373       .036      -.169

MEMBER FORCES ,kips
-------------------
TOP CHORD, MIDSPAN: 27.998
BOT CHORD, MIDSPAN:-33.393
DIAGONAL,  END:     9.052

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
  -3.02518    -3.00986    -3.01752

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
  -2.29405    -2.36141    -2.32773

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
    .27009      .26314      .26662

SUP. END (HOR. )
----------------
     EAST         WEST       AVER.
   -.00306     -.00014     - 00160

W1=     .2731547214
W2=     .2632869406
W AV.=     .2682208310

 WELD STRAINS
IN NORTH WELD=    002966612
IN SOUTH WELD=    003953378
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 165
VER DISP=-3.00986353096

CH.        VOLTS
 0     3.495800
 1     3.156100
 2     3.270400
 3     3.535300
 4     -.862390
 5    -1.250000
 6     3.915500
 7     4.375700
 8     5.172400
 9      .731580
10     2.145200
11     1.429100
12     1.191700
13    15.113000
14     -.000426
15     -.000067
16      .010870
17      .005666
18     5.008000
19      .001183
20      001882
```

```
==================================
DATA POINT: 7

FORCES
======

MOM  EAST= 61.81
MOM. WEST= 61.81
VERT LOAD=165.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  - 395       .060     -.168

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 28.208
BOT CHORD, MIDSPAN:-33.619
DIAGONAL,  END:     9.021

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -3.02614   -3.01061   -3.01837

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -2.29377   -2.36341   -2.32859

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
     27548     .26154     .26851

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
   -.00286     .00119    -.00083

W1=     .2783347302
W2=     .2603449745
W AV.=     .2693398524

 WELD STRAINS
IN NORTH WELD=    .002944985
IN SOUTH WELD=    .004052626

--------------------
VOLTAGE READINGS

VER LOAD= 165
VER DISP=-3.01060690799

CH        VOLTS
 0     3.495400
 1     3.155800
 2     3.270600
 3     3.534400
 4     -.861040
 5    -1.240700
 6     3.918200
 7     4.375000
 8     5.172500
 9      .736590
10     2.144000
11     1.427500
12     1.188900
13    15.113000
14     -.000425
15     -.000071
16      .010867
17      .005676
18     5.007900
19      .001186
20      .001887
```

```
==================================
DATA POINT: 8

FORCES
======

MOM. EAST= 61.81
MOM. WEST= 61.81
VERT LOAD=165.000 lb/ft

RAM LOADS  ,kips
-------------------
 EAST       WEST      AVERAGE
  8.385      9.221     8.803

MEMBER FORCES ,kips
--------------------
TOP CHORD, MIDSPAN: 17.579
BOT CHORD, MIDSPAN:-33.552
DIAGONAL,  END:    9.629

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST      AVER.
  -2.53932   -2.61024   -2.57478

1/4 SPAN (VERT.)
----------------
     EAST        WEST      AVER.
  -1.93670   -2.04735   -1.99202

LOAD END (HOR. )
----------------
     EAST        WEST      AVER.
    .03541    -.02921     .00310

SUP  END (HOR. )
----------------
     EAST        WEST      AVER.
    .03215     .08599     .05907

W1=    .0032580615
W2=   -.1151992051
W AV.=  -.0559705718

 WELD STRAINS
IN NORTH WELD=    003077100
IN SOUTH WELD=   .003895606
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 165
VER DISP=-2 61024281592

CH       VOLTS
 0    3.733300
 1    3.350300
 2    3.444300
 3    3.687900
 4    -.628730
 5    -.648580
 6    3.801300
 7    4.233100
 8    5.172600
 9     .636490
10    2.057800
11    1.423600
12    1.194300
13   15.113000
14    -.000812
15    -.001592
16     .010884
17     .005660
18    5.007900
19     .001180
20     .001732
```

```
==================================
DATA POINT: 9

FORCES
======

MOM  EAST= 61.81
MOM  WEST= 61.81
VERT LOAD=165.000 lb/ft

RAM LOADS   (kips)
------------------
 EAST       WEST      AVERAGE
  3.462      3.866     3.664

MEMBER FORCES (kips)
--------------------
TOP CHORD, MIDSPAN: 23.710
BOT CHORD, MIDSPAN:-33.677
DIAGONAL,  END:     9.195

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -2.83012   -2.88011   -2.85512

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -2.15851   -2.26008   -2.20930

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .15819     .10823     .13321

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .01436     .07033     .04234

W1=    .1438339623
W2=    .0378997789
W AV.=    .0908668706

 WELD STRAINS
IN NORTH WELD=    003030471
IN SOUTH WELD=   .003954489
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 165
VER DISP=-2.88010954154

CH.       VOLTS
 0    3.591300
 1    3.219300
 2    3.336500
 3    3.584700
 4    -.746850
 5    -.757960
 6    3.861200
 7    4.300300
 8    5.172700
 9     .690720
10    2.110700
11    1.424500
12    1.190700
13   15.112000
14    -.000595
15    -.000703
16     .010878
17     .005666
18    5.007900
19     .001187
20     .001840
```

```
==================================
DATA POINT: 10

FORCES
======

MOM. EAST= 61.81
MOM. WEST= 61.81
VERT LOAD=165.000 lb/ft

RAM LOADS  ,kips
--------------------
 EAST       WEST      AVERAGE
   .580       .704       642

MEMBER FORCES ,kips
--------------------
TOP CHORD, MIDSPAN: 27.137
BOT CHORD, MIDSPAN:-33.660
DIAGONAL, END:   9.055

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST      AVER.
  -3.00007   -3.02432   -3.01220

1/4 SPAN (VERT.)
----------------
     EAST        WEST      AVER.
  -2.28115   -2.37550   -2.32832

LOAD END (HOR. )
----------------
     EAST        WEST      AVER.
    .23017     .19952     .21485

SUP. END (HOR. )
----------------
     EAST        WEST      AVER.
    .00276     .05510     .02893

W1=    .2274147387
W2=    .1444245764
W AV.=    .1859196825

 WELD STRAINS
IN NORTH WELD=   003069329
IN SOUTH WELD=   003934861

--------------------
VOLTAGE READINGS

VER LOAD= 165
VER DISP=-3.02432241682

CH.      VOLTS
 0    3.508200
 1    3.149200
 2    3.276800
 3    3.528600
 4    -.823800
 5    -.864300
 6    3.896200
 7    4.344800
 8    5.172600
 9     .723080
10    2.138400
11    1.425300
12    1.190200
13   15.112000
14    -.000468
15    -.000178
16     .010883
17     .005664
18    5.007900
19     .001188
20     .001876
```

```
==================================
DATA POINT: 11

FORCES
======

MOM. EAST= 61.81
MOM. WEST= 61.81
VERT LOAD=165.000 lb/ft

RAM LOADS  ,kips
-------------------
 EAST      WEST      AVERAGE
  2.645     3.595     3.120

MEMBER FORCES ,kips
--------------------
TOP CHORD, MIDSPAN: 23.785
BOT CHORD, MIDSPAN:-33.713
DIAGONAL,  END:     9.316

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -2.84656   -2.88719   -2.86687

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -2.16846   -2.26961   -2.21904

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .16573     .12089     .14331

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .01296     .06743     .04019

W1=    .1527729274
W2=    .0534631750
W AV.=    .1031180512

 WELD STRAINS
IN NORTH WELD=    003016616
IN SOUTH WELD=   .004151877
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 165
VER DISP=-2.88718814819

CH.       VOLTS
 0     3.583200
 1     3.215800
 2     3.331600
 3     3.580000
 4     -.756110
 5     -.778210
 6     3.864800
 7     4.306400
 8     5.172600
 9      .691320
10     2.111400
11     1.424200
12     1.190300
13    15.112000
14     -.000559
15     -.000658
16      .010876
17      .005686
18     5.007800
19      .001168
20      .001827
```

```
==================================
DATA POINT: 13

FORCES
======

MOM. EAST= 61.81
MOM. WEST= 61.81
VERT LOAD=165.000 lb/ft

RAM LOADS   ,kips
-------------------
 EAST       WEST      AVERAGE
  7.252      7.685      7.468

MEMBER FORCES ,kips
--------------------
TOP CHORD, MIDSPAN: 19.330
BOT CHORD, MIDSPAN:-33.755
DIAGONAL,  END:     9.531

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
  -2.62871   -2.69212   -2.66042

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
  -2.00223   -2.10847   -2.05535

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
    .06851     .00728     .03789

SUP. END (HOR. )
----------------
     EAST         WEST       AVER.
    .02677     .08157     .05417

W1=    .0417327676
W2=   -.0742956720
W AV.=  -.0162814522

 WELD STRAINS
IN NORTH WELD=    003072706
IN SOUTH WELD=    .003946895
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 165
VER DISP=-2.69211980163

CH.       VOLTS
 0    3.689700
 1    3.310600
 2    3.412500
 3    3.658300
 4    -.664440
 5    -.679440
 6    3.817500
 7    4.251000
 8    5.172700
 9     .649330
10    2.075300
11    1.423400
12    1.190300
13   15.112000
14    -.000762
15    -.001337
16     .010883
17     .005665
18    5.007700
19     .001163
20     .001775
```

```
==================================
DATA POINT: 13

FORCES
======

MOM. EAST= 61.81
MOM. WEST= 61.81
VERT LOAD=165.000 lb/ft

RAM LOADS  ,kips
-------------------
 EAST       WEST      AVERAGE
  9.248      9.408     9.328

MEMBER FORCES ,kips
-------------------
TOP CHORD, MIDSPAN: 17.284
BOT CHORD, MIDSPAN:-33.776
DIAGONAL,  END:     9.697

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -2.53640   -2.61017   -2.57329

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -1.93190   -2.04708   -1.98949

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .02869    -.03900    -.00515

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .03178     .08929     .06053

W1=   -.0030851116
W2=   -.1282863766
W AV.=   -.0656857441

 WELD STRAINS
IN NORTH WELD=   .003010532
IN SOUTH WELD=   .004192248
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 165
VER DISP=-2.61017027646

CH.       VOLTS
 0     3.734800
 1     3.350400
 2     3.446700
 3     3.688100
 4     -.631230
 5     -.625580
 6     3.798100
 7     4.228400
 8     5.172700
 9      .632690
10     2.056200
11     1.422900
12     1.190400
13    15.112000
14     -.000850
15     -.001623
16      .010875
17      .005690
18     5.007700
19      .001155
20      .001739
```

```
==================================
DATA POINT: 14

FORCES
======

MOM. EAST= 49.44
MOM. WEST= 49.44
VERT LOAD=132.000 lb/ft

RAM LOADS  ,kips
------------------
 EAST       WEST      AVERAGE
  6.934      7.685     7.309

MEMBER FORCES ,kips
--------------------
TOP CHORD, MIDSPAN: 14.182
BOT CHORD, MIDSPAN:-27.993
DIAGONAL,  END:    7.866

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -2.05249   -2.11573   -2.08411

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -1.56847   -1.66718   -1.61783

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .00822    -.05555    -.02366

SUP  END (HOR. )
----------------
     EAST        WEST       AVER.
    .02614     .08601     .05608

W1=   -.0179192617
W2=   -.1415574538
W AV.=   -.0797383578

 WELD STRAINS
IN NORTH WELD=    002528681
IN SOUTH WELD=    003387491
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 132
VER DISP=-2.11573340264

CH.       VOLTS
 0     3.371300
 1     3.590600
 2     3.623500
 3     3.872600
 4     -.668630
 5     -.648480
 6     3.788200
 7     4.220400
 8     5.172800
 9      .602720
10     2.031600
11     1.472000
12     1.253700
13    15.111000
14     -.000748
15     -.001337
16      .010813
17      .005608
18     5.007700
19      .001409
20      .001970
```

```
==================================
DATA POINT: 15

FORCES
======

MOM. EAST= 49.44
MOM. WEST= 49.44
VERT LOAD=132.000 lb/ft

RAM LOADS  ,kips
------------------
 EAST       WEST      AVERAGE
  6.480      6.398     6.739

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 14.902
BOT CHORD, MIDSPAN:-27.956
DIAGONAL,  END:     7.791

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -2.09600   -2.15259   -2.12434

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -1.60651   -1.69623   -1.65137

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .02444    -.03835    -.00696

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .02352     .08365     .05358

W1=    .0009210685
W2=   -.1220001119
W AV.=  -.0605395217

 WELD STRAINS
IN NORTH WELD=   002544224
IN SOUTH WELD=   .003407120
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 132
VER DISP=-2.15258938613

CH.       VOLTS
 0     3.950000
 1     3.572700
 2     3.605000
 3     3.858500
 4     -.686070
 5     -.664940
 6     3.796100
 7     4.228800
 8     5.172800
 9      .609430
10     2.037500
11     1.472400
12     1.254000
13    15.111000
14     -.000728
15     -.001223
16      .010815
17      .005610
18     5.007700
19      .001410
20      .001989
```

```
==================================
DATA POINT: 16

FORCES
======

MOM  EAST= 37.09
MOM. WEST= 37.09
VERT LOAD= 99.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  4.370      5.366     4.868

MEMBER FORCES ,kips
-------------------
TOP CHORD, MIDSPAN: 10.887
BOT CHORD, MIDSPAN:-21.956
DIAGONAL,  END:    5.960

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -1.59175   -1.64052   -1.61614

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -1.21930   -1.30444   -1.26187

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .00268    -.05350    -.02541

SUP. END (HOR. )
----------------
     EAST        WEST       AVER
    .01922     .07948      04935

W1=   -.0165336165
W2=   -.1329799182
W AV.=   -.0747567674

 WELD STRAINS
IN NORTH WELD=    002242797
IN SOUTH WELD=    002868433
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 99
VER DISP=-1.64051770495

CH.       VOLTS
 0    4.196400
 1    3.821400
 2    3.793300
 3    4.048700
 4    -.714600
 5    -.694080
 6    3.785500
 7    4.221400
 8    5.172800
 9     .567070
10    2.009300
11    1.523200
12    1.320000
13   15.111000
14    -.000635
15    -.000952
16     .010776
17     .005555
18    5.007600
19     .001676
20     .002208
```

```
==================================
DATA POINT: 17

FORCES
======

MOM. EAST= 37.09
MOM. WEST= 37.09
VERT LOAD= 99.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  4.189      5.065     4.627

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 11.087
BOT CHORD, MIDSPAN:-21.915
DIAGONAL,  END:    5.900

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -1.60363   -1.65205   -1.62784

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -1.22896   -1.31185   -1.27041

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .00761    -.04552    -.01895

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .01747     .07755     .04751

W1=   -.0098574248
W2=   -.1230694754
W AV.=   -.0664634501

 WELD STRAINS
IN NORTH WELD=    002048498
IN SOUTH WELD=    .00288061

--------------------
VOLTAGE READINGS

VER LOAD= 99
VER DISP=-1.65204806851

CH.       VOLTS
 0    4.190600
 1    3.815800
 2    3.788600
 3    4.045100
 4    -.726220
 5    -.707520
 6    3.787900
 7    4.225300
 8    5.172800
 9     .568060
10    2.011600
11    1.523500
12    1.320300
13   15.110000
14    -.000627
15    -.000902
16     .010751
17     .005557
18    5.007600
19     .001688
20     .002212
```

```
==================================
DATA POINT: 18

FORCES
======

MOM. EAST= 30.908
MOM. WEST= 30.908
VERT LOAD= 82.500 lb/ft

RAM LOADS   ,kips
-------------------
 EAST       WEST       AVERAGE
  3.757      4.324      4.041

MEMBER FORCEC ,kips
--------------------
TOP CHORD, MIDSPAN:   9.094
BOT CHORD, MIDSPAN:-18.987
DIAGONAL,  END:    4.987

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -1.34737   -1.37635   -1.36186

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -1.03731   -1.10010   -1.06871

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
   -.00306    -.05330    -.02818

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .01568     .07553     .04560

W1=   -.0187389107
W2=   -.1288300154
W AV.=   -.0737844631

 WELD STRAINS
IN NORTH WELD=   .001899165
IN SOUTH WELD=   .002729946

--------------------
VOLTAGE READINGS

VER LOAD= 82.5
VER DISP=-1.37634884008

CH.       VOLTS
 0    4.315800
 1    3.949700
 2    3.881800
 3    4.147900
 4    -.738100
 5    -.721630
 6    3.782700
 7    4.221500
 8    5.172800
 9     .548720
10    1.996000
11    1.548200
12    1.352600
13   15.110000
14    -.000608
15    -.000779
16     .010732
17     .005541
18    5.007700
19     .001801
20     .002341
```

```
==================================
DATA POINT: 19

FORCES
======

MOM. EAST= 30.908
MOM. WEST= 30.908
VERT LOAD= 82.500 lb/ft

RAM LOADS   ,kips
-------------------
 EAST       WEST       AVERAGE
  3.099      3.577      3.338

MEMBER FORCEC ,kips
--------------------
TOP CHORD, MIDSPAN:   9.885
BOT CHORD, MIDSPAN:-18.915
DIAGONAL,  END:    4.870

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
  -1.37415   -1.41274   -1.39344

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
  -1.05679   -1.12972   -1.09326

LOAD END (HOR.)
---------------
     EAST         WEST       AVER.
    .01177     -.03217    -.01020

SUP. END (HOR.)
---------------
     EAST         WEST       AVER.
    .01241      .07143     .04192

W1=   -.0006390912
W2=   -.1035984995
W AV.=   -.0521187953

 WELD STRAINS
IN NORTH WELD=    001868078
IN SOUTH WELD=    002779017

-------------------
VOLTAGE READINGS

VER LOAD= 82.5
VER DISP=-1.41274363672

CH.       VOLTS
 0     4.302800
 1     3.932100
 2     3.872400
 3     4.133600
 4     -.759810
 5     -.750300
 6     3.790000
 7     4.231900
 8     5.172900
 9      .556380
10     2.002200
11     1.549000
12     1.353200
13    15.110000
14     -.000579
15     -.000655
16      .010728
17      .005546
18     5.007700
19      .001811
20      .002362
```

```
==================================
DATA POINT: 20

FORCES
======

MOM. EAST= 37.09
MOM. WEST= 37.09
VERT LOAD= 99.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  3.826      4.306     4.066

MEMBER FORCES ,kips
-------------------
TOP CHORD, MIDSPAN: 11.811
BOT CHORD, MIDSPAN:-21.905
DIAGONAL,  END:     5.775

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
  -1.61628    -1.67135    -1.64381

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
  -1.24104    -1.33200    -1.28652

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
    .01238     -.03176     -.00969

SUP. END (HOR. )
----------------
     EAST         WEST       AVER.
    .01448      .07412      .04430

W1=   -.0020937030
W2=   -.1058810694
W AV.=   -.0539873862

 WELD STRAINS
IN NORTH WELD=    .002172849
IN SOUTH WELD=    .003123604
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 99
VER DISP=-1.67134821986

CH        VOLTS
 0     4.184500
 1     3.606500
 2     3.782800
 3     4.035400
 4     -.746070
 5     -.731500
 6     3.790300
 7     4.232100
 8     5.172900
 9      .573740
10     2.018400
11     1.523700
12     1.320100
13    15.109000
14     -.000611
15     -.000776
16      .010767
17      .005581
18     5.007600
19      .001686
20      .002247
```

```
==================================
DATA POINT: 21

FORCES
======

MOM. EAST= 38
MOM. WEST= 38
VERT LOAD= 99.000 lb/ft

RAM LOADS  ,kips
-------------------
 EAST       WEST      AVERAGE
  3.848      4.511     4.180

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 12.463
BOT CHORD, MIDSPAN:-22.933
DIAGONAL,  END:    6.062

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -1.69999   -1.75494   -1.72746

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -1.30232   -1.39214   -1.34723

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .01464    -.02971    -.00754

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .01514     .07474     .04494

W1=   -.0004992743
W2=   -.1044492008
W AV.=   -.0524742376

 WELD STRAINS
IN NORTH WELD=   .002421551
IN SOUTH WELD=   .003084347
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 99
VER DISP=-1.75494173957

CH.       VOLTS
 0    4.143600
 1    3.765900
 2    3.753000
 3    4.006200
 4    -.741670
 5    -.727200
 6    3.791400
 7    4.233100
 8    5.172900
 9     .579850
10    2.023700
11    1.515000
12    1.308800
13   15.109000
14    -.000612
15    -.000810
16     .010799
17     .005577
18    5.007600
19     .001655
20     .002202
```

```
==================================
DATA POINT: 22

FORCES
======

MOM. EAST= 38
MOM. WEST= 38
VERT LOAD= 99.000 lb/ft

RAM LOADS  ,kips
-------------------
 EAST       WEST      AVERAGE
  3.621      4.523     4.072

MEMBER FORCES ,kips
-------------------
TOP CHORD, MIDSPAN: 12.723
BOT CHORD, MIDSPAN:-23.303
DIAGONAL,  END:     6.119

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -1.72942   -1.79915   -1.76429

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -1.33023   -1.42855   -1.37939

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .01552    -.02947    -.00698

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .01506     .07481     .04494

W1=    .0004540820
W2=   -.1042794215
W AV.=  -.0519126698

 WELD STRAINS
IN NORTH WELD=   .002482050
IN SOUTH WELD=   .003122511
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 99
VER DISP=-1.79915238679

CH       VOLTS
 0    4.129300
 1    3.744500
 2    3.739500
 3    3.988600
 4    -.742200
 5    -.726710
 6    3.791900
 7    4.233300
 8    5.173000
 9     .582410
10    2.025700
11    1.511700
12    1.304900
13   15.109000
14    -.000602
15    -.000812
16     .010807
17     .005581
18    5.007700
19     .001630
20     .002212
```

```
==================================
DATA POINT: 23

FORCES
======

MOM. EAST= 49.44
MOM. WEST= 49.44
VERT LOAD=132.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  4.824      5.655     5.240

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 15.397
BOT CHORD, MIDSPAN:-27.864
DIAGONAL,  END:     7.605

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
  -2.12643   -2.19996   -2.16320

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
  -1.62586   -1.73809   -1.68197

LOAD END (HOR.)
---------------
     EAST         WEST       AVER.
    .03568     -.01449      .01060

SUP. END (HOR.)
---------------
     EAST         WEST       AVER.
    .01777      .06075      .04926

W1=    .0179112676
W2=   -.0952310703
W AV.=   -.0386599013

 WELD STRAINS
IN NORTH WELD=    .002755745
IN SOUTH WELD=    .003692834
```

```
-------------------
VOLTAGE READINGS

VER LOAD= 132
VER DISP=-2.19995831631

CH.       VOLTS
 0     3.935400
 1     3.549900
 2     3.595800
 3     3.838400
 4     -.724240
 5     -.685270
 6     3.801800
 7     4.240700
 8     5.173100
 9      .603290
10     2.051500
11     1.473800
12     1.254000
13    15.109000
14     -.000655
15     -.001000
16      .010842
17      .005639
18     5.007600
19      .001425
20      .002023
```

```
==================================
DATA POINT: 24

FORCES
======

MOM. EAST= 49.44
MOM. WEST= 49.44
VERT LOAD=132.000 lb/ft

RAM LOADS (kips)
-------------------
 EAST       WEST       AVERAGE
  6.594      7.035      6.814

MEMBER FORCES (kips)
--------------------
TOP CHORD, MIDSPAN: 13.924
BOT CHORD, MIDSPAN:-27.926
DIAGONAL, END:    7.711

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -2.08714   -2.14972   -2.11843

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -1.60036   -1.69442   -1.64739

LOAD END (HOR.)
---------------
     EAST        WEST       AVER.
    .01742    -.04192    -.01225

SUP. END (HOR.)
---------------
     EAST        WEST       AVER.
    .02224     .08476     .05350

W1=   -.0048227444
W2=   -.1266830986
W AV.=   -.0657529215

 WELD STRAINS
IN NORTH WELD=   .002786833
IN SOUTH WELD=   .003624134
```

```
-------------------
VOLTAGE READINGS

VER LOAD= 132
VER DISP=-2.14972178862

CH.       VOLTS
 0    3.954600
 1    3.574300
 2    3.608200
 3    3.859600
 4    -.694570
 5    -.657230
 6    3.792900
 7    4.227300
 8    5.173100
 9     .589690
10    2.039300
11    1.473000
12    1.253600
13   15.109000
14    -.000733
15    -.001229
16     .010846
17     .005632
18    5.007600
19     .001423
20     .001997
```

```
==================================
DATA POINT: 25

FORCES
======

MOM. EAST= 51
MOM. WEST= 51
VERT LOAD=132.000 lb/ft

RAM LOADS   (kips)
------------------
 EAST        WEST       AVERAGE
 6.961       7.627       7.294

MEMBER FORCES (kips)
--------------------
TOP CHORD, MIDSPAN: 15.598
BOT CHORD, MIDSPAN:-30.389
DIAGONAL,  END=     8.350

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST          WEST          AVER.
  -2.26786     -2.35026     -2.30906

1/4 SPAN (VERT.)
----------------
     EAST          WEST          AVER.
  -1.72950     -1.85323     -1.79136

LOAD END (HOR.)
---------------
     EAST          WEST          AVER.
   .01639       -.04172       -.01266

SUP. END (HOR.)
---------------
     EAST          WEST          AVER.
   .02408        .08624        .05516

W1=   -.0076899627
W2=   -.1279589389
W AV.=   -.0676244508

 WELD STRAINS
IN NORTH WELD=    .002923645
IN SOUTH WELD=    .003863165
```

```
--------------------
VOLTAGE READINGS

WER LOAD= 132
WER DISP=-2.35025612452

CH.       VOLTS
 0     3.866300
 1     3.476900
 2     3.545400
 3     3.782500
 4     -.682350
 5     -.646890
 6     3.792400
 7     4.227400
 8     5.173100
 9      .605340
10     2.052800
11     1.451800
12     1.226700
13    15.108000
14     -.000749
15     -.001327
16      .010861
17      .005655
18     5.006400
19      .001340
20      .001910
```

```
==================================
DATA POINT: 26

FORCES
======

MOM. EAST= 51
MOM. WEST= 51
VERT LOAD=132.000 lb/ft

RAM LOADS  ,kips
------------------
 EAST       WEST      AVERAGE
  7.165      7.747     7.456

MEMBER FORCES ,kips
--------------------
TOP CHORD, MIDSPAN: 15.975
BOT CHORD, MIDSPAN:-30.970
DIAGONAL,  END:     8.506

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -2.31764   -2.39397   -2.35581

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -1.76863   -1.88356   -1.82610

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .01634    -.04155    -.01261

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .02442     .08638     .05540

W1=   -.0080847710
W2=   -.1279301526
W AV.=   -.0680074618

 WELD STRAINS
IN NORTH WELD=   .003009157
IN SOUTH WELD=   .003931882
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 132
VER DISP=-2.39397260831

CH.      VOLTS
 0    3.841900
 1    3.455600
 2    3.526300
 3    3.767700
 4    -.680080
 5    -.645910
 6    3.792300
 7    4.227400
 8    5.173000
 9     .608730
10    2.056000
11    1.446900
12    1.220300
13   15.108000
14    -.000758
15    -.001347
16     .010872
17     .005662
18    5.006400
19     .001311
20     .001897
```

```
==================================
DATA POINT: 27

FORCES
======

MOM. EAST= 51
MOM. WEST= 51
VERT LOAD=132.000 lb/ft

RAM LOADS  ,kips
------------------
 EAST       WEST      AVERAGE
  7.278      7.832     7.555

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 16.199
BOT CHORD, MIDSPAN:-31.330
DIAGONAL,  END:     8.584

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -2.35259   -2.42623   -2.38941

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -1.79530   -1.90534   -1.85032

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .01783    -.04151    -.01184

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .02465     .08653     .05559

W1=   -.0068245274
W2=   -.1280419992
W AV.=   -.0674332633

 WELD STRAINS
IN NORTH WELD=    .003015243
IN SOUTH WELD=    .003979854
------------------
```

```
VOLTAGE READINGS

VER LOAD= 132
VER DISP=-2.42622857825

CH       VOLTS
 0    3.824900
 1    3.440000
 2    3.513400
 3    3.757200
 4    -.678560
 5    -.644880
 6    3.793100
 7    4.227500
 8    5.173100
 9     .611070
10    2.057600
11    1.443700
12    1.216500
13   15.108000
14    -.000763
15    -.001361
16     .010873
17     .005667
18    5.006500
19     .001304
20     .001884
```

```
==================================
DATA POINT: 28

FORCES
======

MOM. EAST= 51
MOM. WEST= 51
VERT LOAD=132.000 lb/ft

RAM LOADS  ,kips
-------------------
 EAST       WEST       AVERAGE
 6.554      7.351      6.953

MEMBER FORCES ,kips
-------------------
TOP CHORD, MIDSPAN: 16.199
BOT CHORD, MIDSPAN:-31.330
DIAGONAL, END:   8.584

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST          WEST        AVER.
  -2.35259     -2.42623     -2.38941

1/4 SPAN (VERT.)
----------------
     EAST          WEST        AVER.
  -1.79530     -1.90534     -1.85032

LOAD END (HOR. )
----------------
     EAST          WEST        AVER.
    .01775       -.04149      -.01187

SUP. END (HOR  )
----------------
     EAST          WEST        AVER.
    .02014        .08038       .05026

W1=   -.0023942874
W2=   -.1280419992
W AV.=   -.0652181433

 WELD STRAINS
IN NORTH WELD=   .003015243
IN SOUTH WELD=   003979854

--------------------
VOLTAGE READINGS

VER LOAD= 132
VER DISP=-2.42622857825

CH.       VOLTS
 0     3.824900
 1     3.440000
 2     3.513400
 3     3.757200
 4     -.708590
 5     -.687900
 6     3.793500
 7     4.228000
 8     5.173700
 9      .611070
10     2.057600
11     1.443700
12     1.216500
13    15.108000
14     -.000731
15     -.001281
16      .010873
17      .005667
18     5.005800
19      .001304
20      .001884
```

```
==================================
DATA POINT: 29

FORCES
======

MOM. EAST= 51
MOM. WEST= 51
VERT LOAD=132.000 lb/ft

RAM LOADS  ,kips
------------------
 EAST       WEST      AVERAGE
  6.554      7.327     6.941

MEMBER FORCEC ,kips
--------------------
TOP CHORD, MIDSPAN: 16.554
BOT CHORD, MIDSPAN:-31.537
DIAGONAL,  END:    8.503

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -2.38910   -2.44372   -2.41641

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -1.82348   -1.92127   -1.87237

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .01775    -.04129    -.01177

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .02009     .08033     .05021

W1=   -.0023385465
W2=   -.1216229977
W AV.=   -.0619807721

 WELD STRAINS
IN NORTH WELD=   .003726790
IN SOUTH WELD=   .004409800
--------------------
```

```
VOLTAGE READINGS

VER LOAD= 132
VER DISP=-2.44372489317

CH.      VOLTS
 0    3.807500
 1    3.431900
 2    3.500100
 3    3.749900
 4    -.708960
 5    -.688220
 6    3.793500
 7    4.228100
 8    5.173700
 9     .616120
10    2.057800
11    1.441500
12    1.213600
13   15.102000
14    -.000731
15    -.001277
16     .010963
17     .005710
18    5.005800
19     .001303
20     .001906
```

```
==================================
DATA POINT: 30

FORCES
======

MOM. EAST= 42.4
MOM. WEST= 42.4
VERT LOAD=165.000 lb/ft

RAM LOADS  ,kips
-------------------
 EAST       WEST      AVERAGE
  7.640      8.081     7.861

MEMBER FORCES ,kips
--------------------
TOP CHORD, MIDSPAN: 18.302
BOT CHORD, MIDSPAN:-34.076
DIAGONAL,  END:     9.478

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
  -2.60351   -2.67628   -2.63989

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
  -1.98871   -2.10224   -2.04548

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
    .01944    -.04125    -.01090

SUP  END (HOR. )
----------------
     EAST         WEST       AVER.
    .02207     .08189     .05198

W1=   -.0026224270
W2=   -.1231408952
W AV.=   -.0628816611

 WELD STRAINS
IN NORTH WELD=   .003856338
IN SOUTH WELD=   .004580498
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 165
VER DISP=-2.67627688199

CH.       VOLTS
 0    3.702800
 1    3.319000
 2    3.419800
 3    3.662100
 4    -.695830
 5    -.677370
 6    3.794400
 7    4.228200
 8    5.173800
 9     .639850
10    2.065000
11    1.420200
12    1.185500
13   15.102000
14    -.000777
15    -.001399
16     .010954
17     .005714
18    4.994100
19     .001170
20     .001774
```

```
==================================
DATA POINT  31

FORCES
======

MOM. EAST= 45.433
MOM. WEST= 45.433
VERT LOAD=165.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  8.924      9.373     9.149

MEMBER FORCES ,kips
--------------------
TOP CHORD, MIDSPAN: 21.093
BOT CHORD, MIDSPAN:-38.900
DIAGONAL,  END:   10.567

DISPLACEMENTS, (in )
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
  -2.96654    -3.02644    -2.99649

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
  -2.25002    -2.38418    -2.31710

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
    .03401      -.03081      .00160

SUP. END (HOR. )
----------------
     EAST         WEST       AVER.
    .02566       .08477      .05521

W1=     .0083510377
W2=    -.1155776317
W AV.=   -.0536132970

 WELD STRAINS
IN NORTH WELD=    .004765657
IN SOUTH WELD=    .005634977
--------------------
```

```
VOLTAGE READINGS

VER LOAD= 165
VER DISP=-3.02644398086

CH.       VOLTS
 0     3.525400
 1     3.148900
 2     3.292700
 3     3.525200
 4     -.671970
 5     -.657270
 6     3.801500
 7     4.233300
 8     5.173800
 9      .668350
10     2.085500
11     1.378400
12     1.133500
13    15.102000
14     -.000834
15     -.001614
16      .011078
17      .005825
18     4.997400
19      .001014
20      .001644
```

```
==================================
DATA POINT  32

FORCES
======

MOM. EAST= 46.04
MOM. WEST= 46.04
VERT LOAD=165.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  9.697     10.067     9.882

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 21.143
BOT CHORD, MIDSPAN:-40.007
DIAGONAL,  END:   10.779

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
  -3.00031   -3.07647   -3.03839

1 4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
  -2.27470   -2.42270   -2.34870

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
    .03442    -.03429      .00007

SUP. END (HOR. )
----------------
     EAST         WEST       AVER.
    .02716     .08823     .05770

W1=     .0072564272
W2=   -.1225241508
W AV.=   -.0576338618

 WELD STRAINS
IN NORTH WELD=    004925742
IN SOUTH WELD=   .005819530
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 165
VER DISP=-3.07646785214

CH        VOLTS
 0    3.508900
 1    3.124600
 2    3.280700
 3    3.506500
 4    -.661980
 5    -.633060
 6    3.801700
 7    4.231600
 8    5.173800
 9     .668940
10    2.085600
11    1.369000
12    1.121200
13   15.101000
14    -.000868
15    -.001729
16     .011099
17     .005844
18    4.997600
19     .000976
20     .001626
```

```
==================================
DATA POINT: 33

FORCES
======

MOM. EAST= 46.16
MOM. WEST= 46.16
VERT LOAD=165.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST       AVERAGE
  9.787     10.115      9.951

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 21.258
BOT CHORD, MIDSPAN:-40.402
DIAGONAL,  END:   10.870

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
  -3.01995    -3.09397    -3.05696

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
  -2.28847    -2.43341    -2.36094

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
    .03442     -.03429      .00007

SUP. END (HOR. )
----------------
     EAST         WEST       AVER.
    .02722      .08836      .05779

W1=    .0071991809
W2=   -.1226515735
W AV.=   -.0577261963

 WELD STRAINS
IN NORTH WELD=    005065917
IN SOUTH WELD=    005947371
--------------
```

```
--------
VOLTAGE READINGS

VER LOAD= 165
VER DISP=-3.0939659141

CH.       VOLTS
 0     3.499300
 1     3.116100
 2     3.274000
 3     3.501300
 4     -.661600
 5     -.632170
 6     3.801700
 7     4.231600
 8     5.173800
 9      .670160
10     2.086400
11     1.366200
12     1.116300
13    15.101000
14     -.000872
15     -.001737
16      .011117
17      .005857
18     4.997600
19      .000966
20      .001612
```

```
==========================
DATA POINT: 34

FORCES
======

MOM. EAST= 50.89
MOM. WEST= 50.89
VERT LOAD=198.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  9 843     10.157    10.000

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 21.387
BOT CHORD, MIDSPAN:-41.279
DIAGONAL,  END:  11.273

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -3.08960   -3.14675   -3.11817

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -2.35002   -2.47899   -2.41450

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .03416    -.03433    -.00008

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .02715     .08802     .05758

W1=    .0070153246
W2=   -.1223463526
W AV.=   -.0576655140

 WELD STRAINS
IN NORTH WELD=   .005253512
IN SOUTH WELD=   .006098395
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 198
VER DISP=-3.14674885326

CH.       VOLTS
 0    3.465200
 1    3.090400
 2    3.244000
 3    3.479100
 4    -.662090
 5    -.634550
 6    3.801500
 7    4.231500
 8    5.173700
 9     .667140
10    2.091500
11    1.359600
12    1.105800
13   15.101000
14    -.000875
15    -.001745
16     .011148
17     .005876
18    5.000700
19     .000907
20     .001566
```

```
==================================
DATA POINT: 35

FORCES
======

MOM. EAST= 50.89
MOM. WEST= 50.89
VERT LOAD=198.000 lb/ft

RAM LOADS  ,kips
-------------------
 EAST       WEST      AVERAGE
 10.298     10.640    10.469

MEMBER FORCEC ,kips
--------------------
TOP CHORD, MIDSPAN: 20.725
BOT CHORD, MIDSPAN:-41.362
DIAGONAL,  END:   11.296

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
  -3.08271   -3.13258   -3.10765

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
  -2.33548   -2.46753   -2.40150

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
    .02627    -.04756    -.01065

SUP. END (HOR. )
----------------
     EAST         WEST       AVER.
    .02862     .09662     .06262

W1=   -.0023564575
W2=   -.1441809272
W AV.=   -.0732686923

 WELD STRAINS
IN NORTH WELD=   .005270813
IN SOUTH WELD=   .006119205
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 198
VER DISP=-3.13258489002

CH.       VOLTS
 0    3.468700
 1    3.097400
 2    3.251200
 3    3.484800
 4    -.652300
 5    -.574490
 6    3.797800
 7    4.225200
 8    5.173900
 9     .661040
10    2.086000
11    1.358600
12    1.105200
13   15.101000
14    -.000895
15    -.001825
16     .011150
17     .005878
18    5.000600
19     .000907
20     .001560
```

```
==================================
DATA POINT: 36

FORCES
======

MOM. EAST= 54.89
MOM. WEST= 54.89
VERT LOAD=198.000 lb/ft

RAM LOADS  ,kips
-------------------
 EAST       WEST      AVERAGE
 11.905     12.150    12.028

MEMBER FORCES ,kips
--------------------
TOP CHORD, MIDSPAN: 24.388
BOT CHORD, MIDSPAN:-49.252
DIAGONAL,  END:   12.769

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
      EAST         WEST       AVER.
   -3.56859   -3.60985   -3.58922

1/4 SPAN (VERT.)
----------------
      EAST         WEST       AVER.
   -2.70090   -2.83500   -2.76795

LOAD END (HOR. )
----------------
      EAST         WEST       AVER.
     .03688    -.04268    -.00290

SUP. END (HOR. )
----------------
      EAST         WEST       AVER.
     .03282     .10329     .06806

W1=    .0040617756
W2=   -.1459752519
W AV.=  -.0709567382

 WELD STRAINS
IN NORTH WELD=   .007059417
IN SOUTH WELD=   .008274425
--------------------
```

```
VOLTAGE READINGS

VER LOAD= 198
VER DISP=-3.60384995276

CH.       VOLTS
 0     3.231200
 1     2.865500
 2     3.073400
 3     3.306300
 4     -.624430
 5     -.527890
 6     3.802900
 7     4.227500
 8     5.173800
 9      .693010
10     2.117900
11     1.297200
12     1.012730
13    15.100000
14     -.000966
15     -.002076
16      .011383
17      .006099
18     5.002000
19      .000673
20      .001405
```

```
==================================
DATA POINT: 37

FORCES
======

MOM. EAST= 55.86
MOM. WEST= 55.86
VERT LOAD=198.000 lb/ft

RAM LOADS  ,kips
-------------------
 EAST      WEST      AVERAGE
 12.087    12.452    12.269

MEMBER FORCEC ,kips
--------------------
TOP CHORD, MIDSPAN: 25.126
BOT CHORD, MIDSPAN:-51.207
DIAGONAL,  END:  13.101

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -3.67758   -3.74212   -3.70985

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -2.78244   -2.93213   -2.85728

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .04186    -.04101     .00043

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .03415     .10619     .07017

W1=    .0077159336
W2=   -.1471992299
W AV.=  -.0697416482

 WELD STRAINS
IN NORTH WELD=   .007454452
IN SOUTH WELD=   .008843082
--------
```

```
-------------
VOLTAGE READINGS

VER LOAD= 198
VER DISP=-3.74212324385

CH.      VOLTS
 0    3.178000
 1    2.801300
 2    3.033800
 3    3.259200
 4    -.615650
 5    -.507650
 6    3.805400
 7    4.228400
 8    5.173900
 9     .699710
10    2.124100
11    1.282200
12     .989640
13   15.100000
14    -.000974
15    -.002126
16     .011434
17      006157
18    5.002100
19     .000621
20     .001369
```

```
==================================
DATA POINT: 38

FORCES
======

MOM. EAST= 55.86
MOM. WEST= 55.86
VERT LOAD=198.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
 12.904     13.187    13.045

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 24.261
BOT CHORD, MIDSPAN:-51.506
DIAGONAL,  END:   13.124

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
  -3.67247    -3.71763    -3.69505

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
  -2.77668    -2.91401    -2.84534

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
    .03386     -.05186     -.00900

SUP. END (HOR. )
----------------
     EAST         WEST       AVER.
    .03606      .10816      .07211

W1=   -.0022037269
W2=   -.1600194842
W AV.=   -.0811116055

 WELD STRAINS
IN NORTH WELD=    007577159
IN SOUTH WELD=    .008930297
```

```
-------------------
VOLTAGE READINGS

VER LOAD= 198
VER DISP=-3.71762643058

CH.       VOLTS
 0     3.180500
 1     2.813200
 2     3.036600
 3     3.268000
 4     -.602920
 5     -.493890
 6     3.801500
 7     4.223100
 8     5.173900
 9      .691770
10     2.117100
11     1.280100
12      .986040
13    15.101000
14     -.001010
15     -.002248
16      .011450
17      .006166
18     5.002200
19      .000618
20      .001366
```

```
==================================
DATA POINT: 39

FORCES
======

MOM  EAST= 56.22
MOM  WEST= 56.22
VERT LOAD=198.000 lb/ft

RAM LOADS  ,kips
------------------
 EAST       WEST      AVERAGE
 13.245     13.326    13.285

MEMBER FORCEC ,kips
--------------------
TOP CHORD, MIDSPAN: 24.599
BOT CHORD, MIDSPAN:-52.122
DIAGONAL,  END:   13.272

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -3.68556   -3.75303   -3.71930

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -2.78799   -2.94325   -2.86562

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .03386    -.05186    -.00900

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .03642     .10851     .07247

W1=   -.0025622625
W2=   -.1603688159
W AV. =   -.0814655392

 WELD STRAINS
IN NORTH WELD=   .007686084
IN SOUTH WELD=   .009008896
      -------------
```

```
-------
VOLTAGE READINGS

VER LOAD= 198
VER DISP=-3.75303358926

CH       VOLTS
 0    3.174100
 1    2.796000
 2    3.031100
 3    3.253800
 4    -.600540
 5    -.491450
 6    3.801500
 7    4.223100
 8    5.173900
 9     .694890
10    2.119700
11    1.275000
12     .979010
13   15.100000
14    -.001025
15    -.002271
16     .011464
17     .006174
18    5.002200
19     .000592
20     .001353
```

END OF FIRST

1st T[illegible]
2nd Roll

================================
DATA POINT: 40

FORCES
======

MOM. EAST= 59.37
MOM. WEST= 59.37
VERT LOAD=231.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
12.627	12.768	12.697

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 23.808
BOT CHORD, MIDSPAN:-50.690
DIAGONAL, END: 13.099

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)

EAST	WEST	AVER.
-3.59082	-3.64311	-3.61696

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-2.72117	-2.86067	-2.79092

LOAD END (HOR.)

EAST	WEST	AVER.
.02955	-.05554	-.01300

SUP. END (HOR.)

EAST	WEST	AVER.
.03507	.10732	.07119

W1= -.0055182093
W2= -.1628640751
W AV.= -.0841911422

WELD STRAINS
IN NORTH WELD= .007652699
IN SOUTH WELD= .008888720

VOLTAGE READINGS

VER LOAD= 231
VER DISP=-3.64310671289

CH.	VOLTS
0	3.220400
1	2.849400
2	3.063600
3	3.293900
4	-.609520
5	-.499760
6	3.799400
7	4.221300
8	5.173900
9	.697480
10	2.103700
11	1.289600
12	.992160
13	15.100000
14	-.000998
15	-.002179
16	.011462
17	.006163
18	5.003200
19	.000619
20	.001372

```
==================================
DATA POINT: 41

FORCES
======

MOM. EAST= 64.34
MOM. WEST= 64.34
VERT LOAD=231.000 lb/ft

RAM LOADS  ,kips
------------------
 EAST       WEST      AVERAGE
 14.371     14.709    14.540

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 26.199
BOT CHORD, MIDSPAN:-60.816
DIAGONAL,  END:   14.879

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -4.19142   -4.22156   -4.20649

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -3.17162   -3.29727   -3.23445

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .04227    -.04756    -.00264

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .04167     .11274     .07720

W1=    .0006000554
W2=   -.1602960005
W AV.=  -.0798479725

 WELD STRAINS
IN NORTH WELD=   .009565443
IN SOUTH WELD=   012326222
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 231
VER DISP=-4.22156087508

CH.      VOLTS
 0    2.926900
 1    2.568400
 2    2.844500
 3    3.081900
 4    -.565690
 5    -.461930
 6    3.805600
 7    4.225200
 8    5.173900
 9     .742860
10    2.135400
11    1.221600
12     .862440
13   15.100000
14    -.001074
15    -.002499
16     .011699
17     .006508
18    4.999400
19     .000344
20     .001175
```

```
==================================
DATA POINT: 42

FORCES
======

MOM. EAST= 65.67
MOM. WEST= 65.67
VERT LOAD=231.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
 15.724     15.963    15.843

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 28.188
BOT CHORD, MIDSPAN:-65.671
DIAGONAL,  END:   15.347

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -4.36434   -4.36628   -4.36531

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -3.30156   -3.39680   -3.35018

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .03796    -.05657    -.00930

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .04617     .11695     .08156

W1=   -.0082024318
W2=   -.1735172132
W AV.=   -.0908598225

 WELD STRAINS
IN NORTH WELD=   .010282003
IN SOUTH WELD=   .014333398
-------------------
```

VOLTAGE READINGS

VER LOAD= 231
VER DISP=-4.36627734341

CH.	VOLTS
0	2.842400
1	2.498100
2	2.781300
3	3.032600
4	-.535860
5	-.432500
6	3.803500
7	4.220800
8	5.173900
9	.743710
10	2.134400
11	1.196000
12	.792930
13	15.100000
14	-.001134
15	-.002708
16	.011796
17	.006715
18	5.001500
19	.000276
20	.001120

```
==================================
DATA POINT: 43

FORCES
======

MOM. EAST= 66.03
MOM. WEST= 66.03
VERT LOAD=231.000 lb/ft

RAM LOADS    ,kips
------------------
 EAST       WEST      AVERAGE
 16.083     16.117    16.100

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 28.384
BOT CHORD, MIDSPAN:-67.830
DIAGONAL,  END:   15.347

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -4.42639   -4.42165   -4.42502

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -3.33918   -3.44514   -3.39216

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .03796    -.05657    -.00930

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .04650     .11725     .08187

W1=   -.0085368641
W2=   -.1735172132
W AV.=  -.0910270387

 WELD STRAINS
IN NORTH WELD=   .010282003
IN SOUTH WELD=   .014333398
-------------------
```

VOLTAGE READINGS

VER LOAD= 231
VER DISP=-4.42165249275

CH.	VOLTS
0	2.811100
1	2.471200
2	2.763000
3	3.010100
4	-.533660
5	-.430430
6	3.803500
7	4.220800
8	5.173900
9	.745660
10	2.135900
11	1.177000
12	.769970
13	15.100000
14	-.001150
15	-.002734
16	.011817
17	.006748
18	5.002400
19	.000260
20	.001108

```
==================================
DATA POINT: 44

FORCES
======

MOM. EAST= 63.61
MOM. WEST= 63.61
VERT LOAD=247.500 lb/ft

RAM LOADS  ,kips
-------------------
 EAST       WEST      AVERAGE
 13.747     13.912    13.829

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 25.436
BOT CHORD, MIDSPAN:-64.655
DIAGONAL,  END:   13.933

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST      AVER.
  -4.02690   -3.95724   -3.99207

1/4 SPAN (VERT.)
----------------
     EAST        WEST      AVER.
  -3.05073   -3.09936   -3.07505

LOAD END (HOR. )
----------------
     EAST        WEST      AVER.
    .01868    -.06906    -.02519

SUP. END (HOR. )
----------------
     EAST        WEST      AVER.
    .03969     .11252     .07610

W1=   -.0210144450
W2=   -.1815741671
W AV.=  -.1012943061

 WELD STRAINS
IN NORTH WELD=   .010114929
IN SOUTH WELD=   .014114590
                  --
```

```
------------------
VOLTAGE READINGS

VER LOAD= 247.5
VER DISP=-3.9572423184

CH.      VOLTS
 0    3.007300
 1    2.696800
 2    2.903300
 3    3.178000
 4    -.578840
 5    -.463450
 6    3.794100
 7    4.214700
 8    5.173900
 9     .724410
10    2.105800
11    1.214900
12     .793350
13   15.100000
14    -.001047
15    -.002368
16     .011775
17     .006693
18    5.001700
19     .000457
20     .001313
```

```
==================================
DATA POINT: 45

FORCES
======

MOM. EAST= 69.54
MOM. WEST= 69.54
VERT LOAD=247.500 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
 16.467     16.682    16.575

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 28.671
BOT CHORD, MIDSPAN:-78.503
DIAGONAL,  END:   15.964

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
  -4.89854    -4.60825    -4.75340

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
  -3.67111    -3.57747    -3.62429

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
    .03145     -.05837     -.01346

SUP  END (HOR. )
----------------
     EAST         WEST       AVER.
    .04798      .11839      .08318

W1=   -.0165229287
W2=   -.1767591131
W AV.=   -.0966410209

 WELD STRAINS
IN NORTH WELD=    .011045721
IN SOUTH WELD=    .018040833
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 247.5
VER DISP=-4.6082523584

CH.       VOLTS
 0     2.581400
 1     2.380600
 2     2.601600
 3     2.945900
 4     -.523860
 5     -.422470
 6     3.800400
 7     4.220000
 8     5.174000
 9      .758420
10     2.128600
11     1.091360
12      .647810
13    15.100000
14     -.001167
15     -.002628
16      .011897
17      .007094
18     5.002700
19      .000175
20      .001058
```

```
==================================
DATA POINT: 46

FORCES
======

MOM. EAST= 71
MOM. WEST= 71
VERT LOAD=247.500 lb/ft

RAM LOADS  ,kips
------------------
 EAST       WEST       AVERAGE
 17.174     17.589     17.381

MEMBER FORCEC ,kips
--------------------
TOP CHORD, MIDSPAN: 22.920
BOT CHORD, MIDSPAN:
DIAGONAL,  END:  16.331

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST          WEST        AVER.
  -6.27727     -4.89718     -5.58722

1/4 SPAN (VERT.)
----------------
     EAST          WEST        AVER.
  -4.56266     -3.77609     -4.16938

LOAD END (HOR. )
----------------
     EAST          WEST        AVER.
    .04125       -.04551      -.00213

SUP. END (HOR. )
----------------
     EAST          WEST        AVER.
    .05070        .12190       .08630

W1=   -.0094585217
W2=   -.1674115824
W AV.=   -.0884350520

 WELD STRAINS
IN NORTH WELD=    .011591816
IN SOUTH WELD=    017920075
```

```
--------------------
VOLTAGE READINGS

VER LOAD= 247.5
VER DISP=-4.89717886808

CH.       VOLTS
 0     1.907600
 1     2.240200
 2     2.167900
 3     2.849400
 4     -.505730
 5     -.397930
 6     3.805100
 7     4.226200
 8     5.173900
 9      .715010
10     2.071600
11      .923120
12      .362560
13    15.099000
14     -.001198
15     -.002978
16      .011966
17      .007081
18     5.002200
19      .000113
20      .001023
```

```
==================================
DATA POINT: 47

FORCES
======

MOM. EAST= -71 78.39
MOM. WEST= -71 78.39
VERT LOAD=247.500 lb/ft

RAM LOADS  ,kips
-------------------
 EAST       WEST       AVERAGE
 17.216     17.538     17.377

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 22.121
BOT CHORD, MIDSPAN:
DIAGONAL,  END:  16.165

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -6.40141   -4.90285   -5.65213

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -4.62508   -3.78318   -4.20413

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .04160    -.04494    -.00167

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .05070     .12191     .08631

W1=   -.0090979547
W2=   -.1668509842
W AV.=   -.0879744695

 WELD STRAINS
IN NORTH WELD=   .003427828
IN SOUTH WELD=   .017951027
               -----
```

```
--------------
VOLTAGE READINGS

VER LOAD= 247.5
VER DISP=-4.90285380229

CH.       VOLTS
 0     1.846900
 1     2.237400
 2     2.137500
 3     2.845900
 4     -.505750
 5     -.397810
 6     3.805200
 7     4.226400
 8     5.173800
 9      .708660
10     2.064000
11      .905900
12      .250030
13    15.099000
14     -.001200
15     -.002970
16      .010918
17      .007085
18     5.002800
19      .000134
20      .001046
```

```
==================================
DATA POINT: 48

FORCES
======

MOM. EAST= 63.61
MOM. WEST= 63.61
VERT LOAD=247.500 lb/ft

RAM LOADS   ,kips
-------------------
 EAST       WEST       AVERAGE
 14.262     13.854     14.058

MEMBER FORCEC ,kips
--------------------
TOP CHORD, MIDSPAN: 14.647
BOT CHORD, MIDSPAN: .
DIAGONAL,  END:   13.538

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST          WEST        AVER.
  -5.90696    -4.17864    -5.04280

1/4 SPAN (VERT.)
----------------
     EAST          WEST        AVER.
  -4.21243    -3.22861    -3.72052

LOAD END (HOR. )
----------------
     EAST          WEST        AVER.
    .01647      -.05817     -.02085

SUP. END (HOR. )
----------------
     EAST          WEST        AVER.
    .03933       .11326       07629

W1=   -.0228522686
W2=   -.1714304851
W AV.=   -.0971413769

 WELD STRAINS
IN NORTH WELD=    .013488689
IN SOUTH WELD=    .016876132
-------------------
```

```
--------
VOLTAGE READINGS

VER LOAD= 247.5
VER DISP=-4.17864007947

CH.        VOLTS
 0      2.088600
 1      2.589300
 2      2.338300
 3      3.115300
 4      -.581270
 5      -.458260
 6      3.793100
 7      4.220100
 8      5.174000
 9       .641020
10      2.000700
11       .810410
12       .124820
13     15.098000
14      -.001070
15      -.002359
16       .012212
17       .006976
18      5.003100
19       .000485
20       .001390
```

```
==================================
DATA POINT: 49

FORCES
======

MOM. EAST= 50.89
MOM. WEST= 50.89
VERT LOAD=198.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
 10.746     10.847    10.796

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 10.620
BOT CHORD, MIDSPAN:.
DIAGONAL, END:  10.909

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
  -5.26810   -3.44087   -4.35448

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
  -3.75191   -2.67607   -3.21399

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
   -.01984    -.08130    -.05057

SUP. END (HOR. )
----------------
     EAST         WEST       AVER.
    .03002     .10573     .06787

W1=   -.0498584019
W2=   -.1870330649
W AV.=   -.1184457334

 WELD STRAINS
IN NORTH WELD=   .012935928
IN SOUTH WELD=   .016169888
-------------------
```

```
---
VOLTAGE READINGS

VER LOAD= 198
VER DISP=-3.4408679627

CH.       VOLTS
 0    2.400800
 1    2.947700
 2    2.562300
 3    3.383600
 4    -.643070
 5    -.510860
 6    3.775400
 7    4.208800
 8    5.174000
 9     .612850
10    1.958800
11     .882260
12     .202200
13   15.098000
14    -.000915
15    -.001860
16     .012139
17     .006903
18    5.002300
19     .000831
20     .001739
```

```
==================================
DATA POINT: 50

FORCES
======

MOM. EAST= 50.89
MOM. WEST= 50.89
VERT LOAD=198.000 lb/ft

RAM LOADS   ,kips
-------------------
 EAST       WEST      AVERAGE
  8.156      8.297     8.226

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 13.752
BOT CHORD, MIDSPAN:
DIAGONAL,  END:   10.913

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST          WEST       AVER.
  -5.39293    -3.58805    -4.49049

1/4 SPAN (VERT.)
----------------
     EAST          WEST       AVER.
  -3.84936    -2.78872    -3.31904

LOAD END (HOR. )
----------------
     EAST          WEST       AVER.
    .03104      -.01108      .00998

SUP. END (HOR. )
----------------
     EAST          WEST       AVER.
    .02154       .09909      .06032

W1=    .0094984198
W2=   -.1101719629
W AV.=   -.0887673225

 WELD STRAINS
IN NORTH WELD=   .012770659
IN SOUTH WELD=   .016169888
-------------------
```

```
----
VOLTAGE READINGS

VER LOAD= 198
VER DISP=-3.58305185318

CH.       VOLTS
 0     2.339800
 1     2.876200
 2     2.514900
 3     3.328900
 4     -.699320
 5     -.557260
 6     3.800200
 7     4.243100
 8     5.174000
 9      .640230
10     1.986000
11      .881070
12      .200690
13    15.097000
14     -.000801
15     -.001437
16      .012118
17      .006918
18     5.002400
19      .000812
20      .001757
```

```
==================================
DATA POINT: 51

FORCES
======

MOM. EAST= 33.92
MOM. WEST= 33.92
VERT LOAD=132.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  3.908      4.817     4.363

MEMBER FORCES ,kips
-------------------
TOP CHORD, MIDSPAN:   7.610
BOT CHORD, MIDSPAN:
DIAGONAL,  END:     7.267

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
  -4.46790   -2.57663   -3.52227

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
  -3.14451   -1.98283   -2.56367

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
   -.00768    -.04319    -.02543

SUP. END (HOR. )
----------------
     EAST         WEST       AVER.
    .00936     .08819     .04877

W1=   -.0170425938
W2=   -.1101719629
W AV.=   -.0635304154

 WELD STRAINS
IN NORTH WELD=    .012770659
IN SOUTH WELD=    016169888
-------------
```

```
-------------
VOLTAGE READINGS

VER LOAD= 132
VER DISP=-2.57663109494

CH.       VOLTS
 0    2.791900
 1    3.367600
 2    2.857800
 3    3.720300
 4    -.780200
 5    -.633420
 6    3.781400
 7    4.227500
 8    5.174100
 9     .573800
10    1.944500
11     .980520
12     .310540
13   15.097000
14    -.000614
15    -.000860
16     .011997
17     .006788
18    5.002500
19     .001299
20     .002235
```

==========
DATA POINT: 52

FORCES
======

MOM. EAST= 25.44
MOM. WEST= 25.44
VERT LOAD= 66.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
1.158	1.971	1.564

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: -1.009
BOT CHORD, MIDSPAN:-91.414
DIAGONAL, END: 3.622

DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-3.47710	-1.45764	-2.46737

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-2.37952	-1.12469	-1.75211

LOAD END (HOR.)

EAST	WEST	AVER.
-.06800	-.07574	-.07187

SUP. END (HOR.)

EAST	WEST	AVER.
-.00041	.07263	.03611

W1= -.0675876427
W2= -.1483653381
W AV.= -.1079765154

WELD STRAINS
IN NORTH WELD= .010814975
IN SOUTH WELD= .013827037

VOLTAGE READINGS

VER LOAD= 66
VER DISP=-1.45764345121

CH.	VOLTS
0	3.276100
1	3.911200
2	3.229900
3	4.137000
4	-.845090
5	-.742090
6	3.752000
7	4.211600
8	5.174100
9	.479800
10	1.887000
11	1.073880
12	.409900
13	15.097000
14	-.000493
15	-.000388
16	.011869
17	.006666
18	5.003400
19	.001748
20	.002752

```
==================================
DATA POINT: 53

FORCES
======

MOM. EAST= 25.44
MOM. WEST= 25.44
VERT LOAD= 66.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  -.568      -.103      -.335

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN:   1.276
BOT CHORD, MIDSPAN:-91.365
DIAGONAL,  END:     3.539

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
  -3.54572   -1.54250   -2.54411

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
  -2.43552   -1.19166   -1.81359

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
   -.02805    -.01641    -.02223

SUP. END (HOR. )
----------------
     EAST         WEST       AVER.
   -.00771     .06170     .02699

W1=   -.0203385125
W2=   -.0781011050
W AV.=   -.0492198088

 WELD STRAINS
IN NORTH WELD=    010814975
IN SOUTH WELD=   .013797569
-----             ----
```

```
---------------
VOLTAGE READINGS

VER LOAD= 66
VER DISP=-1.54250455287

CH.       VOLTS
 0    3.242500
 1    3.869900
 2    3.202600
 3    4.104400
 4    -.893510
 5    -.818450
 6    3.771400
 7    4.240500
 8    5.174000
 9     .501220
10    1.905600
11    1.074750
12     .409970
13   15.097000
14    -.000417
15    -.000044
16     .011869
17     .006663
18    5.003400
19     .001722
20     .002800
```

==================================
DATA POINT: 54

FORCES
======

MOM. EAST= 0
MOM. WEST= 0
VERT LOAD= 0.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
-.001	-.163	-.082

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: -8.772
BOT CHORD, MIDSPAN:-80.851
DIAGONAL, END: -.125

DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)

EAST	WEST	AVER.
-2.39932	-.29687	-1.34810

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.55554	-.20025	-.87789

LOAD END (HOR.)

EAST	WEST	AVER.
-.13571	-.11340	-.12456

SUP. END (HOR.)

EAST	WEST	AVER
-.00357	.06185	.02914

W1= -.1321409260
W2= -.1752511118
W AV.= -.1536960189

WELD STRAINS
IN NORTH WELD= .009244246
IN SOUTH WELD= .012309253

VOLTAGE READINGS

VER LOAD= 0
VER DISP=-.296868741314

CH.	VOLTS
0	3.802800
1	4.475100
2	3.630700
3	4.585900
4	-.866020
5	-.817400
6	3.719000
7	4.193200
8	5.174100
9	.412850
10	1.818300
11	1.170600
12	.518290
13	15.097000
14	-.000442
15	-.000034
16	.011668
17	.006512
18	5.003800
19	.002183
20	.003310

END OF TEST
II

HALL JOISTS 8-28-84

TEST III

ACTION TAKEN	MIDSPAN MOMENT (KIP-FT)	RAM LOAD (KIPS)	DATA POINT
INITIALIZED (NO LOAD)	(Simple Supports) 0	0	1
33 lb/ft Ver. Load	12.36	0	2
66 " "	24.72	0	3
99 " "	37.09	0	4
132 " "	49.44	0	5
165	61.81	0	6
165 (Balanced)	61.81	8.70	7, 8
165	61.81	3.66	9
165	61.81	0	10
165	61.81	3.12	11
165	61.81	7.45	12
165 (Balanced)	61.81	9.3	13

HAAG JOISTS 8/28/84

TEST III

ACTION TAKEN	MIDSPAN MOMENT	RAM LOAD K	DATA POINT
132 lb/ft Ver. Load	49.44	7.4	14
132 lb/ft (Balanced)	49.44	6.73	15
99 lb/ft	37.09	4.86	16
99 lb/ft (Balanced)	37.09	4.62	17
82.5 lb/ft	30.908	4.041	18
82.5 " (Balanced)	30.908	3.33	19
Ponding load started ↓			
99 " (Balanced) (no ponding)	37.09	4.066	20
99 + (P_1 = 2 BLKS. P_2 = 2 BLKS)	±38.00	4.18	21
99 + (P_1 = 2 BLKS. P_2 = 3 BLKS)	±38.00	4.07	22
132 Uniformly distributed	49.44	5.29	23
132 (Balanced)	49.44	6.81	24
132 + (P_1 = 4 BLKS, P_2 = 5 BLKS) (Balanced)	±51.00	7.29	25

8/28/84

HAAG JOISTS
TEST III

$M_u = 74.2^{k-ft}$

ACTION TAKEN	BENDING MOMENT	RAM LOAD	DATA POINTS
132 + ($P_1 = 5^{blks}$, $P_2 = 6^{blks}$) (Balanced)	±51	7.46	26
132 + ($P_1 = 5$, $P_2 = 7$) (Equilibrium of ponding) (Balanced)	±51	7.55	27, 28
same as above (after 1:00 hour stop) (Balanced)	±51	6.91	29
165 (no ponding)	42.4	7.86	30
165 + ($P_1 = 7$, $P_2 = 9$)	45.433	9.149	31
165 + ($P_1 = 8$, $P_2 = 11$)	46.04	9.88	32
165 + ($P_1 = 9$, $P_2 = 11$)	46.16	9.95	33
198	50.89	10.00	34
198 (BALANCED)	50.89	10.47	35
198 + ($P_1 = 9$, $P_2 = 12$)	54.89	12.03	36
198 + ($P_1 = 11$, $P_2 = 15$)	55.86	12.27	37
198 + ($P_1 = 11$, $P_2 = 15$) BAL	55.86	13.05	38

HAAG JOISTS
TEST III

8-28-84

$M_u = 74.2^{K'}$

ACTION TAKEN	BENDING MOMENT	RAM LOAD	DATA POINT
198 + (P_1=12, P_2=16)	56.22	13.29	39
231 (BALANCED)	59.37	12.70	40
231 + (P_1=11, P_2=15)	64.34	14.54	41
231 + (P_1=14, P_2=19) BALANCED	65.67	15.84	42
231 + (P_1=15, P_2=20)	66.03	16.10	43
247.5 (BALANCED)	63.61	13.83	44
247.5 + (P_1=13, P_2=18)	69.54	16.58	45
247.5 + (P_1=17, P_2=22)	71.00	17.38	46
247.5 + (P_1=17, P_2=22) YIELDING	78.39	17.38	47
247.5 (BALANCED)	63.61	14.06	48
198	50.89	10.80	49
1.8 BALANCED	50.89	8.23	50
132 BALANCED	33.92	4.36	51

HAAG JOISTS 8-28-84

TEST III

$M_U = 74.2$ K'

ACTION TAKEN	BENDING MOMENT	RAM LOAD	DATA POINT
66	25.44	1.56	52
66 BALANCED	25.44	0.	53
0 UNLOADED	0.	0.	54

APPENDIX E

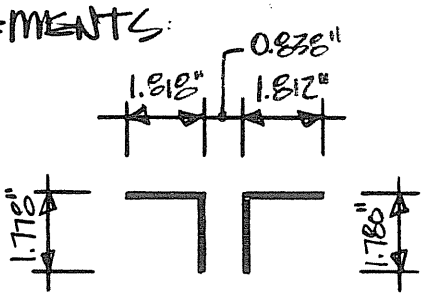
RESULTS FROM TEST IV

PROJECT HAAG JOISTS

TEST IV

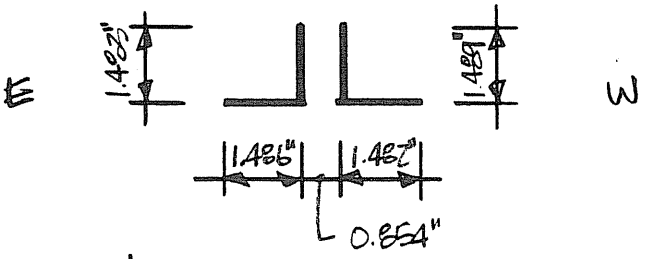
TEST JOIST B19

MEASUREMENTS:

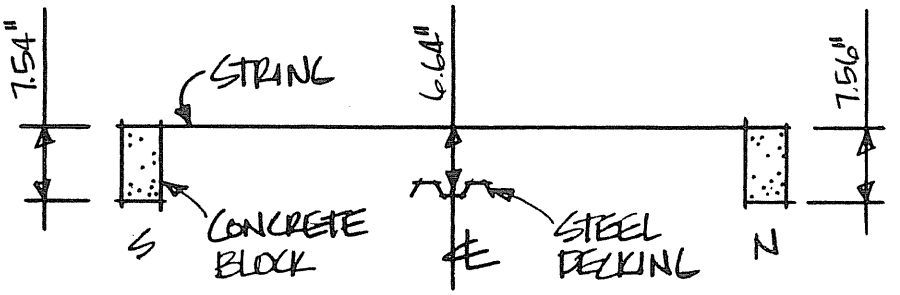


t=0.187" t=0.186"

t=0.192" t=0.195"



+ SOUTH END DIAGONAL = 0.932"



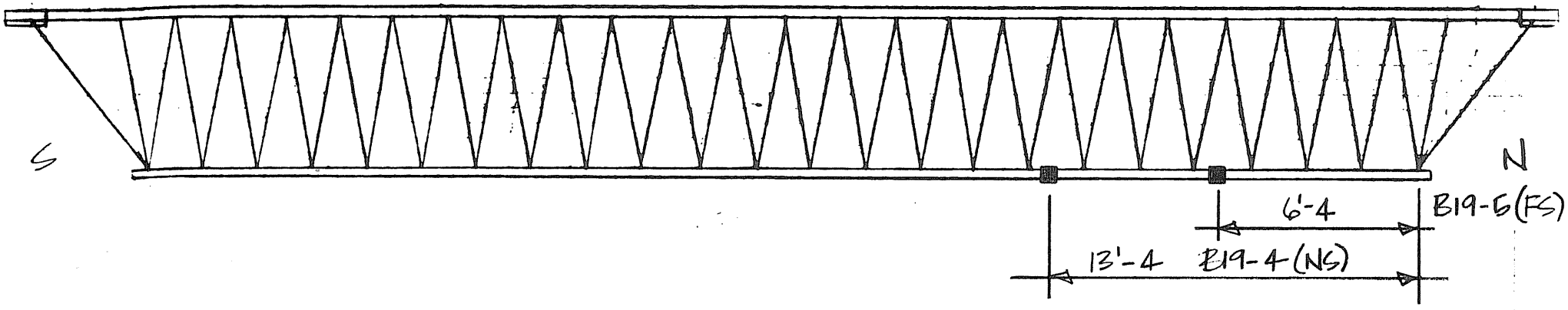
WT. CONCRETE BLOCK = 33 LB ±

WT STEEL DECKING (1 SHEET) = 78.5 LB ±

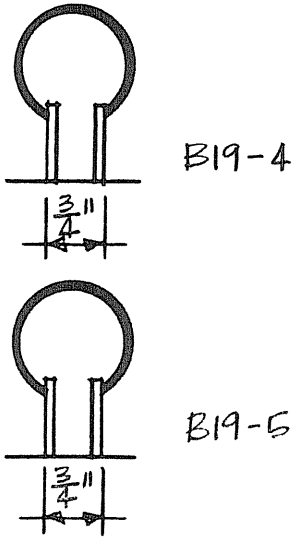
DATE 8-21-84

BY LEL/SJM

LOWER CHORD BUTT WELD LOCATIONS:



CLIP GAGES:



PROJECT HAAG JOISTS

TEST IV

TEST JOIST B19

E.2

DATE 8-21-84

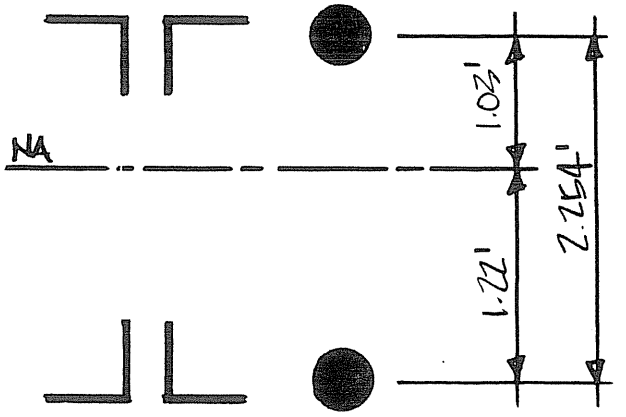
BY SJM

PROJECT HAAG JOISTS

TEST IV

TEST JOIST B19

CALCULATED QUANTITIES:

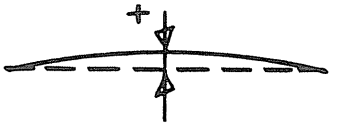


$A_{\text{TOP CHORD}} = 1.271$ in²

$A_{\text{BOT CHORD}} = 1.075$ in²

$A_{\text{SOUTH END DIAGONAL}} = 0.682$ in²

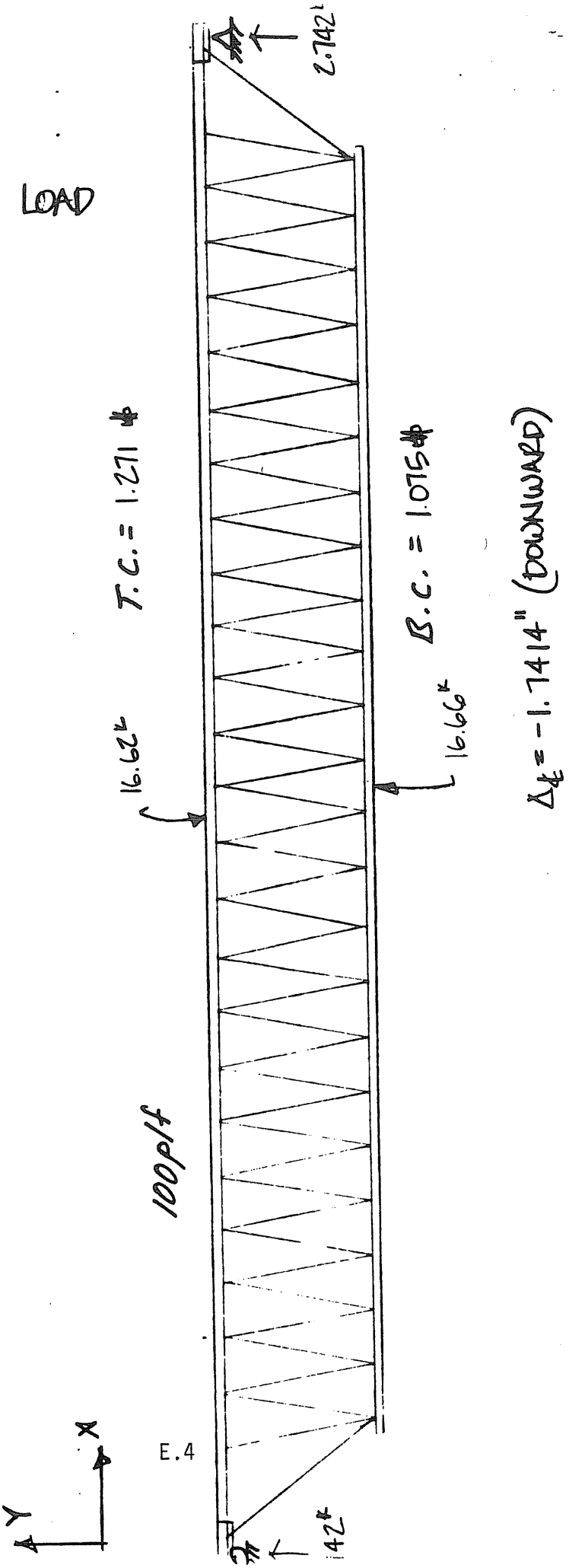
CAMBER = +0.87"



DATE 8-21-84

BY SJM

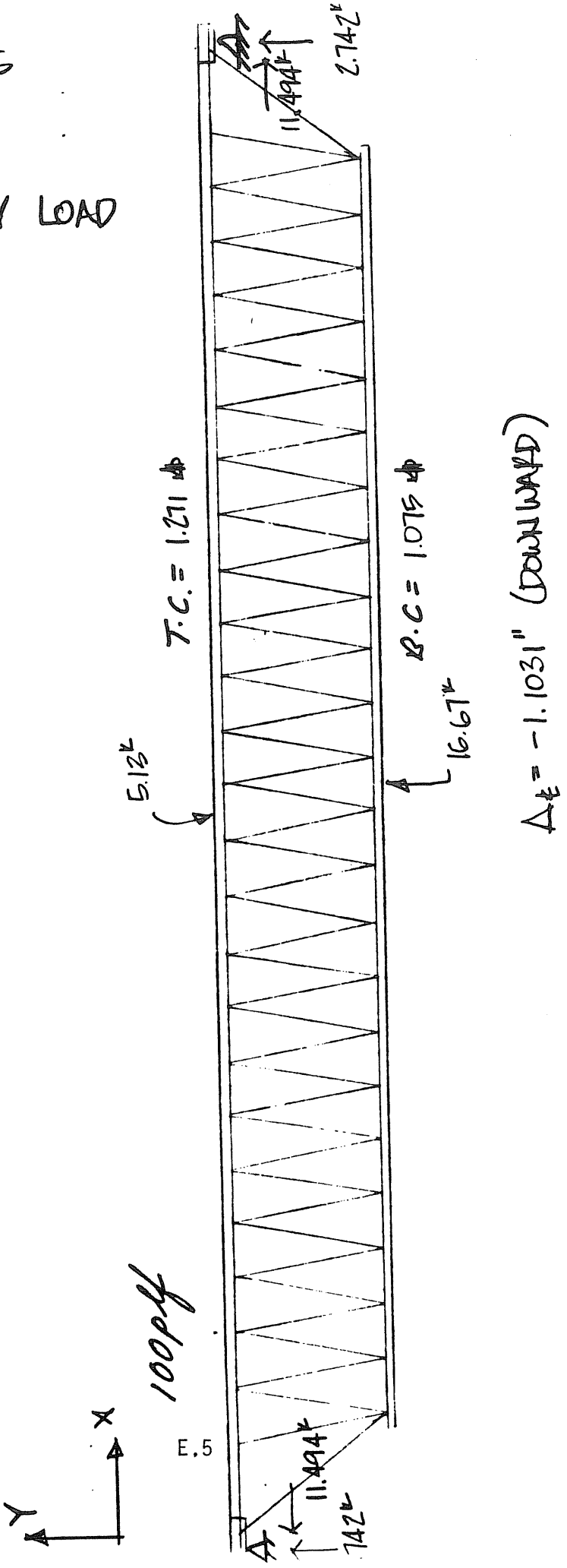
HAAG JOISTS
TEST IV
ROLLER-PIN
UNIFORM -Y LOAD



E.4

8-21-84 (TUE)
SJM

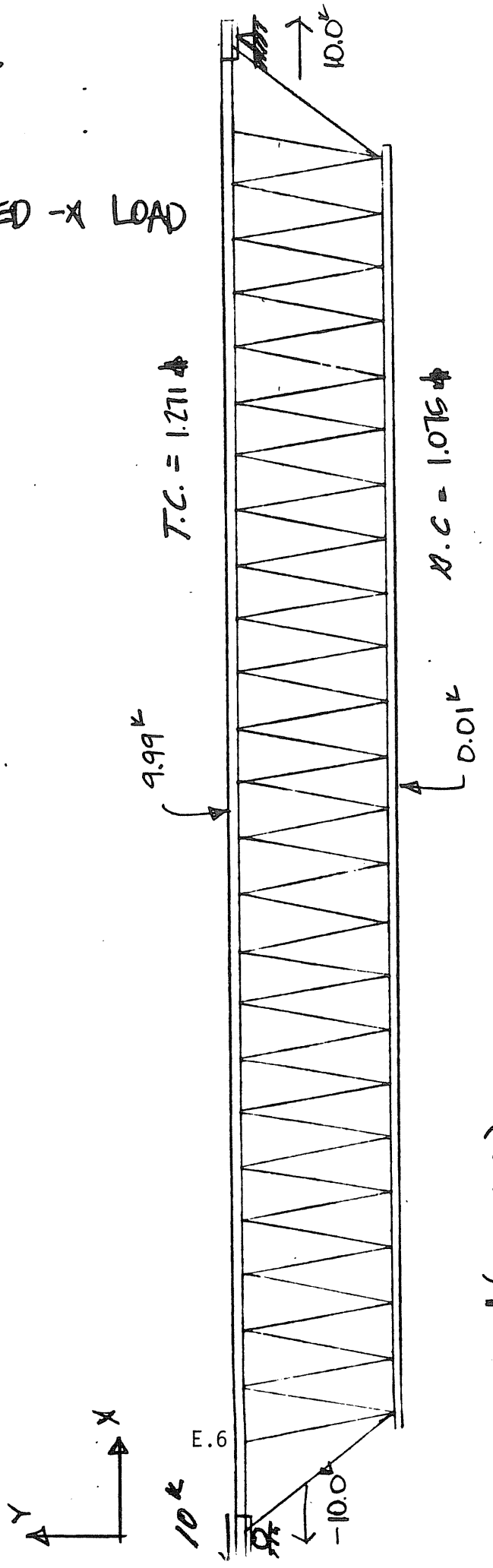
HAAL JOISTS
TEST III
PIN-PIN
UNIFORM -Y LOAD



$\Delta_{\frac{1}{4}} = -1.1031"$ (DOWNWARD)

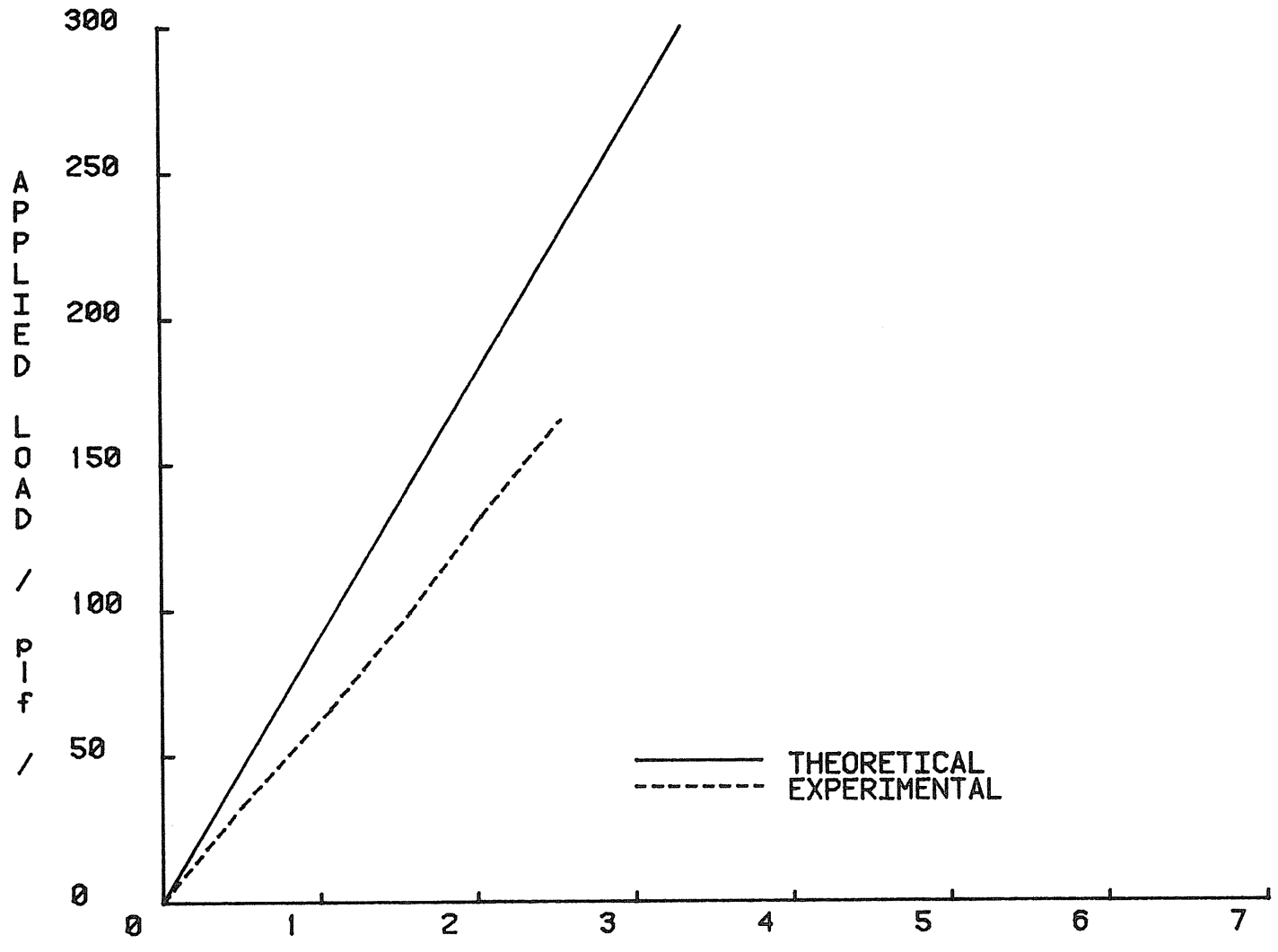
8-21-84 (TUE)
SJM

HAAG JOISTS
TEST IV
ROLLER-PIN
CONCENTRATED -X LOAD

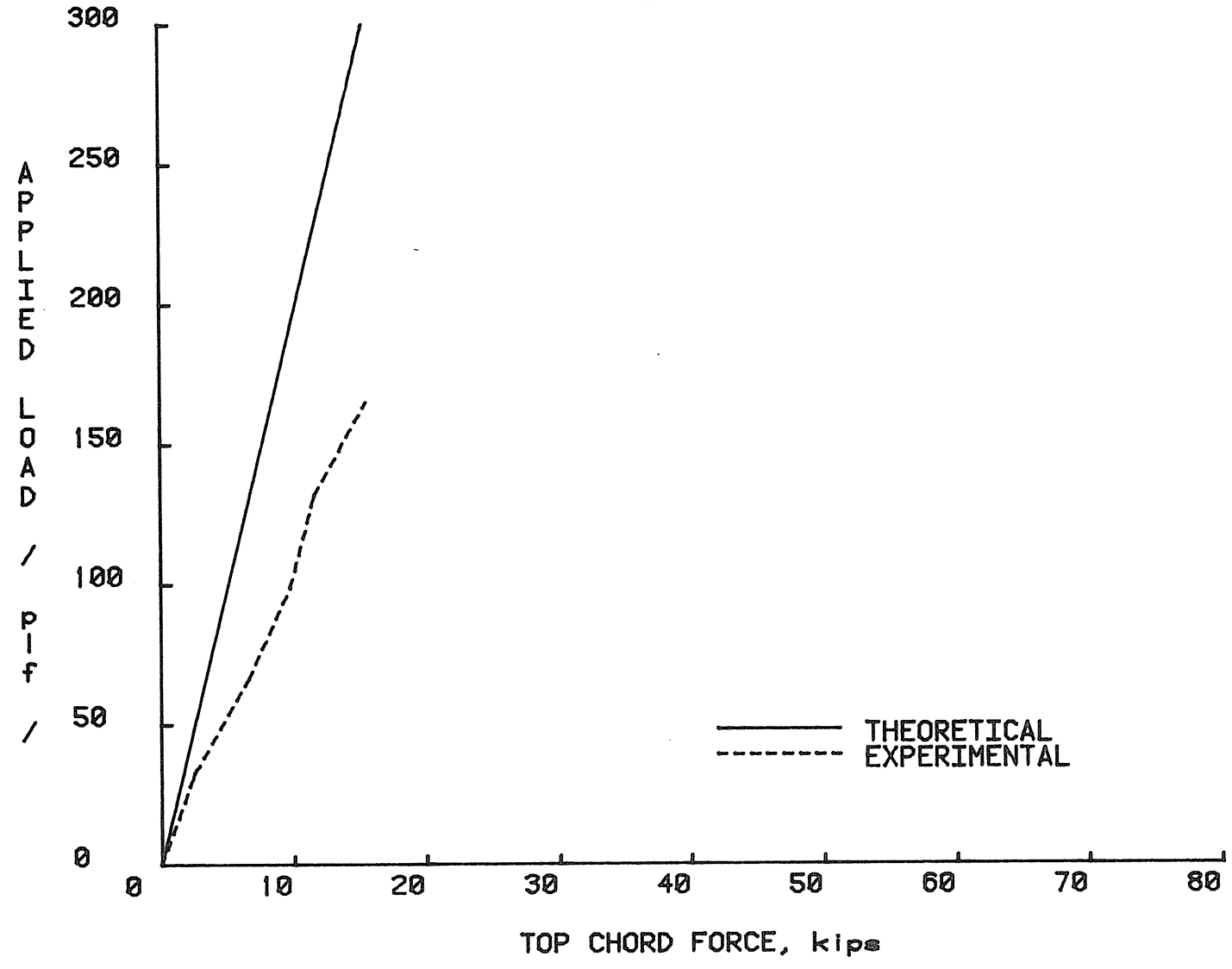


$\Delta_{roller} = -0.1784"$ (LEFT UNLD)

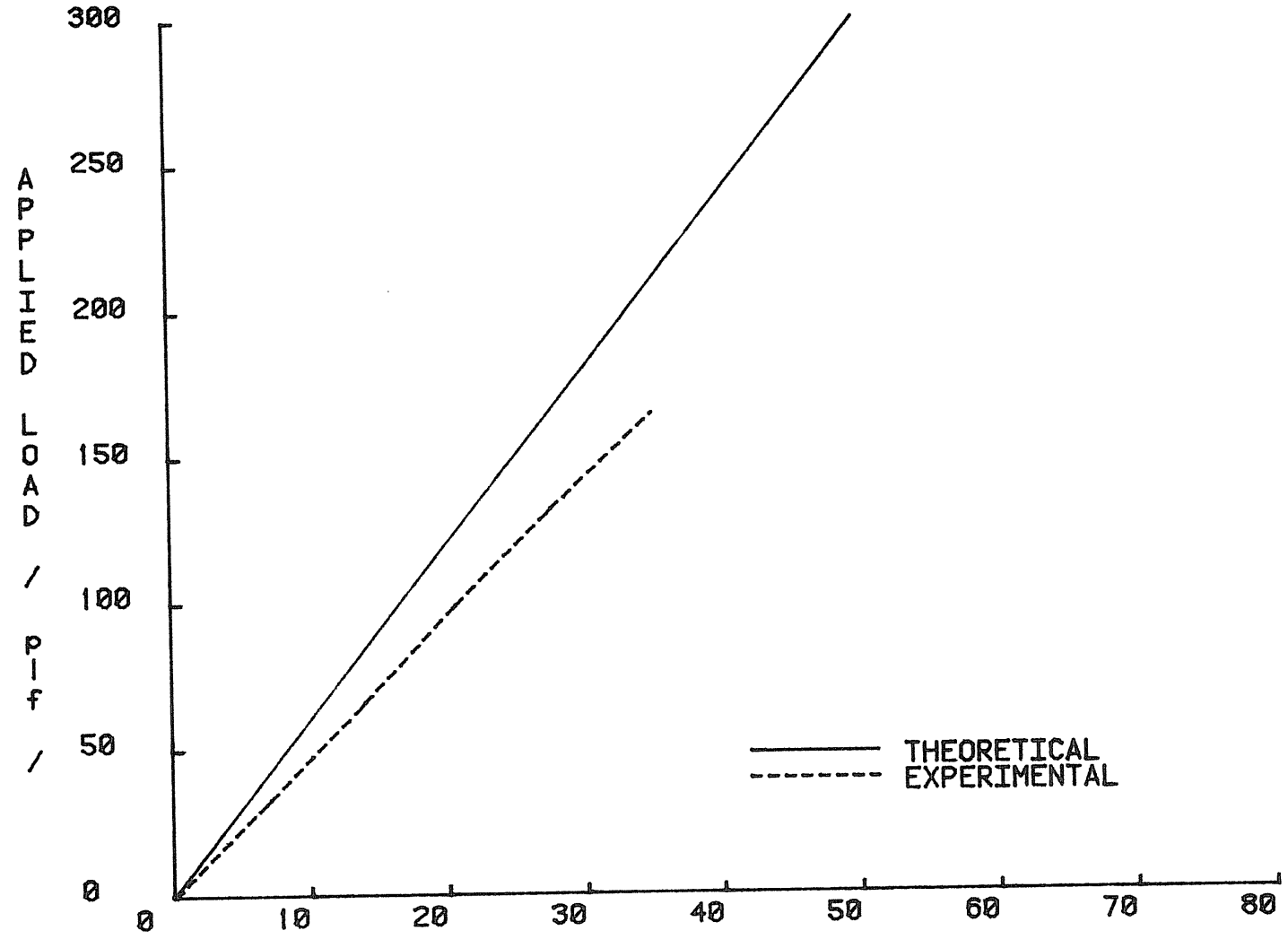
8-21-84 (TUE.)
SJM



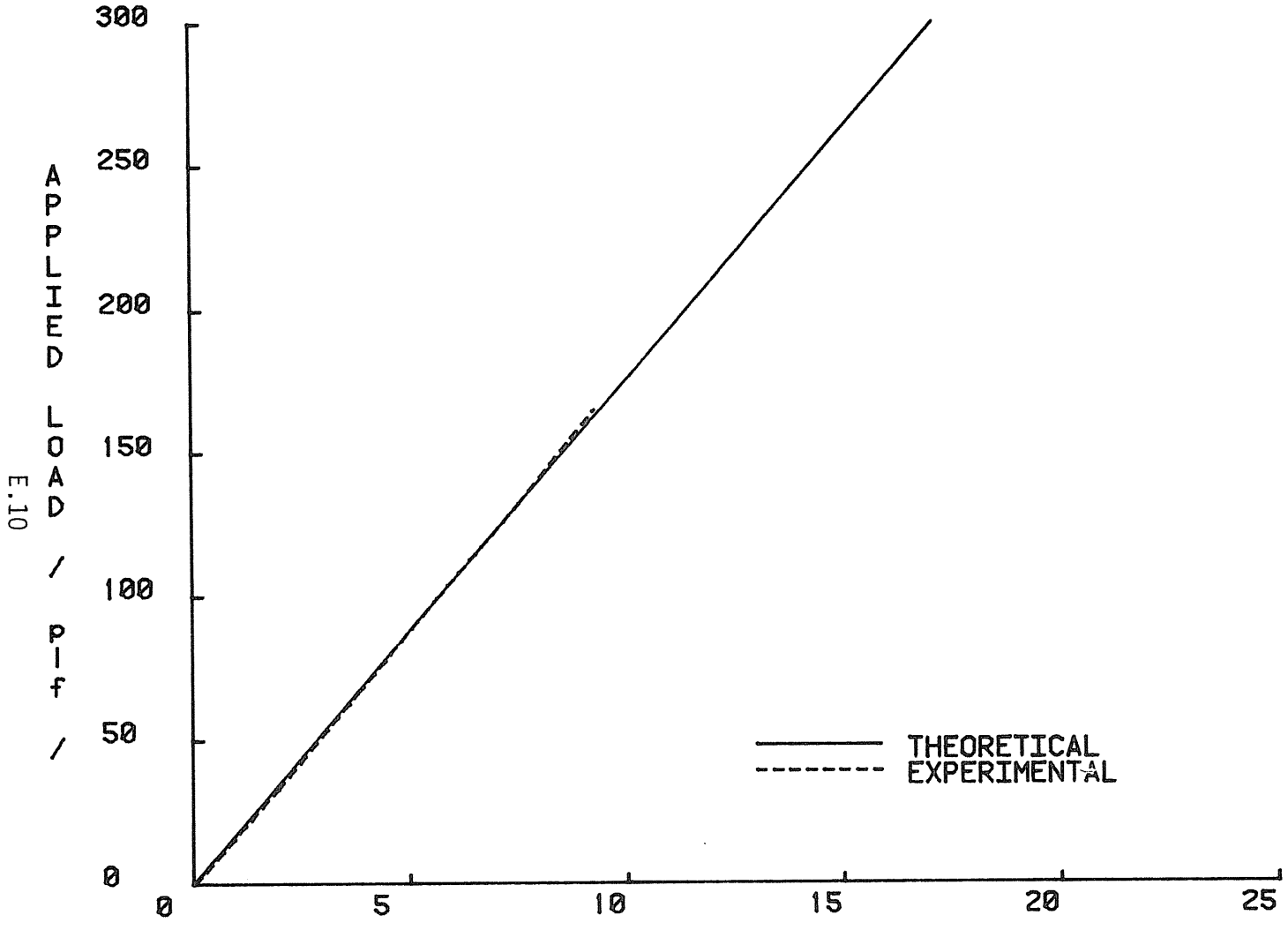
APPLIED LOAD VS CENTERLINE VERTICAL DEFLECTION, TEST 4



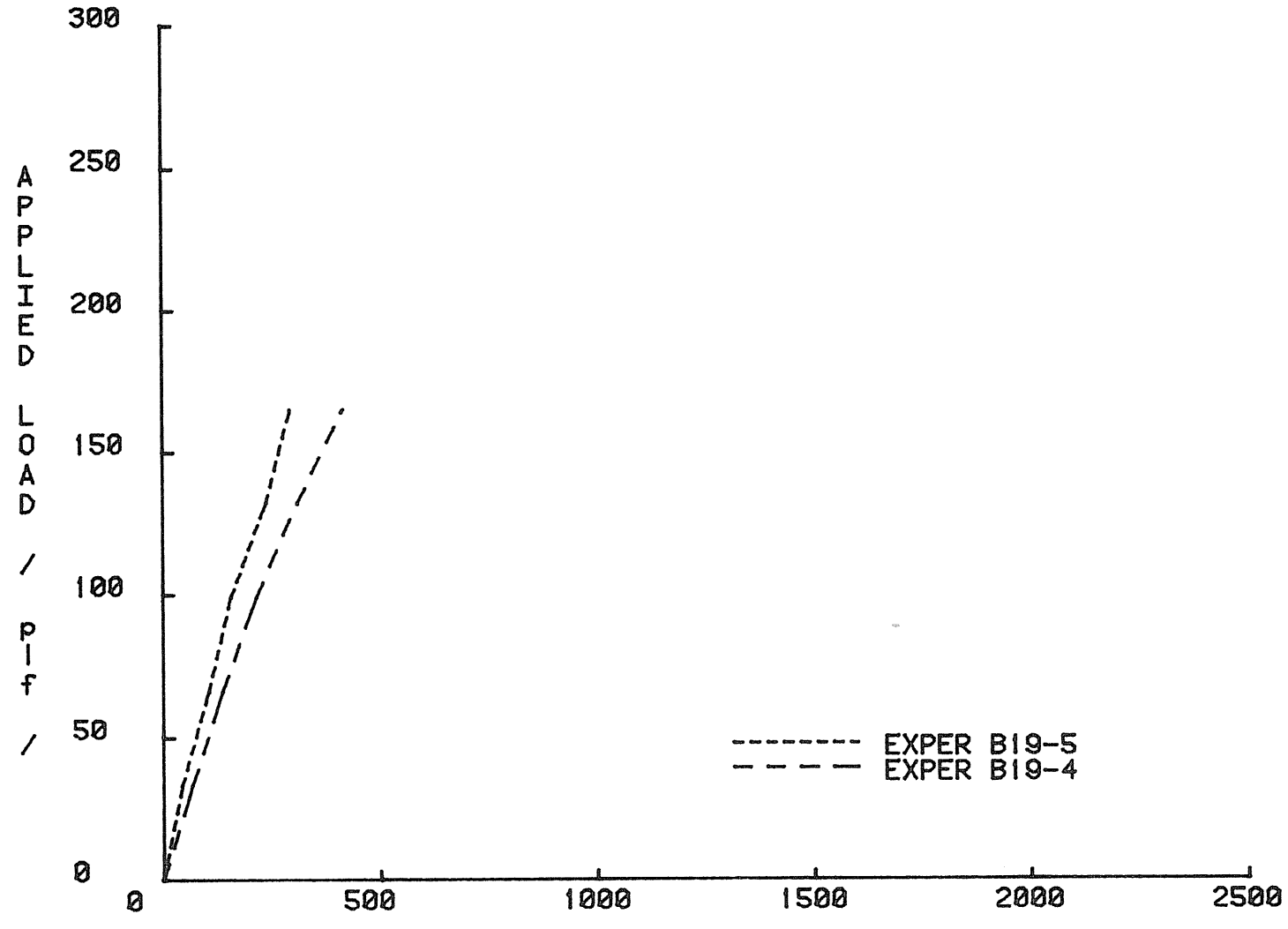
APPLIED LOAD VS TOP CHORD FORCE, TEST 4



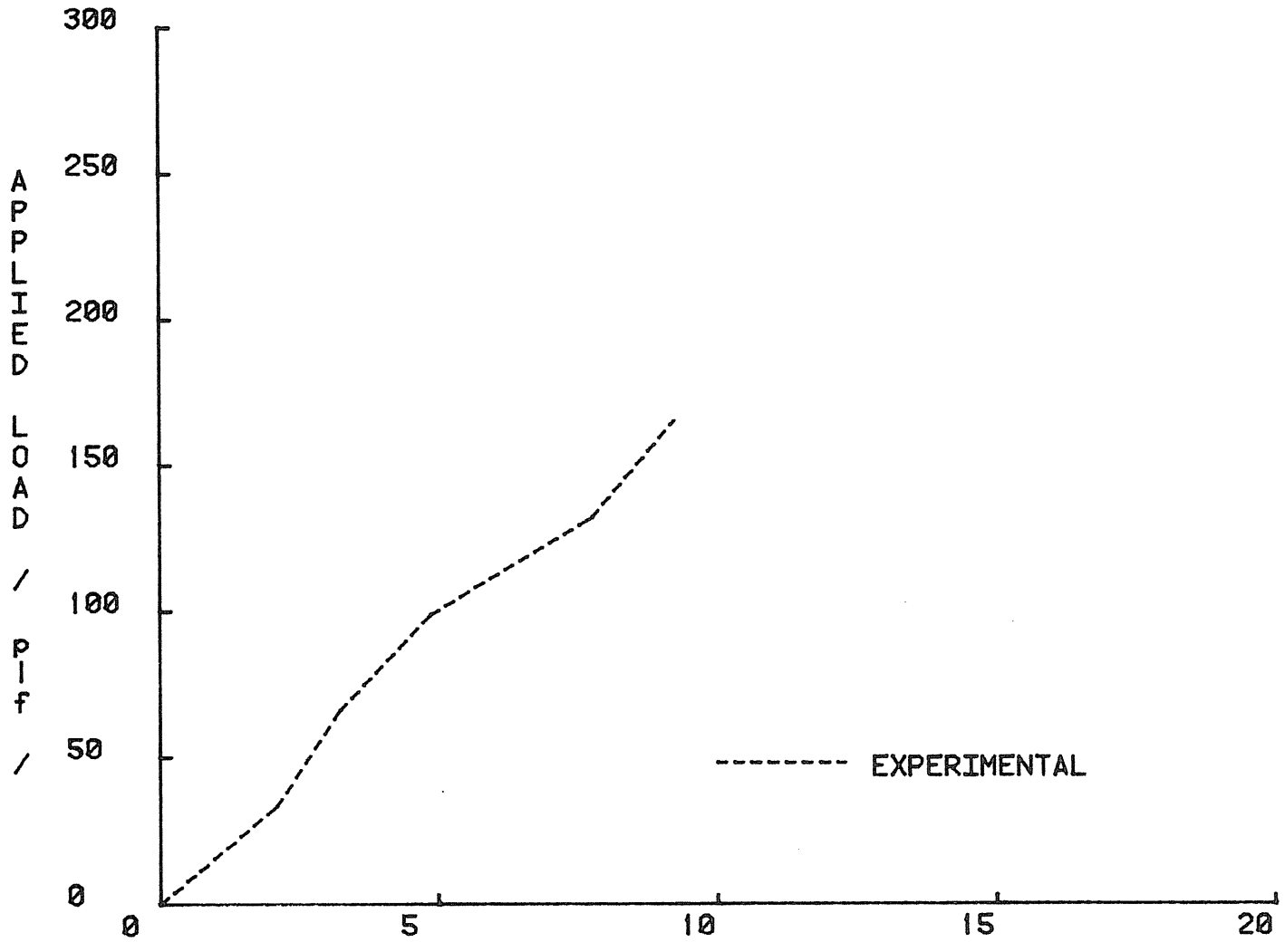
APPLIED LOAD VS BOTTOM CHORD FORCE, TEST 4



APPLIED LOAD VS END DIAGONAL FORCE, TEST 4



APPLIED LOAD VS WELD STRAIN, TEST 4



APPLIED LOAD VS RAM LOAD, TEST 4

HAAG JOISTS
TEST IV
8-21-84

TEST:
TEST IV (8/21/84)
Project Name: HAAG JOISTS
Conducted by: AAA

I=0
CHANNEL NUMBER:0
CALIBRATION FACTOR: .09445
INSTRUMENT:VER CENTER EAST

I=1
CHANNEL NUMBER:1
CALIBRATION FACTOR: .09389
INSTRUMENT:VER CENTER WEST

I=2
CHANNEL NUMBER:2
CALIBRATION FACTOR: .09385
INSTRUMENT:VER 1/4 PT EAST

I=3
CHANNEL NUMBER:3
CALIBRATION FACTOR: .09401
INSTRUMENT:VER 1/4 PT WEST

I=4
CHANNEL NUMBER:5
CALIBRATION FACTOR: 1.283
INSTRUMENT:HOR. NE END

I=5
CHANNEL NUMBER:6
CALIBRATION FACTOR: 1.35
INSTRUMENT:HOR. NW END

I=6
CHANNEL NUMBER:7
CALIBRATION FACTOR: .0942
INSTRUMENT:HOR. SE END

I=7
CHANNEL NUMBER:8
CALIBRATION FACTOR: .09441
INSTRUMENT:HOR. SW END

I=8
CHANNEL NUMBER:4
CALIBRATION FACTOR: 1
INSTRUMENT:EXCIT.

I=9
CHANNEL NUMBER:10
CALIBRATION FACTOR: 1.283
INSTRUMENT:TOP CHORD AXIAL EAST

I=10
CHANNEL NUMBER:11
CALIBRATION FACTOR: 1.3
INSTRUMENT:TOP CHORD AXIAL WEST

I=11
CHANNEL NUMBER:12
CALIBRATION FACTOR: 1.25
INSTRUMENT:BOT CHORD AXIAL EAST

I=12
CHANNEL NUMBER:13
CALIBRATION FACTOR: 1.35
INSTRUMENT:BOT CHORD AXIAL WEST

I=13
CHANNEL NUMBER:19
CALIBRATION FACTOR: 1
INSTRUMENT:EXCIT.

I=14
CHANNEL NUMBER:20
CALIBRATION FACTOR: 1
INSTRUMENT:BUDD BOX READINGS

I=15
CHANNEL NUMBER:21
CALIBRATION FACTOR: -26388
INSTRUMENT:LOAD CELL WEST

I=16
CHANNEL NUMBER:24
CALIBRATION FACTOR: .031624
INSTRUMENT:WELD CLIP GAGE NORTH

I=17
CHANNEL NUMBER:25
CALIBRATION FACTOR: .02713
INSTRUMENT:WELD CLIP GAGE SOUTH

I=18
CHANNEL NUMBER:30
CALIBRATION FACTOR: 1
INSTRUMENT:EXCIT.

I=19
CHANNEL NUMBER:22
BRIDGE SIZE:.5
GAGE FACTOR:2.11
LOCATION:GAGE ON END DIAG. OF EA
ST JOIST

I=20
CHANNEL NUMBER:23
BRIDGE SIZE:.5
GAGE FACTOR:2.11
LOCATION:GAGE ON END DIAG. OF EA
ST JOIST

HAAG JOISTS
TEST III
8-21-84

```
==================================
DATA POINT: 1                    '

FORCES
======

VERT LOAD=  0.000 lb/ft

RAM LOADS    ,kips
--------------------
 EAST       WEST       AVERAGE
  0.000       .024       .012

MEMBER FORCES ,kips
--------------------
TOP CHORD, MIDSPAN:   -.000
BOT CHORD, MIDSPAN:   -.113
DIAGONAL,  END:        .049
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
    .00038      .00054      .00046

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
    .00066      .00057      .00062

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
    .00048      .00060      .00054

SUP. END (HOR. )
----------------
     EAST         WEST       AVER.
   -.00002     -.00006     -.00004

W1=
 4.99689338027E-4
W2=
 6.6330425051E-4
W AV.=
 5.8149679427E-4

 WELD STRAINS
STRAIN IN NORTH WELD=8.428705569
61E-5
STRAIN IN SOUTH WELD=0
```

Disregard these values throughout the test

```
--------------------
VOLTAGE READINGS

VER LOAD=                    0
VER DISP=
 5.36312109916E-4

CH.       VOLT
 0      7.145900
 1     11.432300
 2     12.337000
 3     10.749300
 4     -4.697400
 5      1.692700
 6      9.023200
 7     11.299100
 8     14.107000
 9      1.350000
10      1.513000
11      1.550900
12       .153940
13     14.163000
14      8.767800
15      -.000068
16       .002781
17       .010258
18      5.002200
19       .003622
20       .002049
```

```
==================================
DATA POINT: 2

,ORCES
======

VERT LOAD= 33.000 lb/ft

RAM LOADS   ,kips
-------------------
 EAST       WEST      AVERAGE
   .100       .301      .151

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN:   4.447
BOT CHORD, MIDSPAN: -6.985
DIAGONAL,  END:    1.787
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
   -.56694    -.60067    -.58380

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
   -.43909    -.45577    -.44743

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
    .04744     .04505     .04624

SUP. END (HOR. )
----------------
     EAST         WEST       AVER.
   -.00029     .00041     .00006

W1=
 4.77328004335E-2
W2=
 .044640446979
W AV.=
 4.61866237063E-2

 WELD STRAINS
STRAIN IN NORTH WELD=-4.20976780
884E-4
STRAIN IN SOUTH WELD=8.371475478
56E-4
```

```
--------------------
VOLTAGE READINGS

VER LOAD=                33
VER DISP=
-.600668863042

CH.       VOLT
 0      6.390000
 1     10.636000
 2     11.754800
 3     10.144100
 4     -4.702400
 5      1.701700
 6      9.085600
 7     11.358300
 8     14.107000
 9      1.385800
10      1.547000
11      1.475800
12       .099238
13     14.163000
14      8.757700
15      -.000114
16       .002721
17       .010343
18      5.002100
19       .003453
20       .001754
```

```
==================================
DATA POINT: 3

FORCES
======

VERT LOAD= 33.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  2.000      3.015    1.557

MEMBER FORCEC ,kips
--------------------
TOP CHORD, MIDSPAN:   1.548
BOT CHORD, MIDSPAN: -7.291
DIAGONAL,  END:    2.095
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
   -.45324     -.48251     -.46787

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
   -.33304     -.37154     -.35229

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
   -.02593     -.02080     -.02336

SUP. END (HOR. )
----------------
     EAST         WEST       AVER.
    .00970      .01273      .01121

W1=
-3.56321608471E-2
W2=
-3.35267606701E-2
W AV.=
-3.45794607586E-2

 WELD STRAINS
STRAIN IN NORTH WELD=-4.29405654
988E-4
STRAIN IN SOUTH WELD=8.174973662
61E-4
```

```
--------------------
VOLTAGE READINGS

VER LOAD=                  33
VER DISP=
- 482511623421

CH.       VOLT
 0      6.541500
 1     10.792500
 2     11.895200
 3     10.255800
 4     -4.521500
 5      1.936300
 6      8.988100
 7     11.270600
 8     14.107000
 9      1.362100
10      1.525200
11      1.472400
12       .096859
13     14.163000
14      8.760000
15      -.000564
16       .002720
17       .010341
18      5.002100
19       .003492
20       .001633
```

```
==================================
DATA POINT: 4

FORCES
======

VERT LOAD= 33.000 lb/ft

RAM LOADS   ,kips
------------------
 EAST       WEST      AVERAGE
  0.000       .169    1.084

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN:  4.904
BOT CHORD, MIDSPAN: -6.915
DIAGONAL,  END:    1.713
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST      AVER.
   -.56589    -.60588    -.58588

1/4 SPAN (VERT.)
----------------
     EAST         WEST      AVER.
   -.43969    -.45908    -.44939

LOAD END (HOR. )
----------------
     EAST         WEST      AVER.
    .04428     .04640     .04534

SUP. END (HOR. )
----------------
     EAST         WEST      AVER.
   -.00034     .00044     .00005

W1=
 4.46164433985E-2
W2=
 4.59657043998E-2
W AV.=
 4.52910738992E-2

 WELD STRAINS
STRAIN IN NORTH WELD=-4.88864923
055E-4
STRAIN IN SOUTH WELD=7.663417623
79E-4
```

```
--------------------
VOLTAGE READINGS

VER LOAD=                33
VER DISP=
-.60587835156

CH.       VOLT
 0      6.391400
 1     10.629100
 2     11.754000
 3     10.139700
 4     -4.703200
 5      1.702200
 6      9.081400
 7     11.360100
 8     14.107000
 9      1.386900
10      1.553000
11      1.477100
12       .099229
13     14.163000
14      8.755800
15      -.000092
16       .002713
17       .010336
18      5.002200
19       .003461
20       .001766
```

```
==================================
DATA POINT: 5

FORCES
======

VERT LOAD= 33.000 lb/ft

RAM LOADS  ,kips
-------------------
 EAST       WEST      AVERAGE
  2.000      2.183    ~~1.091~~

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN:  2.531
BOT CHORD, MIDSPAN: -7.138
DIAGONAL,  END:    1.968
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST      AVER.
   -.49159    -.52532    -.50845

1/4 SPAN (VERT.)
----------------
     EAST        WEST      AVER.
   -.36862    -.39884    -.38373

LOAD END (HOR. )
----------------
     EAST        WEST      AVER.
   -.01720    -.00691    -.01205

SUP. END (HOR. )
----------------
     EAST        WEST      AVER.
     .00692     .00952     .00822

W1=
-2.41183605234E-2
W2=
-1.64226880986E-2
W AV.=
-.020270524311

 WELD STRAINS
STRAIN IN NORTH WELD=-5.39437156
464E-4
STRAIN IN SOUTH WELD=7.859915512
96E-4
```

```
--------------------
VOLTAGE READINGS

VER LOAD=                  33
VER DISP=
-.525320029087

CH       VOLT
 0     6.490400
 1    10.735800
 2    11.848100
 3    10.219600
 4    -4.571900
 5     1.875100
 6     8.999700
 7    11.289100
 8    14.107000
 9     1.365100
10     1.537500
11     1.474000
12      .098148
13    14.163000
14     8.759700
15     -.000426
16      .002707
17      .010338
18     5.002200
19      .003490
20      .001669
```

==========

DATA POINT: 6

FORCES
======

VERT LOAD= 66.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
3.200	3.340	~~3.270~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 6.671
BOT CHORD, MIDSPAN:-13.980
DIAGONAL, END: 3.835
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-1.02671	-1.06182	-1.04427

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-.77029	-.80511	-.78770

LOAD END (HOR.)

EAST	WEST	AVER.
.00786	.01547	.01166

SUP. END (HOR.)

EAST	WEST	AVER.
.01079	.01386	.01233

W1=
-2.93273519712E-3
W2=
1.6046172004E-3
W AV.=
-6.6405899836E-4

WELD STRAINS
STRAIN IN NORTH WELD=-1.04515949
064E-3
STRAIN IN SOUTH WELD=1.699706730
07E-3

VOLTAGE READINGS

VER LOAD= 66
VER DISP=
-1.06182184682

CH.	VOLT
0	5.777400
1	10.025200
2	11.316300
3	9.680800
4	-4.501800
5	1.957900
6	9.033000
7	11.318900
8	14.107000
9	1.407100
10	1.560700
11	1.402100
12	.040628
13	14.163000
14	8.755100
15	-.000618
16	.002647
17	.010431
18	5.002200
19	.003293
20	.001368

==========
DATA POINT: 7

FORCES
======

VERT LOAD= 66.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
7.600	7.320	~~5.260~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 2.221
BOT CHORD, MIDSPAN:-14.343
DIAGONAL, END: 4.221
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-.84088	-.89406	-.86747

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-.62301	-.68371	-.65336

LOAD END (HOR.)

EAST	WEST	AVER.
-.09253	-.09100	-.09177

SUP. END (HOR.)

EAST	WEST	AVER.
.02481	.02664	.02572

W1=
-.117335198782
W2=
-.117639854362
W AV.=
-.117487526572

WELD STRAINS
STRAIN IN NORTH WELD=-1.12900220
305E-3
STRAIN IN SOUTH WELD=1.672280266
87E-3

VOLTAGE READINGS

VER LOAD= 66
VER DISP=
-.894061216509

CH.	VOLT
0	6.025000
1	10.247400
2	11.511300
3	9.641806
4	-4.248100
5	2.201200
6	8.899600
7	11.177100
8	14.107000
9	1.365500
10	1.532300
11	1.398500
12	.037337
13	14.163000
14	8.757200
15	-.001278
16	.002637
17	.010428
18	5.002100
19	.003324
20	.001234

==========
DATA POINT: 8

FORCES
======

VERT LOAD= 66.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
3.200	3.268	~~3.434~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 6.610
BOT CHORD, MIDSPAN:-14.054
DIAGONAL, END: 3.819
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-1.04141	-1.10115	-1.07128

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-.77686	-.83921	-.80804

LOAD END (HOR.)

EAST	WEST	AVER.
.01285	.01772	.01529

SUP. END (HOR.)

EAST	WEST	AVER.
.01045	.01298	.01171

W1=
2.4081870504E-3
W2=
4.7392414445E-3
W AV.=
3.57371424745E-3

WELD STRAINS
STRAIN IN NORTH WELD=-1.31355610
73E-3
STRAIN IN SOUTH WELD=1.597773082
69E-3

VOLTAGE READINGS

VER LOAD= 66
VER DISP=
-1.10115200416

CH.	VOLT
0	5.757400
1	9.972400
2	11.306800
3	9.634900
4	-4.507700
5	1.941000
6	9.039000
7	11.321100
8	14.106000
9	1.401400
10	1.565100
11	1.400700
12	.040565
13	14.162000
14	8.755500
15	-.000606
16	.002615
17	.010420
18	5.001900
19	.003301
20	.001364

Balanced

==========
DATA POINT: 9

FORCES
======

VERT LOAD= 99.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
4.680	4.716	~~3.958~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 9.976
BOT CHORD, MIDSPAN:-20.662
DIAGONAL, END: 5.644
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-1.52643	-1.62448	-1.57546

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.15221	-1.22688	-1.18955

LOAD END (HOR.)

EAST	WEST	AVER.
.01692	.03026	.02359

SUP. END (HOR.)

EAST	WEST	AVER.
.01487	.01823	.01655

W1=
.002046145367
W2=
1.20279106162E-2
W AV.=
7.0370280016E-3

WELD STRAINS
STRAIN IN NORTH WELD=-1.83530669
707E-3
STRAIN IN SOUTH WELD=2.574628730
8E-3

VOLTAGE READINGS

VER LOAD= 99
VER DISP=
-1.62447844795

CH.	VOLT
0	5.111200
1	9.279300
2	10.809900
3	9.120800
4	-4.427600
5	2.041000
6	9.044400
7	11.337800
8	14.106000
9	1.427500
10	1.591800
11	1.333100
12	-.016972
13	14.162000
14	8.757100
15	-.000846
16	.002553
17	.010519
18	5.001700
19	.003108
20	.001070

==========
DATA POINT: 10

FORCES
======

VERT LOAD= 99.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
4.880	4.861	~~4.770~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 9.778
BOT CHORD, MIDSPAN:-20.681
DIAGONAL, END: 5.652
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-1.52651	-1.62448	-1.57549

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.15327	-1.22688	-1.19008

LOAD END (HOR.)

EAST	WEST	AVER.
.01699	.03101	.02400

SUP. END (HOR.)

EAST	WEST	AVER.
.01527	.01872	.01699

W1=
1.7235680368E-3
W2=
1.22956891234E-2
W AV.=
7.0096285801E-3

WELD STRAINS
STRAIN IN NORTH WELD=-1.96132217
236E-3
STRAIN IN SOUTH WELD=2.507912726
37E-3

VOLTAGE READINGS

VER LOAD= 99
VER DISP=
-1.62447844795

CH.	VOLT
0	5.111100
1	9.279300
2	10.808500
3	9.120800
4	-4.420400
5	2.050200
6	9.044500
7	11.338800
8	14.106000
9	1.426300
10	1.589900
11	1.332700
12	-.016913
13	14.162000
14	8.753300
15	-.000870
16	.002538
17	.010512
18	5.001600
19	.003108
20	.001068

==========
DATA POINT: 11

FORCES
======

VERT LOAD=132.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
6.480	6.277	~~5.579~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 13.129
BOT CHORD, MIDSPAN:-27.400
DIAGONAL, END: 7.411
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-2.02661	-2.11858	-2.07259

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.53093	-1.60626	-1.56859

LOAD END (HOR.)

EAST	WEST	AVER.
.02914	.04423	.03669

SUP. END (HOR.)

EAST	WEST	AVER.
.02058	.02225	.02141

W1=
8.5621335336E-3
W2=
2.19837510395E-2
W AV.=
1.52729422866E-2

WELD STRAINS
STRAIN IN NORTH WELD=-2.67867491
724E-3
STRAIN IN SOUTH WELD=3.604258717
29E-3

VOLTAGE READINGS

VER LOAD= 132
VER DISP=
-2.11857575026

CH.	VOLT
0	4.444500
1	8.624300
2	10.307800
3	8.617100
4	-4.324000
5	2.117300
6	9.060000
7	11.355600
8	14.105000
9	1.453800
10	1.615000
11	1.262000
12	-.073290
13	14.162000
14	8.753200
15	-.001105
16	.002453
17	.010624
18	5.001800
19	.002906
20	.000801

==========

DATA POINT: 12

FORCES
======

VERT LOAD=132.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
6.990	6.742	~~6.841~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 12.635
BOT CHORD, MIDSPAN:-27.555
DIAGONAL, END: 7.475
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-2.03067	-2.10733	-2.06900

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.52491	-1.60770	-1.56630

LOAD END (HOR.)

EAST	WEST	AVER.
.02888	.03875	.03382

SUP. END (HOR.)

EAST	WEST	AVER.
.02207	.02285	.02246

W1=
6.677960829E-3
W2=
1.58971577221E-2
W AV.=
1.13574769025E-2

WELD STRAINS
STRAIN IN NORTH WELD=-2.82238489
421E-3
STRAIN IN SOUTH WELD=3.700426586
56E-3

VOLTAGE READINGS

VER LOAD= 132
VER DISP=
-2.10733411207

CH.	VOLT
0	4.439400
1	8.639800
2	10.316500
3	8.615800
4	-4.297400
5	2.128900
6	9.060300
7	11.349100
8	14.106000
9	1.448100
10	1.612900
11	1.259500
12	-.073676
13	14.162000
14	8.752300
15	-.001182
16	.002436
17	.010634
18	5.001900
19	.002906
20	.000784

==========
DATA POINT: 13

FORCES
======

VERT LOAD=132.000 lb/ft

RAM LOADS ,kips

EAST 7.890 | WEST 7.622 | AVERAGE ~~7.756~~

MEMBER FORCES ,kips

TOP CHORD, MIDSPAN: 11.641
BOT CHORD, MIDSPAN:-27.656
DIAGONAL, END: 7.539

DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-1.99065	-2.06519	-2.02792

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.48900	-1.57526	-1.53213

LOAD END (HOR.)

EAST	WEST	AVER.
.01078	.01540	.01309

SUP. END (HOR.)

EAST	WEST	AVER.
.02472	.02441	.02457

W1=
-1.39462036906E-2
W2=
-9.0110039331E-3
W AV.=
-1.14786038119E-2

WELD STRAINS
STRAIN IN NORTH WELD=-2.97329569
783E-3
STRAIN IN SOUTH WELD=3.625997521
56E-3

VOLTAGE READINGS

VER LOAD= 132
VER DISP=
-2.06518979917

CH.	VOLT
0	4.492400
1	8.695000
2	10.363300
3	8.658200
4	-4.249000
5	2.158400
6	9.035600
7	11.317200
8	14.105000
9	1.439800
10	1.605600
11	1.258300
12	-.074372
13	14.162000
14	8.756800
15	-.001328
16	.002418
17	.010626
18	5.001700
19	.002910
20	.000763

==========
DATA POINT: 14

FORCES
======

VERT LOAD=165.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
9.400	9.051	~~9.171~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 15.539
BOT CHORD, MIDSPAN:-35.021
DIAGONAL, END: 9.279
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-2.49718	-2.56575	-2.53146

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.88145	-1.95196	-1.91670

LOAD END (HOR.)

EAST	WEST	AVER.
.01191	.02538	.01864

SUP. END (HOR.)

EAST	WEST	AVER.
.02954	.02595	.02774

W1=
-1.76303012637E-2
W2=
-5.673931863E-4
W AV.=
-.009098847225

WELD STRAINS
STRAIN IN NORTH WELD=-3.68137774
273E-3
STRAIN IN SOUTH WELD=4.854232090
43E-3

VOLTAGE READINGS

VER LOAD= 165
VER DISP=
-2.56574916236

CH.	VOLT
0	3.817600
1	8.032100
2	9.843800
3	8.158700
4	-4.161900
5	2.187800
6	9.037100
7	11.330500
8	14.105000
9	1.477100
10	1.629400
11	1.181500
12	-.137010
13	14.161000
14	8.752100
15	-.001565
16	.002334
17	.010751
18	5.001700
19	.002709
20	.000500

==========
DATA POINT: 15

FORCES
======

VERT LOAD=132.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
7.700	7.369	~~7.534~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 12.299
BOT CHORD, MIDSPAN:-28.799
DIAGONAL, END: 7.561
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-2.02556	-2.10227	-2.06391

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.52119	-1.59736	-1.55927

LOAD END (HOR.)

EAST	WEST	AVER.
.01191	.01540	.01365

SUP. END (HOR.)

EAST	WEST	AVER.
.02460	.02082	.02271

W1=
-1.26957040181E-2
W2=
-5.4241487331E-3
W AV.=
-9.0599263756E-3

WELD STRAINS
STRAIN IN NORTH WELD=-3.52121632
781E-3
STRAIN IN SOUTH WELD=4.019032583
36E-3

VOLTAGE READINGS

VER LOAD= 132
VER DISP=
-2.10226547383

CH.	VOLT
0	4.445900
1	8.645900
2	10.320700
3	8.628900
4	-4.251200
5	2.090100
6	9.037100
7	11.317200
8	14.105000
9	1.445100
10	1.610400
11	1.243800
12	-.081416
13	14.161000
14	8.754100
15	-.001286
16	.002353
17	.010666
18	5.001700
19	.002911
20	.000756

==========
DATA POINT: 16

FORCES
======

VERT LOAD= 99.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
5.880	5.699	~~5.699~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 8.935
BOT CHORD, MIDSPAN:-22.559
DIAGONAL, END: 5.738
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-1.54780	-1.63148	-1.58964

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.15156	-1.23383	-1.19269

LOAD END (HOR.)

EAST	WEST	AVER.
-.00630	-.00135	-.00382

SUP. END (HOR.)

EAST	WEST	AVER.
.02001	.01605	.01803

W1=
-2.63086774668E-2
W2=
-1.74013671631E-2
W AV.=
-.021855022315

WELD STRAINS
STRAIN IN NORTH WELD=-3.19246394
983E-3
STRAIN IN SOUTH WELD=3.144529570
71E-3

VOLTAGE READINGS

VER LOAD= 99
VER DISP=
-1.63147877778

CH.	VOLT
0	5.081300
1	9.267400
2	10.807700
3	9.109000
4	-4.333300
5	1.998900
6	9.011000
7	11.292500
8	14.102000
9	1.420700
10	1.582300
11	1.306900
12	-.026229
13	14.162000
14	8.750200
15	-.001009
16	.002392
17	.010577
18	5.001700
19	.003119
20	.001034

==========
DATA POINT: 17

FORCES
======

VERT LOAD= 82.500 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
4.980	4.945	~~5.412~~

MEMBER FORCES ,kips

TOP CHORD, MIDSPAN: 7.734
BOT CHORD, MIDSPAN:-19.271
DIAGONAL, END: 4.883
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-1.30995	-1.37310	-1.34152

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-.96621	-1.04141	-1.00381

LOAD END (HOR.)

EAST	WEST	AVER.
-.01586	-.01021	-.01303

SUP. END (HOR.)

EAST	WEST	AVER.
.01791	.01352	.01572

W1=
-3.37687150732E-2
W2=
-2.37326007682E-2
W AV.=
-2.87506579207E-2

WELD STRAINS
STRAIN IN NORTH WELD=-3.51239004
351E-3
STRAIN IN SOUTH WELD=2.674955967
07E-3

VOLTAGE READINGS

VER LOAD= 82.5
VER DISP=
-1.37310226954

CH.	VOLT
0	5.398100
1	9.609500
2	11.053000
3	9.364100
4	-4.371300
5	1.950700
6	8.998300
7	11.280700
8	14.102000
9	1.409000
10	1.575100
11	1.341400
12	.001476
13	14.162000
14	8.759100
15	-.000884
16	.002354
17	.010529
18	5.001600
19	.003216
20	.001165

==========
DATA POINT: 18

FORCES
======

VERT LOAD= 82.500 lb/ft

RAM LOADS ,kips

EAST WEST AVERAGE
~~9.120~~ 4.897 ~~4.938~~
4.93

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 7.612
BOT CHORD, MIDSPAN:-19.271
DIAGONAL, END: 4.853
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-1.31008	-1.37339	-1.34174

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-.96642	-1.04153	-1.00398

LOAD END (HOR.)

EAST	WEST	AVER.
-.01603	-.01119	-.01361

SUP. END (HOR.)

EAST	WEST	AVER.
.01768	.01307	.01537

W1=
-.033716361645
W2=
-2.42552051983E-2
W AV.=
-2.89857834217E-2

WELD STRAINS
STRAIN IN NORTH WELD=-4.58296406
324E-3
STRAIN IN SOUTH WELD=2.615999529
19E-3

VOLTAGE READINGS

VER LOAD= 82.5
VER DISP=
-1.37339032885

CH.	VOLT
0	5.398300
1	9.609800
2	11.053500
3	9.364600
4	-4.375800
5	1.942200
6	8.998700
7	11.280200
8	14.103000
9	1.408500
10	1.573700
11	1.341100
12	.001805
13	14.162000
14	8.755000
15	-.000876
16	.002227
17	.010523
18	5.001600
19	.003221
20	.001168

==========
DATA POINT: 19

FORCES
======

VERT LOAD= 82.500 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	-.048	~~4.686~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 13.269
BOT CHORD, MIDSPAN:-18.844
DIAGONAL, END: 4.485
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-1.55722	-1.62148	-1.58935

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.17034	-1.23108	-1.20071

LOAD END (HOR.)

EAST	WEST	AVER.
.11885	.12385	.12135

SUP. END (HOR.)

EAST	WEST	AVER.
-.00436	-.00565	-.00501

W1=
.123212620793
W2=
.129503518001
W AV.=
.126358069397

WELD STRAINS
STRAIN IN NORTH WELD=-4.62548713
597E-3
STRAIN IN SOUTH WELD=2.692539249
05E-3

VOLTAGE READINGS

VER LOAD= 82.5
VER DISP=
-1.62147762677

CH.	VOLT
0	5.069100
1	9.281300
2	10.783600
3	9.113300
4	-4.774600
5	1.585800
6	9.177900
7	11.460000
8	14.103000
9	1.454900
10	1.616100
11	1.346000
12	.004942
13	14.162000
14	8.751200
15	-.000056
16	.002222
17	.010531
18	5.001700
19	.003181
20	.001306

==========
DATA POINT: 20

FORCES
======

$P_1 = 4$ Kips

VERT LOAD= 82.500 lb/ft + $P_2 = 5$ Kips

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	-.030	~~-.015~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 15.590
BOT CHORD, MIDSPAN:-21.685
DIAGONAL, END: 5.014
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-1.78785	-1.86164	-1.82474

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.34941	-1.40425	-1.37683

LOAD END (HOR.)

EAST	WEST	AVER.
.13120	.14353	.13736

SUP. END (HOR.)

EAST	WEST	AVER.
-.00475	-.00581	-.00528

W1=
.135949738383
W2=
.149338673467
W AV.=
.142644205925

WELD STRAINS
STRAIN IN NORTH WELD=-4.92821401
088E-3
STRAIN IN SOUTH WELD=2.883376179
88E-3

VOLTAGE READINGS

VER LOAD= 82.5
VER DISP=
-1.86163519366

CH.	VOLT
0	4.761900
1	8.963300
2	10.546600
3	8.883700
4	-4.781700
5	1.582800
6	9.194300
7	11.486200
8	14.103000
9	1.476400
10	1.631100
11	1.316100
12	-.018896
13	14.162000
14	8.752900
15	-.000059
16	.002186
17	.010550
18	5.001500
19	.003124
20	.001222

==========
DATA POINT: 21

FORCES
======

VERT LOAD= 82.500 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	-.036	~~-.018~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 16.126
BOT CHORD, MIDSPAN:-22.219
DIAGONAL, END: 5.092
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-1.83002	-1.90451	-1.86726

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.38670	-1.43719	-1.41194

LOAD END (HOR.)

EAST	WEST	AVER.
.13545	.14865	.14205

SUP. END (HOR.)

EAST	WEST	AVER.
-.00489	-.00600	-.00544

W1=
.140339215922
W2=
.154645505082
W AV.=
.147492360502

WELD STRAINS
STRAIN IN NORTH WELD=-5.03780251
893E-3
STRAIN IN SOUTH WELD=2.981638874
56E-3

VOLTAGE READINGS

VER LOAD= 82.5
VER DISP=
-1.90450744697

CH.	VOLT
0	4.705400
1	8.905900
2	10.496500
3	8.839400
4	-4.783800
5	1.579100
6	9.199300
7	11.492200
8	14.102000
9	1.481100
10	1.634600
11	1.310400
12	-.023384
13	14.161000
14	8.751500
15	-.000058
16	.002173
17	.010560
18	5.001500
19	.003115
20	.001210

==========
DATA POINT: 22

FORCES
======

VERT LOAD= 82.500 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	-.072	[illegible]

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 16.091
BOT CHORD, MIDSPAN:-22.435
DIAGONAL, END: 5.178
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-1.85119	-1.92611	-1.88865

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.39939	-1.45152	-1.42546

LOAD END (HOR.)

EAST	WEST	AVER.
.13681	.15030	.14355

SUP. END (HOR.)

EAST	WEST	AVER.
-.00464	-.00611	-.00538

W1=
.141451031127
W2=
.156408245954
W AV.=
.148929638541

WELD STRAINS
STRAIN IN NORTH WELD=-5.06236065
077E-3
STRAIN IN SOUTH WELD=3.025095061
8E-3

VOLTAGE READINGS

VER LOAD= 82.5
VER DISP=
-1.92610805538

CH.	VOLT
0	4.677200
1	8.877300
2	10.479700
3	8.820400
4	-4.779400
5	1.577000
6	9.201100
7	11.494400
8	14.102000
9	1.479000
10	1.636100
11	1.308500
12	-.025593
13	14.161000
14	8.746600
15	-.000052
16	.002170
17	.010564
18	5.001300
19	.003109
20	.001193

==========
DATA POINT: 23

FORCES
======

VERT LOAD=115.500 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	-.036	~~-.018~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 18.553
BOT CHORD, MIDSPAN:-25.494
DIAGONAL, END: 6.171
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-2.12800	-2.16751	-2.15775

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.61632	-1.66710	-1.64171

LOAD END (HOR.)

EAST	WEST	AVER.
.16323	.17651	.16987

SUP. END (HOR.)

EAST	WEST	AVER.
-.00487	-.00644	-.00566

W1=
.168105763965
W2=
.182958024088
W AV.=
.175531894027

WELD STRAINS
STRAIN IN NORTH WELD=-5.28889291
277E-3
STRAIN IN SOUTH WELD=3.404757920
13E-3

VOLTAGE READINGS

VER LOAD= 115.5
VER DISP=
-2.18750562773

CH.	VOLT
0	4.308500
1	8.531200
2	10.192600
3	8.534600
4	-4.783600
5	1.570600
6	9.236200
7	11.529300
8	14.102000
9	1.501400
10	1.652400
11	1.276400
12	-.051352
13	14.161000
14	8.749000
15	-.000058
16	.002143
17	.010602
18	5.001000
19	.002992
20	.001045

==========
DATA POINT: 24

FORCES
======

VERT LOAD=115.500 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	-.072	~~-.036~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 22.975
BOT CHORD, MIDSPAN:-30.196
DIAGONAL, END: 7.234
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-2.53951	-2.61529	-2.57740

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.93019	-1.99590	-1.96305

LOAD END (HOR.)

EAST	WEST	AVER.
.20877	.22015	.21446

SUP. END (HOR.)

EAST	WEST	AVER.
-.00513	-.00705	-.00609

W1=
.213903230825
W2=
.227201353362
W AV.=
.220552292094

WELD STRAINS
STRAIN IN NORTH WELD=-5.54288332
431E-3
STRAIN IN SOUTH WELD=3.880014691
73E-3

VOLTAGE READINGS

VER LOAD= 115 5
VER DISP=
-2.6152883061

CH.	VOLT
0	3.760400
1	7.964800
2	9.777200
3	8.098700
4	-4.788200
5	1.559100
6	9.296700
7	11.587400
8	14.102000
9	1.537200
10	1.686000
11	1.227700
12	-.091639
13	14.161000
14	8.748800
15	-.000052
16	.002113
17	.010651
18	5.001300
19	.002868
20	.000886

```
==================================
DATA POINT: 25

FORCES
======

VERT LOAD=115.500 lb/ft

RAM LOADS   ,kips
-------------------
 EAST       WEST      AVERAGE
  0.000      -.030     -.015

MEMBER FORCEC ,kips
--------------------
TOP CHORD, MIDSPAN: 24.171
BOT CHORD, MIDSPAN:-31.505
DIAGONAL,  END:     7.512
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
  -2.66354   -2.74263   -2.70308

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
  -2.02366   -2.09366   -2.05866

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
    .22172     .23330     .22751

SUP. END (HOR. )
----------------
     EAST         WEST       AVER.
   -.00518    -.00724    -.00621

W1=
  .22690632661
W2=
  .240534808673
W AV.=
  .233720567642

 WELD STRAINS
STRAIN IN NORTH WELD=-5.63632437
056E-3
STRAIN IN SOUTH WELD=4.042875977
39E-3
```

```
--------------------
VOLTAGE READINGS

VER LOAD=                  115.5
VER DISP=
-2.74262615845

CH.       VOLT
 0      3.595200
 1      7.796200
 2      9.653500
 3      7.969100
 4     -4.789200
 5      1.555500
 6      9.313900
 7     11.604900
 8     14.102000
 9      1.548200
10      1.693800
11      1.214500
12      -.103235
13     14.161000
14      8.748400
15      -.000059
16       .002102
17       .010668
18      5.001500
19       .002838
20       .000842
```

==========

DATA POINT: 26

FORCES
======

VERT LOAD=115.500 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	-.018	-.009

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 24.689
BOT CHORD, MIDSPAN:-31.909
DIAGONAL, END: 7.654
DISPLACEMENTS, (in.)

MIDSPAN (VERT.)

EAST	WEST	AVER.
-2.70056	-2.78266	-2.74161

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-2.04995	-2.12542	-2.08768

LOAD END (HOR.)

EAST	WEST	AVER.
.22594	.23728	.23161

SUP. END (HOR.)

EAST	WEST	AVER.
-.00523	-.00725	-.00624

W1=
.231166113994
W2=
.244531429234
W AV.=
.237848771614

WELD STRAINS
STRAIN IN NORTH WELD=-5.71219333
768E-3
STRAIN IN SOUTH WELD=3.983918360
48E-3

VOLTAGE READINGS

VER LOAD= 115.5
VER DISP=
-2.78265525794

CH.	VOLT
0	3.545900
1	7.743200
2	9.618700
3	7.927000
4	-4.790000
5	1.555200
6	9.319500
7	11.610200
8	14.102000
9	1.551100
10	1.699000
11	1.210400
12	-.106796
13	14.161000
14	8.746600
15	-.000061
16	.002093
17	.010662
18	5.001500
19	.002822
20	.000820

==========
DATA POINT: 27

FORCES
======

VERT LOAD=132.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	-.096	~~-.048~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 27.737
BOT CHORD, MIDSPAN:-35.209
DIAGONAL, END: 8.416
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-3.01559	-3.09163	-3.05361

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-2.28811	-2.36853	-2.32832

LOAD END (HOR.)

EAST	WEST	AVER.
.27065	.27919	.27492

SUP. END (HOR.)

EAST	WEST	AVER.
-.00576	-.01015	-.00795

W1=
.27641187426
W2=
.289337407083
W AV.=
.282874640672

WELD STRAINS
STRAIN IN NORTH WELD=-5.78771104
553E-3
STRAIN IN SOUTH WELD=4.428204094
85E-3

VOLTAGE READINGS

VER LOAD= 132
VER DISP=
-3.09163459007

CH.	VOLT
0	3.126300
1	7.334100
2	9.303500
3	7.604700
4	-4.799600
5	1.500100
6	9.378900
7	11.666000
8	14.102000
9	1.574600
10	1.723300
11	1.176900
12	-.135780
13	14.161000
14	8.743600
15	-.000048
16	.002084
17	.010707
18	5.001400
19	.002730
20	.000709

==========
DATA POINT: 28

FORCES
======

VERT LOAD=132.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	-.042	~~-.021~~

MEMBER FORCES ,kips

TOP CHORD, MIDSPAN: 28.717
BOT CHORD, MIDSPAN:-36.547
DIAGONAL, END: 8.697
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-3.12513	-3.20258	-3.16385

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-2.37682	-2.45505	-2.41593

LOAD END (HOR.)

EAST	WEST	AVER.
.27645	.28505	.28075

SUP. END (HOR.)

EAST	WEST	AVER.
-.00584	-.01000	-.00792

W1=
.282285663026
W2=
.295048958116
W AV.=
.288667310572

WELD STRAINS
STRAIN IN NORTH WELD=-6.05747276
668E-3
STRAIN IN SOUTH WELD=4.555948151
87E-3

VOLTAGE READINGS

VER LOAD= 132
VER DISP=
-3.20258316961

CH.	VOLT
0	2.980400
1	7.187200
2	9.186100
3	7.490000
4	-4.801000
5	1.502900
6	9.386600
7	11.673800
8	14.102000
9	1.583400
10	1.729900
11	1.162600
12	-.146780
13	14.161000
14	8.747300
15	-.000057
16	.002052
17	.010720
18	5.001400
19	.002698
20	.000666

==========
DATA POINT: 29

FORCES
======

VERT LOAD=132.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	-.078	-.039

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 29.454
BOT CHORD, MIDSPAN:-37.070
DIAGONAL, END: 8.824
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-3.15043	-3.23672	-3.19357

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-2.40145	-2.47292	-2.43719

LOAD END (HOR.)

EAST	WEST	AVER.
.27735	.28633	.28184

SUP. END (HOR.)

EAST	WEST	AVER.
-.00616	-.01009	-.00812

W1=
.283509568021
W2=
.296415134992
W AV.=
.289962351507

WELD STRAINS
STRAIN IN NORTH WELD=-6.06590282
043E-3
STRAIN IN SOUTH WELD=4.595254015
97E-3

VOLTAGE READINGS

VER LOAD= 132
VER DISP=
-3.23672119409

CH.	VOLT
0	2.946700
1	7.142000
2	9.153500
3	7.466300
4	-4.806800
5	1.501200
6	9.387800
7	11.675500
8	14.102000
9	1.590400
10	1.734500
11	1.156800
12	-.150840
13	14.161000
14	8.743900
15	-.000051
16	.002051
17	.010724
18	5.001400
19	.002679
20	.000651

==========
DATA POINT: 30

FORCES
======

VERT LOAD=132.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	-.048	~~-.024~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 22.689
BOT CHORD, MIDSPAN:-29.359
DIAGONAL, END: 6.987
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-2.47898	-2.52282	-2.50090

1/4 SPAN (VERT.),

EAST	WEST	AVER.
-1.86989	-1.94090	-1.90540

LOAD END (HOR.)

EAST	WEST	AVER.
.22258	.21721	.21989

SUP. END (HOR.)

EAST	WEST	AVER.
-.00599	-.01100	-.00850

W1=
.228574312494
W2=
.228206292268
W AV.=
.228390302381

WELD STRAINS
STRAIN IN NORTH WELD=-5.72062322
291E-3
STRAIN IN SOUTH WELD=3.600693851
33E-3

VOLTAGE READINGS

VER LOAD= 132
VER DISP=
-2.52282371521

CH.	VOLT
0	3.841300
1	8.087800
2	9.857700
3	8.172200
4	-4.804200
5	1.484000
6	9.315700
7	11.584300
8	14.103000
9	1.534500
10	1.684200
11	1.235900
12	-.083977
13	14.161000
14	8.744600
15	-.000056
16	.002092
17	.010623
18	5.001500
19	.002899
20	.000921

==========
DATA POINT: 31

FORCES
======

VERT LOAD=132.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	-.163	~~-.081~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 22.574
BOT CHORD, MIDSPAN:-29.402
DIAGONAL, END: 6.934
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-2.47307	-2.52179	-2.49743

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.87020	-1.94061	-1.90540

LOAD END (HOR.)

EAST	WEST	AVER.
.22180	.21775	.21977

SUP. END (HOR.)

EAST	WEST	AVER.
-.00599	-.01138	-.00869

W1=
.227788552555
W2=
.229131320496
W AV.=
.228459936526

WELD STRAINS
STRAIN IN NORTH WELD=-5.73748299
339E-3
STRAIN IN SOUTH WELD=3.453299809
31E-3

VOLTAGE READINGS

VER LOAD= 132
VER DISP=
-2.52178637181

CH.	VOLT
0	3.848900
1	8.088600
2	9.856600
3	8.172000
4	-4.803800
5	1.476600
6	9.314000
7	11.584200
8	14.102000
9	1.537500
10	1.679500
11	1.235200
12	-.084071
13	14.161000
14	8.747200
15	-.000037
16	.002090
17	.010608
18	5.001500
19	.002905
20	.000929

==========

DATA POINT: 32

FORCES
======

VERT LOAD=132.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
5.500	5.373	~~2.687~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 16.348
BOT CHORD, MIDSPAN:-29.442
DIAGONAL, END: 7.414
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-2.17500	-2.22806	-2.20153

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.62735	-1.70663	-1.66699

LOAD END (HOR.)

EAST	WEST	AVER.
.07169	.06866	.07017

SUP. END (HOR.)

EAST	WEST	AVER.
.01485	.01743	.01614

W1=
5.68471697495E-2
W2=
.051220252431
W AV.=
5.40337110905E-2

WELD STRAINS
STRAIN IN NORTH WELD=-5.65318414
103E-3
STRAIN IN SOUTH WELD=3.413994731
05E-3

VOLTAGE READINGS

VER LOAD= 132
VER DISP=
-2.22806341345

CH.	VOLT
0	4.245900
1	8.477500
2	10.178000
3	8.482200
4	-4.426800
5	2.025200
6	9.114600
7	11.385700
8	14.102000
9	1.480000
10	1.639100
11	1.235400
12	-.085071
13	14.161000
14	8.751700
15	-.000955
16	.002100
17	.010604
18	5.001500
19	.002904
20	.000802

==========
DATA POINT: 33

FORCES
======

VERT LOAD=132.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
6.500	6.356	~~6.928~~

MEMBER FORCES ,kips

TOP CHORD, MIDSPAN: 15.328
BOT CHORD, MIDSPAN:-29.528
DIAGONAL, END: 7.467
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-2.13108	-2.18010	-2.15559

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.58647	-1.66937	-1.62792

LOAD END (HOR.)

EAST	WEST	AVER.
.04745	.04409	.04577

SUP. END (HOR.)

EAST	WEST	AVER.
.01817	.02042	.01930

W1=
2.92803579067E-2
W2=
2.36702763672E-2
W AV.=
.026475317137

WELD STRAINS
STRAIN IN NORTH WELD=-5.85550138
667E-3
STRAIN IN SOUTH WELD=3.512257425
73E-3

VOLTAGE READINGS

VER LOAD= 132
VER DISP=
-2.18010402066

CH.	VOLT
0	4.304400
1	8.541000
2	10.232100
3	8.531600
4	-4.366600
5	2.082100
6	9.082400
7	11.353000
8	14.102000
9	1.471600
10	1.631500
11	1.234000
12	-.085259
13	14.161000
14	8.745500
15	-.001118
16	.002076
17	.010614
18	5.001500
19	.002927
20	.000765

==========
DATA POINT: 34

FORCES
======

VERT LOAD=132.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
7.200	6.977	[illegible]

MEMBER FORCES ,kips

TOP CHORD, MIDSPAN: 14.648
BOT CHORD, MIDSPAN:-29.608
DIAGONAL, END: 7.549
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-2.08588	-2.14657	-2.11623

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.55708	-1.64312	-1.60010

LOAD END (HOR.)

EAST	WEST	AVER.
.02924	.02764	.02844

SUP. END (HOR.)

EAST	WEST	AVER.
.02037	.02206	.02121

W1=
8.8688337034E-3
W2=
5.5874519757E-3
W AV.=
7.22814283955E-3

WELD STRAINS
STRAIN IN NORTH WELD=-5.77928099
173E-3
STRAIN IN SOUTH WELD=3.396425171
15E-3

VOLTAGE READINGS

VER LOAD= 132
VER DISP=
-2.14657020901

CH	VOLT
0	4.364600
1	8.585400
2	10.271000
3	8.566400
4	-4.326900
5	2.113200
6	9.058200
7	11.331100
8	14.102000
9	1.465600
10	1.626600
11	1.233100
12	-.085945
13	14.160000
14	8.747000
15	-.001221
16	.002085
17	.010602
18	5.001400
19	.002914
20	.000756

==========
DATA POINT: 35

FORCES
======

VERT LOAD=132.000 lb/ft

RAM LOADS , kips

EAST	WEST	AVERAGE
8.200	7.912	~~7.556~~

MEMBER FORCEC , kips

TOP CHORD, MIDSPAN: 16.999
BOT CHORD, MIDSPAN:-33.517
DIAGONAL, END: 8.479
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-2.37028	-2.46333	-2.41681

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.78882	-1.87129	-1.83006

LOAD END (HOR.)

EAST	WEST	AVER.
.02924	.03163	.03043

SUP. END (HOR.)

EAST	WEST	AVER.
.02336	.02292	.02314

W1=
5.8787048873E-3
W2=
8.7068657314E-3
W AV.=
7.29278530935E-3

WELD STRAINS
STRAIN IN NORTH WELD=-6.04869666485E-3
STRAIN IN SOUTH WELD=3.91932134169E-3

VOLTAGE READINGS

VER LOAD= 132
VER DISP=
-2.46332878122

CH.	VOLT
0	3.985800
1	8.166000
2	9.964300
3	8.263900
4	-4.272800
5	2.129600
6	9.058200
7	11.336400
8	14.102000
9	1.488000
10	1.641400
11	1.192600
12	-.119350
13	14.161000
14	8.744300
15	-.001376
16	.002053
17	.010655
18	5.001300
19	.002801
20	.000621

```
==================================
DATA POINT: 36

FORCES
======

VERT LOAD=132.000 lb/ft

RAM LOADS   ,kips
-------------------
 EAST       WEST      AVERAGE
  8.400      8.147    8.274

MEMBER FORCEC ,kips
--------------------
TOP CHORD, MIDSPAN: 16.640
BOT CHORD, MIDSPAN:-33.544
DIAGONAL,  END:     8.479
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
      EAST         WEST       AVER.
  -2.37028    -2.46174    -2.41601

1/4 SPAN (VERT.)·
-----------------
      EAST         WEST       AVER.
  -1.78111    -1.87137    -1.82624

LOAD END (HOR. )
----------------
      EAST         WEST       AVER.
     .02916      .03215      .03066

SUP. END (HOR. )
----------------
      EAST         WEST       AVER.
     .02389      .02340      .02364

W1=
 5.2728309586E-3
W2=
 8.7546410854E-3
W AV.=
 .007013736022

 WELD STRAINS
STRAIN IN NORTH WELD=-6.01532249
772E-3
STRAIN IN SOUTH WELD=3.809136740
63E-3
```

```
-------------------
VOLTAGE READINGS

VER LOAD=                  132
VER DISP=
-2.46174272257

CH.       VOLT
 0      3.985800
 1      8.168100
 2      9.974500
 3      8.263800
 4     -4.263200
 5      2.138700
 6      9.058100
 7     11.337100
 8     14.102000
 9      1.483500
10      1.640000
11      1.192200
12      -.119530
13     14.160000
14      8.745700
15      -.001415
16       .002057
17       .010644
18      5.001400
19       .002797
20       .000625
```

```
==================================
DATA POINT: 37

FORCES
======

VERT LOAD=132.000 lb/ft

RAM LOADS   ,kips
-------------------
 EAST       WEST      AVERAGE
  8.700      8.395    8.397

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN: 17.239
BOT CHORD, MIDSPAN:-34.831
DIAGONAL,  END:     8.746
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST        WEST       AVER.
  -2.46038   -2.54512   -2.50275

1/4 SPAN (VERT.)
----------------
     EAST        WEST       AVER.
  -1.85342   -1.93556   -1.89449

LOAD END (HOR. )
----------------
     EAST        WEST       AVER.
    .02916     .03215     .03066

SUP. END (HOR. )
----------------
     EAST        WEST       AVER.
    .02494     .02347     .02420

W1=
 4.2226932961E-3
W2=
 8.6863555261E-3
W AV.=
 6.4545244111E-3

 WELD STRAINS
STRAIN IN NORTH WELD=-6.08241755
423E-3
STRAIN IN SOUTH WELD=4.086374602
77E-3
```

```
--------------------
VOLTAGE READINGS

VER LOAD=                  132
VER DISP=
-2.54512409208

CH.       VOLT
 0      3.865800
 1      8.057700
 2      9.878800
 3      8.178700
 4     -4.244200
 5      2.140000
 6      9.058100
 7     11.337100
 8     14.102000
 9      1.492000
10      1.641000
11      1.179400
12      -.131120
13     14.160000
14      8.745800
15      -.001456
16       .002049
17       .010672
18      5.001300
19       .002774
20       .000577
```

==========
DATA POINT: 38

FORCES
======

VERT LOAD=132.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
8.750	8.449	~~8.575~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 17.486
BOT CHORD, MIDSPAN:-35.045
DIAGONAL, END: 8.813
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-2.47714	-2.57347	-2.52531

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.86687	-1.95813	-1.91250

LOAD END (HOR.)

EAST	WEST	AVER.
.02957	.03283	.03120

SUP. END (HOR.)

EAST	WEST	AVER.
.02503	.02360	.02431

W1=
4.5425900964E-3
W2=
9.2313089688E-3
W AV.=
6.8869495326E-3

WELD STRAINS
STRAIN IN NORTH WELD=-6.10770822
123E-3
STRAIN IN SOUTH WELD=4.086374602
77E-3

VOLTAGE READINGS

VER LOAD= 132
VER DISP=
-2.57347018861

CH.	VOLT
0	3.843200
1	8.019600
2	9.860300
3	8.148200
4	-4.242300
5	2.142400
6	9.058000
7	11.337200
8	14.101000
9	1.491000
10	1.645800
11	1.176600
12	-.132330
13	14.160000
14	8.748600
15	-.001465
16	.002046
17	.010672
18	5.001300
19	.002766
20	.000567

==========
DATA POINT: 39

FORCES
======

VERT LOAD=132.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
8.750	8.474	~~8.612~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 17.868
BOT CHORD, MIDSPAN:-35.124
DIAGONAL, END: 8.842
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-2.47728	-2.57375	-2.52552

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.86717	-1.95844	-1.91281

LOAD END (HOR.)

EAST	WEST	AVER.
.02922	.03349	.03136

SUP. END (HOR.)

EAST	WEST	AVER.
.02578	.02395	.02486

W1=
3.4320309514E-3
W2=
9.5489455509E-3
W AV.=
6.49048825115E-3

WELD STRAINS
STRAIN IN NORTH WELD=-6.42704120
015E-3
STRAIN IN SOUTH WELD=3.837157003
56E-3

VOLTAGE READINGS

VER LOAD= 132
VER DISP=
-2.5737532795

CH.	VOLT
0	3.844100
1	8.021500
2	9.862700
3	8.150100
4	-4.229800
5	2.149600
6	9.060100
7	11.341300
8	14.105000
9	1.496100
10	1.647400
11	1.176800
12	-.133860
13	14.163000
14	8.756600
15	-.001469
16	.002008
17	.010646
18	5.001000
19	.002758
20	.000567

```
==================================
DATA POINT: 40

FORCES
======

VERT LOAD=132.000 lb/ft

RAM LOADS   ,kips
-------------------
 EAST       WEST      AVERAGE
  7.290      6.930     7.840

MEMBER FORCEC ,kips
--------------------
TOP CHORD, MIDSPAN: 14.453
BOT CHORD, MIDSPAN:-29.462
DIAGONAL,  END:    7.563
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
  -2.07645    -2.15142    -2.11394

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
  -1.55042    -1.64140    -1.59591

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
    .02839      .02734      .02786

SUP. END (HOR. )
----------------
     EAST         WEST       AVER.
    .02201      .01961      .02081

W1=
 6.3783141209E-3
W2=
 7.7237704397E-3
W AV.=
 7.0510422803E-3

 WELD STRAINS
STRAIN IN NORTH WELD=-6.14848309
397E-3
STRAIN IN SOUTH WELD=3.161155105
55E-3
```

```
--------------------
VOLTAGE READINGS

VER LOAD=                  132
VER DISP=
-2.15142283473

CH.       VOLT
 0      4.378100
 1      8.580800
 2     10.282000
 3      8.570500
 4     -4.298100
 5      2.067100
 6      9.059000
 7     11.333100
 8     14.105000
 9      1.464700
10      1.625100
11      1.233800
12      -.083581
13     14.163000
14      8.753600
15      -.001213
16       .002041
17       .010577
18      5.000900
19       .002912
20       .000754
```

==========

DATA POINT: 41

FORCES
======

VERT LOAD= 99.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
5.460	5.308	~~5.299~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 10.904
BOT CHORD, MIDSPAN:-22.998
DIAGONAL, END: 5.736
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-1.59657	-1.67435	-1.63546

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-1.18374	-1.26637	-1.22505

LOAD END (HOR.)

EAST	WEST	AVER.
.01145	.00939	.01042

SUP. END (HOR.)

EAST	WEST	AVER.
.01738	.01411	.01574

W1=
-.005924971015
W2=
-4.72015155032E-3
W AV.=
-5.32256128265E-3

WELD STRAINS
STRAIN IN NORTH WELD=-5.74380005
532E-3
STRAIN IN SOUTH WELD=2.296339645
65E-3

VOLTAGE READINGS

VER LOAD= 99
VER DISP=
-1.67434724917

CH	VOLT
0	5.017400
1	9.212600
2	10.767400
3	9.067800
4	-4.381900
5	1.962300
6	9.036500
7	11.309200
8	14.105000
9	1.432600
10	1.601400
11	1.300300
12	-.027704
13	14.163000
14	8.754400
15	-.000944
16	.002089
17	.010489
18	5.000900
19	.003120
20	.001033

==========
DATA POINT: 42

FORCES
======

VERT LOAD= 66.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
3.820	3.794	~~4.627~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 7.226
BOT CHORD, MIDSPAN:-16.507
DIAGONAL, END: 3.905
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-1.10754	-1.13226	-1.11990

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-.80844	-.86539	-.83691

LOAD END (HOR.)

EAST	WEST	AVER.
-.00721	-.00721	-.00721

SUP. END (HOR.)

EAST	WEST	AVER.
.01269	.00792	.01031

W1=
-1.98984986347E-2
W2=
-1.51296597371E-2
W AV.=
-1.75140791859E-2

WELD STRAINS
STRAIN IN NORTH WELD=-5.35597880
993E-3
STRAIN IN SOUTH WELD=1.411869288
61E-3

VOLTAGE READINGS

VER LOAD= 66
VER DISP=
-1.13225708952

CH.	VOLT
0	5.668900
1	9.930500
2	11.264200
3	9.599500
4	-4.466800
5	1.844500
6	9.011700
7	11.287100
8	14.105000
9	1.399800
10	1.576400
11	1.368200
12	.027208
13	14.163000
14	8.754900
15	-.000693
16	.002135
17	.010399
18	5.000900
19	.003323
20	.001318

==========
DATA POINT: 43

FORCES
======

VERT LOAD= 33.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
2.380	2.485	3.152

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 3.500
BOT CHORD, MIDSPAN:-10.025
DIAGONAL, END: 2.034
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-.56446	-.58443	-.57444

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-.41713	-.45174	-.43444

LOAD END (HOR.)

EAST	WEST	AVER.
-.02761	-.02568	-.02664

SUP. END (HOR.)

EAST	WEST	AVER.
.00728	.00383	.00555

W1=
-3.48846908399E-2
W2=
-2.95066778327E-2
W AV.=
-3.21956843363E-2

WELD STRAINS
STRAIN IN NORTH WELD=-4.83326321
832E-3
STRAIN IN SOUTH WELD=5.470538287
25E-4

VOLTAGE READINGS

VER LOAD= 33
VER DISP=
-.584428128896

CH.	VOLT
0	6.392400
1	10.656000
2	11.782200
3	10.148000
4	-4.564700
5	1.766500
6	8.984600
7	11.262500
8	14.105000
9	1.369100
10	1.548600
11	1.434900
12	.083240
13	14.163000
14	8.760100
15	-.000476
16	.002197
17	.010311
18	5.000900
19	.003512
20	.001628

```
==================================
DATA POINT: 44

FORCES
======

VERT LOAD=  0.000 lb/ft

RAM LOADS   ,kips
-------------------
 EAST       WEST  /   AVERAGE
  1.420      1.568     1.974

MEMBER FORCEC ,kips
-------------------
TOP CHORD, MIDSPAN:   -.258
BOT CHORD, MIDSPAN: -3.404
DIAGONAL,  END:       .204
DISPLACEMENTS, (in.)
====================

MIDSPAN (VERT.)
---------------
     EAST         WEST       AVER.
   -.02648     -.00783     -.01716

1/4 SPAN (VERT.)
----------------
     EAST         WEST       AVER.
    .00047     -.01932     -.00942

LOAD END (HOR. )
----------------
     EAST         WEST       AVER.
   -.05147     -.04873     -.05010

SUP. END (HOR. )
----------------
     EAST         WEST       AVER.
    .00327      .00461      .00394

W1=
-.054730980835
W2=
-5.33484735699E-2
W AV.=
-5.40397272025E-2

 WELD STRAINS
STRAIN IN NORTH WELD=-4.20094597
04E-3
STRAIN IN SOUTH WELD=-3.96381218
332E-4
```

```
-------------------
VOLTAGE READINGS

VER LOAD=                0
VER DISP=
-7.82965290233E-3

CH.       VOLT
 0      7.109100
 1     11.419600
 2     12.335000
 3     10.721400
 4     -4.637300
 5      1.781500
 6      8.952900
 7     11.231800
 8     14.105000
 9      1.338000
10      1.520900
11      1.505800
12       .137610
13     14.164000
14      8.758500
15      -.000324
16       .002272
17       .010215
18      5.000900
19       .003686
20       .001942
```

Note:

ALL INSTRUMENTS BETWEEN THE ENDS ARE REMOVED

ONLY CHANNELS REMAINED ACTIVE ARE:

Ch. 5 HOR. N.E END
6 HOR. N.W END
7 HOR. S.G. END
8 HOR. S.W. END
21 LOAD CELL WEST
22 Strain Gage Diagonal
23 Strain Gage Diagonal

HAAG 8/21/84 TEST IV

ACTION TAKEN	RAM LOAD (kips)	DATA POINT
INITIALIZED (NO LOAD)	0	1
33 lb/ft Load applied	0.10	2
33 lb/ft Load applied	0.06	3,4
33 lb/ft Load applied	2.00	5
66 lb/ft Load	3.20	6
66 " "	7.60	7
66 " " (Balanced)	3.20	8
99 " "	4.68	9
99 " " (≈Balanced)	4.88	10
132 " "	6.48	11
132 " "	6.99	12
132 " "	7.89	13

HAAG 8/21/84 TEST IV

ACTION TAKEN	RAM LOAD	DATA POINT
165 lb/ft (Balanced)	9.40	14
132 lb/ft	7.68	15
99 lb/ft	5.85	16
82.5 lb/ft	4.98	17
Note: in ponding test, the Midspan deflection is calculated by subtracting initial camber (Joist and deck in place) from deflection		
82.5	4.98	18
82.5 Rams Released	0	19
82.5 + (P_1 = 4 Bls., P_2 = 5 Bls. Pond.)	0	20
(32.5 + (P_1 = 5, P_2 = 6 Bls Pond.)	0	21

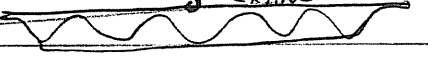
HAAG TEST IV 8-21-84

Action	Ram load	Data Point
82.5 lb/ft ($P_1 = 5$, $P_2 = 6.5$) Pond. Equilib.	0	22
115.5 lb/ft, Uniform load	0	23
115.5 ($P_1 = 6$ Blks $P_2 = 9$ Blks)	0	24
115.5 ($P_1 = 9$ B., $P_2 = 11$ B.)	0	25
115.5 ($P_1 = 9$, $P_2 = 12$)	0	26
132 ($P_1 = 9$, $P_2 = 12$)	0	27
132 ($P_1 = 11$, $P_2 = 14$)	0	28
132 ($P_1 = 11.5$, $P_2 = 15$) Pond. Equilib.	0	29
132 lb/ft Uniforms (no ponding)	0	30
132 lb/ft Rams added	0	31
132 lb/ft Unif.	5.5	32
132 lb/ft unif.	6.50	33
132 lb/ft unif. (Balanced)	7.20	34

HAAG

TEST IV

8-21-84

ACTION	Ram load	Data Point
132 unif. + (P_1 = 6 Blcks., P_2 = 8)	8.2	35
132 unif. + (P_1 = 6, P_2 = 8) (BALANCED)	8.40	36
132 Unif. + (P_1 = 8, P_2 = 10)	8.70	37
132 unif. + (P_1 = 8, P_2 = 11) Ponding Equilib.	8.75	38
132 unif. + (P_1 = 8, P_2 = 11) Pond Equilibrium (40 minutes after Point 39)	8.75	39
132 unif (no ponding)	7.29	40
99 unif	5.46	41
66 lb/ft unif	3.82	42
33 lb/ft unif.	2.38	43
0 All Blocks Removed	1.42	44
0 CRANE IS HOLDING THE JOIST 	0	46

APPENDIX F

RESULTS FROM TEST IV-2

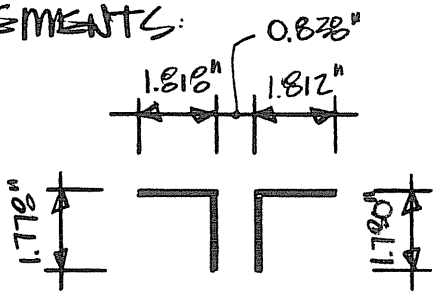
(Two Angles Cut)

PROJECT HAAG JOISTS

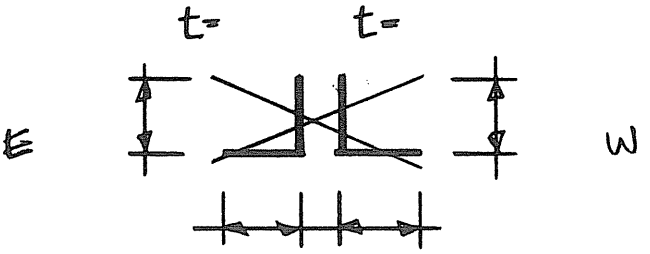
TEST W-2 ANGLES CUT

TEST JOIST B19

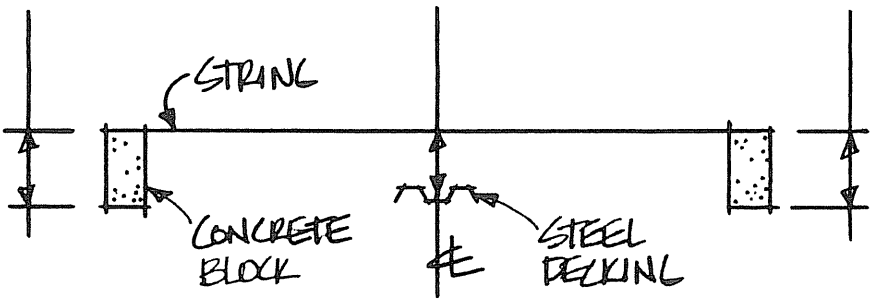
MEASUREMENTS:



t=0.187" t=0.186"



$\frac{1}{4}$ SOUTH END DIAGONAL = 0.932"



WT. CONCRETE BLOCK = 33 LB ±

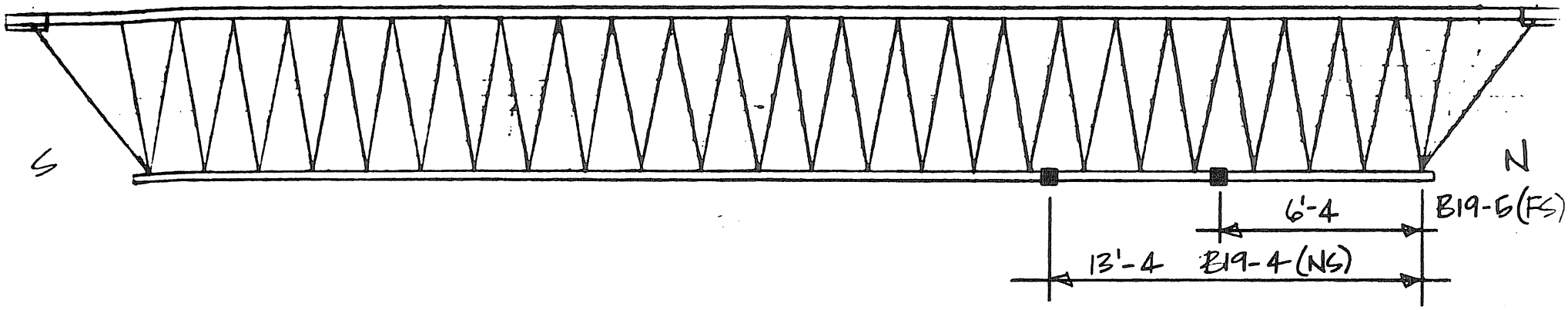
WT STEEL DECKING (1 SHEET) = 78.5 LB ±

F.1

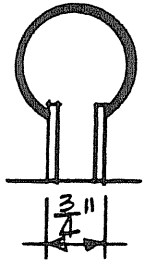
DATE 8-21-84

BY LEC/SJM

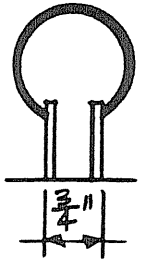
LOWER CHORD BUTT WELD LOCATIONS:



CLIP GAGES:



B19-4



B19-5

PROJECT HAAG JOISTS

TEST IV-2 ANGLES CUT

TEST JOIST B19

F.2

DATE 8-21-84

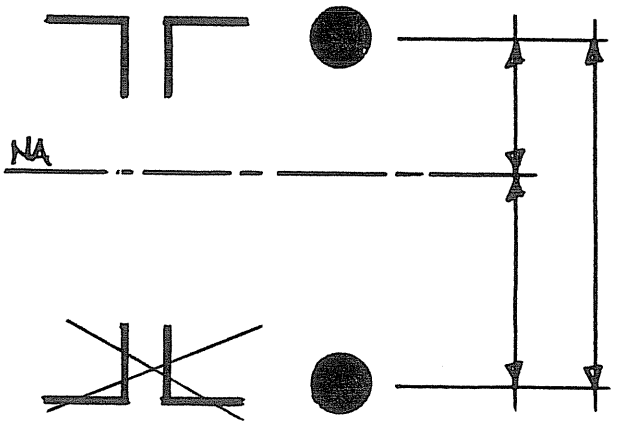
BY SRM

PROJECT HAAG JOISTS

TEST IV - 2 ANGLES CUT

TEST JOIST B19

CALCULATED QUANTITIES:

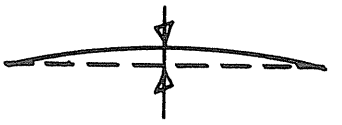


$A_{TOP\ CHORD} = 1.271$ in²

$A_{BOT\ CHORD} =$

$A_{SOUTH\ END\ DIAGONAL} = 0.682$ in²

CAMBER =



DATE 8-21-84

BY SJM

HAAG JOISTS
TEST IV
8-21-84

```
TEST:
TEST IV (8/21/84)
Project Name:          HAAG JOISTS
Conducted by:          AAA
----------------------------
I=0
CHANNEL NUMBER:0
CALIBRATION FACTOR:  .09445
INSTRUMENT:VER CENTER EAST

----------------------------
I=1
CHANNEL NUMBER:1
CALIBRATION FACTOR:  .09389
INSTRUMENT:VER CENTER WEST

----------------------------
I=2
CHANNEL NUMBER:2
CALIBRATION FACTOR:  .09385
INSTRUMENT:VER 1/4 PT EAST

----------------------------
I=3
CHANNEL NUMBER:3
CALIBRATION FACTOR:  .09401
INSTRUMENT:VER 1/4 PT WEST

----------------------------
I=4
CHANNEL NUMBER:5
CALIBRATION FACTOR:  1.283
INSTRUMENT:HOR. NE   END

----------------------------
I=5
CHANNEL NUMBER:6
CALIBRATION FACTOR:  1.35
INSTRUMENT:HOR. NW   END

----------------------------
I=6
CHANNEL NUMBER:7
CALIBRATION FACTOR:  .0942
INSTRUMENT:HOR. SE   END

----------------------------
I=7
CHANNEL NUMBER:8
CALIBRATION FACTOR:  .09441
INSTRUMENT:HOR. SW   END

----------------------------
I=8
CHANNEL NUMBER:4
CALIBRATION FACTOR:  1
INSTRUMENT:EXCIT.

----------------------------
I=9
CHANNEL NUMBER:10
CALIBRATION FACTOR:  1.283
INSTRUMENT:TOP CHORD AXIAL EAST

I=10
CHANNEL NUMBER:11
CALIBRATION FACTOR:  1.3
INSTRUMENT:TOP CHORD AXIAL WEST

----------------------------
I=11
CHANNEL NUMBER:12
CALIBRATION FACTOR:  1.25
INSTRUMENT:BOT CHORD AXIAL EAST

----------------------------
I=12
CHANNEL NUMBER:13
CALIBRATION FACTOR:  1.35
INSTRUMENT:BOT CHORD AXIAL WEST

----------------------------
I=13
CHANNEL NUMBER:19
CALIBRATION FACTOR:  1
INSTRUMENT:EXCIT.

----------------------------
I=14
CHANNEL NUMBER:20
CALIBRATION FACTOR:  1
INSTRUMENT:BUDD BOX READINGS

----------------------------
I=15
CHANNEL NUMBER:21
CALIBRATION FACTOR:  -26388
INSTRUMENT:LOAD CELL WEST

----------------------------
I=16
CHANNEL NUMBER:24
CALIBRATION FACTOR:  .031624
INSTRUMENT:WELD CLIP GAGE NORTH

----------------------------
I=17
CHANNEL NUMBER:25
CALIBRATION FACTOR:  .02713
INSTRUMENT:WELD CLIP GAGE SOUTH

----------------------------
I=18
CHANNEL NUMBER:30
CALIBRATION FACTOR:  1
INSTRUMENT:EXCIT.

----------------------------
I=19
CHANNEL NUMBER:22
BRIDGE SIZE:.5
GAGE FACTOR:2.11
LOCATION:GAGE ON END DIAG. OF EA
ST JOIST
----------------------------
I=20
CHANNEL NUMBER:23
BRIDGE SIZE:.5
GAGE FACTOR:2.11
LOCATION:GAGE ON END DIAG. OF EA
ST JOIST
```

HAAL JOISTS
TEST IV - 2 ANGLES CUT
8-21-84

ALL DATA POINTS FROM HEREON SHOULD BE CORRECTD AS FOLLOWING POINT (Notice crossed lines)

=================================

DATA POINT: 45

FORCES
======

VERT LOAD= 0.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
~~0.000~~	-.027	~~[illegible]~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: ~~[illegible]~~
BOT CHORD, MIDSPAN: ~~[illegible]~~
DIAGONAL, END: ~~[illegible]~~ ✓ O.K.
DISPLACEMENTS, (in.)
=====================

MIDSPAN (VERT.)

EAST	WEST	AVER.
~~-5.11024~~	~~-8.11617~~	~~[illegible]~~

1/4 SPAN (VERT.)

EAST	WEST	AVER.
~~-8.56704~~	~~-7.31909~~	~~[illegible]~~

LOAD END (HOR)

EAST	WEST	AVER.
-.02456	-.02787	-.02621

SUP. END (HOR.)

EAST	WEST	AVER.
.01627	-.00199	.00714

W1=
-4.08277643711E-2
W2=
-2.58843918565E-2
W AV.=
-3.33560781138E-2

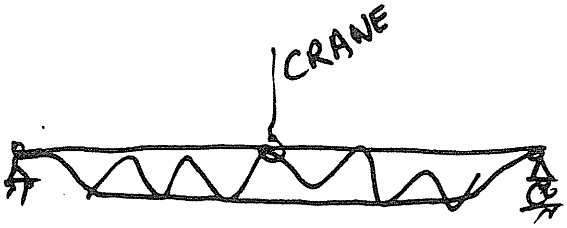
WELD STRAINS
STRAIN IN NORTH WELD= ~~[illegible]~~
571
STRAIN IN SOUTH WELD= ~~[illegible]~~
164

VOLTAGE READINGS

VER LOAD= 0
VER DISP=
-8.11616910814

CH.	VOLT
0	~~.124560~~
1	~~.252350~~
2	~~[illegible]~~
3	~~.385730~~
4	-1.629800
5	.613060
6	3.328000
7	4.168800
8	5.222300
9	~~4.390300~~
10	~~3.658000~~
11	~~3.090200~~
12	~~2.583300~~
13	~~15.226000~~
14	~~8.756300~~
15	-.000060
16	-.037306
17	-.040049
18	5.046100
19	~~[illegible]~~
20	~~[illegible]~~

At this point Joist is lifted by crane (slightly) in preparation for cutting



==========
DATA POINT: 46

FORCES
======

VERT LOAD= 0.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
~~0.000~~	-.069	~~.035~~

MEMBER FORCES ,kips

TOP CHORD, MIDSPAN: ~~312.585~~
BOT CHORD, MIDSPAN: ~~224.634~~
DIAGONAL, END: -.709
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.) ,

EAST	WEST	AVER.
~~5.00675~~	~~8.06385~~	~~6.53530~~

1/4 SPAN (VERT.)

EAST	WEST	AVER.
~~9.45530~~	~~7.22578~~	~~7.84054~~

LOAD END (HOR.)

EAST	WEST	AVER.
-.04304	-.04889	-.04596

SUP. END (HOR.)

EAST	WEST	AVER.
.01664	-.00087	.00788

W1=
-5.96745783146E-2
W2=
-4.80157934479E-2
W AV.=
-5.38451858815E-2

WELD STRAINS
STRAIN IN NORTH WELD= ~~-.191239677~~
567
STRAIN IN SOUTH WELD= ~~-.145752134~~
469

VOLTAGE READINGS

VER LOAD= 0
VER DISP=
-8.06385124308

CH.	VOLT
0	.175580
1	.277960
2	.422580
3	.431510
4	-1.627100
5	.620610
6	3.318400
7	4.157800
8	5.221500
9	4.490300
10	3.871500
11	3.437800
12	3.018400
13	15.228000
14	8.759500
15	-.000053
16	-.020114
17	-.004622
18	5.051400
19	.003755
20	.002176

==========

DATA POINT: 47

FORCES
======

VERT LOAD= 0.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	-.069	.035

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 301.314
BOT CHORD, MIDSPAN: 214.042
DIAGONAL, END: -.858
DISPLACEMENTS, (in.)

MIDSPAN (VERT.)

EAST	WEST	AVER.
4.91044	7.90621	6.40833

1/4 SPAN (VERT.)

EAST	WEST	AVER.
6.37412	7.11607	7.74509

LOAD END (HOR.)

EAST	WEST	AVER.
-.05568	-.07064	-.06316

SUP. END (HOR.)

EAST	WEST	AVER.
.01794	-.00035	.00879

W1=
-7.36198550415E-2
W2=
-7.02926479746E-2
W AV.=
-.071956251508

WELD STRAINS
STRAIN IN NORTH WELD=-.165234446
267
STRAIN IN SOUTH WELD=-7.69870343
968E-2

VOLTAGE READINGS

VER LOAD= 0
VER DISP=
-7.90621462707

CH.	VOLT
0	.223050
1	355200
2	.462350
3	.485270
4	-1.618200
5	.624430
6	3.311800
7	4.146600
8	5.220900
9	4.393100
10	3.780100
11	3.343400
12	2.913800
13	15.231000
14	8.769600
15	-.000053
16	-.016998
17	.002454
18	5.051300
19	.003774
20	.002197

==========
DATA POINT: 48

FORCES
======

VERT LOAD= 0.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
-8.808	.623	-.312

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: -301.635
BOT CHORD, MIDSPAN: 214.507
DIAGONAL, END: -.398
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-4.77499	-7.76119	-6.26809

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-8.26411	-7.09824	-7.68118

LOAD END (HOR.)

EAST	WEST	AVER.
.13334	.11779	.12557

SUP. END (HOR.)

EAST	WEST	AVER.
.01659	-.00081	.00789

W1=
.116755553738
W2=
.118608699811
W AV.=
.117682126775

WELD STRAINS
STRAIN IN NORTH WELD=-.171739522
517
STRAIN IN SOUTH WELD=-6.19724466
189E-2

VOLTAGE READINGS

VER LOAD= 0
VER DISP=
-7.76119306119

CH.	VOLT
0	.289840
1	.426280
2	.516240
3	.494010
4	-1.627200
5	.621140
6	3.404700
7	4.239400
8	5.220800
9	4.395700
10	3.782900
11	3.339600
12	2.910800
13	15.231000
14	8.769100
15	-.000169
16	-.017777
17	.003989
18	5.051200
19	.003741
20	.002106

==========
DATA POINT: 49

FORCES
======

VERT LOAD= 0.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
~~-3.000~~	20.705	~~10.353~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN ~~-305.272~~
BOT CHORD, MIDSPAN ~~220.240~~
DIAGONAL, END: 1.295
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
~~-4.82999~~	~~-7.77959~~	~~-6.30479~~

1/4 SPAN (VERT.)

EAST	WEST	AVER.
~~-8.19221~~	~~-7.05032~~	~~-7.62127~~

LOAD END (HOR.)

EAST	WEST	AVER.
-.71151	-.72417	-.71784

SUP. END (HOR.)

EAST	WEST	AVER.
.17031	.02766	.09899

W1=
-.861825569438
W2=
-.75182737208
W AV.=
-.81682647076

WELD STRAINS
STRAIN IN NORTH WELD=~~-.212880754~~
473
STRAIN IN SOUTH WELD=~~-9.90323716~~
099E-2

VOLTAGE READINGS

VER LOAD= 0
VER DISP=
-7.77959443053

CH.	VOLT
0	.262720
1	.417260
2	.551470
3	.517530
4	-.597510
5	.821620
6	2.989200
7	3.824400
8	5.220800
9	4.454300
10	3.836900
11	3.391800
12	2.976500
13	15.232000
14	8.766700
15	-.003532
16	-.022705
17	.000180
18	5.051000
19	.004255
20	.001136

==========
DATA POINT: 50

FORCES
======

VERT LOAD= 0.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	10.476	5.238

MEMBER FORCES ,kips

TOP CHORD, MIDSPAN: 305.250
BOT CHORD, MIDSPAN 217.450
DIAGONAL, END: .382
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
4.75923	7.72229	6.24076

1/4 SPAN (VERT.)

EAST	WEST	AVER.
8.24042	7.09755	7.66898

LOAD END (HOR.)

EAST	WEST	AVER.
-.41729	-.33991	-.37860

SUP. END (HOR.)

EAST	WEST	AVER.
.14210	.00149	.07180

W1=
-.559385212812
W2=
-.341403027723
W AV.=
-.450394120268

WELD STRAINS
STRAIN IN NORTH WELD=-.101060953
512
STRAIN IN SOUTH WELD=-8.16351025
212E-2

VOLTAGE READINGS

VER LOAD= 0
VER DISP=
-7.72228905752

CH.	VOLT
0	.297610
1	.445350
2	.527850
3	.494350
4	-.786500
5	.637410
6	3.133900
7	4.013800
8	5.220800
9	4.432600
10	3.807700
11	3.366900
12	2.944200
13	15.232000
14	8.769700
15	-.001819
16	-.018893
17	.001968
18	5.051000
19	.004282
20	.001355

==========
DATA POINT: 51

FORCES
======

VERT LOAD= 0.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
~~0.000~~	9.079	~~1.539~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN:~~310.752~~
BOT CHORD, MIDSPAN:~~230.146~~
DIAGONAL, END: .270
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
~~4.89871~~	~~7.13755~~	~~5.61413~~

1/4 SPAN (VERT.)

EAST	WEST	AVER.
~~7.71667~~	~~6.61885~~	~~7.16776~~

LOAD END (HOR.)

EAST	WEST	AVER.
-.30667	-.26707	-.28687

SUP. END (HOR.)

EAST	WEST	AVER.
.13513	.00478	.06995

W1=
-.441803544454
W2=
-.271849894972
W AV.=
-.356826719713

WELD STRAINS
STRAIN IN NORTH WELD=~~-.197022275~~
74
STRAIN IN SOUTH WELD=~~-8.22579087~~
063E-2

VOLTAGE READINGS

VER LOAD= 0
VER DISP=
-7.13754576564

CH.	VOLT
0	.627260
1	.731980
2	.784470
3	.729300
4	-.833170
5	.660540
6	3.188300
7	4.049700
8	5.220800
9	4.450900
10	3.881500
11	3.479900
12	3.091600
13	15.232000
14	8.770500
15	-.001585
16	-.020901
17	.001904
18	5.051000
19	.004256
20	.001411

==========
DATA POINT 52

FORCES
======

VERT LOAD= 0.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	5.669	2.835

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 321.101
BOT CHORD, MIDSPAN 254.930
DIAGONAL, END: -.002
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-3.05123	-6.21623	-4.63373

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-6.91260	-5.88500	-6.39884

LOAD END (HOR.)

EAST	WEST	AVER.
-.08410	-.03623	-.06017

SUP. END (HOR.)

EAST	WEST	AVER.
.12255	.00001	.06128

W1=
-.206649185693
W2=
-3.62406990308E-2
W AV.=
-.12144942362

WELD STRAINS
STRAIN IN NORTH WELD=-.134570576
797
STRAIN IN SOUTH WELD=-.105629388
514

VOLTAGE READINGS

VER LOAD= 0
VER DISP=
-6.21622741244

CH.	VOLT
0	1.139810
1	1.183570
2	1.178420
3	1.089420
4	-.917400
5	.626910
6	3.297700
7	4.163400
8	5.220700
9	4.486800
10	4.018900
11	3.698900
12	3.380900
13	15.232000
14	8.779000
15	-.001014
16	-.020512
17	-.000498
18	5.050900
19	.004215
20	.001525

==========
DATA POINT: 53

FORCES
======

VERT LOAD= 0.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
~~0.000~~	4.278	~~2.139~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN ~~-314.349~~
BOT CHORD, MIDSPAN ~~233.697~~
DIAGONAL, END: -.098
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
~~4.10002~~	~~7.10279~~	~~5.60560~~

1/4 SPAN (VERT.)

EAST	WEST	AVER.
~~7.70011~~	~~6.61617~~	~~7.16214~~

LOAD END (HOR.)

EAST	WEST	AVER.
.15544	.19303	.17423

SUP. END (HOR.)

EAST	WEST	AVER.
.11684	-.00477	.05604

W1=
.038593009758
W2=
.197799804243
W AV.=
.118196407001

WELD STRAINS
STRAIN IN NORTH WELD=~~-.194344619~~
681
STRAIN IN SOUTH WELD=~~-6.33031739~~
123E-2

VOLTAGE READINGS

VER LOAD= 0
VER DISP=
-7.18278703039

CH.	VOLT
0	.578870
1	.709790
2	.788650
3	.730600
4	-.955640
5	.593230
6	3.415500
7	4.276400
8	5.220700
9	4.489000
10	3.904300
11	3.512600
12	3.131600
13	15.232000
14	8.769400
15	-.000781
16	-.019286
17	.003852
18	5.050900
19	.004201
20	.001565

==========
DATA POINT: 54

FORCES
======

VERT LOAD= 0.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
0.000	4.570	2.285

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: 315.211
BOT CHORD, MIDSPAN: 237.267
DIAGONAL, END: -.091
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-4.01569	-7.02684	-5.52127

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-7.56902	-6.41652	-6.99277

LOAD END (HOR.)

EAST	WEST	AVER.
.13937	.16381	.15159

SUP. END (HOR.)

EAST	WEST	AVER.
.11749	-.00380	.05685

W1=
.021882794373
W2=
167612226034
W AV.=
9.47475102035E-2

WELD STRAINS
STRAIN IN NORTH WELD=-.135354000
465
STRAIN IN SOUTH WELD=-8.31040502
145E-2

VOLTAGE READINGS

VER LOAD= 0
VER DISP=
-7.0268416186

CH.	VOLT
0	.664240
1	.786230
2	.856800
3	.828590
4	-.951310
5	.600080
6	3.407600
7	4.262000
8	5.220700
9	4.483000
10	3.924500
11	3.543000
12	3.174500
13	15.232000
14	8.771300
15	-.000830
16	-.020605
17	.001817
18	5.050900
19	.004206
20	.001558

==========
DATA POINT: 55

FORCES
======

VERT LOAD= 16.500 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
~~8.420~~	8.171	~~4.806~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN:~~309.878~~
BOT CHORD, MIDSPAN:~~224.226~~
DIAGONAL, END: .370
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
~~4.80548~~	~~7.77862~~	~~6.29205~~

1/4 SPAN (VERT.)

EAST	WEST	AVER.
~~8.38620~~	~~7.00671~~	~~7.69646~~

LOAD END (HOR.)

EAST	WEST	AVER.
.18187	.21372	.19780

SUP. END (HOR.)

EAST	WEST	AVER.
.13025	.00870	.06947

W1=
.051621882274
W2=
.205022220639
W AV.=
.128322051457

WELD STRAINS
STRAIN IN NORTH WELD=~~-.189202027~~
184
STRAIN IN SOUTH WELD=~~-6.82169068~~
721E-2

VOLTAGE READINGS

VER LOAD= 16.5
VER DISP=
-7.7786192774 6

CH.	VOLT
0	.274800
1	.417730
2	.495610
3	.499660
4	-.865850
5	.688180
6	3.428500
7	4.286600
8	5.220700
9	4.463000
10	3.855700
11	3.425500
12	3.025100
13	15.233000
14	8.768300
15	-.001433
16	-.019868
17	.003347
18	5.050900
19	.004175
20	.001465

==========
DATA POINT: 56

FORCES
======

VERT LOAD= 16.500 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
-8.850	8.607	-8.514

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: -308.069
BOT CHORD, MIDSPAN: -212.034
DIAGONAL, END: .336
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-5.07390	-6.17663	-6.62527

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-8.75636	-7.63593	-8.19615

LOAD END (HOR.),

EAST	WEST	AVER.
15354	.18163	.16758

SUP. END (HOR.)

EAST	WEST	AVER.
.13107	.00978	.07042

W1=
.022471761038
W2=
.171846172271
W AV.=
9.71589666545E-2

WELD STRAINS
STRAIN IN NORTH WELD= -.182566611
539
STRAIN IN SOUTH WELD= -5.04835849
584E-2

VOLTAGE READINGS

VER LOAD= 16.5
VER DISP=
-8.17663451578

CH.	VOLT
0	.142440
1	.222630
2	.275040
3	.230100
4	-.860370
5	.695800
6	3.414500
7	4.270700
8	5.220600
9	4.384700
10	3.768600
11	3.318000
12	2.882500
13	15.233000
14	8.771000
15	-.001506
16	-.019073
17	.004150
18	5.050900
19	.004191
20	.001458

==========
DATA POINT 57

FORCES
======

VERT LOAD= 16.500 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
-9.300	9.001	-6.926

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: -305.779
BOT CHORD, MIDSPAN: 220.979
DIAGONAL, END: .573
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
-4.65411	-7.64693	-6.15052

1/4 SPAN (VERT.)

EAST	WEST	AVER.
-8.14394	-7.01707	-7.58050

LOAD END (HOR.)

EAST	WEST	AVER.
.15028	.18264	.16646

SUP. END (HOR.)

EAST	WEST	AVER.
.13275	.01114	.07194

W1=
.017534199844
W2=
.171507012495
W AV.=
9.45206061695E-2

WELD STRAINS
STRAIN IN NORTH WELD= -.202070113
905
STRAIN IN SOUTH WELD= -.189297029
011

VOLTAGE READINGS

VER LOAD= 16.5
VER DISP=
-7.64693223568

CH.	VOLT
0	.349430
1	.482270
2	.575100
3	.533830
4	-.849090
5	.705340
6	3.412900
7	4.271200
8	5.220600
9	4.427300
10	3.822200
11	3.395200
12	2.988900
13	15.233000
14	8.769300
15	-.001572
16	-.021410
17	-.000875
18	5.050800
19	.004158
20	.001427

==========
DATA POINT: 58

FORCES
======

VERT LOAD= 16.500 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
~~9.600~~	9.402	~~9.351~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN:~~306.235~~
BOT CHORD, MIDSPAN:~~222.422~~
DIAGONAL, END: .599
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
~~-4.58940~~	~~-7.57275~~	~~-6.08108~~

1/4 SPAN (VERT.)

EAST	WEST	AVER.
~~-9.11500~~	~~-6.99486~~	~~-7.55543~~

LOAD END (HOR.)

EAST	WEST	AVER.
.11856	.14531	.13194

SUP. END (HOR.)

EAST	WEST	AVER.
.13425	.01181	.07303

W1=
-.01568621634
W2=
.133501203362
W AV.=
.058907493511

WELD STRAINS
STRAIN IN NORTH WELD=~~-.143561419~~
972
STRAIN IN SOUTH WELD=~~-5.04503607~~
028E-2

VOLTAGE READINGS

VER LOAD= 16.5
VER DISP=
-7.572752699

CH.	VOLT
0	.381340
1	.518630
2	.588790
3	.544730
4	-.839050
5	.710090
6	3.397300
7	4.252800
8	5.220600
9	4.431100
10	3.826100
11	3.406500
12	3.007300
13	15.233000
14	8.776500
15	-.001639
16	-.014400
17	.005172
18	5.050800
19	.004162
20	.001416

==========
DATA POINT: 59

FORCES
======

VERT LOAD= 16.500 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
~~10.200~~	9.987	~~9.794~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: ~~311.093~~
BOT CHORD, MIDSPAN: ~~220.796~~
DIAGONAL, END: .644
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
~~4.29779~~	~~7.34856~~	~~5.82317~~

1/4 SPAN (VERT.)

EAST	WEST	AVER.
~~7.92039~~	~~6.73717~~	~~7.32878~~

LOAD END (HOR.)

EAST	WEST	AVER.
.05654	.08160	.06907

SUP. END (HOR.)

EAST	WEST	AVER.
.13604	.01318	.07461

W1=
-7.94973246327E-2
W2=
6.84258045231E-2
W AV.=
-5.5357600548E-3

Pin-Pin

WELD STRAINS
STRAIN IN NORTH WELD=~~-.135720653~~
377
STRAIN IN SOUTH WELD=~~-.108052487~~
238

VOLTAGE READINGS

VER LOAD= 16.5
VER DISP=
-7.34856157451

CH	VOUT
0	.525130
1	.628520
2	.684630
3	.671200
4	-.827050
5	.719730
6	3.366800
7	4.221400
8	5.220600
9	4.461600
10	3.877300
11	3.481700
12	3.103800
13	15.233000
14	8.777200
15	-.001737
16	-.020648
17	-.000747
18	5.050700
19	.004170
20	.001396

==========

DATA POINT: 60

FORCES
======

VERT LOAD= 33.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
~~13.208~~	9.987	~~9.794~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: ~~311.693~~
BOT CHORD, MIDSPAN: ~~230.796~~
DIAGONAL, END: .644

DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
~~4.81097~~	~~7.80478~~	~~6.30788~~

1/4 SPAN (VERT.)

EAST	WEST	AVER.
~~8.35839~~	~~7.25944~~	~~7.80892~~

LOAD END (HOR.)

EAST	WEST	AVER.
.07823	.11342	.09582

SUP. END (HOR.)

EAST	WEST	AVER.
.14631	.01887	.08259

W1=
-7.94973246327E-2
W2=
6.84258045231E-2
W AV.=
-5.5357600548E-3

WELD STRAINS
STRAIN IN NORTH WELD= ~~-.195720653~~
377
STRAIN IN SOUTH WELD= ~~-.180852487~~
238

VOLTAGE READINGS

VER LOAD= 33
VER DISP=
-7.34856157451

CH.	VOLT
0	.272080
1	.404890
2	.470020
3	.414870
4	-.758240
5	.759820
6	3.377400
7	4.237000
8	5.220500
9	4.479800
10	3.869000
11	3.437900
12	3.032000
13	15.233000
14	8.771600
15	-.002193
16	-.021745
17	-.004278
18	5.050700
19	.004103
20	.001309

==========
DATA POINT: 61

FORCES
======

VERT LOAD= 33.000 lb/ft

RAM LOADS ,kips

EAST	WEST	AVERAGE
~~24.710~~	9.987	~~9.794~~

MEMBER FORCEC ,kips

TOP CHORD, MIDSPAN: ~~311.093~~
BOT CHORD, MIDSPAN: ~~230.796~~
DIAGONAL, END: .644
DISPLACEMENTS, (in.)
==========

MIDSPAN (VERT.)

EAST	WEST	AVER.
~~4.72735~~	~~7.81045~~	~~6.26890~~

1/4 SPAN (VERT.)

EAST	WEST	AVER.
~~8.30823~~	~~7.21153~~	~~7.79988~~

LOAD END (HOR.)

EAST	WEST	AVER.
-.60432	-.59483	-.59958

SUP. END (HOR.)

EAST	WEST	AVER.
.21449	.02499	.11974

W1=
-7.94973246327E-2
W2=
6.84258045231E-2
W AV.=
-5.5357600548E-3

WELD STRAINS
STRAIN IN NORTH WELD= ~~.195720657~~
377
STRAIN IN SOUTH WELD= ~~.100052487~~
238

VOLTAGE READINGS

VER LOAD= 33
VER DISP=
-7.34856157451

CH	VOLT
0	.313320
1	.402120
2	.455410
3	.438390
4	-.301610
5	.802960
6	3.041800
7	3.886000
8	5.220600
9	4.462100
10	3.851200
11	3.412900
12	2.993200
13	15.233000
14	8.774200
15	-.004154
16	-.022592
17	-.004996
18	5.050700
19	.004156
20	.001004

END OF TEST IV
8/21/84

PROJECT HAAG JOISTS

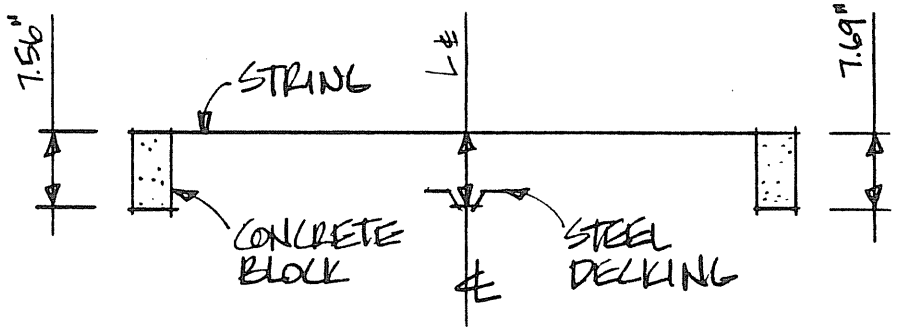
TEST IV-2 ANGLES CUT

TEST JOIST B19

BAR JOIST TEST ASSEMBLY CRANE SUPPORTED AT CENTERLINE.

BOTH TEST JOIST AND NEW JOIST BOTTOM CHORDS CUT AT BAR JOIST TEST ASSEMBLY CENTERLINE.

BAR JOIST TEST ASSEMBLY CENTERLINE DEFLECTIONS MEASURED AT CENTERLINE WITH TAPE MEASURE:



NOTE THAT $-\Delta_{\ell}$ INDICATES DOWNWARD DEFLECTION

DATE 8-22-24

BY CJM

PROJECT HAAG JOISTS

TEST IV - 2 ANGLES CUT

TEST JOIST B19

BAR JOIST TEST ASSEMBLY CENTERLINE DEFLECTION:

DATA POINT	L_ℓ (IN)	Δ_ℓ (IN)	REMARKS
46	6.54	-1.05	PRIOR CUT / CRANE SUPPORT
47	6.40	-1.19	AFTER CUT / CRANE SUPPORT
48	>15	-7.41	REST ON CRIBBING
49	$12\frac{1}{16}$	-4.47	RAMS AT 42"
50	14	-6.41	RAMS AT 22"
51	$15\frac{1}{4}$	-7.66	GRADUAL RAM RELEASE
52	$15\frac{7}{8}$	-8.29	GRADUAL RAM RELEASE
53	$20\frac{3}{4}$	-13.16	GRADUAL RAM RELEASE
54	$20\frac{7}{8}$	-12.79	GRADUAL RAM RELEASE
55	$22\frac{1}{16}$	-14.47	
56	$22\frac{1}{16}$	-14.47	
57	$22\frac{7}{16}$	-14.60	REST ON LAB FLOOR
58	$21\frac{3}{4}$	-14.16	
59	$21\frac{1}{4}$	-13.66	
60	$22\frac{5}{16}$	-14.72	
61	$17\frac{1}{2}$	-9.91	END OF TEST

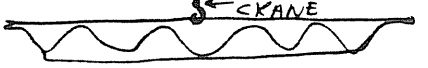
DATE 8-22-84

BY SJM

HAAG

TEST IV

8-21-84

ACTION	Ram load	Data Point
~~132 unif. + (P_1 = 6 Blcks., P_2 = 8)~~	~~8.2~~	~~35~~
132 unif. + (P_1 = 6, P_2 = 8) (BALANCED)	8.40	36
132 unif. + (P_1 = 8, P_2 = 10)	8.70	37
132 unif. + (P_1 = 8, P_2 = 11) Ponding Equilib.	8.75	38
132 unif. + (P_1 = 8, P_2 = 11) Pond. Equilib. (40 minutes after Point 39)	8.75	39
132 unif (no Ponding)	7.29	40
99 unif	5.46	41
66 lb/ft unif	3.82	42
33 lb/ft unif.	2.38	43
~~0 All Blocks Removed~~	~~1.42~~	~~44~~
0 CRANE IS HOLDING THE JOIST 	0	46

HAAG

TEST IV

8-21-84

AFTER CUTTING BOTT CHORDS

ACTION	℄ DEFLECTION	OPENNING OF CUT	RAM LOAD	DATA PON
Both Bott. Chords are cut. Crane is holding the Joist	SEE OTHER 2 SHEETS		.20	47
Crane lowered. Joist Deflected downward			.47	48
End rams were loaded and midspan was lifted up			21.30	49
Rams were released			11.20	50
			0	51
Rams were loaded			4.8	52
			4.4	53
Balanced condition (Pin-Pin)			4.8	54

8/21/84

TEST IV

16.5 lb/ft Almost hitting the ground (End 7 Blocks are missing)	8.4	55
16.5 lb/ft More ram load applied (End 7 Blocks are missing)	8.88	56
16.5 lb/ft complete Vert. load	9.30	57
16.5 lb/ft ram load applied	9.80	58
16.5 " " " " (Pin-Pin) Balanced		59
P3.0 ℄ is sitting on the ground	13.11	60
		61