w/ LTR. dtd. Nov. 15, 1995

CRWMS/M&O

Design Analysis Review Summary

Complete only applicable items.

(1.) QA: L

Page: 1 Of: 1

2. DESIGN ANALYSIS TITLE

ESF GROUND SUPPORT - STRUCTURAL STEEL ANALYSIS

3. DOCUMENT IDENTIFIER (Including Rev. No.)	4. REV. NO.
BABEE0000-01717-0200-00003 REV 00	00
5. ORIGINATOR SPIRO ROMANOS	6. DATE 05/30/95
7. CHECKER	8. DATE

9. Due Date	10. Discipline	11. Review		Comments		12. Backcheck	
		Signature	Date	Yes	No	Signature	Date

NOT REQUIRED

13. REMARKS

The Structural Steel Analysis will go directly into External Review. No Inter-Discipline review is required because this analysis (revision) does not affect any other disciplines, only expands on the previous steel set analysis (DI: BABEAB000-01717-0200-00002, Rev. 04), adds calculations for the smaller W6x20 size steel set, and was performed in conjunction with the only other involved discipline, Geotechnical, as documented in the Ground Support Analysis (DI: BABEE0000-01717-0200-00002, Rev. 00).

14. APPROVED:

Originator Signature	Date
Checker Signature	Date
LDE Signature	Date
QA Signature	Date

0486 (Rev. 02/03/95)

QAP-3-9

CRWMS/M&O

Design Analysis Cover Sheet

Complete only applicable items.

(1.)

QA: N

2. DESIGN ANALYSIS TITLE		
ESF GROUND SUPPORT - STRUCTURAL STEEL ANALYSIS		
3. DOCUMENT IDENTIFIER (Including Rev. No.)	4. REV. NO.	5. TOTAL PAGES
BABEE0000-01717-0200-00003 REV 00B	00B	20
6. TOTAL ATTACHMENTS	7. ATTACHMENT NUMBERS - NO. OF PAGES IN EACH	8. SYSTEM ELEMENT
9	I-174,II-62,III-108,IV-1,V-1,VI-8,VII-10,VIII-27,IX-19	MGDS SUBSURFACE

	Print Name	Signature	Date
9. Originator	M. E. Taylor, Jr.		
10. Checker	Matthew Gomez		
11. Lead Design Engineer			
12.QA Manager			
13. Department Manager	J. L. Naaf		

14. REMARKS

1. TBV-193: Seismic design values for steel sets to be verified later.
2. TBD-147: Thermally-induced stresses in the steel sets (or lining) to be determined later.
3. TBD-154: Upgrades (if needed) to linings and ground supports due to a credible explosion and fire will be determined after completion of risk assessment.
4. TBV-XXX: (Informal) Pending approval of Rev 00 of ESF Ground Support Design Analysis, BABEE0000-01717-0200-00002, this TBV will be removed prior to final check and verification.
5. QA Classification of structural steel and accessories are QA-1 and QA-5 except for: jacking brackets and connection to steel set, lagging clamps and carriage bolt assembly, and expansion bolts in concrete invert segment which are classified as QA: NONE.

CRWMS/M&O

Design Analysis Revision Record

Complete only applicable items.

(1.)

QA: N

2. DESIGN ANALYSIS TITLE	
ESF GROUND SUPPORT - STRUCTURAL STEEL ANALYSIS	
3. DOCUMENT IDENTIFIER (Including Rev. No.)	4. REVISION NO.
BABEE0000-01717-0200-00003 REV 00B	00B

5. Revision No.	6. Total Pages	7. Description of Revision
00B	20	NOTE: The Document Identifier (DI) for this analysis has been changed to adopt the new CII system. The original DI for this analysis was: BABEAB000-01717-0200-00002. Revisions 00, 01, 02, 03, and 04 were developed and approved under the original DI. The new DI is: BABEE0000-01717-0200-00003 which is adopted in this analysis. The new DI will start with Revision 00. This analysis has been expanded to address the Exploratory Studies Facililty (ESF) ground support structural steel design. The ESF includes the TS North Ramp, TS Main Drift, and TS South Ramp. The history of changes for the revisions under original DI can be found in REV 04 of BABEAB000-01717-0200-00002. BABEE0000-01717-0200-00003 REV 00 Title of analysis changed. Analysis was reformatted to conform to QAP-3-9, Rev. 05, Attachment I new format. Attachment I, Revised to include several computer analyses of the various jacking conditions to bound the jacking process. Attachment II, Deleted entire contents and replaced with the computer analysis results from ESF Ground Support Design Analysis (Reference 5.20). Attachment III, Revised the design calculations using forces from Attachment I and II. Attachment IV, Deleted entire contents. Attachment V, Deleted entire contents. Attachment VI, Removed Hilti Bolt information, added title. Attachment VII, Added entire attachment for clarification of the erection and shop fabrication tolerances. Attachment VIII, Added entire calculation to check W6x20 steel set for jacking loads. Attachment IX, Added entire contents, summary of design sketches. Main body of analysis, many miscellaneous editorial revisions throughout. Removed TBV-192 (Released on 12/30/94) Issued for External Review.

1. PURPOSE

1.1 The purpose and objective of this analysis are to analyze, design, and select the structural steel ground support members and components for the Exploratory Studies Facility (ESF).

1.2 This analysis includes design calculations for the following ground support structural members, components, and features (attachments where calculations are found are in parentheses after each item):

A. Steel Sets (I, II.A and VIII)
B. Steel lagging (III.B)
C. Tie rod and pipe spacer (III.D)
D. Steel set foot plate (III.E)
E. Steel set connection to insert (III.G)
F. Connection between steel set segments (III.G)
G. Inserts (III.C)
H. Steel set foot segments (III.H and III.I)
I. Shim plates (III.K)
J. Steel wedges (III.L)
K. Jacking bracket assembly and bolted connection to steel set (III.C and VI)
L. Tolerances (VII)
M. Summary of Design Sketches (IX)
N. FLAC Computer Output (II)

2. QUALITY ASSURANCE

2.1 The quality assurance (QA) classifications for structural steel ground support in this analysis are presented in QA Classification Analysis of Ground Support Systems ([Configuration Item] CI: BABEE0000) (Reference 5.5).

2.2 The following structural steel ground support components are permanent and are classified QA-1 and QA-5:

A. Steel set
B. Steel lagging
C. Tie rod and pipe spacer
D. Steel set foot plate
E. Steel set connection to insert
F. Connection between steel set segments
G. Insert
H. Steel set foot segments
I. Shim plate
J. Steel wedges.

2.3 The drilling of holes in the steel set members and bolting of connections are subject to Q-Controls.

2.4 The following structural component is temporary and is classified "NONE":

- Jacking bracket assembly and bolted connection to steel set

The jacking brackets and connection will be used during installation of steel sets only. Since the brackets have no permanent ground support function, they are not considered important to waste isolation or radiological safety.

3. METHOD

3.1 The Steel Set is analyzed for two basic conditions:

3.1.1 Installation/jacking process associated with erecting the steel sets after the ground has been excavated by the tunnel boring machine (TBM)—the computer software STAAD-III/ISDS (See Section 6, "USE OF COMPUTER SOFTWARE") is used to analyze steel sets and verify size of steel members as noted in Section 3.2.

3.1.2 Long-term rock load condition—the long-term rock load analysis, including utility and seismic loads, was determined in ESF Ground Support Design Analysis (Reference 5.20). The resulting forces and moments were then used for the design of the steel set and components, noted in Section 3.2.

3.2 The steel set and other components listed in Section 1.2 are designed by hand calculations using the results of the ESF Ground Support Design Analysis (Reference 5.20) outputs, installation/jacking loads, and other inputs listed in Section 4.

4. DESIGN INPUTS

4.1 DESIGN PARAMETERS

4.1.1 Seismic - Mean Peak Horizontal Acceleration = 0.37g (TBV-193). (Appendix A.5, Page A.5-2, Reference 5.16).

4.1.2 Rock Mass Properties (Reference 5.9, Tables 4 and 5) as used in design of lagging (Attachment III.B).

Geologic Unit	Mean Density		Minimum Friction Angle
	Kg/m^3	lb/ft^3	
TCW	2150	134	53°
PTn	1299	81	40°
TSw1	2162	135	41°
TSw2	2274	142	49°

4.1.3 Precast Concrete Dimensions - Drawings (References 5.7 and 5.8). Dimensions used in this analysis were:

- Curb face angle = 31.01° (±) 0.02°
- Invert segment width = 48 inch (1220 mm)
- Curb face width = 7½ inch (191 mm)
- Notch dimension on back of curb face = ½ inch x 3 inch (13 mm x 76 mm)
- Minimum side cover on bars = 1½ inch (38 mm)
- Base thickness = 28⅛ (715 mm)
- Curb rebar is as shown on Reference 5.7 and 5.8

4.1.4 The configuration of the steel sets was developed through numerous meetings and discussions between the A/E and Contractor during the development of the Steel Set Shop Drawings (Reference 5.11) and previous analyses (Reference 5.6). Details, were refined to accommodate construction methods and the installation process.

4.1.5 The critical dimensions for the jacks used in this analysis for the design of the jacking bracket are from References 5.18 and 5.19 and are as follows (see Attachment VI):

4.1.5.1 25 ton jack for W8 steel set (HSR 258T or HSR2510T):

	258T	2510T
Capacity	25 Ton	25 Ton
Stroke	8¼ inch	10¼ inch
Closed Height	12¾ inch	14¾ inch
Body Dimension	3⅜ inch	3⅜ inch

4.1.6 Tunnel (Topopah Spring [TS] North Ramp) grade is 2.148 percent (Reference 5.12).

4.1.7 Not Used.

4.1.8 Not Used.

4.1.9 TS North Ramp Tunnel Diameter = 7.62 meters nominal (Reference 5.12).

4.1.10 Force results in steel set from ESF Ground Support Design Analysis (Reference 5.20). Axial forces moments and shears are provided at various locations (nodes) throughout the steel set. This output from Reference 5.20 has been included as Attachment II to the analysis.

4.1.11 Not Used.

4.1.12 Specified Compressive Strength of Concrete f'c = 5,000 pounds per square inch (psi) (Reference 5.21).

4.1.13 Rock Bearing Capacity = 37 kips per square foot (ksf) to 110 ksf (Reference 5.9, Table 5-6 and 7).

4.2 CRITERIA

The following design criteria, applicable to this analysis, were developed in response to requirements in the Exploratory Studies Facility Design Requirements (ESFDR) document (Reference 5.16).

4.2.1 The structural steel design shall conform to applicable standards pertaining to natural hazards and foundation stability, i.e., the applicable requirements specified in U.S. Department of Energy, DOE Order 6430.1A, General Design Criteria, Sections 0111-1, 0111-2, 0111-3, 0111-99, 0140, and Division 5. (ESFDR 3.2.1.G)

4.2.2 The structural steel shall be designed and constructed with the same criteria, standards, and QA as required for a repository, to the extent known at the time of design. (ESFDR 3.2.1.H, 3.2.1.H.1.c, 3.2.1.29)

4.2.3 The structural steel shall be designed for seismic loading (TBV-193) conditions so the seismic loads will not interfere with necessary safety functions. The ESF seismic design criteria are those included in Appendix A.5 of the ESFDR. Thermal loading (TBD-147) conditions are To Be Determined and are deferred until thermal stresses are determined. The steel sets as designed will provide safe and maintainable subsurface ground support and control under all anticipated conditions. (ESFDR 3.2.1.H.2, 3.2.1.H.2.a, 3.2.1.N, 3.2.1.N.1, 3.2.1.N.2, 3.2.1.N.2.a, 3.2.1.10.1, 3.2.1.10.1.A, 3.2.1.10.1.B, 3.2.1.10.1.I, 3.2.2.4.T.3, 3.2.2.4.T.1, 3.2.2.4.T.2, 3.2.2.4.U.6.b, 3.2.2.U.6.d, 3.2.2.4.V, 3.2.2.4.V.1, 3.2.2.4.V.2, 3.2.2.4.V.3, 3.2.2.4.V.4, Appendix A.4, Appendix A.5)

4.2.4 The structural steel shall be designed to permit periodic inspection testing and maintenance as necessary, to ensure its continued functioning. (ESFDR 3.2.1.H.2, 3.2.1.H.2.d, 3.2.1.M.2)

4.2.5 The structural steel ground support system shall be designed to meet the needs of site characterization testing and confirmation programs. (ESFDR 3.2.1.I.1, 3.2.1.I.2, 3.2.1.I.4, 3.2.1.K, 3.2.1.M.1)

4.2.6 The structural steel shall be designed and constructed with reasonably available technology similar to or corresponding with the techniques planned for the potential repository. Technology used shall be reasonably available technology that exists and has been demonstrated, or for which the results of any necessary development, demonstration, or confirmatory testing will be available prior to its application to the steel sets. (ESFDR 3.2.1.K)

4.2.7 Structural steel design and construction shall limit adverse effects, to the extent practical, on the long-term performance of the geologic repository; shall not adversely affect in situ site characterization.
(ESFDR 3.2.1.M, 3.2.1.M.1, 3.2.1.M.2)

4.2.8 Specific boundaries and interfaces between participating organizations' designs are identified in the Yucca Mountain Site Characterization Project (YMP) Interface Control Document. Structural steel design shall comply with the requirements of this document and with the boundary and interface impacts of the requirements and criteria throughout this document. Interdiscipline and external reviews and interface control procedures and documents accomplish this objective. (ESFDR 3.2.1.Z, 3.2.1.Z.1, 3.2.1.Z.2, 3.2.1.4.H, 3.2.1.6.E)

4.2.9 The structural steel ground support shall be designed so that when incorporated into the potential repository the steel will continue to perform its safety functions under credible fire and explosion conditions.
(ESFDR 3.2.1.9.2.A.3) (TBD 154)

4.2.10 The structural steel ground support shall be designed and constructed for a 100-year maintainable life, see Section 7.1. (ESFDR 3.2.1.9.4.B.5, 3.2.1.9.4.C.3)

4.2.11 Special processes for structural steel, including welding, and nondestructive testing, shall be controlled and performed by qualified personnel using approved procedures, and where applicable, in accordance with the Quality Assurance Requirements and Description. Workmanship criteria shall reflect the currently applicable codes, standards, regulations, and architectural and engineering principles and practices specified in DOE Order 6430.1A (General Design Criteria) - 0109. This will be done in the structural steel set output documents (also see Section 7.6). (ESFDR 3.2.1.17.A, 3.2.1.17.B)

4.2.12 Computer analyses shall be performed and documented in accordance with the applicable M&O Software Quality Assurance procedures. (ESFDR 3.2.1.25.7)

4.2.13 The structural steel ground support items shall incorporate use of noncombustible material to the extent practical. (ESFDR 3.2.1.H.2, 3.2.1.H.2.c, 3.2.1.H.2.c.i, 3.2.1.4.E.1)

4.3 ASSUMPTIONS

4.3.1 The steel set loading assumption in Reference 5.20 will be confirmed by the Architect/Engineer (A/E) geotechnical engineer during TBM tunnel construction. The steel set spacing may be adjusted to 2 feet ($\pm$2 inches) as needed to accommodate rock loads.

4.3.2 It is assumed that seismic design values used in this analysis are conservative. However, these values will need to be verified (Reference 5.20) (TBV 193).

4.3.3 It is assumed that the steel set and accessories possess sufficient reserve capacity such that anticipated corrosion of the steel will not impact the load carrying capacity of the members. The basis for this assumption is that the tunnel is not a corrosive environment; therefore this assumption need not be verified.

4.3.4 It is assumed that thermal loading on the steel sets will not govern the design of the members. Thermal loads on steel sets have yet to be determined (TBD 147).

4.3.5 The lateral and vertical restraints location used in the computer models for jacking load analysis is assumed to be at every four nodes, which corresponds to approximately 6 feet based on engineering judgement, limitations common in the mining industry, and on observed field conditions. This is consistent with assuming positive contact between steel sets and the rock walls and crown when the jacking has just been completed.

4.3.6 It is assumed that loads due to a credible explosion in the tunnel will not affect the design of the steel sets. However, upgrades to linings and ground support due to a credible explosion in potential repository operation need to be determined after establishment of explosion loads, if applicable. (TBD 154).

4.3.7 The TBV's and TBD's are identified above will be carried into the output documents.

4.4 CODES AND STANDARDS

4.4.1 American Concrete Institute (ACI):

ACI 318-89 Building Code Requirements for Reinforced Concrete (ACI 318-89, Revised 1992) and Commentary (ACI 318R-89, Revised 1992).

ACI 301-89 Specifications for Structural Concrete for Buildings

4.4.2 American Institute of Steel Construction (AISC):

AISC M016-89 AISC Manual of Steel Construction, Allowable Stress Design, Ninth Edition

4.4.3 American Society of Mechanical Engineers (ASME):

ASME B.18.5-90 Round Head Bolts (Inch Series)

4.4.4 American Society for Testing and Materials (ASTM):

ASTM A6/A6M-94a Standard Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use

ASTM A36/ A36M-94	Standard Specification for Carbon Structural Steel
ASTM A106-94a	Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service
ASTM A307-94	Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
ASTM A325-94	Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 kips per square inch ksi Minimum Tensile Strength
ASTM A370-94	Standard Test Methods and Definitions for Mechanical Testing of Steel Products
ASTM A490-93	Standard Specification for Heat-Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength
ASTM A563-94	Standard Specification for Carbon and Alloy Steel Nuts
ASTM A570/ A570M-92/93	Standard Specification for Steel, Sheet and Strip, Carbon, Hot-Rolled, Structural Quality
ASTM A606-91a	Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance
ASTM F436-93	Standard Specification for Hardened Steel Washers

4.4.5 American Welding Society (AWS):

AWS B2.1-84	Standard for Welding Procedure and Performance Qualification
AWS D1.1-94	Structural Welding Code-Steel, Thirteenth Edition

4.4.6 Code of Federal Regulations (CFR):

CFR, Title 29	Labor; Part 1910, Occupational Safety and Health Standards, July 1, 1994
CFR, Title 29	Labor; Part 1926, Safety and Health Regulations for Construction, July 1, 1994

CFR, Title 30 Mineral Resources; Chapter 1, Mine Safety and Health Administration, Department of Labor; Part 57, Safety and Health Standards-Underground Metal and Nonmetal Mines, July 1, 1994

4.4.7 Uniform Building Code (UBC):

Uniform Building Code, 1994

4.4.8 United States Department of Energy (DOE):

DOE 6430.1A General Design Criteria

5. REFERENCES

5.1 Not Used.

5.2 Package 1A, Starter Tunnel Test Alcove, Elevation & Section Drawing YMP-025-1-MING-MG 128 Rev 3.

5.3 Package 1A, Starter Tunnel Gen. Arrangement Plan (Sht. 2), Drawing YMP-025-1-MING-MG 121 REV 3.

5.4 Technical Report: "Seismic Design Inputs for the ESF at Yucca Mountain," BAB000000-01717-5705-00001 REV 02.

5.5 QA Classification Analysis of Ground Support Systems (CI: BABEE0000), BABEE0000-01717-2200-00001 REV 02.

5.6 Structural Steel Sets Analysis, BABEAB000-01717-0200-00002 REV 04.

5.7 Rail Placement Invert Segments - B, Plan & Sections, Drawing BABFCC000-01717-2100-41100 REV 03.

5.8 Rail Placement Invert Segments - A, Plan Sections & Details, Drawing BABFCC000-01717-2100-41099 REV 03.

5.9 Geology of the Exploratory Studies Facility TS Loop, BAB000000-01717-0200-00002 REV 00.

5.10 Software Requirements Document for Structural Analysis and Design/Integrated Structural Design System (STAAD-III/ISDS), Version 4-8 MB, Rev. 16.0, Computer Software Document Number: SRD-02, Revision 0, Computer Software Configuration Item (CSCI) Number 20.93.3002-AAU4-8MB.

5.11 Steel Sets and Accessories Shop Drawings submittals, Commercial Pantex Sika, Inc., BABEAB000-01717-6300-02341-VD-54-0, 55-0, and 58-1.

5.12 TS North Ramp Excavation Layout Profile - Sheet 2 of 7, Drawing BABEAD000-01717-2100-40111, Rev. 01.

5.13 Not Used.

5.14 Not Used.

5.15 Not Used.

5.16 Yucca Mountain Site Characterization Project, "Exploratory Studies Facility Design Requirements," Rev. 01, ICN-2, YMP/CM-0019.

5.17 Not Used.

5.18 Simplex Catalog SC101, Hydraulic and Mechanical Power, 1995.

5.19 TK SIMPLEX Catalog, Hydraulic and Mechanical Jacks for Industry, 1990.

5.20 ESF Ground Support Design Analysis BABEE0000-01717-0200-00002 REV 00.

5.21 Precast Concrete Specification, BABFCC000-01717-6300-03480, REV 00.

5.22 Non-Gassy Mine Classification Analysis, BABE00000-01717-0200-00115 REV 00.

6. USE OF COMPUTER SOFTWARE

6.1 Basis for Computer Use: The steel set (W8 or W6 shape) is a symmetrical arch frame which is a statically indeterminate structure subject to a variety of loading conditions. The general approach to the problem of analysis of statically indeterminate structures with different loading conditions is to utilize the accuracy and speed of the computer to efficiently derive the forces, reactions and moments for the steel set and the size of the W8 or W6 shape using an appropriate indeterminate structural analysis.

6.2 Computer inputs and outputs are presented in Attachments I and II. The steel set W8 or W6 shape is analyzed and initially checked by computer in these attachments. The initial computer check is verified by hand calculation. The permanent attachments and connections are designed by hand calculations (Attachment III) using the maximum axial forces, shears, and moments from the computer analysis output.

6.3 Computer hardware used for this analysis - IBM Compatible 486/33 Mhz.

6.4 STAAD-III/ISDS (Reference 5.10), CSCI No. 20.93-3002-AAU4-8MB, is the computer software used for this analysis. The computer software has been validated, verified, and controlled in accordance with applicable M&O procedures.

6.5 The computer software used in this analysis is appropriate for this application since the STAAD-III program was specifically selected and validated for the purpose of analyzing and designing the steel sets and accessories. The program was used within the validated range as described in the verification and validation documentation.

7. DESIGN ANALYSIS

7.1 INTRODUCTION

Steel sets comprised of radiused wide-flange structural shapes have been selected as the appropriate ground support system (including configuration and spacing) based on the ESF Ground Support Design Analysis (Reference 5.20).

The ESF ground support structural steel analysis is based on two conditions. The first condition is the installation/jacking process associated with erecting the steel sets after the ground has been excavated by the TBM. The second condition is the long term operating conditions for the steel set, which includes the long term rock loading and the various utility service supports loads. Of these two conditions, the second (Reference 5.20) establishes the starting point for the analysis of the structural steel.

The shape of the steel set is based on the excavated diameter of the tunnel as set by the TBM. Spacing of the steel sets was established at 1.22 m (4 feet) center to center, nominally, based on construction and equipment limitations associated with the weight and size of the ground support segments and nominal steel set sections associated with a tunnel of this size and the excavation method. Where weaker ground is encountered requiring heavier steel support, the spacing of the steel sets is reduced to 0.61 m (2 feet). With this reduced spacing the steel set configuration would remain the same as that used at 1.22 m (4 feet) spacing, but the lagging span would decrease to provide a stronger support system for the higher rock loads. Also, the 2 foot spacing was provided from Reference 5.20.

Configuration of the steel set was developed during (undocumented) review meetings between the A/E and Contractor and previous analyses (Reference 5.6). A multiple piece set was selected to facilitate handling and erection within the tunnel. The steel set was configured into three large segments (one crown segment and two wall segments) and two small segments; i.e., the foot segments (See Steel Set Detail, Alternate I, Attachment IX). The three large segments provide ground support for the tunnel crown and walls. The two small segments are an extension of the wall segments and have a foot plate on one end that rests on a precast concrete invert foundation. An insert and shims or shims alone are placed between the wall segments and foot (small) segments upper plates during expansion of the steel set. As an alternative steel set configuration (See Steel Set Detail, Alternate III, Attachment IX), the two wall segments are extended and the two foot segments that rest on the precast concrete invert foundation are reduced. Inserts and shims are placed between the wall segments and the foot segment upper plate during the expansion/jacking process.

As shown in Attachment IX, Alternate I consists of a longer foot segment with a jacking bracket near the upper end. A similar jacking bracket is attached to the lower end of the

wall segment. The brackets are aligned such that the reaction line of the jacking force passes through the center part of the foot segment base plate, thus eliminating any eccentricity on the foot segment base plate and ensuring stability of this member. The base plate of the foot segment has a small shear plate that engages the outside edge of the invert segment curb to resist inward shear forces under seismic loading conditions. In addition, only shim plates, are required between the foot segment and the wall segment.

Alternate III in Attachment IX represents the jacking bracket design as used to date. In this design a shorter foot segment is used. This configuration requires an insert segment and shim plate between the foot segment and wall segment. The jacking brackets, though similar in design to Alternate I, are aligned such that an eccentric load is applied to the foot segment. To counteract this load and to assure stability of the foot segment, a stiffened leg was added to the base plate to engage the top face of the invert segment curb.

The final configuration of the steel set with detailed dimensions is shown in Attachment IX.

Although individual steel sets cannot be guaranteed to last for the design life of 100 years, due to long term rock loads effects and other factors, they have been designed for a "maintainable life" of 100 years. This means that steel sets exhibiting obvious signs of deterioration or distress can accommodate removal and replacement either with other steel sets of like kind or with other means of ground support. Similarly, the steel sets as presently designed do not preclude future methods of rock support for repository loads, i.e., tunnel shotcrete lining with steel sets remaining in place as sacrificed members.

It should be noted that the design and configuration of the steel sets and accessories as presented in this analysis only represent one method for ground support of the ESF. The contractor will be encouraged to develop alternative support design to facilitate construction as long as the critical attributes of the ground support system as identified in Section 8.5 are met.

7.2 STEEL SET JACKING

The purpose of jacking the steel set is to bring the profile of the steel set into positive contact with the excavated profile and to support unsound, loose or raveled rock resulting from the excavation process. The steel set was analyzed to establish the maximum jack forces for the jacking operation. A (STAAD-III) computer analysis was performed to determine the effects of various size jacks, 50^T, 30^T and 25^T, on the steel set and what the resulting stress ratios were for these three different size jacks using the AISC code check option of the STAAD-III software. The selected jack size/capacity was analyzed for simultaneous jacking and one sided jacking to determine the governing condition. The computer input files and output results for all jacking cases are presented in Attachment I. The explanations of the loading conditions including loading points in the model, loading values and location of supports are presented in detail in Attachment I.

The jacking analysis used a structural model of the steel set with joints and members that accurately describe the actual steel set configuration. Supports/contact points were modelled to reflect the actual steel sets behavior during the jacking process. At the initial

stage of the jacking operation, the steel set starts to make contact with the tunnel walls which provide horizontal support for the steel set from the bottom to about the spring line level. The distance between these horizontal supports is modelled to be at each fourth node (about 6 feet based on engineering judgement, limitations common in the mining industry, and observed field conditions), which conservatively reflects the positive contact requirements for steel set installation. No vertical support is provided below the spring line due to the fact that the steel set is moving upward during the jacking operation and only supports above the spring line could restrain this movement. As the jacking force increases, more contact is made at about mid distance between the spring line and the crown where the support has a horizontal as well as a vertical component. In the final stage, the crown makes contact with the steel set providing the vertical restraint required, which is represented in the model by two vertical supports close to and symmetric about the crown.

The self weight of the steel set was increased in the analysis to account for the additional weight of lagging and other components. No frictional forces were considered as part of the jacking analysis to ensure that the results were conservative and maximum stress for design could be obtained.

7.3 LONG-TERM ROCK LOADING AND UTILITY SERVICES

The purpose of this portion of the analysis is to determine maximum design stresses, forces and reactions resulting from long-term rock loading and normal operating conditions. The results of this analysis are then compared with the jacking portion of the analysis to determine the governing condition for the structural design and selection process of the steel set and its associated components.

The long-term rock loading analysis results (including utility and seismic loads) are included in Attachment II and were determined in Reference 5.20.

7.4 DESIGN SELECTION PROCESS

The analysis to support the design selection process for the structural members, components, and attachments (outlined in Section 1.2) are presented in detail in Attachments I, III, and VIII. Calculations for all structural members, components, and attachments are presented under appropriate headings (with a reference to representative subsection in Section 1.2) in those attachments. A summary of the conclusions from all attachments are found in Section 8.7.

7.5 BOLTED CONNECTIONS

Requirements for bolted connections using ASTM A307 and A325 bolts and at Constructor's option ASTM A490 bolts are provided below:

The bolted connections in this analysis were determined to be not slip-critical based on the fact that there is little impact, vibration, repetitive loads, load reversals, or high tensile forces in the steel set connections which would tend to reduce the friction between the joint plates (also AISC M016, p. 5-270, Paragraph 5[a]).

A307 and A325 bolts shall be visually inspected as snug tight in accordance with AISC (Codes and Standards 4.4.2). In AISC, p. 5-303, "snug tight condition is defined as the tightness that exists when all plies in a joint are in firm contact. This may be attained by a few impacts of an impact wrench or the full effort of a man using an ordinary spud wrench. In actuality, snug tight is a degree of tightness which will vary from joint to joint depending upon the thickness and degree of parallelism of the connected material. In most joints the plies will pull together; however, in some joints, it may not be possible at snug tight to have contact throughout the fraying surface area".

In the AISC Commentary to Specifications for Joints Using ASTM A325 and A490 bolts, a discussion is presented on why separate installation procedures are now provided for bolts that are not within the slip critical or direct tension category. "The intent in making this change is to improve the quality of bolted steel construction and reduce the frequency of costly controversies by focusing attention, both during the installation and tensioning phase and during inspection, on the true slip-critical connections rather than diluting the effort through the requirement for costly tensioning and tension testing of the great many connections where such effort serves no useful purpose. The requirement for identification of connections on the drawings may be satisfied either by identifying the slip-critical and direct tension connections which must be fully tightened and inspected or by identifying the connections which need be tightened only to the snug tight condition."

Quotations found in the preceeding two paragraphs are extracted directly from AISC p. 5-273, Paragraph 8.(c) and p. 5-303 for joints not within the slip-critical range nor subject to tension loads, respectively. The steel set is designed to be in ring compression, therefore, the load transferred at the joint is primarily a compressive force. As the full rock load develops, this compression load will tend to force the plates into contact.

AISC Section M4. Erection, Paragraph 4, p. 5-90 states: "Lack of contact bearing not exceeding a gap of 1/16-in., regardless of the type of connection used (partial-penetration, groove-welded or bolted), shall be acceptable. If the gap exceeds 1/16-in., but is less than 1/4-in., and if an engineering investigation shows sufficient contact area does not exist, the gap shall be packed with non-tapered steel shims. Shims may be of mild steel, regardless of the grade of the main material."

Based on engineering judgement, where gaps may exist in steel set segment connections, it is recognized that a minimal ring compressive force will occur. As the rock loading increases, sufficient contact will develop between the plates of the steel set joints to adequately transfer the ring compressive force. As the design compressive force is attained, the plates may come together as noted above. Snug tightness shall be in accordance with AISC, p. 5-303 except where gaps between connection plates and between connection plates and shims may exceed 1/16-in. if plates or plates and shims make contact at any point in the connection plane.

7.6 WELDED CONNECTIONS

Welding shall be performed in accordance with the requirements of AWS D1.1 using E70XX or E7XT electrodes. Welders and weld procedures shall be qualified in accordance with AWS B2.1 and AWS D1.1, Section 5.

8. CONCLUSIONS

8.1 The ESF ground support steel set configuration and details are summarized in Attachment IX. The steel set member sizes analyzed and their spacing along the ESF loop are summarized in the following table (a detailed discussion of rock properties and steel set spacings evaluated are found in Reference 5.20).

Flac Run Identifier	Member Size	Spacing
TCw @ 7+00	W8x31	4'-0"
PTn @ 10+00	W8x31	2'-0"
TSw1 @ 18+00	W8x31	4'-0"
TSw2 @ 34+00	W8x31	2'-0"
TCw @ 7+00	W6x20	4'-0"
TSw1 @ 18+00	W6x20	4'-0"
TSw2 @ 27+00	W6x20	4'-0"
TSw2 @ 34+00	W6x20	4'-0"
TSw2 @ 53+00	W6x20	4'-0"

This analysis concluded that using the above member sizes and spacing and the member forces, shears and moments from (Reference 5.20) the steel sets have acceptable structural capacity and can adequately accommodate gravitational, long-term rock, utility, and seismic loads.

8.2 The maximum nominal jack load/force on the W8x31 is 25 tons (Attachment I) and on the W6x20 is 15 tons (Attachment VIII). The jacking load may be applied to both sides of the steel set simultaneously or to only one side of the steel set. The range in jacking force is (±) 2 tons from the nominal values.

8.3 The steel sets are adequate for use in the construction of a stable, functional opening with a 100 year maintainable life (see Section 71).

8.4 The installation tolerances for the steel sets along the longitudinal direction of the tunnel are presented in Attachment VII. The established tolerances contribute no significant

decrease to the capacity of the steel sets or components. During TBM construction the steel sets and all the components should be inspected for the installation tolerances specified in Attachment IX.

8.5 As noted in Section 7.1, the results of this analysis present only one solution to the design of the ground support system. The Contractor will be encouraged to submit alternative solutions as long as the following minimum critical attributes are met:

A. Member Sizes

The steel set members shall be of the following (members of equal or greater strength may be substituted):

1. Steel set ring beam members shall be either W8 x 31 or W6 x 20, as required to suit the rock conditions encountered

2. Steel lagging shall be C8 x 11.5

3. Connecting bolts shall be a minimum of 1 inch diameter

4. Tie rods shall be a minimum of ¾ inch diameter

B. Steel Set Configuration

The bend radius of the steel sets shall facilitate placement, shall be compatible with the nominal 25 feet - 0 inch diameter of the tunnel, and shall engage or contact the rock face when expanded and/or wedged or blocked into their final configuration.

1. The steel sets shall be founded on the curbs of the concrete invert segments (see Attachment IIE).

2. The steel sets shall be spaced based on the rock conditions encountered (either 2 feet or 4 feet nominal).

3. The quantity and location of steel sets joints shall be determined by the Constructor.

C. Lagging

Lagging shall be configured such that it can transfer the anticipated rock loads to the steel set ring beam.

D. Connection Details

Steel set joint connection details shall be as shown in Attachment IIG.

E. Tie Rods

Since the tie rods are primarily designed to carry tension loads, they shall be provided with a compression brace (pipe spacer/collar brace) capable of maintaining the steel set spacing. Tie rod general arrangement may be as shown in Attachment IIID with the following critical attributes:

1. 35° maximum angle between tie rods
2. 10° maximum angle from joints
3. Locate at centerline of ring beam (±) 1 inch
4. Separate adjacent tie rods as required to facilitate installation.

F. Jacking/Expansion of Steel Sets

The steel sets shall be jacked into final position using hydraulic jacks or other means that will provide uniform expansion of the steel set against the tunnel walls and crown to provide positive contact to the extent practical. The jacking process shall not overstress the steel set ring beams. The jacking load shall be transferred into the steel sets through brackets or other devices that minimize the eccentricity of the load (moment on the steel set) and maintain stability of the steel set during the jacking process. The jacking brackets shown in Attachment IIIC represent one jacking method that will work, but should not constrain the Constructor in developing a system for expanding the steel sets that meets the above requirements.

8.6 The ESF has been determined to be a nongassy tunnel (Reference 5.22), and therefore explosion from methane or other explosive gasses are not credible events. The Important to Safety Ground Support and Lining items classified QA-1 and QA-5 begin their intended radiological safety function at the beginning of the repository phase when waste packages are disposed. Therefore, the use of explosives during the construction of the ESF has no impact on the design of steel sets to perform their intended safety function. The use, the amounts transported and stored, and the logistics and associated risk assessment of explosives in the potential repository have yet to be determined. Design for effects of explosions cannot proceed without the above determination being performed (TBD-154). However, current design does not preclude the installation of reinforcement to allow the linings and ground support to meet ESFDR Requirement 3.2.1.9.2.A.3.

8.7 SUMMARY OF CONCLUSIONS FROM ATTACHMENTS

8.7.1 Attachment I

- W8 x 31 selected as preliminary member size based on 25 ton jack load
- Jacking force shall be 25 ton (nominal ± 2 tons)
- Jacking centerline to be maximum of 6 inches form W8 X-X axis
- Two-sided jacking is preferred, one-sided allowed

- Shim length on one side not to exceed length on other side by more then 2 inches.

8.7.2 Attachment II

- Output results from FLAC analysis (Reference 5.20), no conclusions.

8.7.3 Attachment III

- III.A: W8 x 31 steel set adequate for 25 tons (± 2 tons) jacking force, rock loads, utility load, and seismic loads.
- III.B: C8 x 11.5 lagging is adequate for rock loads.
- III.C: Jacking bracket assembly as shown is adequate for 25 ton jack load.
- III.D: ¾ inch diameter tie rod (in combination with 1½ inch diameter Schedule 40 pipe spacer) is sufficient to laterally brace the steel sets.
- III.E: Steel set foot plate as shown is adequate for worst case steel set reactions on curb of invert segment. Also maximum allowable gap between foot plate stiffened plate and curb of invert is 1⅛ inch.
- III.F: Steel set foot segment as shown is adequate for 20 ton jack load.
- III.G: Steel set splice connection as shown is adequate.
- III.H: Steel set foot segment (2 alternatives) are stable under 25 ton jack load.
- III.I: Steel wedge as shown is adequate for expansion of steel set against rock without exceeding bearing capacity of rock.

8.7.4 Attachment IV

Not Used.

8.7.5 Attachment V

Not Used.

8.7.6 Attachment VI

- Catalog cuts from jack manufacturer's catalog (no conclusions)

8.7.7 Attachment VII

- Mill tolerances per AISC M016 and ASTM A6.
- Bending tolerances (see Attachment).
- Installation tolerances (see Attachment).
- Steel set is adequate to accommodate cumulative offset tolerances.

8.7.8 Attachment VIII

- W6 x 20 steel set is adequate for 17 ton jacking force (15 ton nominal) but not adequate for 20 ton jacking force.

8.7.9 Attachment IX

- Proposed design of steel sets components and accessories shall be as shown on the sketches of this attachment.

9. ATTACHMENTS

There are nine attachments to this analysis (Attachment IV and V are not used).

ATTACHMENT	DESCRIPTION
I	Jacking Load Analysis
II	Rock Long-Term Load Computer Analysis Results
III	Steel Set Member and Components Design
IV	Not Used
V	Not Used
VI	Miscellaneous Reference Data
VII	Shop Fabrication Tolerances and Steel Set Installation Tolerances
VIII	Structural Steel Set Using W6x20
IX	Summary of Design Sketches

ATTACHMENT I

Jacking load analysis

TWO SIDED JACKING WITH VARIOUS SIZE JACKS APPLIED EQUALLY ON EACH SIDE

STLRV2 - Two sided jacking with 50 Ton, 30 Ton and 25 Ton jacking load applied at 47

TWO SIDED JACKING WITH 25 TON JACKING LOADS

STLRV3A - Jacking loads applied at 49°.

STLRV3D - Jacking loads applied at 51

STLRV3B - Jacking loads applied at 47° and member end moments released at splice locations.

STLRV3C - Jacking loads applied at 49° and member end moments released at the splice locations.

STLRV3A1 - Jacking loads applied at 47 with rock engagement at most joints (near the completion of the jacking process).

STLRV3A2 - Jacking loads applied at 47 with rock engagement at all joints (near the completion of the jacking process).

ONE SIDED JACKING WITH A 25 TON JACKING LOAD

STLRV4 - Jacking load applied at 47°.

STLRV4A - Jacking load applied at 49°.

STLRV4B - Jacking load applied at 51

STLRV4C - Jacking load applied at 47 , with member end moments released at the splice location.

ATTACHMENT I

PURPOSE AND DESCRIPTION

The purpose for the computer analyses in this attachment is to determine the jack size to be used for the W8X31 steel sets, and then evaluate the W8X31 shape for stresses from the jacking process using the selected jack capacity under different jack loading conditions and jacking settings.

Computer analysis STLRV2 for jack capacities of 50, 30 and 25 tons was executed. Based on this computer analysis and hand calculations in Attachment III pages III-25 through III-27, a maximum size jack of 27 Tons was selected for the jacking operation.

With the jacking force established, the location of jacking loads were varied to simulate the angle range that the jacking forces may be applied to the steel set during the jacking process. Computer analyses were performed with the jacking force applied at 47, 49 and 51 degrees. The 47 and 49 degrees correspond to two different jacks that can be used (see the jack information sheet in this attachment, which is based on the attachment VI tables), and the 51 degree is based on the possibility of using a crown segment based on an angle of 84 degrees arc length instead of the typical 90 degrees. The 51 degrees angle is also the angle that defines the jacking load

position when no insert is used. Comparing the analyses: STLRV2, STLRV3A and STLRV3D for two side jacking, and the analyses: STLRV4, STLRV4A and STLRV4B for one side jacking, the conclusions are: (1). There is no difference between the stresses in the steel set caused by two side jacking and one side jacking (hence no further computer analyses for one side jacking are required), and (2). that the jacking at 47 degrees produces higher stresses in the steel set that the jacking force applied at 49 or 51 degrees, hence all the other analyses were performed with jacking force at 47 degrees. The difference between the stresses obtained from varying the angle is typically less than 2%, (4% overall), (see Summary of Computer Analyses for Jacking Loads for comparison). No other analyses were performed with jacking force application below 47 degrees because the small difference expected between the resulting stresses, if the jack was to be applied at a lower point.

In addition to the varying the angle of the jacking force application, computer analyses were performed to simulate the boundary conditions of the splice connections during the jacking process. Depending on when the bolts in the splice connection are tightened the connection may or may not be capable of transmitting moment across the splice during the jacking process. These two conditions were evaluated and the results from the various computer analyses revealed that if the bolts are not tightened, slightly higher stress levels are induced in the W8X31 steel set member when the splice connection acts as a pin connection (capable only of taking shear) , versus the bolts being tightened and the connection being capable of transmitting moment through the

splice prior to starting the jacking process. Note computer analyses STLRV2, 3A, and 4, versus the corresponding computer analyses STLRV3B, 3C and 4C.

The initial contact\support points of the steel sets to the rock, is assumed to be at maximum 4 nodes which corresponds to approximately 6 ft. This is a conservative assumption, as compared to making positive contact with the rock in the tunnel crown and walls, as a result of 25 Ton jacking force. (See section 4.3.4)

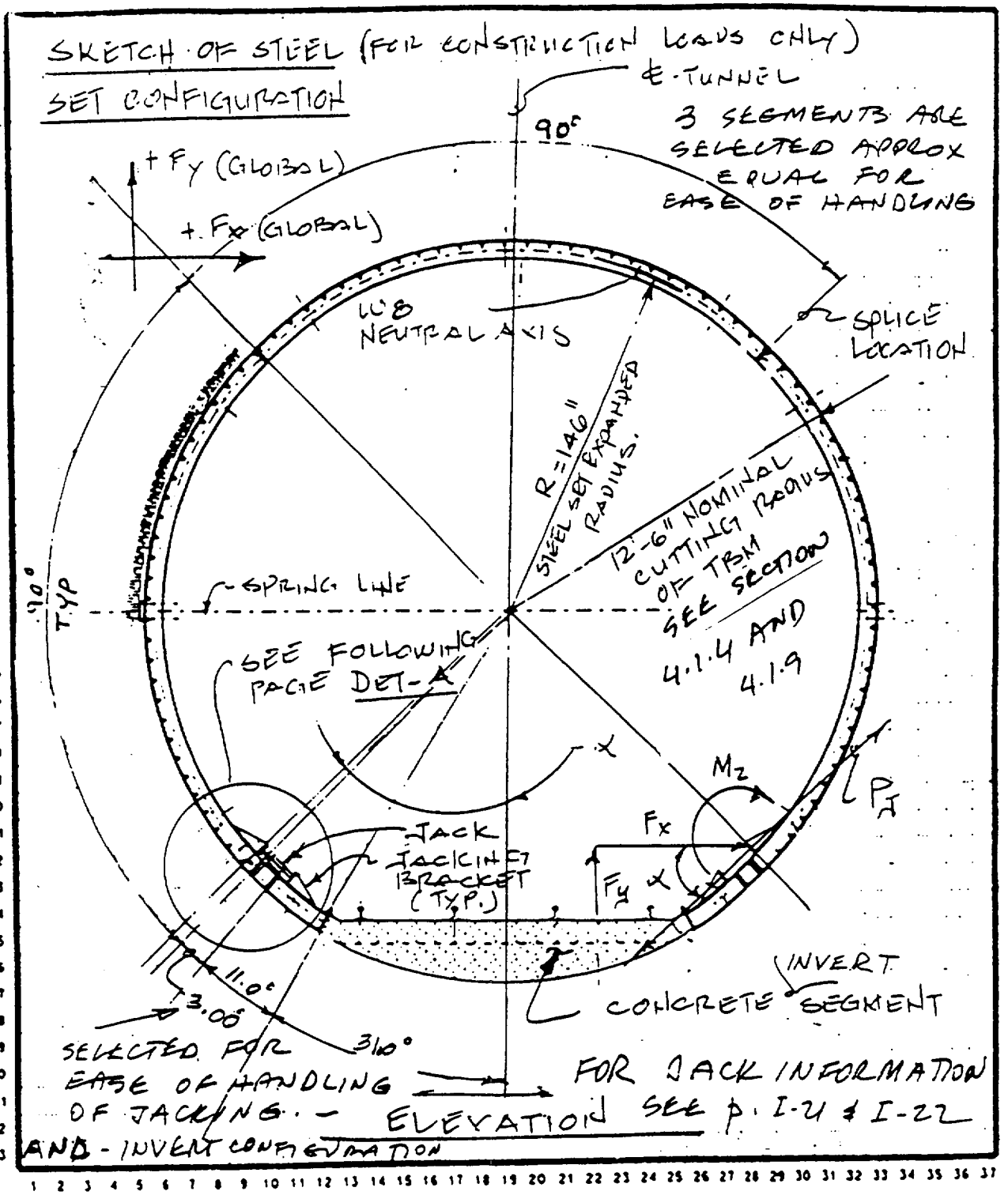
Additional computer analyses were performed to simulate the jacking process as the steel set restraint changes from initial contact/support points with the excavated profile (as described in the above paragraph) to partial, and then full engagement with the rock. See computer analyses STLRV3A1 and A2.

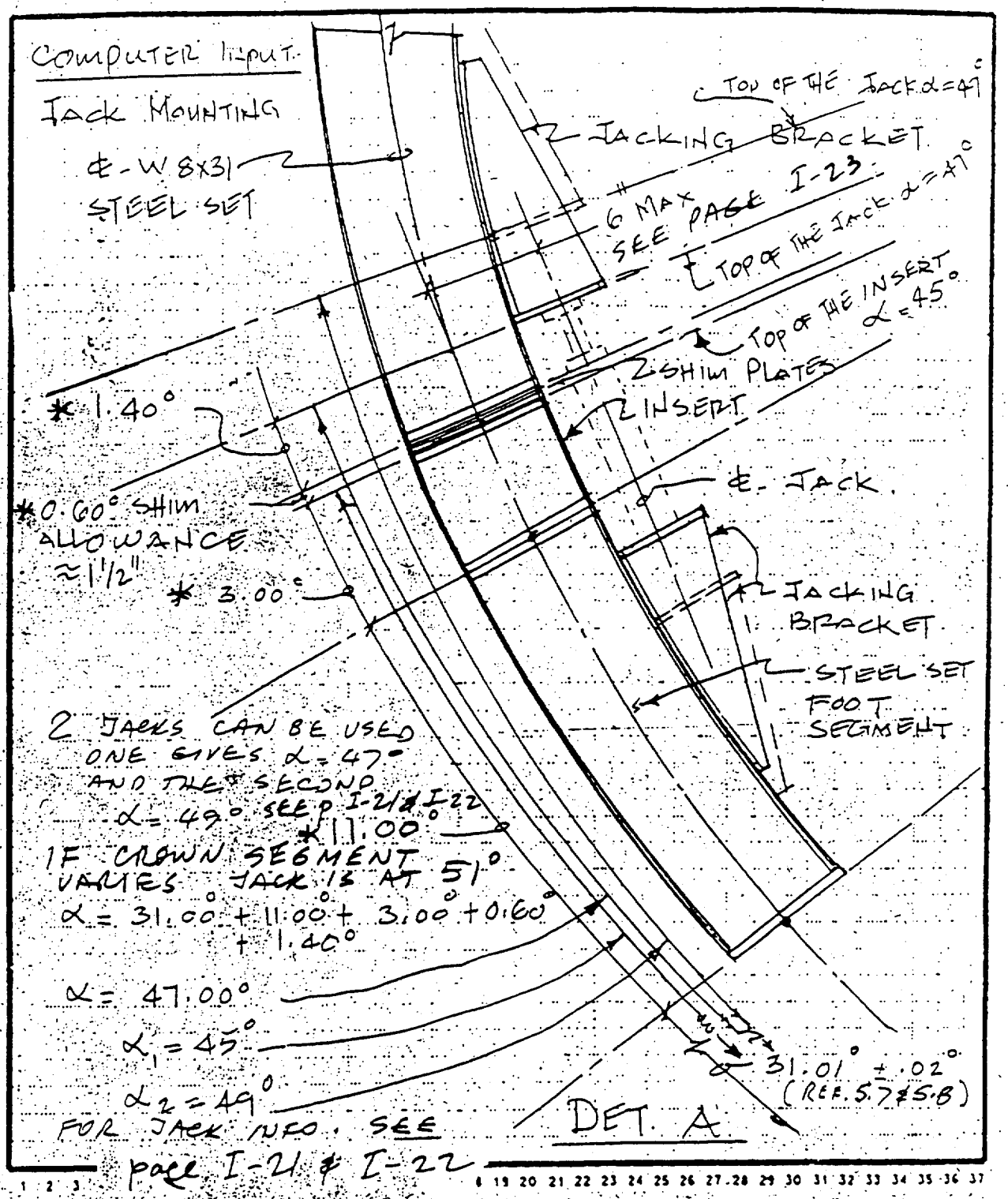
The transition from the initial horizontal contact points below the spring line at each 4 nodes to the full engagement of the steel set by the rock, will occur during the jacking process as the steel set moves upward into the excavated profile of the tunnel and additional supports are provided by the rock. As the steel set is brought in contact with more points of the excavated profile's walls and crown , additional horizontal and vertical supports between the steel sets and the rock will be engaged above the spring line, further restraining the movement of the steel set. No vertical supports are provided below the spring line due to the fact that the steel set is moving upward during the jacking operation and only supports above the spring line can restrain this vertical movement. (For supports layouts see page I-20 and individual computer inputs). In the final stage, additional intermediate points make contact, providing full or almost

full support.

After the jacking process is completed, as described in the above paragraph, long term rock loads begin to act on the steel set . This condition is analyzed in attachment II of this analysis.

Hand calculations are performed in Attachment III based on the maximum member forces from this attachment and Attachment II.


SKETCH OF STEEL (FOR CONSTRUCTION LOADS ONLY)
SET CONFIGURATION
℄ TUNNEL
90°
3 SEGMENTS ARE SELECTED APPROX EQUAL FOR EASE OF HANDLING
+ Fy (GLOBAL)
+ Fx (GLOBAL)
W8 NEUTRAL AXIS
SPLICE LOCATION
R=146" STEEL SET EXPANDED RADIUS.
12'-6" NOMINAL CUTTING RADIUS OF TBM SEE SECTION 4.1.4 AND 4.1.9
90° TYP
SPRING LINE
SEE FOLLOWING PAGE DET-A
X
Mz
Fx
Fy
PJ
JACK
JACKING BRACKET (TYP.)
11.0°
3.00
310°
INVERT CONCRETE SEGMENT
SELECTED FOR EASE OF HANDLING OF JACKING. - ELEVATION
FOR JACK INFORMATION SEE p. I-21 & I-22
AND - INVERT CONFIGURATION



FOR PARAMETERS MARKED *
SEE SECTION 4.1.4 FOR DISCUSSION

COMPUTER INPUT

FOR THE COMPUTER MODEL OF THE STEEL SET USE 8 EQUAL LENGTH MEMBERS FROM THE CONCRETE INVERT TO THE SPRING LINE. THIS RELATES TO A MEMBER LENGTH OF 18.79 INCHES (SEE BELOW).

ARC LENGTH OF THE SEGMENT BEAM FROM THE SPRING LINE TO THE CONCRETE INVERT EQUALS:

$$\text{ARC LENGTH} = \frac{\pi r A}{180} = \frac{3.14(144)(90^\circ - 31^\circ)}{180^\circ}$$

$$= 150.34 \text{ INCHES}$$

$$\text{MEMBER LENGTH} = \frac{150.34}{8} = 18.79 \text{ INCHES}$$

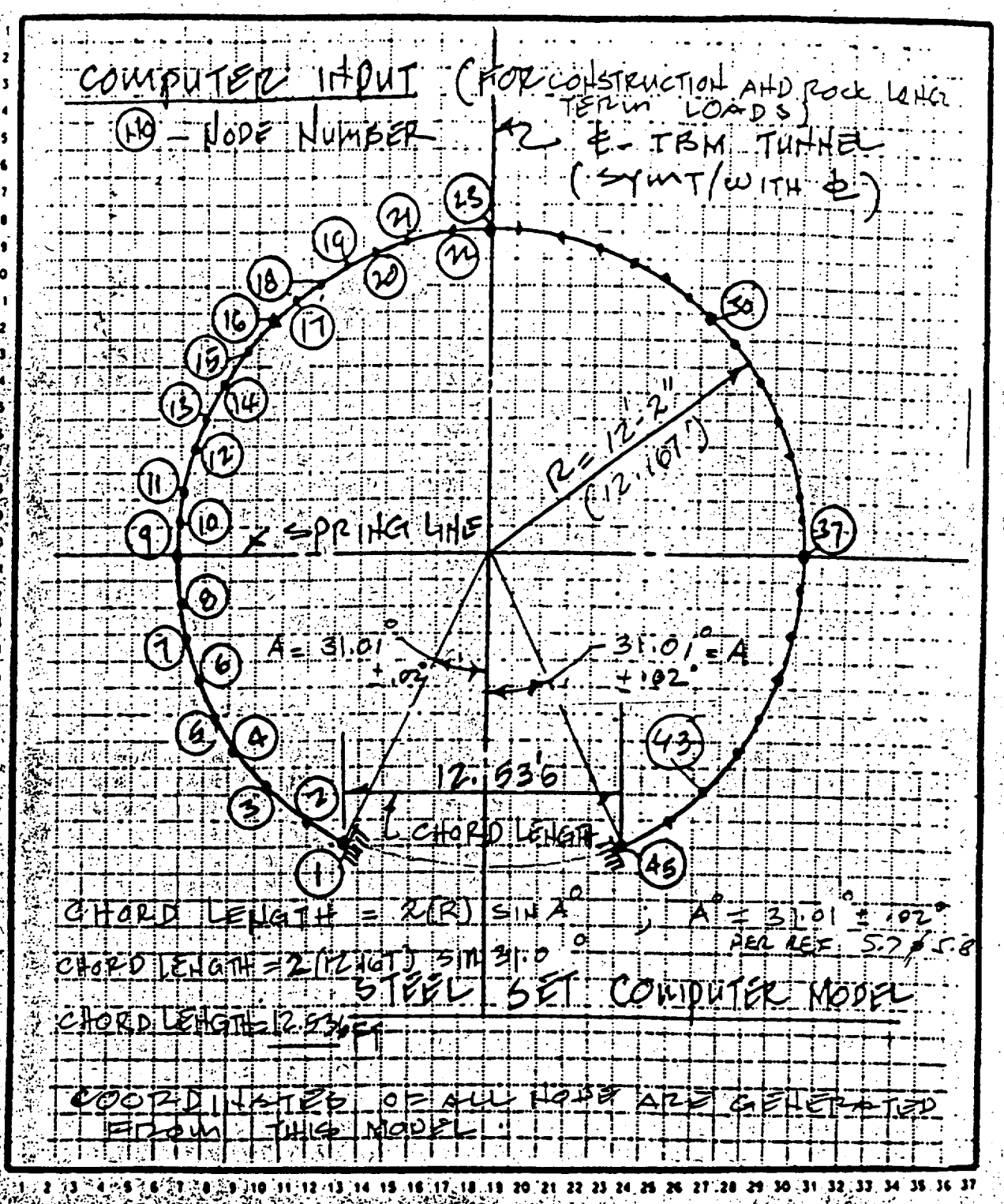
FOR THE COMPUTER MODEL USE 14 MEMBERS FROM THE SPRING LINE TO THE CROWN OF THE STEEL SET. THIS RELATES TO A MEMBER LENGTH OF 16.38 INCHES (SEE BELOW)

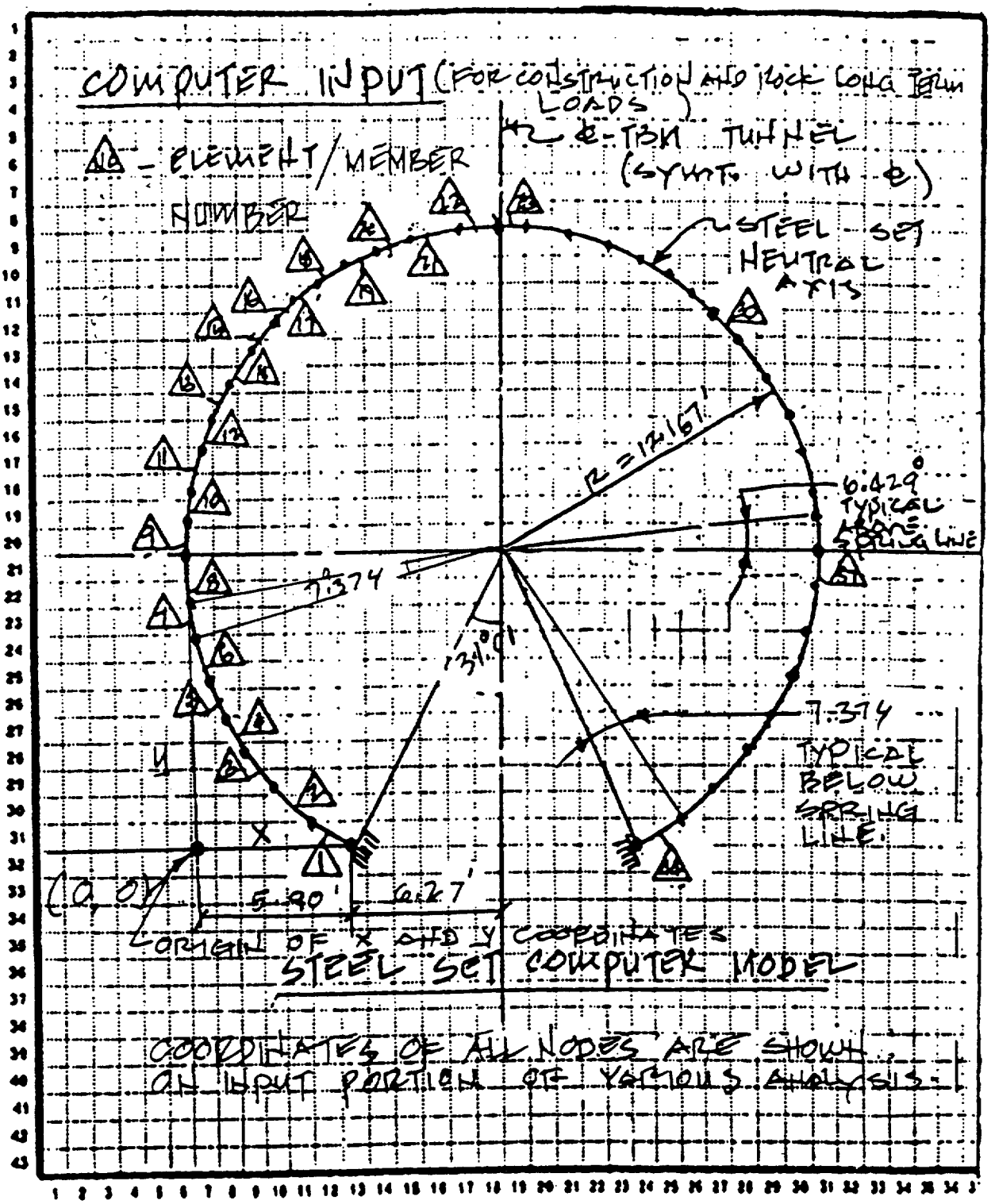
ARC LENGTH OF THE SEGMENT FROM THE SPRING LINE TO THE CROWN EQUALS,

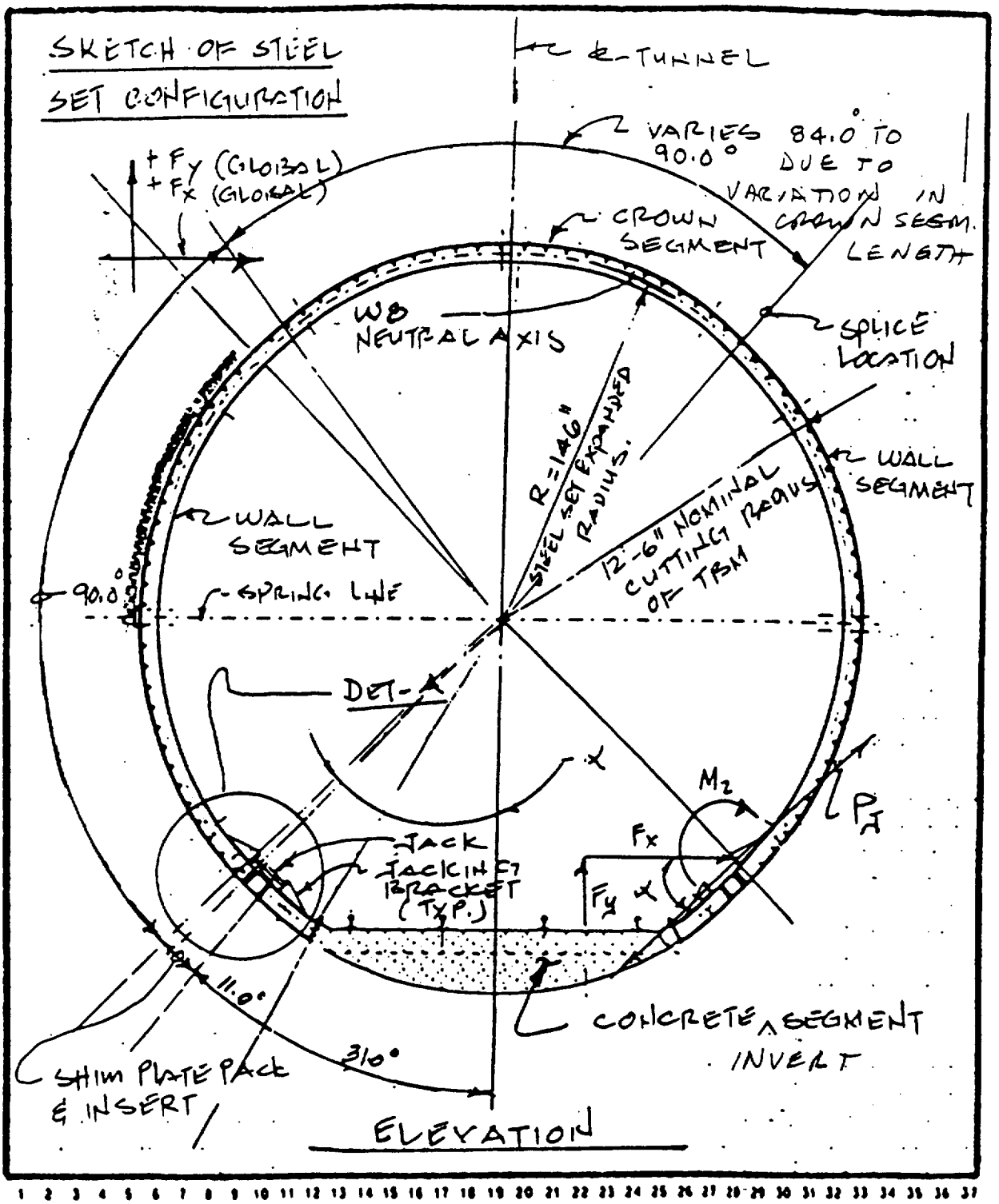
ARC LENGTH = $\pi r A^\circ / 180 = 229.34$ INCHES

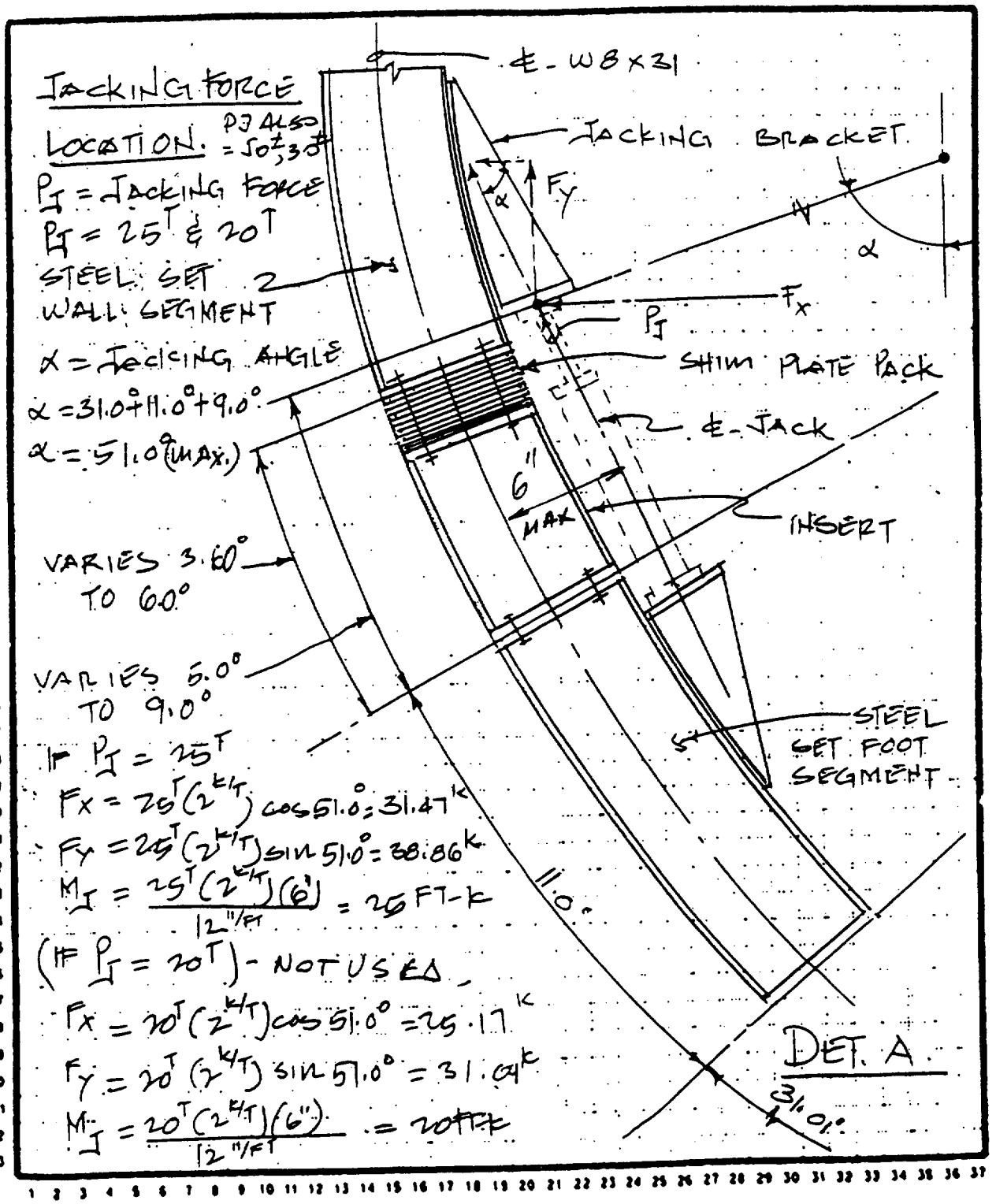
MEMBER LENGTH = $229.34/14 = 16.38$ INCHES

THIS WILL PROVIDE A REASONABLE COMPUTER MODEL MEMBER LENGTH FOR A STRUCTURAL ANALYSIS OF THE STEEL SET.


COMPUTER INPUT (FOR CONSTRUCTION AND ROCK LENGTH TERM LOADS)
(10) = NODE NUMBER
℄ - TBM TUNNEL
(SYMT/WITH ℄)
R = 12'-2" (12.167')
SPRING LINE
A = 31.01° ±.02°
31.01° = A ±.02°
12.536'
L CHORD LENGTH
CHORD LENGTH = 2(R) SIN A° ; A° = 31.01° ± .02°
PER REF 5.7 & 5.8
CHORD LENGTH = 2 (12.167') SIN 31.0°
STEEL SET COMPUTER MODEL
CHORD LENGTH = 12.536 FT
COORDINATES OF ALL NODES ARE GENERATED FROM THIS MODEL


COMPUTER INPUT (FOR CONSTRUCTION AND ROCK LOAD LOADS)
E-TBM TUNNEL (SYMM. WITH Ⓔ)
ELEMENT/MEMBER NUMBER
STEEL SET NEUTRAL AXIS
R = 12.167'
6.429°
TYPICAL ABOVE SPRING LINE
7.374
131.01°
7.374
TYPICAL BELOW SPRING LINE
Y
X
(0,0)
5.90'
6.27'
ORIGIN OF X AND Y COORDINATES
STEEL SET COMPUTER MODEL
COORDINATES OF ALL NODES ARE SHOWN ON INPUT PORTION OF VARIOUS ANALYSIS


SKETCH OF STEEL SET CONFIGURATION
℄ TUNNEL
VARIES 84.0° TO 90.0° DUE TO VARIATION IN CROWN SEGM. LENGTH
+ Fy (GLOBAL)
+ Fx (GLOBAL)
CROWN SEGMENT
W8 NEUTRAL AXIS
SPLICE LOCATION
R=146" STEEL SET EXPANDED RADIUS.
WALL SEGMENT
12'-6" NOMINAL CUTTING RADIUS OF TBM
WALL SEGMENT
90.0°
SPRING LINE
DET-X
X
M2
PT
Fx
Fy
JACK
JACKING BRACKET (TYP.)
11.0°
310°
CONCRETE SEGMENT INVERT
SHIM PLATE PACK & INSERT
ELEVATION


JACKING FORCE LOCATION. PJ ALSO = 50 ± 3.0 #
P_J = JACKING FORCE
P_J = 25^T & 20^T
STEEL SET 2 WALL SEGMENT
α = JACKING ANGLE
α = 31.0° + 11.0° + 9.0°
α = 51.0° (MAX.)
VARIES 3.60° TO 60.0°
VARIES 5.0° TO 9.0°
IF P_J = 25^T
$F_X = 25^T(2^{K/T})\cos 51.0° = 31.47^K$
$F_Y = 25^T(2^{K/T})\sin 51.0° = 38.86^K$
$M_J = \frac{25^T(2^{K/T})(6")}{12"/FT} = 25\ FT\text{-}K$
(IF P_J = 20^T) - NOT USED
$F_X = 20^T(2^{K/T})\cos 51.0° = 25.17^K$
$F_Y = 20^T(2^{K/T})\sin 51.0° = 31.09^K$
$M_J = \frac{20^T(2^{K/T})(6")}{12"/FT} = 20\ FT\text{-}K$
℄ - W8 X 31
JACKING BRACKET
F_Y
α
F_X
P_J
SHIM PLATE PACK
℄ - JACK
6" MAX
INSERT
STEEL SET FOOT SEGMENT
11.0°
DET. A
31.0°

COMPUTER INPUT

THE X AND Y COORDINATES ARE GENERATED FROM THE INFORMATION PRESENTED ON THE MODELS

UNIT FT

JOINT COORDINATES

	X	Y		X	Y
1	5.90	0.00	16	3.56	19.03
2	4.61	0.89	17	4.58	19.94
3	3.45	1.94	18	5.69	20.73
4	2.43	3.13	19	6.89	21.39
5	1.58	4.44	20	8.15	21.91
6	0.90	5.85	21	9.46	22.29
7	0.40	7.33	22	10.80	22.52
8	0.10	8.87	23	12.17	22.60
9	0.00	10.43	24	13.53	22.52
10	0.08	11.79	25	14.87	22.29
11	0.31	13.14	26	16.18	21.91
12	0.68	14.45	27	17.45	21.39
13	1.21	15.71	28	18.64	20.73
14	1.86	16.90	29	19.75	19.94
15	2.65	18.02	30	20.77	19.03

COMPUTER INPUT

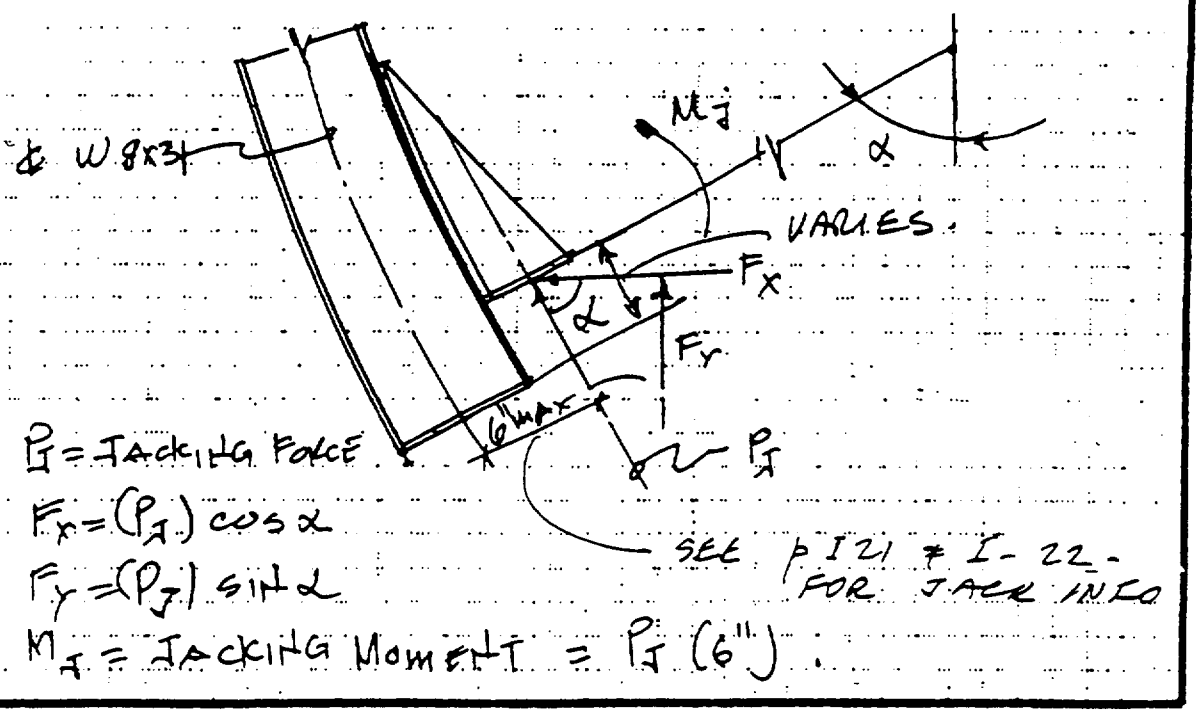
JOINT COORDINATES

	X	Y
31	21.68	18.02
32	22.47	16.90
33	23.13	16.71
34	23.65	14.45
35	24.03	13.14
36	24.26	11.79
37	24.33	10.43
38	24.23	8.87
39	23.93	7.33
40	23.44	5.85
41	22.76	4.44
42	21.90	3.13
43	20.88	1.94
44	19.72	0.89
45	18.43	0.00

COMPUTER INPUT

CONSTRUCTION LOAD - JACKING PROCESS WITH VARIOUS JACKING CAPACITY

ANALYSE W8x31 FOR JACKING.



P_J = JACKING FORCE

$F_x = (P_J) \cos \alpha$

$F_y = (P_J) \sin \alpha$

M_J = JACKING MOMENT = $P_J (6")$

SEE PI21 ≠ I-22 FOR JACK INFO

COMPUTER INPUT (FOR JACKING LOADS ONLY)
50 TONS, 30 TONS AND 25 TONS SIMULTANEOUS JACKING

FOR: $\alpha = 47.00°$

$F_y = P_J \sin\alpha$, M_J = MOMENT FROM JACKING FORCE.

$F_x = P_J \cos\alpha$

CONVERT TON TO KIP 1 TON = 2 KIP

FOR 50 TONS JACK $M_J = \frac{50^T (2)^{K/T} (6)}{12"/1'} = 50.0^{FT-K}$

FOR 30 TONS JACK $M_J = \frac{30^T (2)^{K/T} (6)}{12"/1'} = 30.0^{FT-K}$

FOR 25 TONS JACK $M_J = \frac{25^T (2)^{K/T} (6)}{12"/1'} = 25.0^{FT-K}$

50 TONS JACK

$F_y = 50(2)\sin 47.00° = 73.14^K$

$F_x = 50(2)\cos 47.00° = 68.20^K$

30 TONS JACK

$F_y = 30(2)\sin 47.00° = 43.88^K$

$F_x = 30(2)\cos 47.00° = 40.92^K$

25 TONS JACK

$F_y = 25(2)\sin 47.00° = 36.57^K$

$F_x = 25(2)\cos 47.00° = 34.10^K$

COMPUTER INPUT FOR $\alpha = 49°$

$\alpha = 49.00°$

$F_Y = P_I \sin\alpha$

$P_X = P_I \cos\alpha$

50 TONS JACK

$F_Y = 50(2)\sin 49.00° = 75.47^k$

$F_X = 50(2)\cos 49.00° = 65.61^k$

30 TONS JACK

$F_Y = 30(2)\sin 49.00° = 45.28^k$

$F_X = 30(2)\cos 49.00° = 39.36^k$

25 TONS JACK

$F_Y = 25(2)\sin 49.00° = 37.74^k$

$F_X = 25(2)\cos 49.00° = 32.80$

20 TONS JACK - NOT USED -

$M_I = \frac{20^T (2)^{K/T} (6)}{12^{11/1}} = 20$ FT-K

$F_Y = 20(2)\sin 49.00° = 30.19^k$

$F_X = 20(2)\cos 49.00° = 26.24^k$

FOR COMPUTER INPUT MEMBER SELFWEIGHT WILL BE INCREASED BY 25 TO ACCOUNT FOR LAGGING - SEE NEXT PAGE

CALCULATE LAGGING WEIGHT TRIBUTARY TO STEEL SET ~

STEEL SET SPACING = 4'-0" ±

			SPACING	
C8 x 11.5	= 11.5 PLF x 4	= 46 lb	x 12"/o"	= 69.0
1½"Φ PIPE SPACER	= 2.7 PLF x 4	= 10.8 lb	x 1/7.43'	= 1.45
TIE ROD (¾"Φ)	= 1.5 PLF x 4	= 6.0 lb	x 1/7.43	= 0.81
				71.3

TOTAL WT = 71.3 lb

$$\frac{\text{TOTAL WT.}}{\text{STEEL SET DEAD LOAD}} = \frac{71.3}{31} = 2.3$$

(USE OF FACTOR 2.5 IN COMPUTER INPUT FOR SELFWEIGHT)

- FOR LAGGING THERE IS NO SPACING

- FOR TIE ROD SPACING SEE PAGE IX - 6

COMPUTER INPUT FOR $\alpha = 51^\circ$.

$F_y = 25(2) \sin 51^\circ = 38.86^k$.

$F_x = 25(2) \cos 51^\circ = 31.47^k$.

DETERMINE POINT OF APPLICATION OF JACKING LOAD FOR ANGLES OF APPLICATION AT 47°, 49° AND 51°

THE POINT OF APPLICATION WILL ALWAYS BE AT POINTS 3 OR 43 as applicable SO I WE WILL VARY THE COORDINATES OF PTS. 3&43 FOR DIFFERENT ANGLES OF APPLICATION -

47° $X = -\sin 47^\circ * 146'' + 146'' = 39.2236''$

$= -106.77764 + 146 = 3.27'$, SEE PI-20

$Y = -\cos 47^\circ * 146'' + 146'' - 20.866) =$

$= -99.57176'' + 146'' - 20.866'' = 2.13'$.

POINT 3 < $X = 3.27'$, $Y = 2.13$

POINT 43 < $X = \sin 47^\circ * 146'' + 146'' = 21.06'$, $Y = 2.13'$

49° $X = -\sin 49^\circ * 146'' + 146'' = 35.812''$

$= 2.98'$

$Y = -\cos 49^\circ * 146'' * 146'' - 20.8667''$

$.656$

$= 29.3487'' = 2.45'$

JT 3 < $X = 2.98'$, $Y = 2.45'$

JT 43 < $X = \sin 49^\circ * 146'' + 146'' = 21.35'$, $Y = 2.45'$

51° - JT 3: $X = -\sin 51^\circ * 146'' + 146'' = 2.71'$,

$Y = -\cos 51^\circ * 146 + 146 - 20.8667 = 2.77$

(SEE NEXT PAGE)

JT 43: $X = \sin 51^\circ * 146 + 146 = 113.46 + 146$

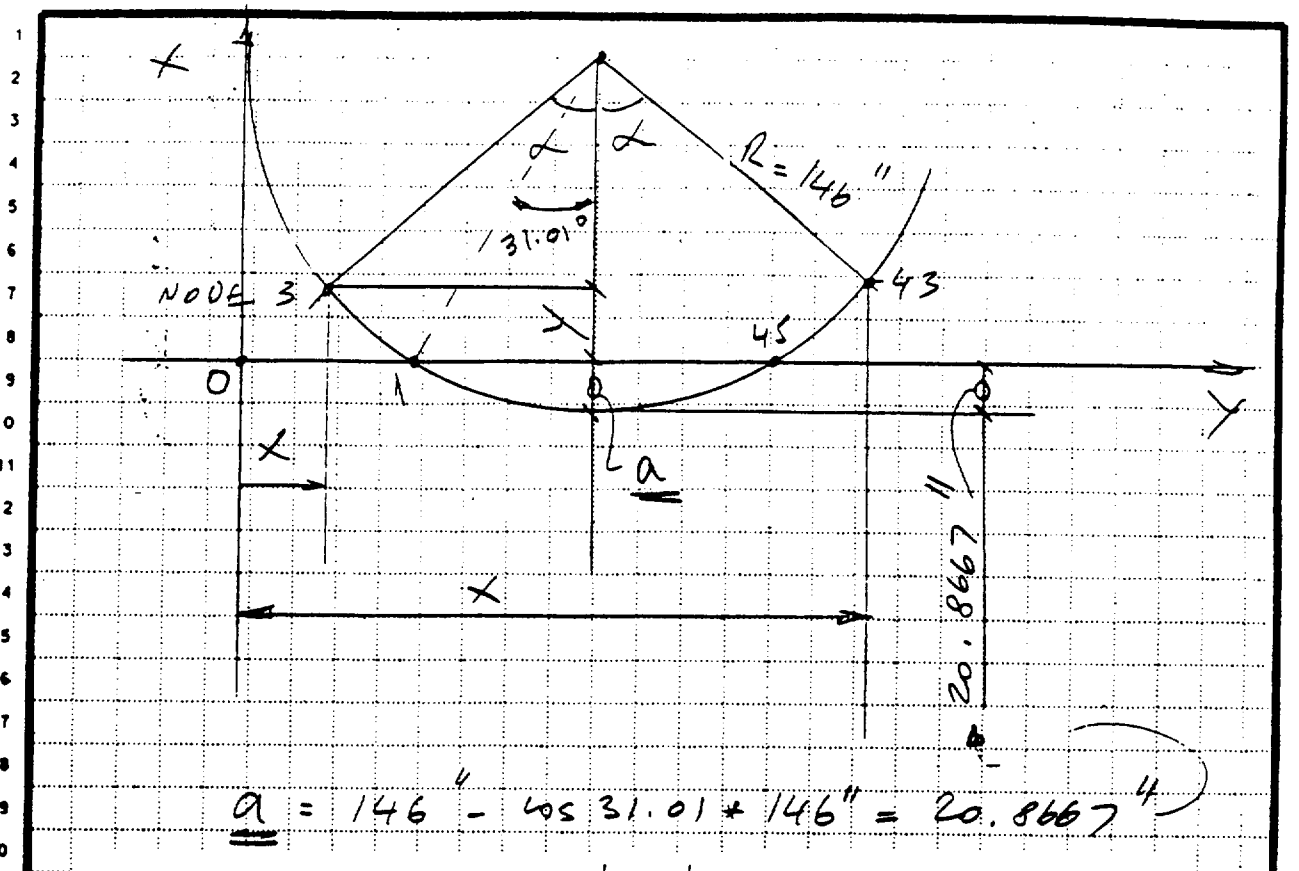
$= 259.46'' = 21.62'$ (ON BOTH SIDES)

$Y = 2.77$

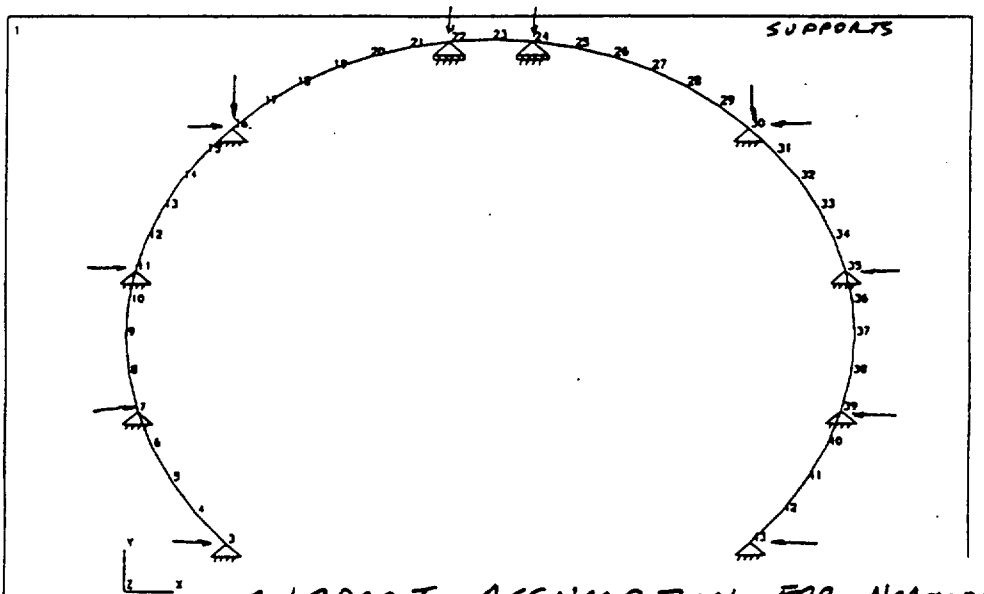
$X = 21.62$ } FOR JACKS APPLIED
$Y = 2.77$ }

FOR JACK APPLIED ON ONE SIDE - AT JT 3
COORDINATES FOR JT.'S 43, 44, 45 NEED NOT CHANGE
ALL ANGLES ARE MEASURED FROM THE
VERTICAL AXIS TOWARDS THE NODE

SEE NEXT PAGE



$a = 146^{4} - 4 \cos 31.01 * 146'' = 20.8667^{4}$



SUPPORT ASSUMPTION FOR NORMAL JACKING -

DETERMINE JACK CHARACTERISTICS FOR COMPUTER INPUT - ATTACHMENT VI pg. VI-3

FROM DISCUTIONS WITH CONTRACTOR, JACKS HSR 258T and HSR 2510T ARE CHOSEN AS A CLOSE REPRESENTATION OF THE JACKS THAT WOULD ACTUALLY BE PROCURED AND USED.

JACK.	CLOSED HEIGHT	+	STROKE	=	TOTAL
HSR-258T	12"	+	8"	=	20"
HSR-2510T	14"	+	10"	=	24"

FOR BOTH JACKS THE BODY DIAMETER IS 3"

ESTABLISH JACK POSITION

FIRST POSITION IS AT 47° WITH VERTICAL AXIS IF HSR-258T IS USED — SEE pg I-7. - FOR CALCULATION.

IF HSR-2510T IS USED.
THERE IS A MAXIMUM DIFFERENCE OF
24" - 20" = 4".

FOR 1° THE ARC LENGTH = $\frac{2\pi \times 146"}{360°} = 2.55"$

AT ℄ OF STEEL SET

$4" \div 2.55"/\text{DEGREE} = 1.57° = 2°$

HENCE CONSIDER THE SECOND POSITION AT 49°

IN CASE THE KNOWN SEGMENT ~~IS~~ also VARIED FROM 90° TO 84°

90° − 84° = 6° - variation

6° ÷ 2 = 3° on each side

47° + 3° = 50°

49° + 3° = 52°

CHECK ADEQUACY OF STEEL SET FOR 51° - WHICH WILL GIVE CLOSE RESULTS FOR BOTH CASES.

DISTANCE BETWEEN ℄ STEEL SET AND ℄ JACK.

JACK BODY = 3" - SEE ATTACHMENT VI - page VI-3.

3" ÷ 2 = 1 1/2"

ADD: 4" (½ W8×31) + 1 1/2" = 5 1/2"

SEE ATTACHMENT IX page IX-8.

HENCE KEEP JACK AT MAX 6"

℄ STEEL SET TO ℄ JACK - (½ TOLERANCE)

```
**************************************************
*                                                *
*           S T A A D - III                      *
*           Revision 16.0b                       *
*           Proprietary Program of               *
*           RESEARCH ENGINEERS, Inc.             *
*           Date=    JUL 17, 1995                *
*           Time=    16:12:22                    *
*                                                *
**************************************************

 2. STAAD PLANE BABEE0000-01717-0200-00003  ATTACHMENT  I
 3. * ESF GROUND SUPPORT-STRUCTURAL STEEL ANALYSIS REV 00
 4. * 50 T, 30 T AND 25 T JACKING LOADS APPLIED TO BOTH SIDES OF STEEL SET
 5. * AT 47 DEGREES.       FILE STLRV2
 6. UNIT FT KIP
 7. JOINT COORDINATES
 8. 3 3.27 2.13 ; 4 2.43 3.13
 9. 5 1.58 4.44 ; 6 0.90 5.85 ; 7 0.40 7.33 ; 8 0.10 8.87
10. 9 0.0 10.43 ; 10 0.08 11.79 ; 11 0.31 13.14 ; 12 0.68 14.45
11. 13 1.21 15.71 ; 14 1.86 16.90 ; 15 2.65 18.02 ; 16 3.56 19.03
12. 17 4.58 19.94 ; 18 5.69 20.73 ; 19 6.89 21.39 ; 20 8.15 21.91
13. 21 9.46 22.29 ; 22 10.80 22.52 ; 23 12.17 22.60 ; 24 13.53 22.52
14. 25 14.87 22.29 ; 26 16.18 21.91 ; 27 17.45 21.39 ; 28 18.64 20.73
15. 29 19.75 19.94 ; 30 20.77 19.03 ; 31 21.68 18.02 ; 32 22.47 16.90
16. 33 23.13 15.71 ; 34 23.65 14.45 ; 35 24.03 13.14 ; 36 24.26 11.79
17. 37 24.33 10.43 ; 38 24.23 8.87 ; 39 23.93 7.33 ; 40 23.44 5.85
18. 41 22.76 4.44 ; 42 21.90 3.13 ; 43 21.06 2.13
19. MEMBER INCIDENCE
20. 3 3 4 42
21. UNIT KIP INCH
22. MEMBER PROPERTIES
23. 3 TO 42 TA STA W8X31
24. CONSTANTS
25. E 29000.0 ALL
26. DENSITY 0.00028 ALL
27. BETA 0 ALL
28. UNIT FT
29. SUPPORT
30. 3 7 11 35 39 43 FIXED BUT FY MZ
31. 22 24 FIXED BUT FX MZ
32. 16 30 PINNED
33. UNIT KIP
34. LOAD 1
35. SELF WEIGHT Y -1.0
36. LOADING 2
37. * 50 TON JACKS AT EACH SIDE
38. JOINT LOADING
39. 3 FY 73.14
40. 43 FY 73.14
41. 3 FX -68.20
42. 43 FX 68.20
43. 43 MZ -50.00
44. 3 MZ 50.00
45. LOADING 3
45. * 30 TON JACKS AT EACH SIDE
46. JOINT LOADING
47. 3 FY 43.88
```

```
48. 43 FY 43.88
49. 3 FX -40.92
50. 43 FX 40.92
51. 43 MZ -30.00
52. 3 MZ 30.00
53. LOADING 4
54. * 25 TON JACKS AT EACH SIDE
55. JOINT LOADING
56. 3 FX -34.10
57. 43 FX 34.10
58. 3 FY 36.57
59. 43 FY 36.57
60. 43 MZ -25.00
61. 3 MZ 25.00
62. LOADING COMBINATION 5
63. 1 2.5 2 1.0
64. LOADING COMBINATION 6
65. 1 2.5 3 1.0
66. LOADING COMBINATION 7
67. 1 2.5 4 1.0
68. PERFORM ANALYSIS

      P R O B L E M   S T A T I S T I C S
      -----------------------------------

 NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS =    41/   40/   10
 ORIGINAL/FINAL BAND-WIDTH =     1/    1
 TOTAL PRIMARY LOAD CASES  =     4, TOTAL DEGREES OF FREEDOM =   111
 SIZE OF STIFFNESS MATRIX =      666 DOUBLE PREC. WORDS
 TOTAL REQUIRED DISK SPACE =     0.08 MEGA-BYTES


++ PROCESSING ELEMENT STIFFNESS MATRIX.              15:55:54
++ PROCESSING GLOBAL STIFFNESS MATRIX.               15:55:55
++ PROCESSING TRIANGULAR FACTORIZATION.              15:55:55
++ CALCULATING JOINT DISPLACEMENTS.                  15:55:55
++ CALCULATING MEMBER  FORCES.                       15:55:56

69. LOAD LIST 5 6 7
70. PRINT ANALYSIS RESULTS
```

JOINT DISPLACEMENT (INCH RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
3	5	0.00000	0.13013	0.00000	0.00000	0.00000	0.00680
	6	0.00000	0.07763	0.00000	0.00000	0.00000	0.00409
	7	0.00000	0.06451	0.00000	0.00000	0.00000	0.00341
4	5	-0.06137	0.07148	0.00000	0.00000	0.00000	0.00369
	6	-0.03686	0.04241	0.00000	0.00000	0.00000	0.00222
	7	-0.03074	0.03515	0.00000	0.00000	0.00000	0.00185
5	5	-0.08369	0.04927	0.00000	0.00000	0.00000	0.00015
	6	-0.05027	0.02908	0.00000	0.00000	0.00000	0.00009
	7	-0.04192	0.02404	0.00000	0.00000	0.00000	0.00008
6	5	-0.05310	0.05695	0.00000	0.00000	0.00000	-0.00198
	6	-0.03189	0.03371	0.00000	0.00000	0.00000	-0.00119
	7	-0.02660	0.02790	0.00000	0.00000	0.00000	-0.00099
7	5	0.00000	0.06840	0.00000	0.00000	0.00000	-0.00145
	6	0.00000	0.04060	0.00000	0.00000	0.00000	-0.00087
	7	0.00000	0.03366	0.00000	0.00000	0.00000	-0.00073
8	5	0.00462	0.06415	0.00000	0.00000	0.00000	-0.00012
	6	0.00281	0.03808	0.00000	0.00000	0.00000	-0.00007
	7	0.00235	0.03156	0.00000	0.00000	0.00000	-0.00006
9	5	0.00113	0.05880	0.00000	0.00000	0.00000	0.00008
	6	0.00071	0.03488	0.00000	0.00000	0.00000	0.00005
	7	0.00060	0.02891	0.00000	0.00000	0.00000	0.00004
10	5	0.00120	0.05432	0.00000	0.00000	0.00000	0.00012
	6	0.00072	0.03221	0.00000	0.00000	0.00000	0.00007
	7	0.00060	0.02669	0.00000	0.00000	0.00000	0.00006
11	5	0.00000	0.05003	0.00000	0.00000	0.00000	0.00077
	6	0.00000	0.02966	0.00000	0.00000	0.00000	0.00046
	7	0.00000	0.02457	0.00000	0.00000	0.00000	0.00038
12	5	-0.02698	0.05250	0.00000	0.00000	0.00000	0.00111
	6	-0.01598	0.03112	0.00000	0.00000	0.00000	0.00065
	7	-0.01323	0.02577	0.00000	0.00000	0.00000	0.00054
13	5	-0.04444	0.05435	0.00000	0.00000	0.00000	0.00030
	6	-0.02631	0.03220	0.00000	0.00000	0.00000	0.00018
	7	-0.02178	0.02666	0.00000	0.00000	0.00000	0.00015
14	5	-0.04286	0.04773	0.00000	0.00000	0.00000	-0.00088
	6	-0.02538	0.02827	0.00000	0.00000	0.00000	-0.00052
	7	-0.02101	0.02341	0.00000	0.00000	0.00000	-0.00043
15	5	-0.02384	0.02810	0.00000	0.00000	0.00000	-0.00171
	6	-0.01412	0.01665	0.00000	0.00000	0.00000	-0.00101
	7	-0.01169	0.01378	0.00000	0.00000	0.00000	-0.00084
16	5	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00139
	6	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00082
	7	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00068
17	5	0.00772	-0.00961	0.00000	0.00000	0.00000	-0.00050
	6	0.00461	-0.00576	0.00000	0.00000	0.00000	-0.00030
	7	0.00383	-0.00480	0.00000	0.00000	0.00000	-0.00025
18	5	0.00809	-0.01129	0.00000	0.00000	0.00000	0.00000
	6	0.00486	-0.00682	0.00000	0.00000	0.00000	0.00000
	7	0.00406	-0.00571	0.00000	0.00000	0.00000	0.00000

JOINT DISPLACEMENT (INCH RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
19	5	0.00578	-0.00852	0.00000	0.00000	0.00000	0.00021
	6	0.00351	-0.00522	0.00000	0.00000	0.00000	0.00013
	7	0.00294	-0.00440	0.00000	0.00000	0.00000	0.00010
20	5	0.00335	-0.00447	0.00000	0.00000	0.00000	0.00023
	6	0.00205	-0.00281	0.00000	0.00000	0.00000	0.00014
	7	0.00172	-0.00240	0.00000	0.00000	0.00000	0.00012
21	5	0.00170	-0.00134	0.00000	0.00000	0.00000	0.00015
	6	0.00104	-0.00088	0.00000	0.00000	0.00000	0.00009
	7	0.00088	-0.00077	0.00000	0.00000	0.00000	0.00008
22	5	0.00076	0.00000	0.00000	0.00000	0.00000	0.00008
	6	0.00046	0.00000	0.00000	0.00000	0.00000	0.00005
	7	0.00039	0.00000	0.00000	0.00000	0.00000	0.00004
23	5	0.00001	0.00094	0.00000	0.00000	0.00000	0.00000
	6	0.00001	0.00058	0.00000	0.00000	0.00000	0.00000
	7	0.00000	0.00048	0.00000	0.00000	0.00000	0.00000
24	5	-0.00074	0.00000	0.00000	0.00000	0.00000	-0.00008
	6	-0.00045	0.00000	0.00000	0.00000	0.00000	-0.00005
	7	-0.00037	0.00000	0.00000	0.00000	0.00000	-0.00004
25	5	-0.00168	-0.00132	0.00000	0.00000	0.00000	-0.00015
	6	-0.00103	-0.00088	0.00000	0.00000	0.00000	-0.00009
	7	-0.00087	-0.00076	0.00000	0.00000	0.00000	-0.00008
26	5	-0.00332	-0.00444	0.00000	0.00000	0.00000	-0.00023
	6	-0.00203	-0.00279	0.00000	0.00000	0.00000	-0.00014
	7	-0.00171	-0.00238	0.00000	0.00000	0.00000	-0.00012
27	5	-0.00574	-0.00848	0.00000	0.00000	0.00000	-0.00021
	6	-0.00348	-0.00520	0.00000	0.00000	0.00000	-0.00013
	7	-0.00292	-0.00438	0.00000	0.00000	0.00000	-0.00010
28	5	-0.00805	-0.01124	0.00000	0.00000	0.00000	0.00000
	6	-0.00484	-0.00680	0.00000	0.00000	0.00000	0.00000
	7	-0.00404	-0.00568	0.00000	0.00000	0.00000	0.00000
29	5	-0.00770	-0.00959	0.00000	0.00000	0.00000	0.00050
	6	-0.00460	-0.00575	0.00000	0.00000	0.00000	0.00030
	7	-0.00382	-0.00479	0.00000	0.00000	0.00000	0.00025
30	5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00138
	6	0.00000	0.00000	0.00000	0.00000	0.00000	0.00082
	7	0.00000	0.00000	0.00000	0.00000	0.00000	0.00068
31	5	0.02379	0.02807	0.00000	0.00000	0.00000	0.00171
	6	0.01409	0.01662	0.00000	0.00000	0.00000	0.00101
	7	0.01167	0.01377	0.00000	0.00000	0.00000	0.00084
32	5	0.04283	0.04770	0.00000	0.00000	0.00000	0.00089
	6	0.02536	0.02825	0.00000	0.00000	0.00000	0.00053
	7	0.02099	0.02339	0.00000	0.00000	0.00000	0.00044
33	5	0.04463	0.05450	0.00000	0.00000	0.00000	-0.00030
	6	0.02642	0.03229	0.00000	0.00000	0.00000	-0.00018
	7	0.02188	0.02674	0.00000	0.00000	0.00000	-0.00015
34	5	0.02678	0.05260	0.00000	0.00000	0.00000	-0.00111
	6	0.01586	0.03117	0.00000	0.00000	0.00000	-0.00066
	7	0.01313	0.02582	0.00000	0.00000	0.00000	-0.00054

JOINT DISPLACEMENT (INCH RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
35	5	0.00000	0.05001	0.00000	0.00000	0.00000	-0.00077
	6	0.00000	0.02965	0.00000	0.00000	0.00000	-0.00046
	7	0.00000	0.02456	0.00000	0.00000	0.00000	-0.00038
36	5	-0.00130	0.05429	0.00000	0.00000	0.00000	-0.00014
	6	-0.00078	0.03219	0.00000	0.00000	0.00000	-0.00008
	7	-0.00065	0.02668	0.00000	0.00000	0.00000	-0.00007
37	5	-0.00170	0.05874	0.00000	0.00000	0.00000	-0.00009
	6	-0.00105	0.03484	0.00000	0.00000	0.00000	-0.00006
	7	-0.00089	0.02888	0.00000	0.00000	0.00000	-0.00005
38	5	-0.00513	0.06409	0.00000	0.00000	0.00000	0.00013
	6	-0.00311	0.03804	0.00000	0.00000	0.00000	0.00008
	7	-0.00261	0.03153	0.00000	0.00000	0.00000	0.00007
39	5	0.00000	0.06824	0.00000	0.00000	0.00000	0.00149
	6	0.00000	0.04051	0.00000	0.00000	0.00000	0.00090
	7	0.00000	0.03358	0.00000	0.00000	0.00000	0.00075
40	5	0.05403	0.05680	0.00000	0.00000	0.00000	0.00201
	6	0.03245	0.03362	0.00000	0.00000	0.00000	0.00121
	7	0.02706	0.02783	0.00000	0.00000	0.00000	0.00101
41	5	0.08481	0.04903	0.00000	0.00000	0.00000	-0.00016
	6	0.05094	0.02894	0.00000	0.00000	0.00000	-0.00010
	7	0.04247	0.02392	0.00000	0.00000	0.00000	-0.00008
42	5	0.06185	0.07189	0.00000	0.00000	0.00000	-0.00373
	6	0.03715	0.04265	0.00000	0.00000	0.00000	-0.00224
	7	0.03097	0.03535	0.00000	0.00000	0.00000	-0.00187
43	5	0.00000	0.13094	0.00000	0.00000	0.00000	-0.00685
	6	0.00000	0.07812	0.00000	0.00000	0.00000	-0.00411
	7	0.00000	0.06492	0.00000	0.00000	0.00000	-0.00343

SUPPORT REACTIONS -UNIT KIP FEET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
3	5	12.46	0.00	0.00	0.00	0.00	0.00
	6	7.52	0.00	0.00	0.00	0.00	0.00
	7	6.28	0.00	0.00	0.00	0.00	0.00
7	5	56.73	0.00	0.00	0.00	0.00	0.00
	6	34.02	0.00	0.00	0.00	0.00	0.00
	7	28.34	0.00	0.00	0.00	0.00	0.00
11	5	38.74	0.00	0.00	0.00	0.00	0.00
	6	22.96	0.00	0.00	0.00	0.00	0.00
	7	19.01	0.00	0.00	0.00	0.00	0.00
35	5	-38.86	0.00	0.00	0.00	0.00	0.00
	6	-23.03	0.00	0.00	0.00	0.00	0.00
	7	-19.07	0.00	0.00	0.00	0.00	0.00
39	5	-56.75	0.00	0.00	0.00	0.00	0.00
	6	-34.03	0.00	0.00	0.00	0.00	0.00
	7	-28.35	0.00	0.00	0.00	0.00	0.00
43	5	-12.40	0.00	0.00	0.00	0.00	0.00
	6	-7.49	0.00	0.00	0.00	0.00	0.00
	7	-6.25	0.00	0.00	0.00	0.00	0.00
22	5	0.00	-2.38	0.00	0.00	0.00	0.00
	6	0.00	-1.32	0.00	0.00	0.00	0.00
	7	0.00	-1.05	0.00	0.00	0.00	0.00
24	5	0.00	-2.39	0.00	0.00	0.00	0.00
	6	0.00	-1.33	0.00	0.00	0.00	0.00
	7	0.00	-1.06	0.00	0.00	0.00	0.00
16	5	-28.58	-68.59	0.00	0.00	0.00	0.00
	6	-16.82	-40.39	0.00	0.00	0.00	0.00
	7	-13.88	-33.35	0.00	0.00	0.00	0.00
30	5	28.66	-68.59	0.00	0.00	0.00	0.00
	6	16.87	-40.39	0.00	0.00	0.00	0.00
	7	13.92	-33.35	0.00	0.00	0.00	0.00

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
3	5	3	91.86	4.36	0.00	0.00	0.00	-50.00
		4	-91.78	-4.30	0.00	0.00	0.00	55.65
	6	3	55.08	2.65	0.00	0.00	0.00	-30.00
		4	-55.00	-2.58	0.00	0.00	0.00	33.42
	7	3	45.89	2.22	0.00	0.00	0.00	-25.00
		4	-45.82	-2.16	0.00	0.00	0.00	27.86
4	5	4	91.61	-7.00	0.00	0.00	0.00	-55.65
		5	-91.51	7.07	0.00	0.00	0.00	44.67
	6	4	54.91	-4.19	0.00	0.00	0.00	-33.42
		5	-54.81	4.25	0.00	0.00	0.00	26.83
	7	4	45.74	-3.48	0.00	0.00	0.00	-27.86
		5	-45.63	3.55	0.00	0.00	0.00	22.37
5	5	5	89.89	-18.53	0.00	0.00	0.00	-44.67
		6	-89.79	18.58	0.00	0.00	0.00	15.61
	6	5	53.83	-11.12	0.00	0.00	0.00	-26.83
		6	-53.73	11.17	0.00	0.00	0.00	9.38
	7	5	44.83	-9.27	0.00	0.00	0.00	-22.37
		6	-44.72	9.32	0.00	0.00	0.00	7.82
6	5	6	86.81	-29.51	0.00	0.00	0.00	-15.61
		7	-86.70	29.55	0.00	0.00	0.00	-30.51
	6	6	51.94	-17.71	0.00	0.00	0.00	-9.38
		7	-51.83	17.75	0.00	0.00	0.00	-18.31
	7	6	43.23	-14.76	0.00	0.00	0.00	-7.82
		7	-43.11	14.80	0.00	0.00	0.00	-15.26
7	5	7	71.15	14.87	0.00	0.00	0.00	30.51
		8	-71.03	-14.85	0.00	0.00	0.00	-7.20
	6	7	42.50	8.91	0.00	0.00	0.00	18.31
		8	-42.38	-8.89	0.00	0.00	0.00	-4.35
	7	7	35.34	7.42	0.00	0.00	0.00	15.26
		8	-35.23	-7.40	0.00	0.00	0.00	-3.64
8	5	8	72.35	5.63	0.00	0.00	0.00	7.20
		9	-72.23	-5.62	0.00	0.00	0.00	1.59
	6	8	43.17	3.39	0.00	0.00	0.00	4.35
		9	-43.05	-3.38	0.00	0.00	0.00	0.94
	7	8	35.88	2.83	0.00	0.00	0.00	3.64
		9	-35.76	-2.82	0.00	0.00	0.00	0.77
9	5	9	72.37	3.27	0.00	0.00	0.00	1.59
		10	-72.27	-3.26	0.00	0.00	0.00	2.86
	6	9	43.14	1.92	0.00	0.00	0.00	0.94
		10	-43.04	-1.91	0.00	0.00	0.00	1.67
	7	9	35.84	1.58	0.00	0.00	0.00	0.77
		10	-35.73	-1.58	0.00	0.00	0.00	1.38

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
10	5	10	71.47	11.17	0.00	0.00	0.00	-2.86
		11	-71.37	-11.16	0.00	0.00	0.00	18.15
	6	10	42.57	6.63	0.00	0.00	0.00	-1.67
		11	-42.46	-6.61	0.00	0.00	0.00	10.74
	7	10	35.35	5.49	0.00	0.00	0.00	-1.38
		11	-35.24	-5.47	0.00	0.00	0.00	8.88
11	5	11	80.31	-18.60	0.00	0.00	0.00	-18.15
		12	-80.21	18.63	0.00	0.00	0.00	-7.19
	6	11	47.76	-11.01	0.00	0.00	0.00	-10.74
		12	-47.66	11.04	0.00	0.00	0.00	-4.27
	7	11	39.63	-9.11	0.00	0.00	0.00	-8.88
		12	-39.53	9.14	0.00	0.00	0.00	-3.54
12	5	12	81.89	-8.65	0.00	0.00	0.00	7.19
		13	-81.79	8.70	0.00	0.00	0.00	-19.05
	6	12	48.65	-5.11	0.00	0.00	0.00	4.27
		13	-48.56	5.15	0.00	0.00	0.00	-11.28
	7	12	40.35	-4.22	0.00	0.00	0.00	3.54
		13	-40.25	4.26	0.00	0.00	0.00	-9.34
13	5	13	82.25	-0.34	0.00	0.00	0.00	19.05
		14	-82.16	0.39	0.00	0.00	0.00	-19.55
	6	13	48.83	-0.19	0.00	0.00	0.00	11.28
		14	-48.74	0.24	0.00	0.00	0.00	-11.57
	7	13	40.48	-0.15	0.00	0.00	0.00	9.34
		14	-40.39	0.20	0.00	0.00	0.00	-9.58
14	5	14	81.67	8.99	0.00	0.00	0.00	19.55
		15	-81.58	-8.93	0.00	0.00	0.00	-7.27
	6	14	48.45	5.32	0.00	0.00	0.00	11.57
		15	-48.36	-5.26	0.00	0.00	0.00	-4.32
	7	14	40.15	4.41	0.00	0.00	0.00	9.58
		15	-40.06	-4.35	0.00	0.00	0.00	-3.58
15	5	15	79.94	18.55	0.00	0.00	0.00	7.27
		16	-79.87	-18.48	0.00	0.00	0.00	17.91
	6	15	47.39	10.97	0.00	0.00	0.00	4.32
		16	-47.32	-10.90	0.00	0.00	0.00	10.55
	7	15	39.26	9.07	0.00	0.00	0.00	3.58
		16	-39.18	-9.00	0.00	0.00	0.00	8.71
16	5	16	10.40	-5.10	0.00	0.00	0.00	-17.91
		17	-10.33	5.18	0.00	0.00	0.00	10.89
	6	16	6.41	-2.97	0.00	0.00	0.00	-10.55
		17	-6.34	3.04	0.00	0.00	0.00	6.44
	7	16	5.41	-2.43	0.00	0.00	0.00	-8.71
		17	-5.35	2.51	0.00	0.00	0.00	5.33
17	5	17	10.83	-4.01	0.00	0.00	0.00	-10.89
		18	-10.77	4.10	0.00	0.00	0.00	5.36

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	6	17	6.64	-2.33	0.00	0.00	0.00	-6.44
		18	-6.58	2.42	0.00	0.00	0.00	3.21
	7	17	5.59	-1.91	0.00	0.00	0.00	-5.33
		18	-5.53	1.99	0.00	0.00	0.00	2.67
18	5	18	11.17	-2.83	0.00	0.00	0.00	-5.36
		19	-11.12	2.92	0.00	0.00	0.00	1.43
	6	18	6.81	-1.64	0.00	0.00	0.00	-3.21
		19	-6.76	1.73	0.00	0.00	0.00	0.90
	7	18	5.72	-1.34	0.00	0.00	0.00	-2.67
		19	-5.67	1.44	0.00	0.00	0.00	0.76
19	5	19	11.38	-1.66	0.00	0.00	0.00	-1.43
		20	-11.34	1.76	0.00	0.00	0.00	-0.90
	6	19	6.91	-0.97	0.00	0.00	0.00	-0.90
		20	-6.87	1.07	0.00	0.00	0.00	-0.49
	7	19	5.79	-0.80	0.00	0.00	0.00	-0.76
		20	-5.75	0.89	0.00	0.00	0.00	-0.39
20	5	20	11.46	-0.51	0.00	0.00	0.00	0.90
		21	-11.43	0.61	0.00	0.00	0.00	-1.67
	6	20	6.95	-0.31	0.00	0.00	0.00	0.49
		21	-6.92	0.41	0.00	0.00	0.00	-0.98
	7	20	5.82	-0.26	0.00	0.00	0.00	0.39
		21	-5.79	0.36	0.00	0.00	0.00	-0.81
21	5	21	11.43	0.67	0.00	0.00	0.00	1.67
		22	-11.41	-0.57	0.00	0.00	0.00	-0.83
	6	21	6.92	0.37	0.00	0.00	0.00	0.98
		22	-6.90	-0.26	0.00	0.00	0.00	-0.56
	7	21	5.79	0.29	0.00	0.00	0.00	0.81
		22	-5.78	-0.19	0.00	0.00	0.00	-0.49
22	5	22	11.14	-0.54	0.00	0.00	0.00	0.83
		23	-11.13	0.65	0.00	0.00	0.00	-1.64
	6	22	6.75	-0.29	0.00	0.00	0.00	0.56
		23	-6.75	0.39	0.00	0.00	0.00	-1.02
	7	22	5.66	-0.22	0.00	0.00	0.00	0.49
		23	-5.65	0.33	0.00	0.00	0.00	-0.86
23	5	23	11.13	0.66	0.00	0.00	0.00	1.64
		24	-11.14	-0.55	0.00	0.00	0.00	-0.82
	6	23	6.75	0.40	0.00	0.00	0.00	1.02
		24	-6.75	-0.29	0.00	0.00	0.00	-0.55
	7	23	5.65	0.33	0.00	0.00	0.00	0.86
		24	-5.66	-0.23	0.00	0.00	0.00	-0.48
24	5	24	11.41	-0.57	0.00	0.00	0.00	0.82
		25	-11.43	0.67	0.00	0.00	0.00	-1.66
	6	24	6.90	-0.27	0.00	0.00	0.00	0.55
		25	-6.92	0.37	0.00	0.00	0.00	-0.98

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	7	24	5.78	-0.19	0.00	0.00	0.00	0.48
		25	-5.79	0.29	0.00	0.00	0.00	-0.81
25	5	25	11.43	0.61	0.00	0.00	0.00	1.66
		26	-11.46	-0.51	0.00	0.00	0.00	-0.90
	6	25	6.92	0.41	0.00	0.00	0.00	0.98
		26	-6.95	-0.31	0.00	0.00	0.00	-0.49
	7	25	5.79	0.36	0.00	0.00	0.00	0.81
		26	-5.82	-0.26	0.00	0.00	0.00	-0.38
26	5	26	11.34	1.72	0.00	0.00	0.00	0.90
		27	-11.38	-1.63	0.00	0.00	0.00	1.40
	6	26	6.87	1.05	0.00	0.00	0.00	0.49
		27	-6.91	-0.95	0.00	0.00	0.00	0.88
	7	26	5.76	0.88	0.00	0.00	0.00	0.38
		27	-5.80	-0.78	0.00	0.00	0.00	0.75
27	5	27	11.11	2.95	0.00	0.00	0.00	-1.40
		28	-11.16	-2.86	0.00	0.00	0.00	5.36
	6	27	6.76	1.75	0.00	0.00	0.00	-0.88
		28	-6.81	-1.66	0.00	0.00	0.00	3.20
	7	27	5.67	1.45	0.00	0.00	0.00	-0.75
		28	-5.72	-1.36	0.00	0.00	0.00	2.67
28	5	28	10.77	4.09	0.00	0.00	0.00	-5.36
		29	-10.83	-4.01	0.00	0.00	0.00	10.88
	6	28	6.58	2.41	0.00	0.00	0.00	-3.20
		29	-6.64	-2.33	0.00	0.00	0.00	6.43
	7	28	5.53	1.99	0.00	0.00	0.00	-2.67
		29	-5.59	-1.91	0.00	0.00	0.00	5.32
29	5	29	10.33	5.17	0.00	0.00	0.00	-10.88
		30	-10.40	-5.09	0.00	0.00	0.00	17.90
	6	29	6.34	3.04	0.00	0.00	0.00	-6.43
		30	-6.41	-2.96	0.00	0.00	0.00	10.54
	7	29	5.35	2.51	0.00	0.00	0.00	-5.32
		30	-5.42	-2.43	0.00	0.00	0.00	8.70
30	5	30	79.92	-18.42	0.00	0.00	0.00	-17.90
		31	-80.00	18.49	0.00	0.00	0.00	-7.19
	6	30	47.35	-10.86	0.00	0.00	0.00	-10.54
		31	-47.43	10.93	0.00	0.00	0.00	-4.27
	7	30	39.21	-8.97	0.00	0.00	0.00	-8.70
		31	-39.29	9.04	0.00	0.00	0.00	-3.54
31	5	31	81.63	-8.86	0.00	0.00	0.00	7.19
		32	-81.72	8.92	0.00	0.00	0.00	-19.37
	6	31	48.39	-5.22	0.00	0.00	0.00	4.27
		32	-48.48	5.28	0.00	0.00	0.00	-11.47
	7	31	40.08	-4.31	0.00	0.00	0.00	3.54
		32	-40.17	4.37	0.00	0.00	0.00	-9.50

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
32	5	32	82.20	-0.06	0.00	0.00	0.00	19.37
		33	-82.29	0.11	0.00	0.00	0.00	-19.50
	6	32	48.76	-0.03	0.00	0.00	0.00	11.47
		33	-48.85	0.08	0.00	0.00	0.00	-11.55
	7	32	40.41	-0.02	0.00	0.00	0.00	9.50
		33	-40.50	0.07	0.00	0.00	0.00	-9.56
33	5	33	81.76	9.33	0.00	0.00	0.00	19.50
		34	-81.86	-9.29	0.00	0.00	0.00	-6.81
	6	33	48.54	5.53	0.00	0.00	0.00	11.55
		34	-48.64	-5.49	0.00	0.00	0.00	-4.04
	7	33	40.24	4.58	0.00	0.00	0.00	9.56
		34	-40.34	-4.54	0.00	0.00	0.00	-3.35
34	5	34	80.36	18.14	0.00	0.00	0.00	6.81
		35	-80.46	-18.11	0.00	0.00	0.00	17.92
	6	34	47.75	10.75	0.00	0.00	0.00	4.04
		35	-47.85	-10.72	0.00	0.00	0.00	10.60
	7	34	39.60	8.90	0.00	0.00	0.00	3.35
		35	-39.70	-8.87	0.00	0.00	0.00	8.77
35	5	35	71.36	-11.19	0.00	0.00	0.00	-17.92
		36	-71.47	11.21	0.00	0.00	0.00	2.58
	6	35	42.46	-6.63	0.00	0.00	0.00	-10.60
		36	-42.56	6.65	0.00	0.00	0.00	1.51
	7	35	35.24	-5.49	0.00	0.00	0.00	-8.77
		36	-35.34	5.51	0.00	0.00	0.00	1.24
36	5	36	72.29	-2.77	0.00	0.00	0.00	-2.58
		37	-72.39	2.77	0.00	0.00	0.00	-1.19
	6	36	43.05	-1.62	0.00	0.00	0.00	-1.51
		37	-43.15	1.62	0.00	0.00	0.00	-0.70
	7	36	35.74	-1.33	0.00	0.00	0.00	-1.24
		37	-35.85	1.34	0.00	0.00	0.00	-0.57
37	5	37	72.23	-5.59	0.00	0.00	0.00	-1.19
		38	-72.35	5.59	0.00	0.00	0.00	-7.55
	6	37	43.05	-3.36	0.00	0.00	0.00	-0.70
		38	-43.17	3.37	0.00	0.00	0.00	-4.56
	7	37	35.76	-2.80	0.00	0.00	0.00	-0.57
		38	-35.88	2.81	0.00	0.00	0.00	-3.81
38	5	38	71.04	-14.81	0.00	0.00	0.00	7.55
		39	-71.16	14.83	0.00	0.00	0.00	-30.80
	6	38	42.39	-8.87	0.00	0.00	0.00	4.56
		39	-42.50	8.89	0.00	0.00	0.00	-18.49
	7	38	35.23	-7.38	0.00	0.00	0.00	3.81
		39	-35.35	7.40	0.00	0.00	0.00	-15.41
39	5	39	86.53	30.13	0.00	0.00	0.00	30.80
		40	-86.65	-30.09	0.00	0.00	0.00	16.13

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
	6	39	51.73	18.09	0.00	0.00	0.00	18.49
		40	-51.84	-18.05	0.00	0.00	0.00	9.69
	7	39	43.03	15.09	0.00	0.00	0.00	15.41
		40	-43.15	-15.05	0.00	0.00	0.00	8.08
40	5	40	89.81	18.64	0.00	0.00	0.00	-16.13
		41	-89.92	-18.58	0.00	0.00	0.00	45.26
	6	40	53.74	11.20	0.00	0.00	0.00	-9.69
		41	-53.85	-11.15	0.00	0.00	0.00	27.18
	7	40	44.73	9.34	0.00	0.00	0.00	-8.08
		41	-44.84	-9.29	0.00	0.00	0.00	22.67
41	5	41	91.58	6.63	0.00	0.00	0.00	-45.26
		42	-91.68	-6.56	0.00	0.00	0.00	55.60
	6	41	54.85	3.99	0.00	0.00	0.00	-27.18
		42	-54.95	-3.92	0.00	0.00	0.00	33.38
	7	41	45.67	3.33	0.00	0.00	0.00	-22.67
		42	-45.77	-3.26	0.00	0.00	0.00	27.83
42	5	42	91.82	-4.25	0.00	0.00	0.00	-55.60
		43	-91.89	4.32	0.00	0.00	0.00	50.00
	6	42	55.03	-2.56	0.00	0.00	0.00	-33.38
		43	-55.10	2.62	0.00	0.00	0.00	30.00
	7	42	45.84	-2.14	0.00	0.00	0.00	-27.83
		43	-45.91	2.20	0.00	0.00	0.00	25.00

********** END OF LATEST ANALYSIS RESULT **********

71. LOAD LIST 5
72. CHECK CODE ALL

STAAD-III CODE CHECKING - (AISC)
****

ALL UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
* 3	ST W8X 31	FAIL	AISC- H1-2	1.488	5
		91.78 C	0.00	55.65	1.31
* 4	ST W8X 31	FAIL	AISC- H1-2	1.487	5
		91.61 C	0.00	-55.65	0.00
* 5	ST W8X 31	FAIL	AISC- H1-2	1.276	5
		89.89 C	0.00	-44.67	0.00
* 6	ST W8X 31	FAIL	AISC- H1-2	1.000	5
		86.70 C	0.00	-30.51	1.56
7	ST W8X 31	PASS	AISC- H1-2	0.921	5
		71.15 C	0.00	30.51	0.00
8	ST W8X 31	PASS	AISC- H1-2	0.499	5
		72.35 C	0.00	7.20	0.00
9	ST W8X 31	PASS	AISC- H1-2	0.419	5
		72.27 C	0.00	2.86	1.36
10	ST W8X 31	PASS	AISC- H1-2	0.695	5
		71.37 C	0.00	18.15	1.37
11	ST W8X 31	PASS	AISC- H1-2	0.740	5
		80.31 C	0.00	-18.15	0.00
12	ST W8X 31	PASS	AISC- H1-2	0.765	5
		81.79 C	0.00	-19.05	1.37
13	ST W8X 31	PASS	AISC- H1-2	0.776	5
		82.16 C	0.00	-19.55	1.36
14	ST W8X 31	PASS	AISC- H1-2	0.773	5
		81.67 C	0.00	19.55	0.00
15	ST W8X 31	PASS	AISC- H1-2	0.734	5
		79.87 C	0.00	17.91	1.36
16	ST W8X 31	PASS	AISC- H1-3	0.382	5
		10.40 C	0.00	-17.91	0.00
17	ST W8X 31	PASS	AISC- H1-3	0.256	5
		10.83 C	0.00	-10.89	0.00
18	ST W8X 31	PASS	AISC- H1-3	0.156	5
		11.17 C	0.00	-5.36	0.00
19	ST W8X 31	PASS	AISC- H1-3	0.085	5
		11.38 C	0.00	-1.43	0.00
20	ST W8X 31	PASS	AISC- H1-3	0.090	5
		11.43 C	0.00	-1.67	1.36
21	ST W8X 31	PASS	AISC- H1-3	0.090	5
		11.43 C	0.00	1.67	0.00
22	ST W8X 31	PASS	AISC- H1-3	0.088	5
		11.13 C	0.00	-1.64	1.37
23	ST W8X 31	PASS	AISC- H1-3	0.088	5
		11.13 C	0.00	1.64	0.00
24	ST W8X 31	PASS	AISC- H1-3	0.089	5
		11.43 C	0.00	-1.66	1.36
25	ST W8X 31	PASS	AISC- H1-3	0.090	5
		11.43 C	0.00	1.66	0.00
26	ST W8X 31	PASS	AISC- H1-3	0.084	5
		11.38 C	0.00	1.40	1.37

L UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

	MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
	27	ST W8X 31	PASS	AISC- H1-3	0.156	5
			11.16 C	0.00	5.36	1.36
	28	ST W8X 31	PASS	AISC- H1-3	0.256	5
			10.83 C	0.00	10.88	1.36
	29	ST W8X 31	PASS	AISC- H1-3	0.382	5
			10.40 C	0.00	17.90	1.37
	30	ST W8X 31	PASS	AISC- H1-2	0.734	5
			79.92 C	0.00	-17.90	0.00
	31	ST W8X 31	PASS	AISC- H1-2	0.770	5
			81.72 C	0.00	-19.37	1.37
	32	ST W8X 31	PASS	AISC- H1-2	0.775	5
			82.29 C	0.00	-19.50	1.36
	33	ST W8X 31	PASS	AISC- H1-2	0.773	5
			81.76 C	0.00	19.50	0.00
	34	ST W8X 31	PASS	AISC- H1-2	0.737	5
			80.46 C	0.00	17.92	1.36
	35	ST W8X 31	PASS	AISC- H1-2	0.691	5
			71.36 C	0.00	-17.92	0.00
	36	ST W8X 31	PASS	AISC- H1-2	0.414	5
			72.29 C	0.00	-2.58	0.00
	37	ST W8X 31	PASS	AISC- H1-2	0.506	5
			72.35 C	0.00	-7.55	1.56
	38	ST W8X 31	PASS	AISC- H1-2	0.927	5
			71.16 C	0.00	-30.80	1.57
*	39	ST W8X 31	FAIL	AISC- H1-2	1.005	5
			86.53 C	0.00	30.80	0.00
*	40	ST W8X 31	FAIL	AISC- H1-2	1.287	5
			89.92 C	0.00	45.26	1.57
*	41	ST W8X 31	FAIL	AISC- H1-2	1.486	5
			91.68 C	0.00	55.60	1.57
*	42	ST W8X 31	FAIL	AISC- H1-2	1.487	5
			91.82 C	0.00	-55.60	0.00

********** END OF TABULATED RESULT OF DESIGN **********

73. LOAD LIST 6
74. CHECK CODE ALL

STAAD-III CODE CHECKING - (AISC)
****

ALL UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
3	ST W8X 31	PASS	AISC- H1-2	0.893	6
		55.00 C	0.00	33.42	1.31
4	ST W8X 31	PASS	AISC- H1-2	0.892	6
		54.91 C	0.00	-33.42	0.00
5	ST W8X 31	PASS	AISC- H1-2	0.766	6
		53.83 C	0.00	-26.83	0.00
6	ST W8X 31	PASS	AISC- H1-2	0.599	6
		51.83 C	0.00	-18.31	1.56
7	ST W8X 31	PASS	AISC- H1-2	0.552	6
		42.50 C	0.00	18.31	0.00
8	ST W8X 31	PASS	AISC- H1-2	0.299	6
		43.17 C	0.00	4.35	0.00
9	ST W8X 31	PASS	AISC- H1-2	0.249	6
		43.04 C	0.00	1.67	1.36
10	ST W8X 31	PASS	AISC- H1-2	0.412	6
		42.46 C	0.00	10.74	1.37
11	ST W8X 31	PASS	AISC- H1-2	0.439	6
		47.76 C	0.00	-10.74	0.00
12	ST W8X 31	PASS	AISC- H1-2	0.453	6
		48.56 C	0.00	-11.28	1.37
13	ST W8X 31	PASS	AISC- H1-2	0.460	6
		48.74 C	0.00	-11.57	1.36
14	ST W8X 31	PASS	AISC- H1-2	0.458	6
		48.45 C	0.00	11.57	0.00
15	ST W8X 31	PASS	AISC- H1-2	0.434	6
		47.32 C	0.00	10.55	1.36
16	ST W8X 31	PASS	AISC- H1-3	0.227	6
		6.41 C	0.00	-10.55	0.00
17	ST W8X 31	PASS	AISC- H1-3	0.152	6
		6.64 C	0.00	-6.44	0.00
18	ST W8X 31	PASS	AISC- H1-3	0.094	6
		6.81 C	0.00	-3.21	0.00
19	ST W8X 31	PASS	AISC- H1-3	0.052	6
		6.91 C	0.00	-0.90	0.00
20	ST W8X 31	PASS	AISC- H1-3	0.054	6
		6.92 C	0.00	-0.98	1.36
21	ST W8X 31	PASS	AISC- H1-3	0.054	6
		6.92 C	0.00	0.98	0.00
22	ST W8X 31	PASS	AISC- H1-3	0.054	6
		6.75 C	0.00	-1.02	1.37
23	ST W8X 31	PASS	AISC- H1-3	0.054	6
		6.75 C	0.00	1.02	0.00
24	ST W8X 31	PASS	AISC- H1-3	0.054	6
		6.92 C	0.00	-0.98	1.36
25	ST W8X 31	PASS	AISC- H1-3	0.054	6
		6.92 C	0.00	0.98	0.00
26	ST W8X 31	PASS	AISC- H1-3	0.052	6
		6.91 C	0.00	0.88	1.37

.L UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
27	ST W8X 31	PASS	AISC- H1-3	0.094	6
		6.81 C	0.00	3.20	1.36
28	ST W8X 31	PASS	AISC- H1-3	0.152	6
		6.64 C	0.00	6.43	1.36
29	ST W8X 31	PASS	AISC- H1-3	0.227	6
		6.41 C	0.00	10.54	1.37
30	ST W8X 31	PASS	AISC- H1-2	0.434	6
		47.35 C	0.00	-10.54	0.00
31	ST W8X 31	PASS	AISC- H1-2	0.456	6
		48.48 C	0.00	-11.47	1.37
32	ST W8X 31	PASS	AISC- H1-2	0.460	6
		48.85 C	0.00	-11.55	1.36
33	ST W8X 31	PASS	AISC- H1-2	0.458	6
		48.54 C	0.00	11.55	0.00
34	ST W8X 31	PASS	AISC- H1-2	0.437	6
		47.85 C	0.00	10.60	1.36
35	ST W8X 31	PASS	AISC- H1-2	0.410	6
		42.46 C	0.00	-10.60	0.00
36	ST W8X 31	PASS	AISC- H1-2	0.246	6
		43.05 C	0.00	-1.51	0.00
37	ST W8X 31	PASS	AISC- H1-2	0.303	6
		43.17 C	0.00	-4.56	1.56
38	ST W8X 31	PASS	AISC- H1-2	0.555	6
		42.50 C	0.00	-18.49	1.57
39	ST W8X 31	PASS	AISC- H1-2	0.602	6
		51.73 C	0.00	18.49	0.00
40	ST W8X 31	PASS	AISC- H1-2	0.772	6
		53.85 C	0.00	27.18	1.57
41	ST W8X 31	PASS	AISC- H1-2	0.892	6
		54.95 C	0.00	33.38	1.57
42	ST W8X 31	PASS	AISC- H1-2	0.892	6
		55.03 C	0.00	-33.38	0.00

********** END OF TABULATED RESULT OF DESIGN **********

75. LOAD LIST 7
76. CHECK CODE ALL

STAAD-III CODE CHECKING - (AISC)
****

ALL UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
3	ST W8X 31	PASS	AISC- H1-2	0.744	7
		45.82 C	0.00	27.86	1.31
4	ST W8X 31	PASS	AISC- H1-2	0.744	7
		45.74 C	0.00	-27.86	0.00
5	ST W8X 31	PASS	AISC- H1-2	0.638	7
		44.83 C	0.00	-22.37	0.00
6	ST W8X 31	PASS	AISC- H1-2	0.499	7
		43.11 C	0.00	-15.26	1.56
7	ST W8X 31	PASS	AISC- H1-2	0.460	7
		35.34 C	0.00	15.26	0.00
8	ST W8X 31	PASS	AISC- H1-2	0.249	7
		35.88 C	0.00	3.64	0.00
9	ST W8X 31	PASS	AISC- H1-2	0.207	7
		35.73 C	0.00	1.38	1.36
10	ST W8X 31	PASS	AISC- H1-2	0.342	7
		35.24 C	0.00	8.88	1.37
11	ST W8X 31	PASS	AISC- H1-2	0.364	7
		39.63 C	0.00	-8.88	0.00
12	ST W8X 31	PASS	AISC- H1-2	0.376	7
		40.25 C	0.00	-9.34	1.37
13	ST W8X 31	PASS	AISC- H1-2	0.381	7
		40.39 C	0.00	-9.58	1.36
14	ST W8X 31	PASS	AISC- H1-2	0.380	7
		40.15 C	0.00	9.58	0.00
15	ST W8X 31	PASS	AISC- H1-2	0.359	7
		39.18 C	0.00	8.71	1.36
16	ST W8X 31	PASS	AISC- H1-3	0.188	7
		5.41 C	0.00	-8.71	0.00
17	ST W8X 31	PASS	AISC- H1-3	0.127	7
		5.59 C	0.00	-5.33	0.00
18	ST W8X 31	PASS	AISC- H1-3	0.078	7
		5.72 C	0.00	-2.67	0.00
19	ST W8X 31	PASS	AISC- H1-3	0.044	7
		5.79 C	0.00	-0.76	0.00
20	ST W8X 31	PASS	AISC- H1-3	0.045	7
		5.79 C	0.00	-0.81	1.36
21	ST W8X 31	PASS	AISC- H1-3	0.045	7
		5.79 C	0.00	0.81	0.00
22	ST W8X 31	PASS	AISC- H1-3	0.045	7
		5.65 C	0.00	-0.86	1.37
23	ST W8X 31	PASS	AISC- H1-3	0.045	7
		5.65 C	0.00	0.86	0.00
24	ST W8X 31	PASS	AISC- H1-3	0.045	7
		5.79 C	0.00	-0.81	1.36
25	ST W8X 31	PASS	AISC- H1-3	0.045	7
		5.79 C	0.00	0.81	0.00
26	ST W8X 31	PASS	AISC- H1-3	0.044	7
		5.80 C	0.00	0.75	1.37

L UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
27	ST W8X 31	PASS	AISC- H1-3	0.078	7
		5.72 C	0.00	2.67	1.36
28	ST W8X 31	PASS	AISC- H1-3	0.127	7
		5.59 C	0.00	5.32	1.36
29	ST W8X 31	PASS	AISC- H1-3	0.188	7
		5.42 C	0.00	8.70	1.37
30	ST W8X 31	PASS	AISC- H1-2	0.359	7
		39.21 C	0.00	-8.70	0.00
31	ST W8X 31	PASS	AISC- H1-2	0.378	7
		40.17 C	0.00	-9.50	1.37
32	ST W8X 31	PASS	AISC- H1-2	0.381	7
		40.50 C	0.00	-9.56	1.36
33	ST W8X 31	PASS	AISC- H1-2	0.380	7
		40.24 C	0.00	9.56	0.00
34	ST W8X 31	PASS	AISC- H1-2	0.362	7
		39.70 C	0.00	8.77	1.36
35	ST W8X 31	PASS	AISC- H1-2	0.340	7
		35.24 C	0.00	-8.77	0.00
36	ST W8X 31	PASS	AISC- H1-2	0.204	7
		35.74 C	0.00	-1.24	0.00
37	ST W8X 31	PASS	AISC- H1-2	0.252	7
		35.88 C	0.00	-3.81	1.56
38	ST W8X 31	PASS	AISC- H1-2	0.462	7
		35.35 C	0.00	-15.41	1.57
39	ST W8X 31	PASS	AISC- H1-2	0.501	7
		43.03 C	0.00	15.41	0.00
40	ST W8X 31	PASS	AISC- H1-2	0.644	7
		44.84 C	0.00	22.67	1.57
41	ST W8X 31	PASS	AISC- H1-2	0.743	7
		45.77 C	0.00	27.83	1.57
42	ST W8X 31	PASS	AISC- H1-2	0.744	7
		45.84 C	0.00	-27.83	0.00

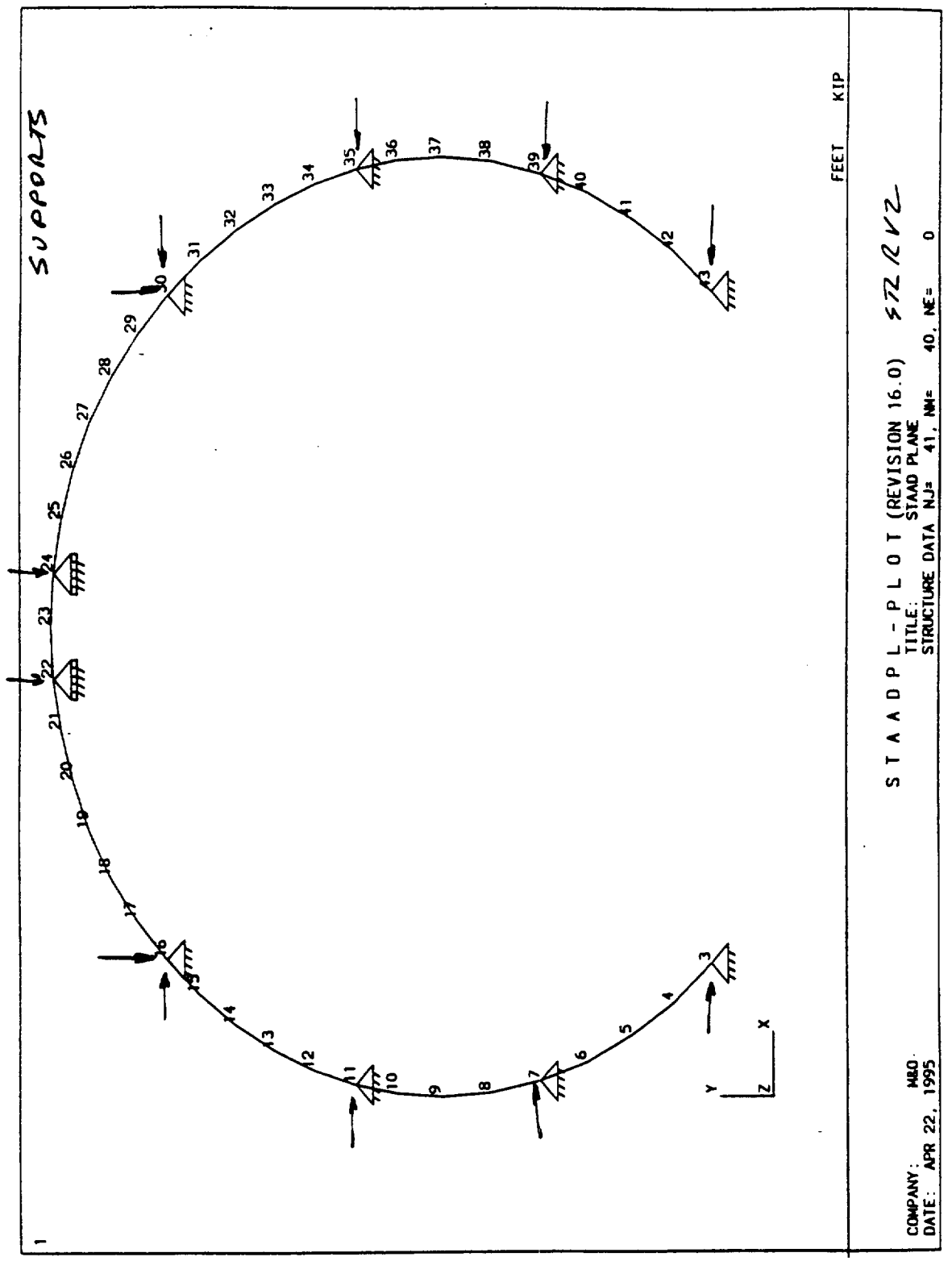
********** END OF TABULATED RESULT OF DESIGN **********

77. PLOT DISPLACEMENT FILE
78. PLOT STRESS FILE
79. PLOT BENDING FILE
80. FINISH

********** END OF STAAD-III **********

DATE= JUL 17,1995 TIME= 15:56: 2 ******

****
* For questions on STAAD-III/ISDS, contact: *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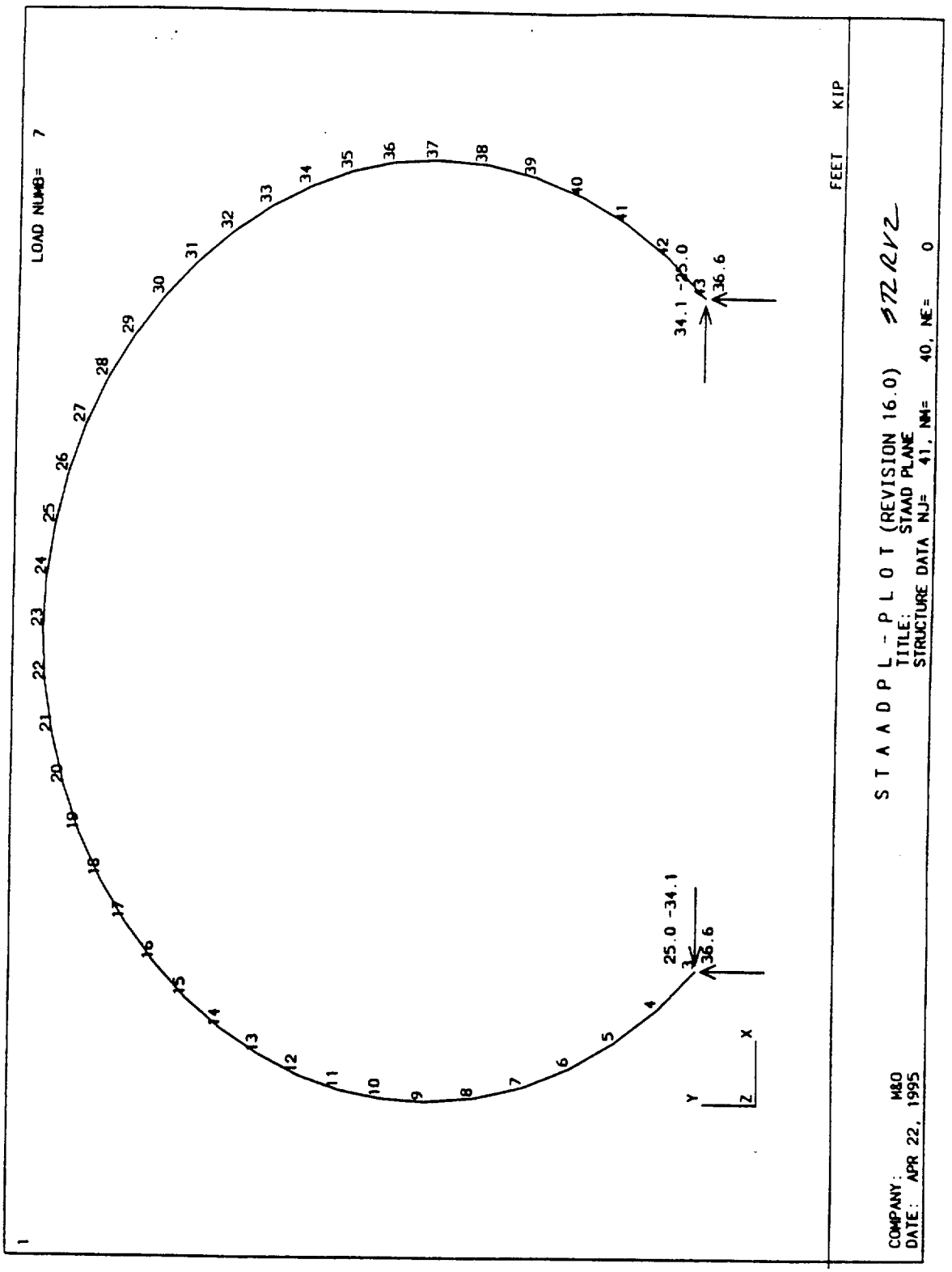
COMPANY: M&O
DATE: APR 22, 1995
X
Y
Z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TITLE:
STAAD PLANE
STRUCTURE DATA NJ= 41, NM= 40, NE= 0
COMPANY: M&O
DATE: APR 22, 1995
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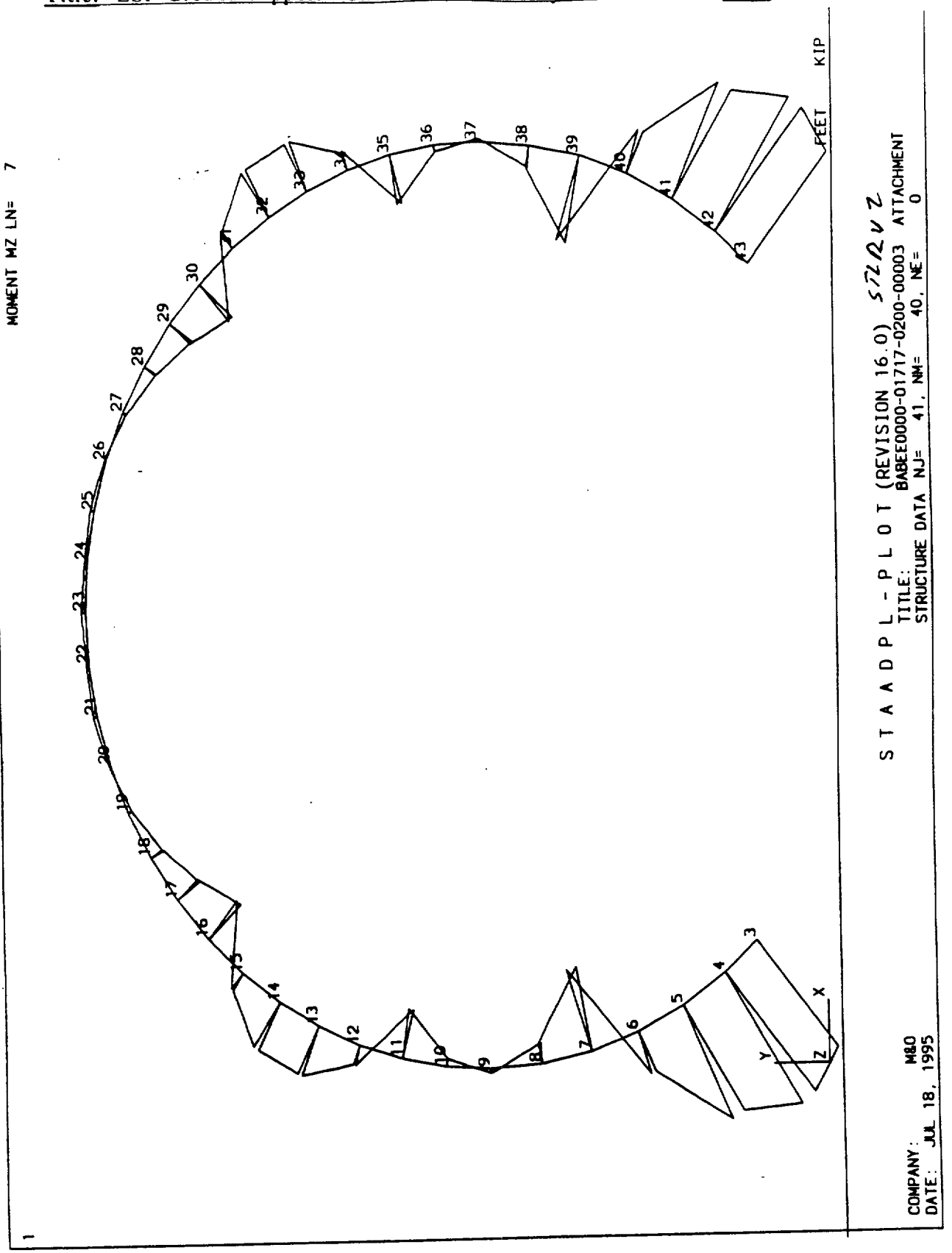
36.6
X
Y
Z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KIP
FEET
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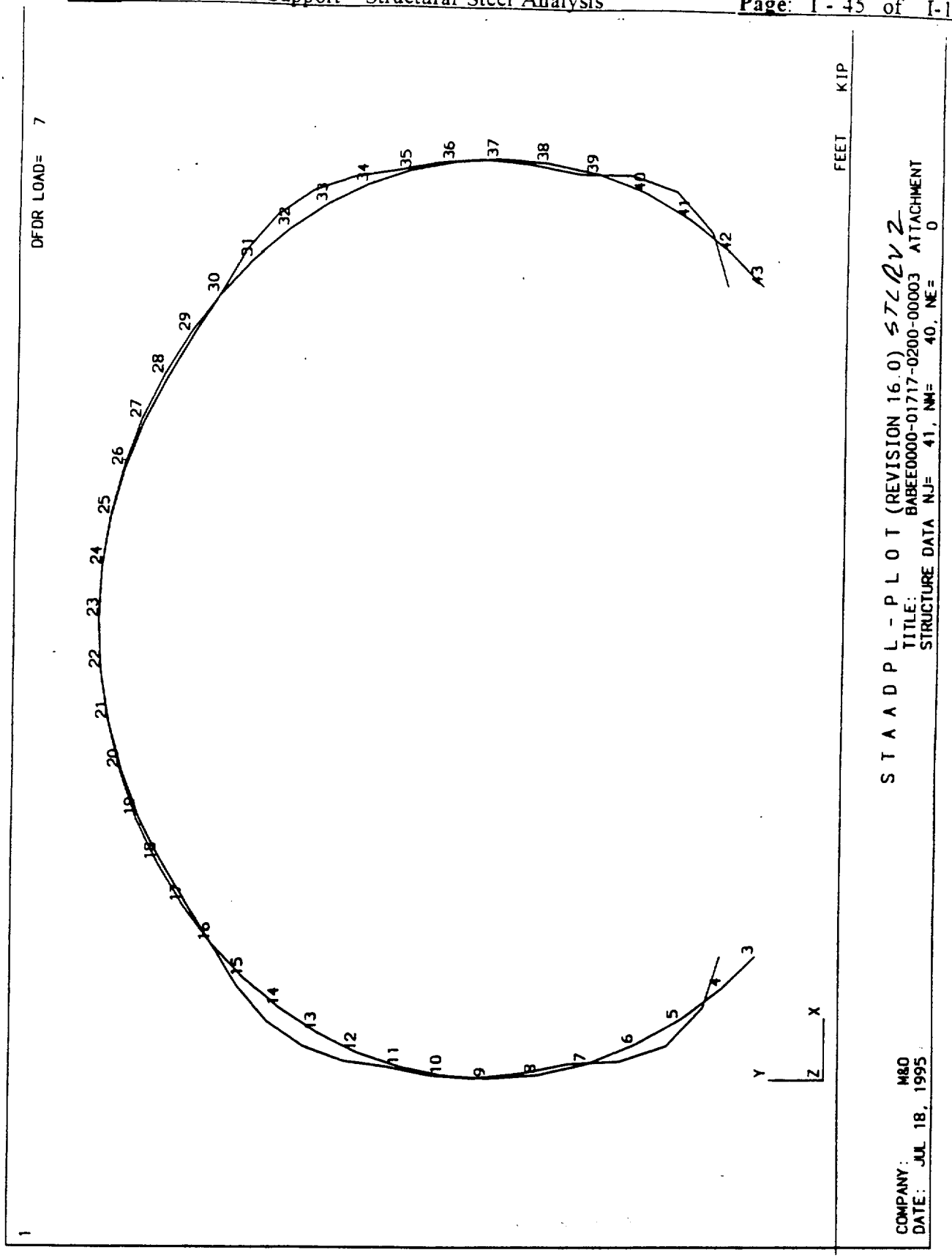
TITLE: BABEE0000-01717-0200-00003 ATTACHMENT
STRUCTURE DATA NJ= 41, NM= 40, NE= 0
COMPANY: M&O
DATE: JUL 18, 1995
1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TITLE: BABEE0000-01717-0200-00003 ATTACHMENT
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COMPANY: M&O
DATE: JUL 18, 1995
1
Y
X
Z

```
 ****************************************************
 *                                                  *
 *           S T A A D - III                        *
 *           Revision 16.0b                         *
 *           Proprietary Program of                 *
 *           RESEARCH ENGINEERS, Inc.               *
 *           Date=    JUL 18, 1995                  *
 *           Time=     8:41:10                      *
 *                                                  *
 ****************************************************
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 1. STAAD PLANE BABEE0000-01717-0200-00003  ATTACHMENT  I
 2. * ESF GROUND SUPPORT-STRUCTURAL STEEL ANALYSIS REV 00
 3. * FILE STLRV3A
 4. * 25 TON JACKS APPLIED BOTH SIDES @ 49 DEGREES
 5. UNIT FT KIP
 6. JOINT COORDINATES
 7. 3 2.98 2.45 ; 4 2.43 3.13
 8. 5 1.58 4.44 ; 6 0.90 5.85 ; 7 0.40 7.33 ; 8 0.10 8.87
 9. 9 0.0 10.43 ; 10 0.08 11.79 ; 11 0.31 13.14 ; 12 0.68 14.45
10. 13 1.21 15.71 ; 14 1.86 16.90 ; 15 2.65 18.02 ; 16 3.56 19.03
11. 17 4.58 19.94 ; 18 5.69 20.73 ; 19 6.89 21.39 ; 20 8.15 21.91
12. 21 9.46 22.29 ; 22 10.80 22.52 ; 23 12.17 22.60 ; 24 13.53 22.52
13. 25 14.87 22.29 ; 26 16.18 21.91 ; 27 17.45 21.39 ; 28 18.64 20.73
14. 29 19.75 19.94 ; 30 20.77 19.03 ; 31 21.68 18.02 ; 32 22.47 16.90
15. 33 23.13 15.71 ; 34 23.65 14.45 ; 35 24.03 13.14 ; 36 24.26 11.79
16. 37 24.33 10.43 ; 38 24.23 8.87 ; 39 23.93 7.33 ; 40 23.44 5.85
17. 41 22.76 4.44 ; 42 21.90 3.13 ; 43 21.35 2.45
18. MEMBER INCIDENCE
19. 3 3 4 42
20. UNIT KIP INCH
21. MEMBER PROPERTIES
22. 3 TO 42 TA STA W8X31
23. CONSTANTS
24. E 29000.0 ALL
25. DENSITY 0.00028 ALL
26. BETA 0 ALL
27. UNIT FT
28. SUPPORT
29. 3 7 11 35 39 43 FIXED BUT FY MZ
30. 22 24 FIXED BUT FX MZ
31. 16 30 PINNED
32. UNIT KIP
33. LOAD 1
34. SELF WEIGHT Y -1.0
35. LOADING 2
36. * 25 TON JACKS & SIMULTANEOUS JACKING
37. JOINT LOADING
38. 3 FX -32.80
39. 43 FX 32.80
40. 3 FY 37.74
41. 43 FY 37.74
42. 43 MZ -25.00
43. 3 MZ 25.00
44. LOADING COMBINATION 3
45. 1 2.5 2 1.0
46. PERFORM ANALYSIS
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P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 41/ 40/ 10
ORIGINAL/FINAL BAND-WIDTH = 1/ 1
TOTAL PRIMARY LOAD CASES = 2, TOTAL DEGREES OF FREEDOM = 111
SIZE OF STIFFNESS MATRIX = 666 DOUBLE PREC. WORDS
TOTAL REQUIRED DISK SPACE = 0.07 MEGA-BYTES

++ PROCESSING ELEMENT STIFFNESS MATRIX. 8:41:13
++ PROCESSING GLOBAL STIFFNESS MATRIX. 8:41:14
++ PROCESSING TRIANGULAR FACTORIZATION. 8:41:14
++ CALCULATING JOINT DISPLACEMENTS. 8:41:14
++ CALCULATING MEMBER FORCES. 8:41:15

47. LOAD LIST 3
48. PRINT ANALYSIS RESULTS

JOINT DISPLACEMENT (INCH RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
3	3	0.00000	0.06081	0.00000	0.00000	0.00000	0.00305
4	3	-0.02014	0.04214	0.00000	0.00000	0.00000	0.00203
5	3	-0.03488	0.02863	0.00000	0.00000	0.00000	0.00030
6	3	-0.02344	0.03053	0.00000	0.00000	0.00000	-0.00079
7	3	0.00000	0.03514	0.00000	0.00000	0.00000	-0.00060
8	3	0.00086	0.03266	0.00000	0.00000	0.00000	-0.00001
9	3	-0.00094	0.02992	0.00000	0.00000	0.00000	0.00002
10	3	-0.00022	0.02759	0.00000	0.00000	0.00000	0.00002
11	3	0.00000	0.02526	0.00000	0.00000	0.00000	0.00036
12	3	-0.01335	0.02641	0.00000	0.00000	0.00000	0.00055
13	3	-0.02214	0.02730	0.00000	0.00000	0.00000	0.00015
14	3	-0.02144	0.02398	0.00000	0.00000	0.00000	-0.00044
15	3	-0.01195	0.01414	0.00000	0.00000	0.00000	-0.00086
16	3	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00070
17	3	0.00392	-0.00491	0.00000	0.00000	0.00000	-0.00025
18	3	0.00415	-0.00583	0.00000	0.00000	0.00000	0.00000
19	3	0.00300	-0.00450	0.00000	0.00000	0.00000	0.00011
20	3	0.00176	-0.00244	0.00000	0.00000	0.00000	0.00012
21	3	0.00090	-0.00078	0.00000	0.00000	0.00000	0.00008
22	3	0.00039	0.00000	0.00000	0.00000	0.00000	0.00004
23	3	0.00000	0.00050	0.00000	0.00000	0.00000	0.00000
24	3	-0.00038	0.00000	0.00000	0.00000	0.00000	-0.00004
25	3	-0.00088	-0.00078	0.00000	0.00000	0.00000	-0.00008
26	3	-0.00174	-0.00242	0.00000	0.00000	0.00000	-0.00012
27	3	-0.00298	-0.00447	0.00000	0.00000	0.00000	-0.00011
28	3	-0.00413	-0.00581	0.00000	0.00000	0.00000	0.00000
29	3	-0.00391	-0.00490	0.00000	0.00000	0.00000	0.00025
30	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00070
31	3	0.01193	0.01412	0.00000	0.00000	0.00000	0.00086
32	3	0.02142	0.02397	0.00000	0.00000	0.00000	0.00044
33	3	0.02223	0.02738	0.00000	0.00000	0.00000	-0.00015
34	3	0.01325	0.02645	0.00000	0.00000	0.00000	-0.00055
35	3	0.00000	0.02525	0.00000	0.00000	0.00000	-0.00036
36	3	0.00017	0.02757	0.00000	0.00000	0.00000	-0.00003
37	3	0.00065	0.02988	0.00000	0.00000	0.00000	-0.00003
38	3	-0.00111	0.03263	0.00000	0.00000	0.00000	0.00002
39	3	0.00000	0.03506	0.00000	0.00000	0.00000	0.00062
40	3	0.02391	0.03043	0.00000	0.00000	0.00000	0.00080
41	3	0.03542	0.02849	0.00000	0.00000	0.00000	-0.00031
42	3	0.02033	0.04237	0.00000	0.00000	0.00000	-0.00206
43	3	0.00000	0.06120	0.00000	0.00000	0.00000	-0.00308

SUPPORT REACTIONS -UNIT KIP FEET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
3	3	4.96	0.00	0.00	0.00	0.00	0.00
7	3	28.01	0.00	0.00	0.00	0.00	0.00
11	3	20.12	0.00	0.00	0.00	0.00	0.00
35	3	-20.18	0.00	0.00	0.00	0.00	0.00
39	3	-28.02	0.00	0.00	0.00	0.00	0.00
43	3	-4.93	0.00	0.00	0.00	0.00	0.00
22	3	0.00	-1.08	0.00	0.00	0.00	0.00
24	3	0.00	-1.09	0.00	0.00	0.00	0.00
16	3	-14.50	-34.52	0.00	0.00	0.00	0.00
30	3	14.54	-34.52	0.00	0.00	0.00	0.00

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
3	3	3	46.85	2.09	0.00	0.00	0.00	-25.00
		4	-46.80	-2.04	0.00	0.00	0.00	26.81
4	3	4	46.76	-2.85	0.00	0.00	0.00	-26.81
		5	-46.66	2.91	0.00	0.00	0.00	22.31
5	3	5	45.92	-8.76	0.00	0.00	0.00	-22.31
		6	-45.81	8.82	0.00	0.00	0.00	8.54
6	3	6	44.37	-14.40	0.00	0.00	0.00	-8.54
		7	-44.26	14.43	0.00	0.00	0.00	-13.97
7	3	7	36.59	7.30	0.00	0.00	0.00	13.97
		8	-36.47	-7.27	0.00	0.00	0.00	-2.54
8	3	8	37.11	2.55	0.00	0.00	0.00	2.54
		9	-36.99	-2.54	0.00	0.00	0.00	1.43
9	3	9	37.02	2.01	0.00	0.00	0.00	1.43
		10	-36.91	-2.00	0.00	0.00	0.00	1.30
10	3	10	36.47	6.04	0.00	0.00	0.00	-1.30
		11	-36.37	-6.03	0.00	0.00	0.00	9.57
11	3	11	40.99	-9.50	0.00	0.00	0.00	-9.57
		12	-40.89	9.53	0.00	0.00	0.00	-3.38
12	3	12	41.75	-4.44	0.00	0.00	0.00	3.38
		13	-41.65	4.48	0.00	0.00	0.00	-9.48
13	3	13	41.89	-0.23	0.00	0.00	0.00	9.48
		14	-41.80	0.28	0.00	0.00	0.00	-9.83
14	3	14	41.56	4.49	0.00	0.00	0.00	9.83
		15	-41.47	-4.43	0.00	0.00	0.00	-3.71
15	3	15	40.65	9.33	0.00	0.00	0.00	3.71
		16	-40.58	-9.26	0.00	0.00	0.00	8.92
16	3	16	5.53	-2.49	0.00	0.00	0.00	-8.92
		17	-5.46	2.57	0.00	0.00	0.00	5.45
17	3	17	5.71	-1.96	0.00	0.00	0.00	-5.45
		18	-5.65	2.04	0.00	0.00	0.00	2.73
18	3	18	5.85	-1.38	0.00	0.00	0.00	-2.73
		19	-5.80	1.47	0.00	0.00	0.00	0.78

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
19	3	19	5.92	-0.82	0.00	0.00	0.00	-0.78
		20	-5.88	0.91	0.00	0.00	0.00	-0.40
20	3	20	5.95	-0.27	0.00	0.00	0.00	0.40
		21	-5.92	0.37	0.00	0.00	0.00	-0.83
21	3	21	5.92	0.30	0.00	0.00	0.00	0.83
		22	-5.90	-0.20	0.00	0.00	0.00	-0.49
22	3	22	5.78	-0.23	0.00	0.00	0.00	0.49
		23	-5.78	0.34	0.00	0.00	0.00	-0.88
23	3	23	5.78	0.34	0.00	0.00	0.00	0.88
		24	-5.78	-0.24	0.00	0.00	0.00	-0.49
24	3	24	5.90	-0.20	0.00	0.00	0.00	0.49
		25	-5.92	0.30	0.00	0.00	0.00	-0.83
25	3	25	5.92	0.37	0.00	0.00	0.00	0.83
		26	-5.95	-0.27	0.00	0.00	0.00	-0.40
26	3	26	5.89	0.89	0.00	0.00	0.00	0.40
		27	-5.93	-0.80	0.00	0.00	0.00	0.76
27	3	27	5.79	1.49	0.00	0.00	0.00	-0.76
		28	-5.84	-1.40	0.00	0.00	0.00	2.73
28	3	28	5.65	2.04	0.00	0.00	0.00	-2.73
		29	-5.71	-1.96	0.00	0.00	0.00	5.45
29	3	29	5.46	2.57	0.00	0.00	0.00	-5.45
		30	-5.53	-2.49	0.00	0.00	0.00	8.91
30	3	30	40.60	-9.22	0.00	0.00	0.00	-8.91
		31	-40.68	9.29	0.00	0.00	0.00	-3.68
31	3	31	41.50	-4.40	0.00	0.00	0.00	3.68
		32	-41.58	4.46	0.00	0.00	0.00	-9.74
32	3	32	41.82	0.05	0.00	0.00	0.00	9.74
		33	-41.91	0.00	0.00	0.00	0.00	-9.71
33	3	33	41.64	4.81	0.00	0.00	0.00	9.71
		34	-41.73	-4.77	0.00	0.00	0.00	-3.19
34	3	34	40.97	9.28	0.00	0.00	0.00	3.19
		35	-41.07	-9.25	0.00	0.00	0.00	9.45
35	3	35	36.36	-6.05	0.00	0.00	0.00	-9.45
		36	-36.47	6.06	0.00	0.00	0.00	1.16

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
36	3	36	36.93	-1.75	0.00	0.00	0.00	-1.16
		37	-37.03	1.76	0.00	0.00	0.00	-1.23
37	3	37	36.99	-2.52	0.00	0.00	0.00	-1.23
		38	-37.11	2.53	0.00	0.00	0.00	-2.71
38	3	38	36.48	-7.26	0.00	0.00	0.00	2.71
		39	-36.60	7.28	0.00	0.00	0.00	-14.12
39	3	39	44.18	14.73	0.00	0.00	0.00	14.12
		40	-44.30	-14.69	0.00	0.00	0.00	8.82
40	3	40	45.82	8.84	0.00	0.00	0.00	-8.82
		41	-45.93	-8.79	0.00	0.00	0.00	22.62
41	3	41	46.69	2.69	0.00	0.00	0.00	-22.62
		42	-46.79	-2.62	0.00	0.00	0.00	26.79
42	3	42	46.82	-2.02	0.00	0.00	0.00	-26.79
		43	-46.87	2.06	0.00	0.00	0.00	25.00

********** END OF LATEST ANALYSIS RESULT **********

49. CHECK CODE ALL

STAAD-III CODE CHECKING - (AISC)
****

ALL UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
3	ST W8X 31	PASS	AISC- H1-2	0.730	3
		46.80 C	0.00	26.81	0.87
4	ST W8X 31	PASS	AISC- H1-2	0.729	3
		46.76 C	0.00	-26.81	0.00
5	ST W8X 31	PASS	AISC- H1-2	0.642	3
		45.92 C	0.00	-22.31	0.00
6	ST W8X 31	PASS	AISC- H1-2	0.481	3
		44.26 C	0.00	-13.97	1.56
7	ST W8X 31	PASS	AISC- H1-2	0.442	3
		36.59 C	0.00	13.97	0.00
8	ST W8X 31	PASS	AISC- H1-2	0.235	3
		37.11 C	0.00	2.54	0.00
9	ST W8X 31	PASS	AISC- H1-2	0.214	3
		37.02 C	0.00	1.43	0.00
10	ST W8X 31	PASS	AISC- H1-2	0.360	3
		36.37 C	0.00	9.57	1.37
11	ST W8X 31	PASS	AISC- H1-2	0.384	3
		40.99 C	0.00	-9.57	0.00
12	ST W8X 31	PASS	AISC- H1-2	0.385	3
		41.65 C	0.00	-9.48	1.37
13	ST W8X 31	PASS	AISC- H1-2	0.392	3
		41.80 C	0.00	-9.83	1.36
14	ST W8X 31	PASS	AISC- H1-2	0.391	3
		41.56 C	0.00	9.83	0.00
15	ST W8X 31	PASS	AISC- H1-2	0.370	3
		40.58 C	0.00	8.92	1.36
16	ST W8X 31	PASS	AISC- H1-3	0.192	3
		5.53 C	0.00	-8.92	0.00
17	ST W8X 31	PASS	AISC- H1-3	0.130	3
		5.71 C	0.00	-5.45	0.00
18	ST W8X 31	PASS	AISC- H1-3	0.080	3
		5.85 C	0.00	-2.73	0.00
19	ST W8X 31	PASS	AISC- H1-3	0.045	3
		5.92 C	0.00	-0.78	0.00
20	ST W8X 31	PASS	AISC- H1-3	0.046	3
		5.92 C	0.00	-0.83	1.36
21	ST W8X 31	PASS	AISC- H1-3	0.046	3
		5.92 C	0.00	0.83	0.00
22	ST W8X 31	PASS	AISC- H1-3	0.046	3
		5.78 C	0.00	-0.88	1.37
23	ST W8X 31	PASS	AISC- H1-3	0.046	3
		5.78 C	0.00	0.88	0.00
24	ST W8X 31	PASS	AISC- H1-3	0.046	3
		5.92 C	0.00	-0.83	1.36
25	ST W8X 31	PASS	AISC- H1-3	0.046	3
		5.92 C	0.00	0.83	0.00
26	ST W8X 31	PASS	AISC- H1-3	0.045	3
		5.93 C	0.00	0.76	1.37

L UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
27	ST W8X 31	PASS	AISC- H1-3	0.080	3
		5.84 C	0.00	2.73	1.36
28	ST W8X 31	PASS	AISC- H1-3	0.130	3
		5.71 C	0.00	5.45	1.36
29	ST W8X 31	PASS	AISC- H1-3	0.192	3
		5.53 C	0.00	8.91	1.37
30	ST W8X 31	PASS	AISC- H1-2	0.370	3
		40.60 C	0.00	-8.91	0.00
31	ST W8X 31	PASS	AISC- H1-2	0.390	3
		41.58 C	0.00	-9.74	1.37
32	ST W8X 31	PASS	AISC- H1-2	0.391	3
		41.82 C	0.00	9.74	0.00
33	ST W8X 31	PASS	AISC- H1-2	0.389	3
		41.64 C	0.00	9.71	0.00
34	ST W8X 31	PASS	AISC- H1-2	0.382	3
		41.07 C	0.00	9.45	1.36
35	ST W8X 31	PASS	AISC- H1-2	0.358	3
		36.36 C	0.00	-9.45	0.00
36	ST W8X 31	PASS	AISC- H1-2	0.210	3
		37.03 C	0.00	-1.23	1.36
37	ST W8X 31	PASS	AISC- H1-2	0.238	3
		37.11 C	0.00	-2.71	1.56
38	ST W8X 31	PASS	AISC- H1-2	0.445	3
		36.60 C	0.00	-14.12	1.57
39	ST W8X 31	PASS	AISC- H1-2	0.483	3
		44.18 C	0.00	14.12	0.00
40	ST W8X 31	PASS	AISC- H1-2	0.648	3
		45.93 C	0.00	22.62	1.57
41	ST W8X 31	PASS	AISC- H1-2	0.729	3
		46.79 C	0.00	26.79	1.57
42	ST W8X 31	PASS	AISC- H1-2	0.729	3
		46.82 C	0.00	-26.79	0.00

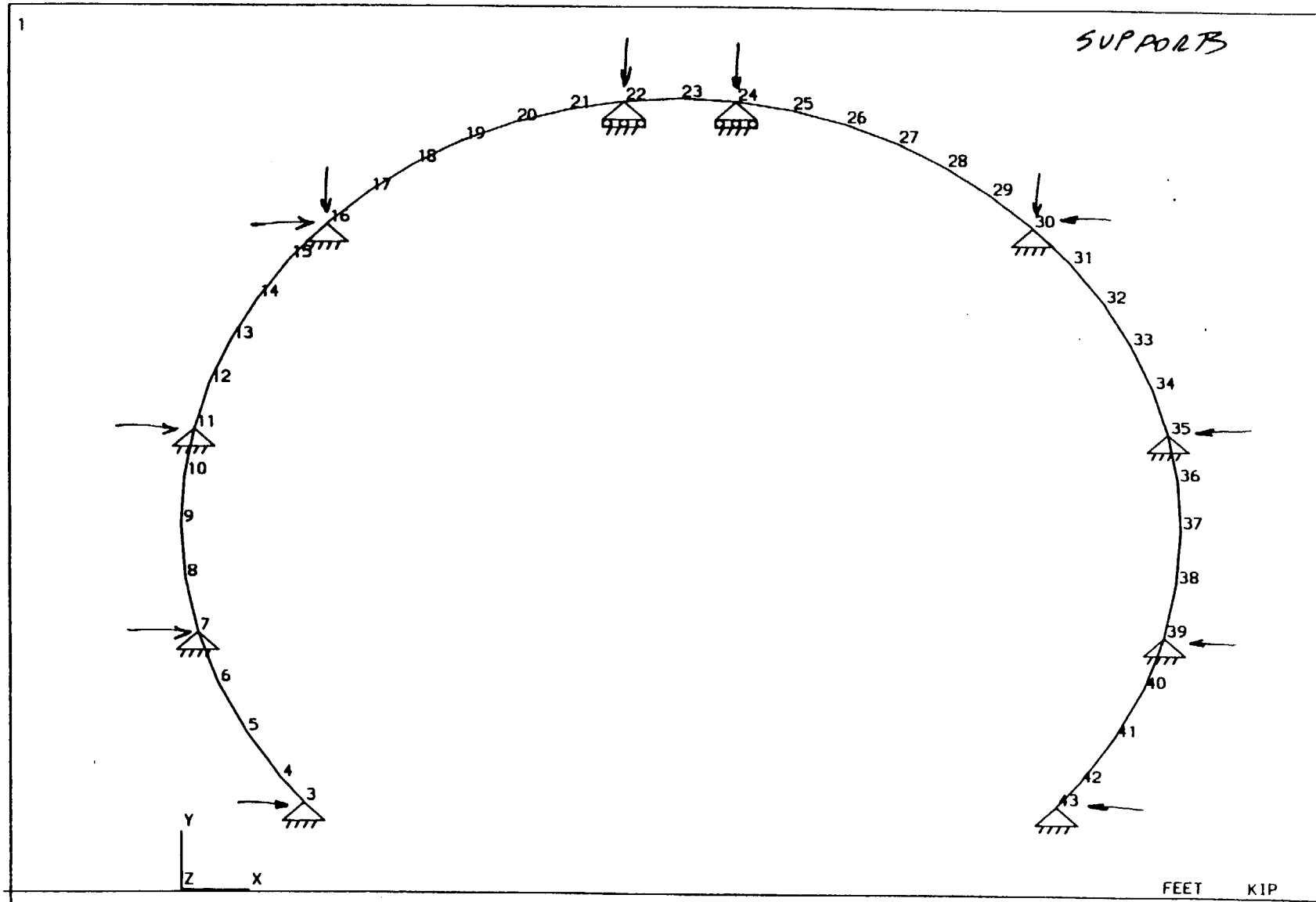
********** END OF TABULATED RESULT OF DESIGN **********

50. PLOT DISPLACEMENT FILE
51. PLOT BENDING FILE
52. FINISH

********** END OF STAAD-III **********

DATE= JUL 18,1995 TIME= 8:41:18 ******

****
* For questions on STAAD-III/ISDS, contact: *
* RESEARCH ENGINEERS, Inc at (714) 974-2500 *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S T A A D P L - P L O T (REVISION 16.0) STLRV3A
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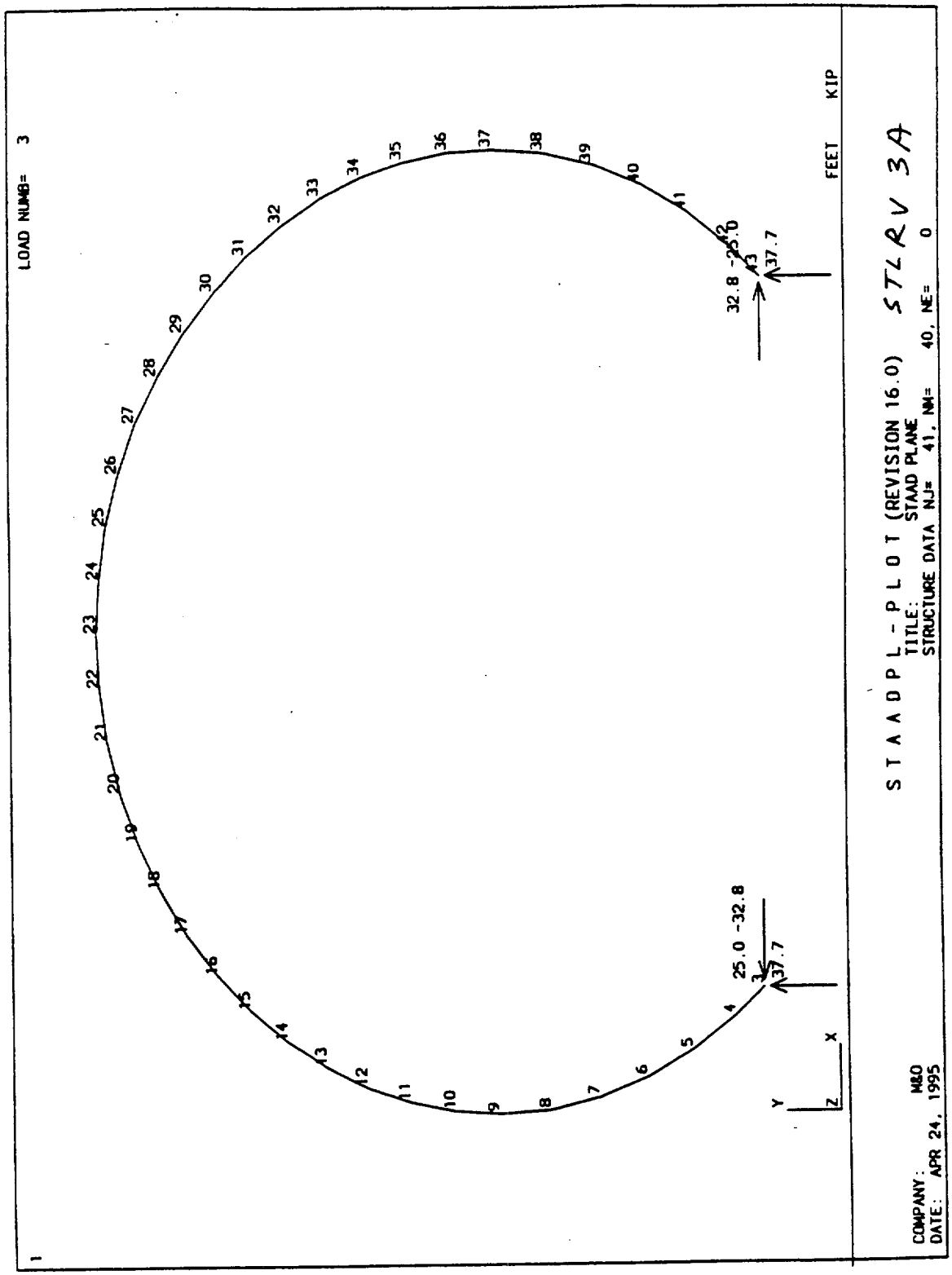
COMPANY: M&O
DATE: JUL 18, 1995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COMPANY:
DATE: APR 24, 1995
M&O
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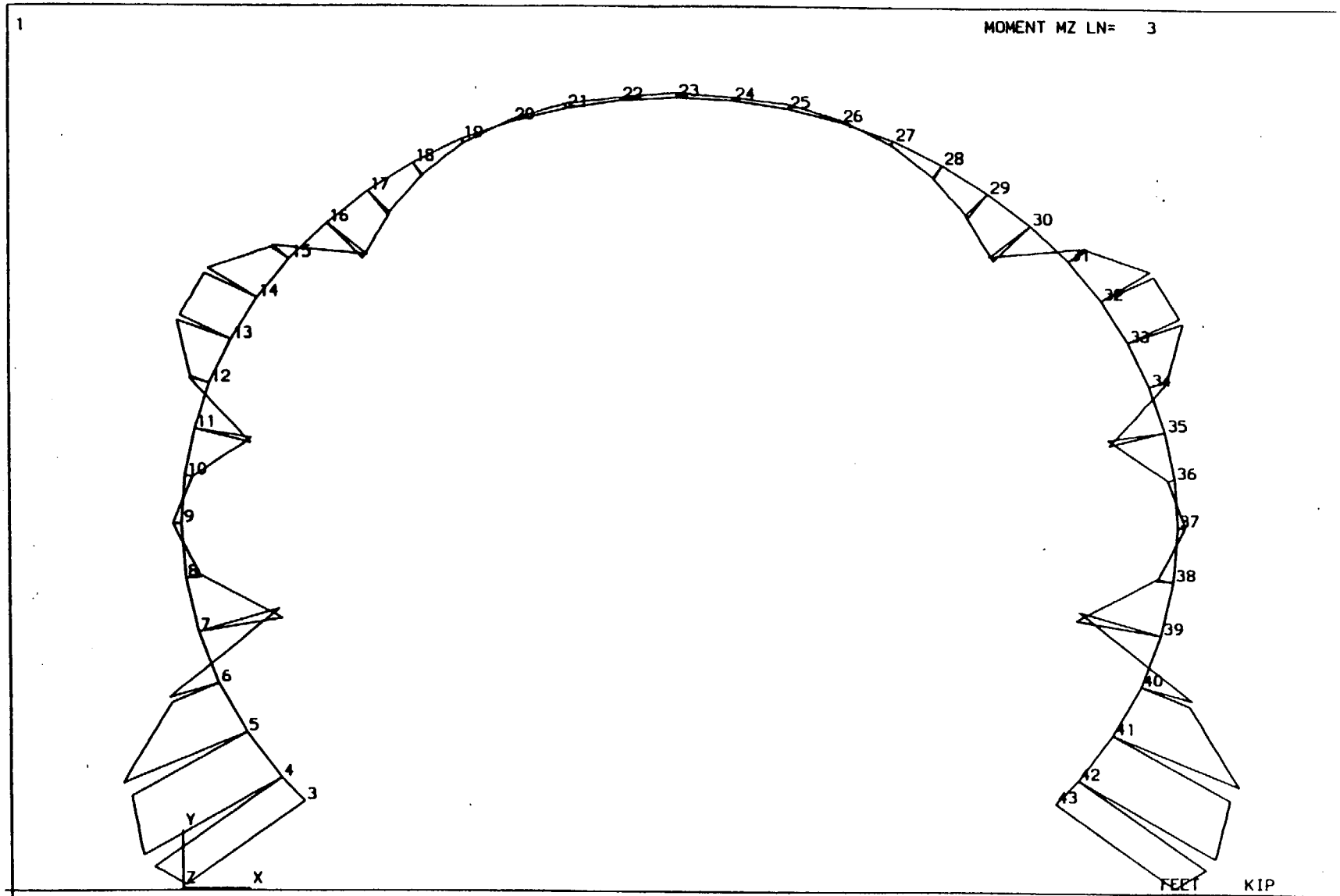
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STAADPL - PLOT (REVISION 16.0)
STLRV 3A
COMPANY: M&O
DATE: JUL 18, 1995
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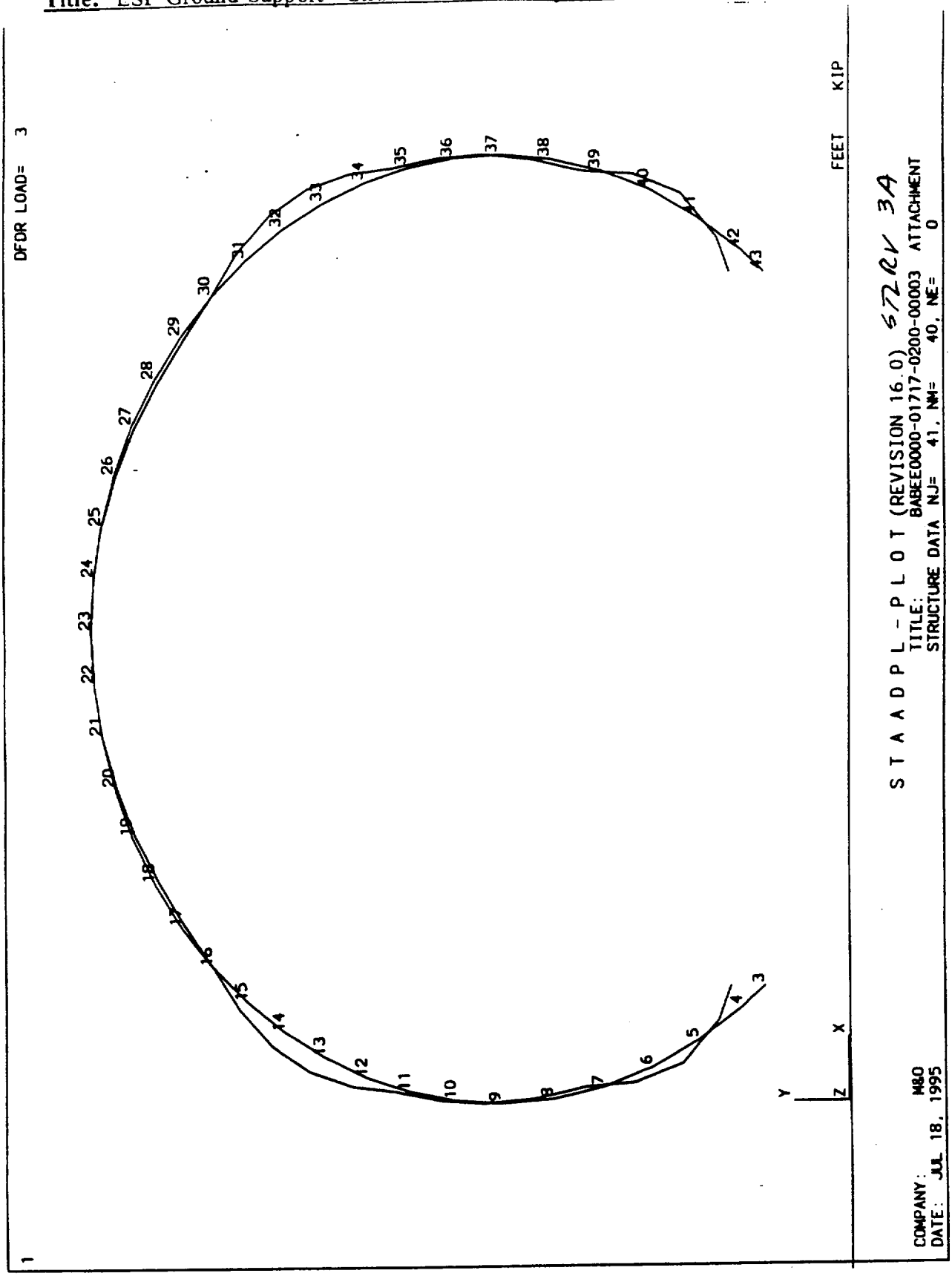
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STRUCTURE DATA NJ= 41, NM= 40, NE= 0
COMPANY: M&O
DATE: JUL 18, 1995
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 ****************************************************
 *                                                  *
 *           S T A A D - III                        *
 *           Revision 16.0b                         *
 *           Proprietary Program of                 *
 *           RESEARCH ENGINEERS, Inc.               *
 *           Date=    JUL 18, 1995                  *
 *           Time=     9: 1:57                      *
 *                                                  *
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  1. STAAD PLANE BABEE0000-01717-0200-00003  ATTACHMENT  I
  2. * ESF GROUND SUPPORT-STRUCTURAL STEEL ANALYSIS REV 00
  3. * FILE STLRV3D
  4. * 25 TON JACKS APPLIED BOTH SIDES @ 51 DEGREES
  5. UNIT FT KIP
  6. JOINT COORDINATES
  7. 3 2.71 2.77 ; 4 2.43 3.13
  8. 5 1.58 4.44 ; 6 0.90 5.85 ; 7 0.40 7.33 ; 8 0.10 8.87
  9. 9 0.0 10.43 ; 10 0.08 11.79 ; 11 0.31 13.14 ; 12 0.68 14.45
 10. 13 1.21 15.71 ; 14 1.86 16.90 ; 15 2.65 18.02 ; 16 3.56 19.03
 11. 17 4.58 19.94 ; 18 5.69 20.73 ; 19 6.89 21.39 ; 20 8.15 21.91
 12. 21 9.46 22.29 ; 22 10.80 22.52 ; 23 12.17 22.60 ; 24 13.53 22.52
 13. 25 14.87 22.29 ; 26 16.18 21.91 ; 27 17.45 21.39 ; 28 18.64 20.73
 14. 29 19.75 19.94 ; 30 20.77 19.03 ; 31 21.68 18.02 ; 32 22.47 16.90
 15. 33 23.13 15.71 ; 34 23.65 14.45 ; 35 24.03 13.14 ; 36 24.26 11.79
 16. 37 24.33 10.43 ; 38 24.23 8.87 ; 39 23.93 7.33 ; 40 23.44 5.85
 17. 41 22.76 4.44 ; 42 21.90 3.13 ; 43 21.62 2.77
 18. MEMBER INCIDENCE
 19. 3 3 4 42
 20. UNIT KIP INCH
 21. MEMBER PROPERTIES
 22. 3 TO 42 TA STA W8X31
 23. CONSTANTS
 24. E 29000.0 ALL
 25. DENSITY 0.00028 ALL
 26. BETA 0 ALL
 27. UNIT FT
 28. SUPPORT
 29. 3 7 11 35 39 43 FIXED BUT FY MZ
 30. 22 24 FIXED BUT FX MZ
 31. 16 30 PINNED
 32. UNIT KIP
 33. LOAD 1
 34. SELF WEIGHT Y -1.0
 35. LOADING 2
 36. * 25 TON JACKS & SIMULTANEOUS JACKING
 37. JOINT LOADING
 38. 3 FX -31.47
 39. 43 FX 31.47
 40. 3 43 FY 38.86
 41. 43 MZ -25.00
 42. 3 MZ 25.00
 43. LOADING COMBINATION 3
 44. 1 2.5 2 1.0
```

P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 41/ 40/ 10
ORIGINAL/FINAL BAND-WIDTH = 1/ 1
TOTAL PRIMARY LOAD CASES = 2, TOTAL DEGREES OF FREEDOM = 111
SIZE OF STIFFNESS MATRIX = 666 DOUBLE PREC. WORDS
TOTAL REQUIRED DISK SPACE = 0.07 MEGA-BYTES

++ PROCESSING ELEMENT STIFFNESS MATRIX. 9: 2: 0
++ PROCESSING GLOBAL STIFFNESS MATRIX. 9: 2: 1
++ PROCESSING TRIANGULAR FACTORIZATION. 9: 2: 1
++ CALCULATING JOINT DISPLACEMENTS. 9: 2: 1
++ CALCULATING MEMBER FORCES. 9: 2: 2

46. LOAD LIST 3
47. PRINT ANALYSIS RESULTS

JOINT DISPLACEMENT (INCH RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
3	3	0.00000	0.05793	0.00000	0.00000	0.00000	0.00273
4	3	-0.01029	0.04868	0.00000	0.00000	0.00000	0.00220
5	3	-0.02835	0.03294	0.00000	0.00000	0.00000	0.00051
6	3	-0.02052	0.03302	0.00000	0.00000	0.00000	-0.00060
7	3	0.00000	0.03655	0.00000	0.00000	0.00000	-0.00048
8	3	-0.00054	0.03372	0.00000	0.00000	0.00000	0.00003
9	3	-0.00238	0.03088	0.00000	0.00000	0.00000	0.00001
10	3	-0.00098	0.02845	0.00000	0.00000	0.00000	-0.00002
11	3	0.00000	0.02592	0.00000	0.00000	0.00000	0.00034
12	3	-0.01348	0.02702	0.00000	0.00000	0.00000	0.00055
13	3	-0.02249	0.02792	0.00000	0.00000	0.00000	0.00016
14	3	-0.02186	0.02454	0.00000	0.00000	0.00000	-0.00045
15	3	-0.01221	0.01448	0.00000	0.00000	0.00000	-0.00088
16	3	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00071
17	3	0.00401	-0.00501	0.00000	0.00000	0.00000	-0.00026
18	3	0.00424	-0.00596	0.00000	0.00000	0.00000	0.00000
19	3	0.00307	-0.00459	0.00000	0.00000	0.00000	0.00011
20	3	0.00180	-0.00249	0.00000	0.00000	0.00000	0.00012
21	3	0.00092	-0.00080	0.00000	0.00000	0.00000	0.00008
22	3	0.00040	0.00000	0.00000	0.00000	0.00000	0.00004
23	3	0.00001	0.00051	0.00000	0.00000	0.00000	0.00000
24	3	-0.00039	0.00000	0.00000	0.00000	0.00000	-0.00004
25	3	-0.00090	-0.00079	0.00000	0.00000	0.00000	-0.00008
26	3	-0.00178	-0.00247	0.00000	0.00000	0.00000	-0.00012
27	3	-0.00304	-0.00457	0.00000	0.00000	0.00000	-0.00011
28	3	-0.00422	-0.00593	0.00000	0.00000	0.00000	0.00000
29	3	-0.00400	-0.00500	0.00000	0.00000	0.00000	0.00026
30	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00071
31	3	0.01219	0.01446	0.00000	0.00000	0.00000	0.00088
32	3	0.02184	0.02453	0.00000	0.00000	0.00000	0.00045
33	3	0.02259	0.02799	0.00000	0.00000	0.00000	-0.00016
34	3	0.01337	0.02706	0.00000	0.00000	0.00000	-0.00055
35	3	0.00000	0.02591	0.00000	0.00000	0.00000	-0.00034
36	3	0.00094	0.02843	0.00000	0.00000	0.00000	0.00001
37	3	0.00209	0.03085	0.00000	0.00000	0.00000	-0.00001
38	3	0.00028	0.03367	0.00000	0.00000	0.00000	-0.00002
39	3	0.00000	0.03646	0.00000	0.00000	0.00000	0.00050
40	3	0.02099	0.03289	0.00000	0.00000	0.00000	0.00062
41	3	0.02886	0.03279	0.00000	0.00000	0.00000	-0.00052
42	3	0.01040	0.04896	0.00000	0.00000	0.00000	-0.00223
43	3	0.00000	0.05830	0.00000	0.00000	0.00000	-0.00275

SUPPORT REACTIONS -UNIT KIP FEET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
3	3	3.59	0.00	0.00	0.00	0.00	0.00
7	3	27.72	0.00	0.00	0.00	0.00	0.00
11	3	21.16	0.00	0.00	0.00	0.00	0.00
35	3	-21.23	0.00	0.00	0.00	0.00	0.00
39	3	-27.72	0.00	0.00	0.00	0.00	0.00
43	3	-3.56	0.00	0.00	0.00	0.00	0.00
22	3	0.00	-1.11	0.00	0.00	0.00	0.00
24	3	0.00	-1.12	0.00	0.00	0.00	0.00
16	3	-15.09	-35.64	0.00	0.00	0.00	0.00
30	3	15.13	-35.64	0.00	0.00	0.00	0.00

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
3	3	3	47.79	1.85	0.00	0.00	0.00	-25.00
		4	-47.77	-1.83	0.00	0.00	0.00	25.84
4	3	4	47.75	-2.26	0.00	0.00	0.00	-25.84
		5	-47.65	2.32	0.00	0.00	0.00	22.26
5	3	5	46.98	-8.30	0.00	0.00	0.00	-22.26
		6	-46.87	8.35	0.00	0.00	0.00	9.22
6	3	6	45.48	-14.07	0.00	0.00	0.00	-9.22
		7	-45.37	14.11	0.00	0.00	0.00	-12.78
7	3	7	37.79	7.19	0.00	0.00	0.00	12.78
		8	-37.67	-7.17	0.00	0.00	0.00	-1.52
8	3	8	38.28	2.29	0.00	0.00	0.00	1.52
		9	-38.16	-2.28	0.00	0.00	0.00	2.05
9	3	9	38.15	2.41	0.00	0.00	0.00	2.05
		10	-38.05	-2.41	0.00	0.00	0.00	1.24
10	3	10	37.55	6.57	0.00	0.00	0.00	-1.24
		11	-37.45	-6.55	0.00	0.00	0.00	10.22
11	3	11	42.29	-9.87	0.00	0.00	0.00	-10.22
		12	-42.19	9.90	0.00	0.00	0.00	-3.24
12	3	12	43.09	-4.65	0.00	0.00	0.00	3.24
		13	-42.99	4.69	0.00	0.00	0.00	-9.63
13	3	13	43.24	-0.30	0.00	0.00	0.00	9.63
		14	-43.15	0.35	0.00	0.00	0.00	-10.07
14	3	14	42.91	4.58	0.00	0.00	0.00	10.07
		15	-42.82	-4.51	0.00	0.00	0.00	-3.84
15	3	15	41.99	9.57	0.00	0.00	0.00	3.84
		16	-41.91	-9.50	0.00	0.00	0.00	9.12
16	3	16	5.64	-2.55	0.00	0.00	0.00	-9.12
		17	-5.57	2.63	0.00	0.00	0.00	5.58
17	3	17	5.82	-2.00	0.00	0.00	0.00	-5.58
		18	-5.76	2.09	0.00	0.00	0.00	2.79
18	3	18	5.97	-1.41	0.00	0.00	0.00	-2.79
		19	-5.92	1.50	0.00	0.00	0.00	0.79

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
19	3	19	6.05	-0.84	0.00	0.00	0.00	-0.79
		20	-6.01	0.93	0.00	0.00	0.00	-0.41
20	3	20	6.07	-0.27	0.00	0.00	0.00	0.41
		21	-6.04	0.37	0.00	0.00	0.00	-0.85
21	3	21	6.05	0.31	0.00	0.00	0.00	0.85
		22	-6.03	-0.20	0.00	0.00	0.00	-0.50
22	3	22	5.90	-0.24	0.00	0.00	0.00	0.50
		23	-5.90	0.34	0.00	0.00	0.00	-0.90
23	3	23	5.90	0.35	0.00	0.00	0.00	0.90
		24	-5.90	-0.24	0.00	0.00	0.00	-0.50
24	3	24	6.03	-0.21	0.00	0.00	0.00	0.50
		25	-6.05	0.31	0.00	0.00	0.00	-0.85
25	3	25	6.04	0.37	0.00	0.00	0.00	0.85
		26	-6.07	-0.27	0.00	0.00	0.00	-0.41
26	3	26	6.01	0.91	0.00	0.00	0.00	0.41
		27	-6.05	-0.82	0.00	0.00	0.00	0.78
27	3	27	5.91	1.52	0.00	0.00	0.00	-0.78
		28	-5.96	-1.43	0.00	0.00	0.00	2.79
28	3	28	5.77	2.09	0.00	0.00	0.00	-2.79
		29	-5.83	-2.00	0.00	0.00	0.00	5.57
29	3	29	5.57	2.63	0.00	0.00	0.00	-5.57
		30	-5.64	-2.55	0.00	0.00	0.00	9.12
30	3	30	41.94	-9.47	0.00	0.00	0.00	-9.12
		31	-42.02	9.54	0.00	0.00	0.00	-3.80
31	3	31	42.85	-4.48	0.00	0.00	0.00	3.80
		32	-42.94	4.54	0.00	0.00	0.00	-9.98
32	3	32	43.18	0.11	0.00	0.00	0.00	9.98
		33	-43.27	-0.06	0.00	0.00	0.00	-9.86
33	3	33	42.97	5.03	0.00	0.00	0.00	9.86
		34	-43.07	-4.99	0.00	0.00	0.00	-3.04
34	3	34	42.27	9.65	0.00	0.00	0.00	3.04
		35	-42.37	-9.62	0.00	0.00	0.00	10.10
35	3	35	37.44	-6.57	0.00	0.00	0.00	-10.10
		36	-37.55	6.59	0.00	0.00	0.00	1.09

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
36	3	36	38.06	-2.15	0.00	0.00	0.00	-1.09
		37	-38.16	2.15	0.00	0.00	0.00	-1.84
37	3	37	38.16	-2.26	0.00	0.00	0.00	-1.84
		38	-38.28	2.26	0.00	0.00	0.00	-1.69
38	3	38	37.67	-7.15	0.00	0.00	0.00	1.69
		39	-37.79	7.17	0.00	0.00	0.00	-12.92
39	3	39	45.29	14.41	0.00	0.00	0.00	12.92
		40	-45.40	-14.37	0.00	0.00	0.00	9.52
40	3	40	46.88	8.38	0.00	0.00	0.00	-9.52
		41	-46.99	-8.33	0.00	0.00	0.00	22.60
41	3	41	47.67	2.09	0.00	0.00	0.00	-22.60
		42	-47.78	-2.03	0.00	0.00	0.00	25.83
42	3	42	47.78	-1.80	0.00	0.00	0.00	-25.83
		43	-47.81	1.82	0.00	0.00	0.00	25.00

********** END OF LATEST ANALYSIS RESULT **********

48. CHECK CODE ALL

STAAD-III CODE CHECKING - (AISC)
****

ALL UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
3	ST W8X 31	PASS	AISC- H1-2	0.717	3
		47.77 C	0.00	25.84	0.46
4	ST W8X 31	PASS	AISC- H1-2	0.717	3
		47.75 C	0.00	-25.84	0.00
5	ST W8X 31	PASS	AISC- H1-2	0.647	3
		46.98 C	0.00	-22.26	0.00
6	ST W8X 31	PASS	AISC- H1-2	0.465	3
		45.37 C	0.00	-12.78	1.56
7	ST W8X 31	PASS	AISC- H1-2	0.426	3
		37.79 C	0.00	12.78	0.00
8	ST W8X 31	PASS	AISC- H1-2	0.231	3
		38.16 C	0.00	2.05	1.56
9	ST W8X 31	PASS	AISC- H1-2	0.231	3
		38.15 C	0.00	2.05	0.00
10	ST W8X 31	PASS	AISC- H1-2	0.378	3
		37.45 C	0.00	10.22	1.37
11	ST W8X 31	PASS	AISC- H1-2	0.402	3
		42.29 C	0.00	-10.22	0.00
12	ST W8X 31	PASS	AISC- H1-2	0.395	3
		42.99 C	0.00	-9.63	1.37
13	ST W8X 31	PASS	AISC- H1-2	0.404	3
		43.15 C	0.00	-10.07	1.36
14	ST W8X 31	PASS	AISC- H1-2	0.403	3
		42.91 C	0.00	10.07	0.00
15	ST W8X 31	PASS	AISC- H1-2	0.380	3
		41.91 C	0.00	9.12	1.36
16	ST W8X 31	PASS	AISC- H1-3	0.197	3
		5.64 C	0.00	-9.12	0.00
17	ST W8X 31	PASS	AISC- H1-3	0.132	3
		5.82 C	0.00	-5.58	0.00
18	ST W8X 31	PASS	AISC- H1-3	0.082	3
		5.97 C	0.00	-2.79	0.00
19	ST W8X 31	PASS	AISC- H1-3	0.046	3
		6.05 C	0.00	-0.79	0.00
20	ST W8X 31	PASS	AISC- H1-3	0.047	3
		6.04 C	0.00	-0.85	1.36
21	ST W8X 31	PASS	AISC- H1-3	0.047	3
		6.05 C	0.00	0.85	0.00
22	ST W8X 31	PASS	AISC- H1-3	0.047	3
		5.90 C	0.00	-0.90	1.37
23	ST W8X 31	PASS	AISC- H1-3	0.047	3
		5.90 C	0.00	0.90	0.00
24	ST W8X 31	PASS	AISC- H1-3	0.047	3
		6.05 C	0.00	-0.85	1.36
25	ST W8X 31	PASS	AISC- H1-3	0.047	3
		6.04 C	0.00	0.85	0.00
26	ST W8X 31	PASS	AISC- H1-3	0.046	3
		6.05 C	0.00	0.78	1.37

L UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
27	ST W8X 31	PASS	AISC- H1-3	0.082	3
		5.96 C	0.00	2.79	1.36
28	ST W8X 31	PASS	AISC- H1-3	0.132	3
		5.83 C	0.00	5.57	1.36
29	ST W8X 31	PASS	AISC- H1-3	0.196	3
		5.64 C	0.00	9.12	1.37
30	ST W8X 31	PASS	AISC- H1-2	0.380	3
		41.94 C	0.00	-9.12	0.00
31	ST W8X 31	PASS	AISC- H1-2	0.401	3
		42.94 C	0.00	-9.98	1.37
32	ST W8X 31	PASS	AISC- H1-2	0.402	3
		43.18 C	0.00	9.98	0.00
33	ST W8X 31	PASS	AISC- H1-2	0.399	3
		42.97 C	0.00	9.86	0.00
34	ST W8X 31	PASS	AISC- H1-2	0.400	3
		42.37 C	0.00	10.10	1.36
35	ST W8X 31	PASS	AISC- H1-2	0.375	3
		37.44 C	0.00	-10.10	0.00
36	ST W8X 31	PASS	AISC- H1-2	0.227	3
		38.16 C	0.00	-1.84	1.36
37	ST W8X 31	PASS	AISC- H1-2	0.227	3
		38.16 C	0.00	-1.84	0.00
38	ST W8X 31	PASS	AISC- H1-2	0.429	3
		37.79 C	0.00	-12.92	1.57
39	ST W8X 31	PASS	AISC- H1-2	0.467	3
		45.29 C	0.00	12.92	0.00
40	ST W8X 31	PASS	AISC- H1-2	0.653	3
		46.99 C	0.00	22.60	1.57
41	ST W8X 31	PASS	AISC- H1-2	0.717	3
		47.78 C	0.00	25.83	1.57
42	ST W8X 31	PASS	AISC- H1-2	0.717	3
		47.78 C	0.00	-25.83	0.00

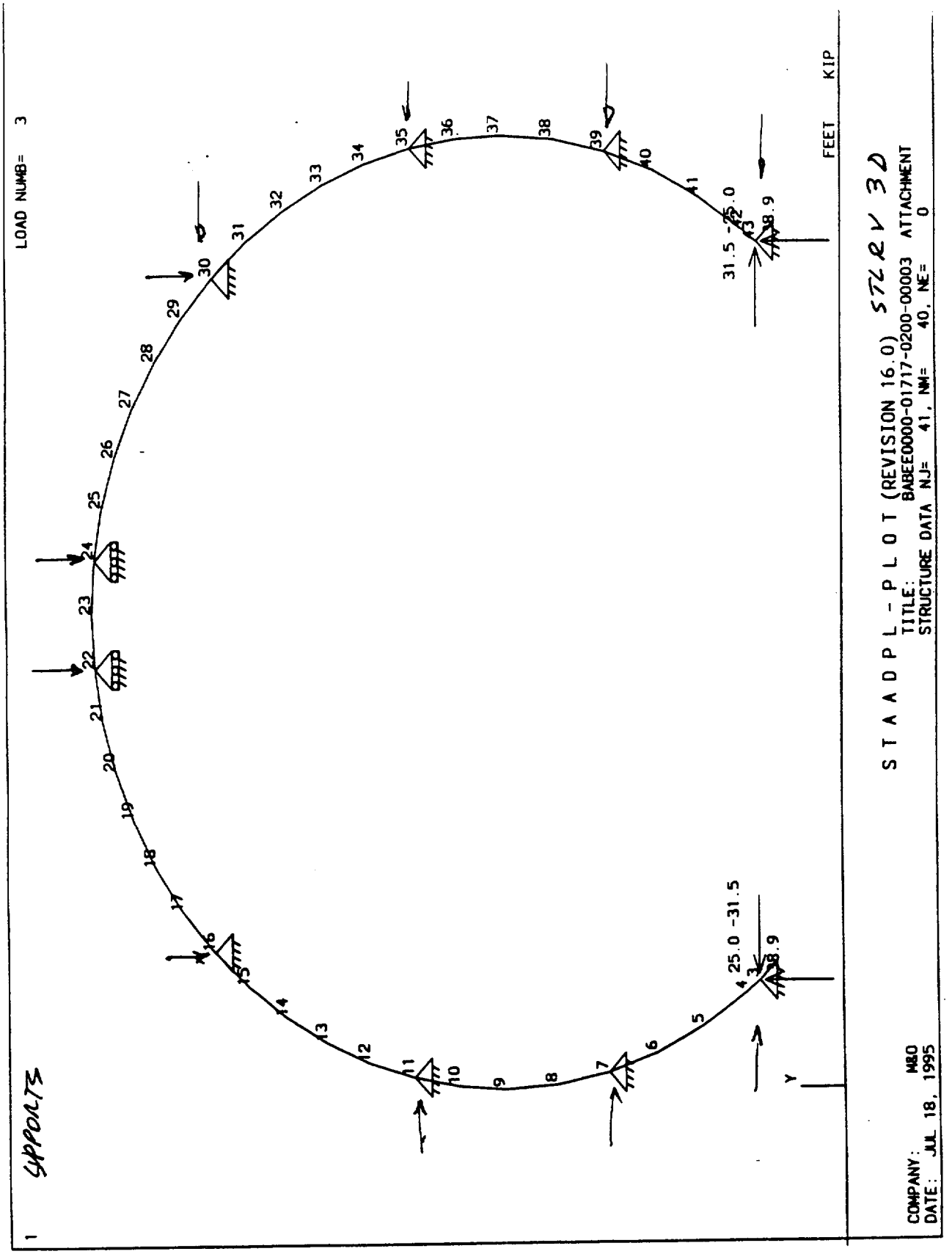
********** END OF TABULATED RESULT OF DESIGN **********

49. PLOT DISPLACEMENT FILE
50. PLOT BENDING FILE
51. FINISH

********** END OF STAAD-III **********

DATE= JUL 18,1995 TIME= 9: 2: 5 ******

****
* For questions on STAAD-III/ISDS, contact: *
* RESEARCH ENGINEERS, Inc at (714) 974-2500 *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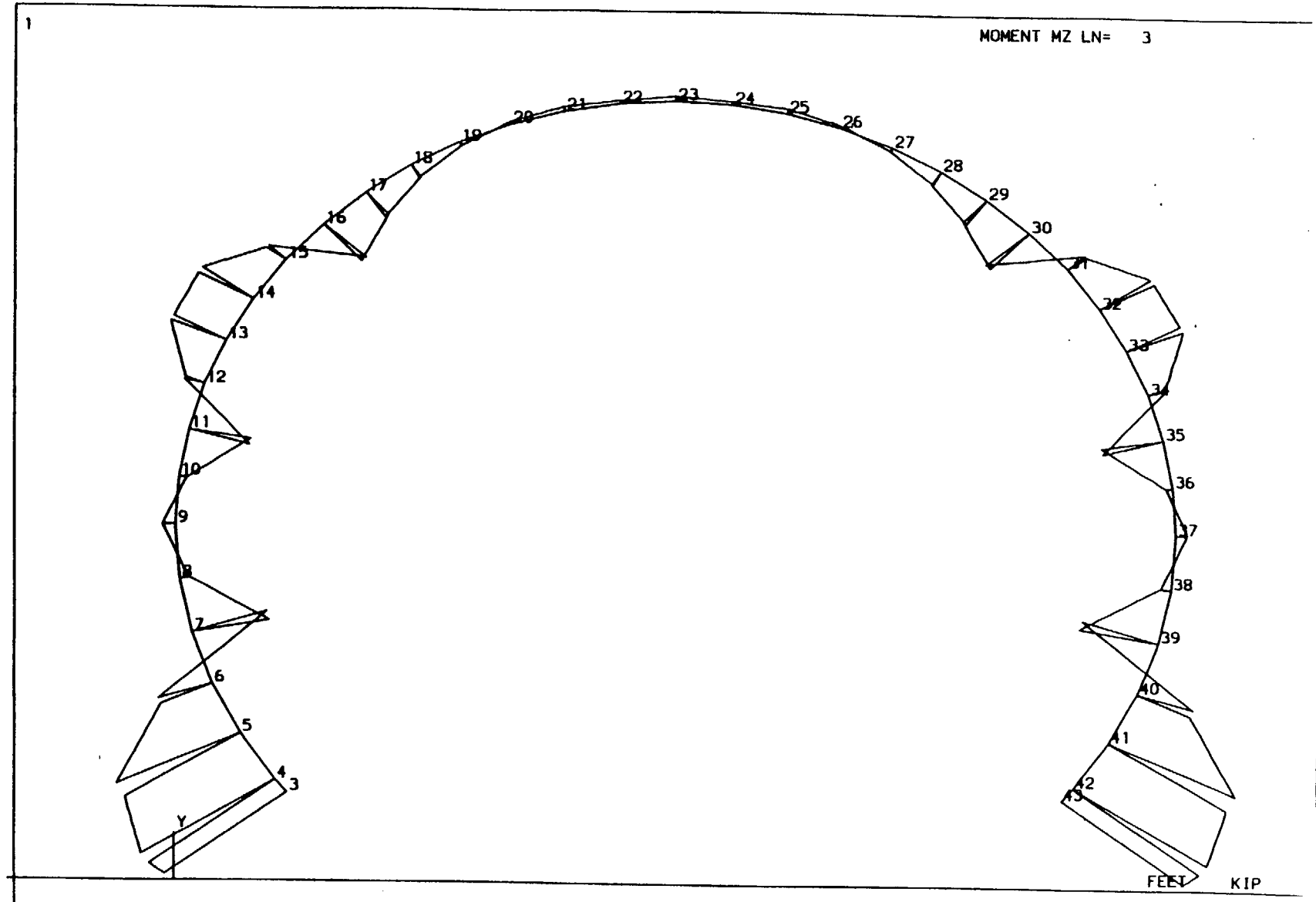
COMPANY: M&O
DATE: JUL 18, 1995
FEET KIP
31.5 -25.0
25.0 -31.5
38.9
Y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FEET
KIP
COMPANY: M&O
DATE: JUL 18, 1995
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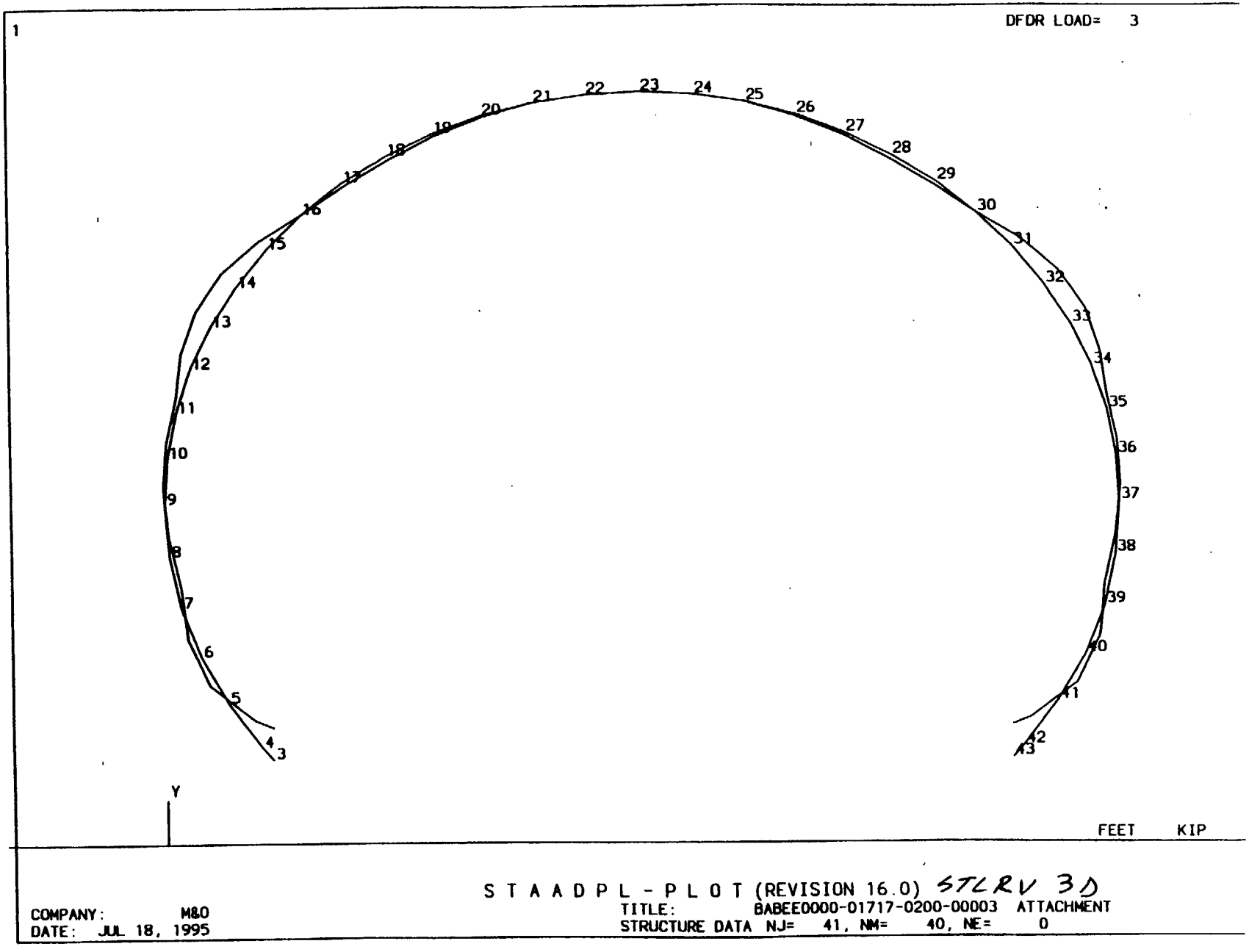
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DFDR LOAD= 3
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39
40
41
42
43
Y
FEET KIP
S T A A D P L - P L O T (REVISION 16.0) STLRV 3D
TITLE: BABEE0000-01717-0200-00003 ATTACHMENT
STRUCTURE DATA NJ= 41, NM= 40, NE= 0
COMPANY: M&O
DATE: JUL 18, 1995

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**************************************************
*                                                *
*           S T A A D - III                      *
*           Revision 16.0b                       *
*           Proprietary Program of               *
*           RESEARCH ENGINEERS, Inc.             *
*           Date=    JUL 18, 1995                *
*           Time=    10:10:59                    *
*                                                *
**************************************************

  1. STAAD PLANE  BABEE0000-01717-0200-00003 ATTACHMENT  I
  2. * ESF GROUND SUPPORT-STRUCTURAL STEEL ANALYSIS REV 00
  3. * FILE STLRV3B
  4. * 25 TON JACKS APPLIED BOTH SIDES @ 47 DEGREES
  5. * MOMENT MZ RELEASED AT THE ENDS OF MEMBERS 15 AND 29
  6. * MOMENT MZ RELEASED AT THE START OF MEMBERS 16 AND 30
  7. UNIT FT KIP
  8. JOINT COORDINATES
  9. 3 3.27 2.13 ; 4 2.43 3.13
 10. 5 1.58 4.44 ; 6 0.90 5.85 ; 7 0.40 7.33 ; 8 0.10 8.87
 11. 9 0.0 10.43 ; 10 0.08 11.79 ; 11 0.31 13.14 ; 12 0.68 14.45
 12. 13 1.21 15.71 ; 14 1.86 16.90 ; 15 2.65 18.02 ; 16 3.56 19.03
 13. 17 4.58 19.94 ; 18 5.69 20.73 ; 19 6.89 21.39; 20 8.15 21.91
 14. 21 9.46 22.29 ; 22 10.80 22.52 ; 23 12.17 22.60 ; 24 13.53 22.52
 15. 25 14.87 22.29 ; 26 16.18 21.91 ; 27 17.45 21.39 ; 28 18.64 20.73
 16. 29 19.75 19.94 ; 30 20.77 19.03 ; 31 21.68 18.02 ; 32 22.47 16.90
 17. 33 23.13 15.71 ; 34 23.65 14.45 ; 35 24.03 13.14 ; 36 24.26 11.79
 18. 37 24.33 10.43 ; 38 24.23 8.87 ; 39 23.93 7.33 ; 40 23.44 5.85
 19. 41 22.76 4.44 ; 42 21.90 3.13 ; 43 21.06 2.13
 20. MEMBER INCIDENCE
 21. 3 3 4 42
 22. UNIT KIP INCH
 23. MEMBER RELEASE
 24. 15 29 END MZ
 25. 16 30 START MZ
 26. MEMBER PROPERTIES
 27. 3 TO 42 TA STA W8X31
 28. CONSTANTS
 29. E 29000.0 ALL
 30. DENSITY 0.00028 ALL
 31. BETA 0 ALL
 32. UNIT FT
 33. SUPPORT
 34. 3 7 11 35 39 43 FIXED BUT FY MZ
 35. 22 24 FIXED BUT FX MZ
 36. 16 30 PINNED
 37. UNIT KIP
 38. LOAD 1
 39. SELF WEIGHT Y -1.0
 40. LOADING 2
 41. * 25 TON JACKS & SIMULTANEOUS JACKING
 42. JOINT LOADING
 43. 3 FX -34.10
 44. 43 FX 34.10
 45. 3 FY 36.57
 46. 43 FY 36.57
 47. 43 MZ -25.00
```

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48. 3 MZ 25.00
49. LOADING COMBINATION 3
50. 1 2.5 2 1.0
51. PERFORM ANALYSIS

        P R O B L E M   S T A T I S T I C S
        -----------------------------------

 NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS =    41/   40/   10
 ORIGINAL/FINAL BAND-WIDTH =     1/    1
 TOTAL PRIMARY LOAD CASES  =     2, TOTAL DEGREES OF FREEDOM =    111
 SIZE OF STIFFNESS MATRIX =      666 DOUBLE PREC. WORDS
 TOTAL REQUIRED DISK SPACE =     0.07 MEGA-BYTES


++ PROCESSING ELEMENT STIFFNESS MATRIX.          10:11: 2
++ PROCESSING GLOBAL STIFFNESS MATRIX.           10:11: 3
++ PROCESSING TRIANGULAR FACTORIZATION.          10:11: 3
++ CALCULATING JOINT DISPLACEMENTS.              10:11: 3
++ CALCULATING MEMBER  FORCES.                   10:11: 4

52. LOAD LIST 3
53. PRINT ANALYSIS RESULTS
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JOINT DISPLACEMENT (INCH RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
3	3	0.00000	0.06910	0.00000	0.00000	0.00000	0.00342
4	3	-0.03097	0.03955	0.00000	0.00000	0.00000	0.00186
5	3	-0.04236	0.02831	0.00000	0.00000	0.00000	0.00008
6	3	-0.02702	0.03218	0.00000	0.00000	0.00000	-0.00100
7	3	0.00000	0.03808	0.00000	0.00000	0.00000	-0.00077
8	3	0.00352	0.03621	0.00000	0.00000	0.00000	-0.00011
9	3	0.00263	0.03360	0.00000	0.00000	0.00000	0.00003
10	3	0.00239	0.03141	0.00000	0.00000	0.00000	0.00013
11	3	0.00000	0.02960	0.00000	0.00000	0.00000	0.00056
12	3	-0.01765	0.03201	0.00000	0.00000	0.00000	0.00079
13	3	-0.03021	0.03454	0.00000	0.00000	0.00000	0.00030
14	3	-0.03095	0.03205	0.00000	0.00000	0.00000	-0.00050
15	3	-0.01909	0.02056	0.00000	0.00000	0.00000	-0.00127
16	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
17	3	0.00016	-0.00024	0.00000	0.00000	0.00000	-0.00001
18	3	0.00024	-0.00042	0.00000	0.00000	0.00000	-0.00001
19	3	0.00025	-0.00050	0.00000	0.00000	0.00000	0.00000
20	3	0.00019	-0.00043	0.00000	0.00000	0.00000	0.00001
21	3	0.00010	-0.00023	0.00000	0.00000	0.00000	0.00001
22	3	0.00003	0.00000	0.00000	0.00000	0.00000	0.00001
23	3	0.00000	0.00005	0.00000	0.00000	0.00000	0.00000
24	3	-0.00003	0.00000	0.00000	0.00000	0.00000	-0.00001
25	3	-0.00010	-0.00023	0.00000	0.00000	0.00000	-0.00001
26	3	-0.00019	-0.00043	0.00000	0.00000	0.00000	-0.00001
27	3	-0.00025	-0.00050	0.00000	0.00000	0.00000	0.00000
28	3	-0.00024	-0.00042	0.00000	0.00000	0.00000	0.00001
29	3	-0.00016	-0.00024	0.00000	0.00000	0.00000	0.00001
30	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
31	3	0.01907	0.02054	0.00000	0.00000	0.00000	0.00127
32	3	0.03093	0.03204	0.00000	0.00000	0.00000	0.00051
33	3	0.03030	0.03460	0.00000	0.00000	0.00000	-0.00030
34	3	0.01755	0.03208	0.00000	0.00000	0.00000	-0.00079
35	3	0.00000	0.02957	0.00000	0.00000	0.00000	-0.00056
36	3	-0.00244	0.03138	0.00000	0.00000	0.00000	-0.00014
37	3	-0.00291	0.03356	0.00000	0.00000	0.00000	-0.00004
38	3	-0.00377	0.03616	0.00000	0.00000	0.00000	0.00012
39	3	0.00000	0.03799	0.00000	0.00000	0.00000	0.00079
40	3	0.02749	0.03210	0.00000	0.00000	0.00000	0.00102
41	3	0.04292	0.02818	0.00000	0.00000	0.00000	-0.00009
42	3	0.03121	0.03975	0.00000	0.00000	0.00000	-0.00188
43	3	0.00000	0.06950	0.00000	0.00000	0.00000	-0.00344

SUPPORT REACTIONS -UNIT KIP FEET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
3	3	6.37	0.00	0.00	0.00	0.00	0.00
7	3	27.80	0.00	0.00	0.00	0.00	0.00
11	3	21.31	0.00	0.00	0.00	0.00	0.00
35	3	-21.37	0.00	0.00	0.00	0.00	0.00
39	3	-27.81	0.00	0.00	0.00	0.00	0.00
43	3	-6.34	0.00	0.00	0.00	0.00	0.00
22	3	0.00	0.20	0.00	0.00	0.00	0.00
24	3	0.00	0.20	0.00	0.00	0.00	0.00
16	3	-20.92	-34.61	0.00	0.00	0.00	0.00
30	3	20.96	-34.61	0.00	0.00	0.00	0.00

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
3	3	3	45.84	2.29	0.00	0.00	0.00	-25.00
		4	-45.76	-2.22	0.00	0.00	0.00	27.95
4	3	4	45.69	-3.41	0.00	0.00	0.00	-27.95
		5	-45.59	3.48	0.00	0.00	0.00	22.57
5	3	5	44.79	-9.19	0.00	0.00	0.00	-22.57
		6	-44.68	9.24	0.00	0.00	0.00	8.15
6	3	6	43.20	-14.67	0.00	0.00	0.00	-8.15
		7	-43.09	14.71	0.00	0.00	0.00	-14.80
7	3	7	35.43	6.98	0.00	0.00	0.00	14.80
		8	-35.31	-6.95	0.00	0.00	0.00	-3.88
8	3	8	35.91	2.37	0.00	0.00	0.00	3.88
		9	-35.79	-2.37	0.00	0.00	0.00	-0.17
9	3	9	35.81	2.03	0.00	0.00	0.00	-0.17
		10	-35.71	-2.03	0.00	0.00	0.00	2.94
10	3	10	35.27	5.94	0.00	0.00	0.00	-2.94
		11	-35.17	-5.92	0.00	0.00	0.00	11.05
11	3	11	40.13	-10.89	0.00	0.00	0.00	-11.05
		12	-40.03	10.92	0.00	0.00	0.00	-3.79
12	3	12	41.07	-5.93	0.00	0.00	0.00	3.79
		13	-40.97	5.97	0.00	0.00	0.00	-11.92
13	3	13	41.36	-1.77	0.00	0.00	0.00	11.92
		14	-41.27	1.82	0.00	0.00	0.00	-14.35
14	3	14	41.21	2.90	0.00	0.00	0.00	14.35
		15	-41.13	-2.84	0.00	0.00	0.00	-10.42
15	3	15	40.50	7.70	0.00	0.00	0.00	10.42
		16	-40.42	-7.63	0.00	0.00	0.00	0.00
16	3	16	0.70	0.09	0.00	0.00	0.00	0.00
		17	-0.63	-0.01	0.00	0.00	0.00	0.07
17	3	17	0.62	0.08	0.00	0.00	0.00	-0.07
		18	-0.56	0.01	0.00	0.00	0.00	0.12
18	3	18	0.56	0.06	0.00	0.00	0.00	-0.12
		19	-0.51	0.03	0.00	0.00	0.00	0.13

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
19	3	19	0.51	0.02	0.00	0.00	0.00	-0.13
		20	-0.47	0.07	0.00	0.00	0.00	0.10
20	3	20	0.48	-0.02	0.00	0.00	0.00	-0.10
		21	-0.45	0.12	0.00	0.00	0.00	0.00
21	3	21	0.46	-0.07	0.00	0.00	0.00	0.00
		22	-0.44	0.17	0.00	0.00	0.00	-0.16
22	3	22	0.47	0.08	0.00	0.00	0.00	0.16
		23	-0.46	0.03	0.00	0.00	0.00	-0.13
23	3	23	0.46	0.03	0.00	0.00	0.00	0.13
		24	-0.47	0.08	0.00	0.00	0.00	-0.16
24	3	24	0.44	0.17	0.00	0.00	0.00	0.16
		25	-0.46	-0.07	0.00	0.00	0.00	0.00
25	3	25	0.45	0.12	0.00	0.00	0.00	0.00
		26	-0.48	-0.02	0.00	0.00	0.00	0.10
26	3	26	0.47	0.07	0.00	0.00	0.00	-0.10
		27	-0.51	0.03	0.00	0.00	0.00	0.13
27	3	27	0.51	0.03	0.00	0.00	0.00	-0.13
		28	-0.56	0.06	0.00	0.00	0.00	0.12
28	3	28	0.56	0.01	0.00	0.00	0.00	-0.12
		29	-0.62	0.08	0.00	0.00	0.00	0.07
29	3	29	0.63	-0.01	0.00	0.00	0.00	-0.07
		30	-0.70	0.09	0.00	0.00	0.00	0.00
30	3	30	40.45	-7.60	0.00	0.00	0.00	0.00
		31	-40.52	7.67	0.00	0.00	0.00	-10.38
31	3	31	41.15	-2.80	0.00	0.00	0.00	10.38
		32	-41.23	2.86	0.00	0.00	0.00	-14.27
32	3	32	41.30	1.59	0.00	0.00	0.00	14.27
		33	-41.39	-1.54	0.00	0.00	0.00	-12.13
33	3	33	40.94	6.28	0.00	0.00	0.00	12.13
		34	-41.04	-6.24	0.00	0.00	0.00	-3.60
34	3	34	40.12	10.67	0.00	0.00	0.00	3.60
		35	-40.22	-10.64	0.00	0.00	0.00	10.94
35	3	35	35.16	-5.93	0.00	0.00	0.00	-10.94
		36	-35.27	5.95	0.00	0.00	0.00	2.80

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
36	3	36	35.72	-1.78	0.00	0.00	0.00	-2.80
		37	-35.83	1.79	0.00	0.00	0.00	0.37
37	3	37	35.79	-2.35	0.00	0.00	0.00	0.37
		38	-35.91	2.36	0.00	0.00	0.00	-4.05
38	3	38	35.32	-6.94	0.00	0.00	0.00	4.05
		39	-35.43	6.96	0.00	0.00	0.00	-14.95
39	3	39	43.00	15.00	0.00	0.00	0.00	14.95
		40	-43.12	-14.96	0.00	0.00	0.00	8.41
40	3	40	44.69	9.26	0.00	0.00	0.00	-8.41
		41	-44.80	-9.21	0.00	0.00	0.00	22.87
41	3	41	45.62	3.26	0.00	0.00	0.00	-22.87
		42	-45.72	-3.19	0.00	0.00	0.00	27.92
42	3	42	45.78	-2.20	0.00	0.00	0.00	-27.92
		43	-45.86	2.27	0.00	0.00	0.00	25.00

********** END OF LATEST ANALYSIS RESULT **********

54. CHECK CODE ALL

STAAD-III CODE CHECKING - (AISC)
****

ALL UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
3	ST W8X 31	PASS	AISC- H1-2	0.745	3
		45.76 C	0.00	27.95	1.31
4	ST W8X 31	PASS	AISC- H1-2	0.745	3
		45.69 C	0.00	-27.95	0.00
5	ST W8X 31	PASS	AISC- H1-2	0.642	3
		44.79 C	0.00	-22.57	0.00
6	ST W8X 31	PASS	AISC- H1-2	0.490	3
		43.09 C	0.00	-14.80	1.56
7	ST W8X 31	PASS	AISC- H1-2	0.452	3
		35.43 C	0.00	14.80	0.00
8	ST W8X 31	PASS	AISC- H1-2	0.253	3
		35.91 C	0.00	3.88	0.00
9	ST W8X 31	PASS	AISC- H1-2	0.235	3
		35.71 C	0.00	2.94	1.36
10	ST W8X 31	PASS	AISC- H1-2	0.381	3
		35.17 C	0.00	11.05	1.37
11	ST W8X 31	PASS	AISC- H1-2	0.407	3
		40.13 C	0.00	-11.05	0.00
12	ST W8X 31	PASS	AISC- H1-2	0.427	3
		40.97 C	0.00	-11.92	1.37
13	ST W8X 31	PASS	AISC- H1-2	0.473	3
		41.27 C	0.00	-14.35	1.36
14	ST W8X 31	PASS	AISC- H1-2	0.473	3
		41.21 C	0.00	14.35	0.00
15	ST W8X 31	PASS	AISC- H1-2	0.397	3
		40.50 C	0.00	10.42	0.00
16	ST W8X 31	PASS	AISC- H1-3	0.004	3
		0.63 C	0.00	0.07	1.37
17	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.56 C	0.00	0.12	1.36
18	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.56 C	0.00	-0.12	0.00
19	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.51 C	0.00	-0.13	0.00
20	ST W8X 31	PASS	AISC- H1-3	0.004	3
		0.48 C	0.00	-0.10	0.00
21	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.44 C	0.00	-0.16	1.36
22	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.47 C	0.00	0.16	0.00
23	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.47 C	0.00	-0.16	1.36
24	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.44 C	0.00	0.16	0.00
25	ST W8X 31	PASS	AISC- H1-3	0.004	3
		0.48 C	0.00	0.10	1.36
26	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.51 C	0.00	0.13	1.37

L UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
27	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.51 C	0.00	-0.13	0.00
28	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.56 C	0.00	-0.12	0.00
29	ST W8X 31	PASS	AISC- H1-3	0.004	3
		0.63 C	0.00	-0.07	0.00
30	ST W8X 31	PASS	AISC- H1-2	0.396	3
		40.52 C	0.00	-10.38	1.36
31	ST W8X 31	PASS	AISC- H1-2	0.471	3
		41.23 C	0.00	-14.27	1.37
32	ST W8X 31	PASS	AISC- H1-2	0.471	3
		41.30 C	0.00	14.27	0.00
33	ST W8X 31	PASS	AISC- H1-2	0.430	3
		40.94 C	0.00	12.13	0.00
34	ST W8X 31	PASS	AISC- H1-2	0.405	3
		40.22 C	0.00	10.94	1.36
35	ST W8X 31	PASS	AISC- H1-2	0.379	3
		35.16 C	0.00	-10.94	0.00
36	ST W8X 31	PASS	AISC- H1-2	0.233	3
		35.72 C	0.00	-2.80	0.00
37	ST W8X 31	PASS	AISC- H1-2	0.256	3
		35.91 C	0.00	-4.05	1.56
38	ST W8X 31	PASS	AISC- H1-2	0.454	3
		35.43 C	0.00	-14.95	1.57
39	ST W8X 31	PASS	AISC- H1-2	0.493	3
		43.00 C	0.00	14.95	0.00
40	ST W8X 31	PASS	AISC- H1-2	0.647	3
		44.80 C	0.00	22.87	1.57
41	ST W8X 31	PASS	AISC- H1-2	0.745	3
		45.72 C	0.00	27.92	1.57
42	ST W8X 31	PASS	AISC- H1-2	0.745	3
		45.78 C	0.00	-27.92	0.00

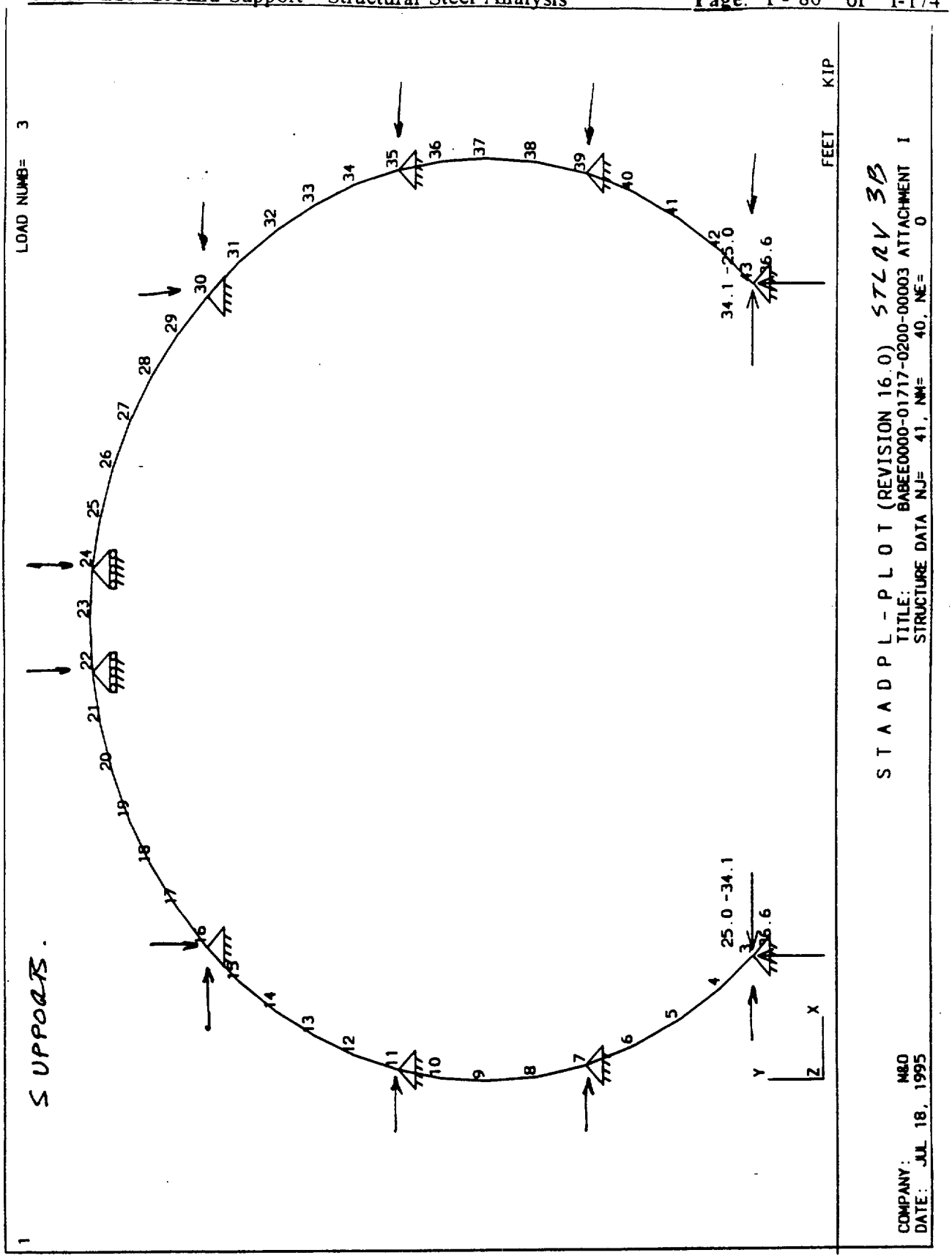
********** END OF TABULATED RESULT OF DESIGN **********

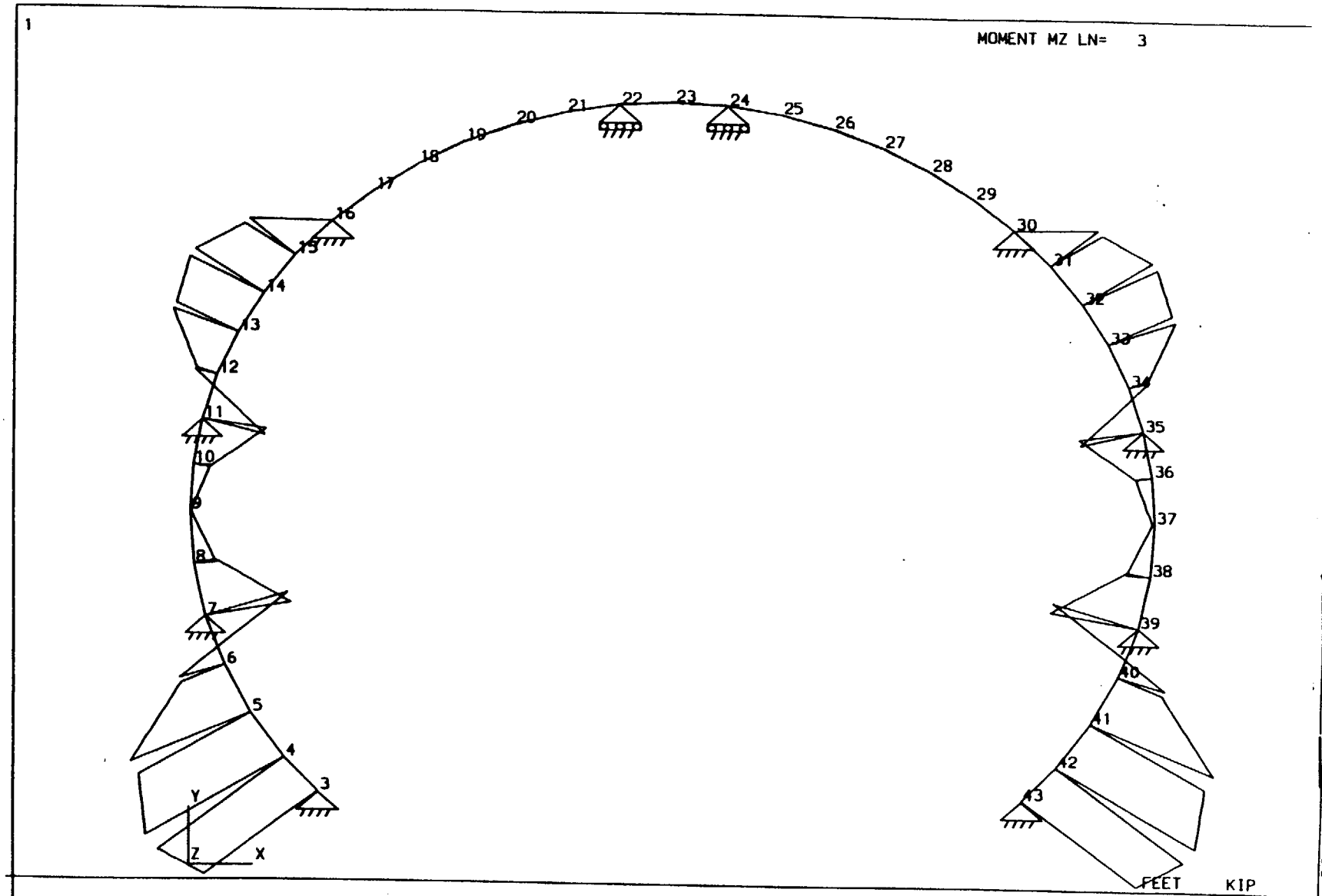
55. PLOT DISPLACEMENT FILE
56. PLOT BENDING FILE
57. FINISH

********** END OF STAAD-III **********

DATE= JUL 18,1995 TIME= 10:11: 7 ******

****
* For questions on STAAD-III/ISDS, contact: *
* RESEARCH ENGINEERS, Inc at (714) 974-2500 *


LOAD NUMB= 3
FEET KIP
STAADPL - PLOT (REVISION 16.0) STLRV 3B
TITLE: BABEE0000-01717-0200-00003 ATTACHMENT I
STRUCTURE DATA NJ= 41, NM= 40, NE= 0
COMPANY: N&D
DATE: JUL 18, 1995
SUPPORTS.
34.1 -25.0
25.0 -34.1
36.6
Y
X
Z


1
MOMENT MZ LN= 3
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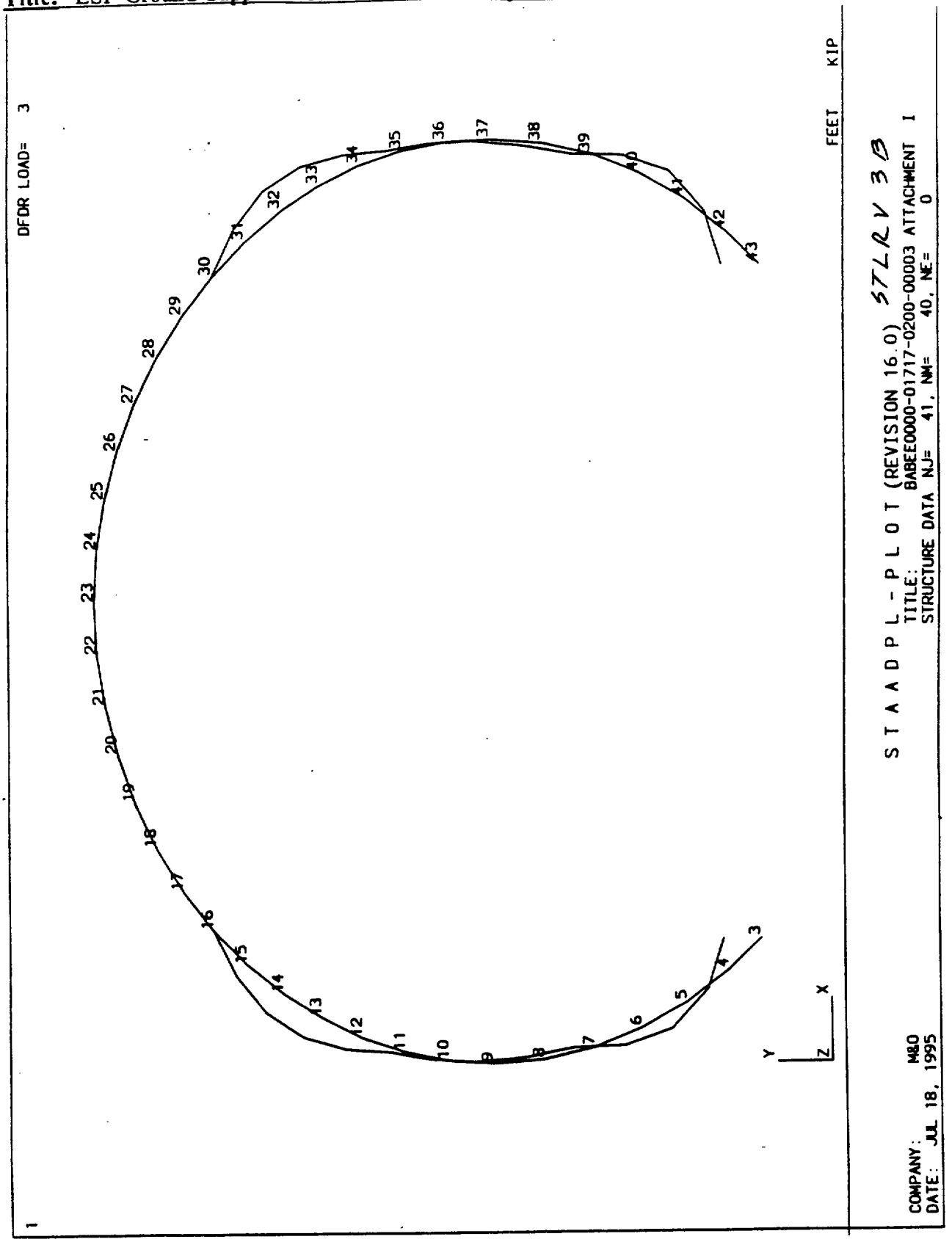
Y
Z
X
FEET
KIP
COMPANY: M&O
DATE: JUL 18, 1995
S T A A D P L - P L O T (REVISION 16.0) STLRV 3B
TITLE: BABEE0000-01717-0200-00003 ATTACHMENT I
STRUCTURE DATA NJ= 41, NM= 40, NE= 0


DFDR LOAD= 3
FEET KIP
STAADPL - PLOT (REVISION 16.0) STLRV 3B
TITLE: BABEE0000-01717-0200-00003 ATTACHMENT I
STRUCTURE DATA NJ= 41, NM= 40, NE= 0
COMPANY: M&O
DATE: JUL 18, 1995
1
Y
X
Z

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**************************************************
*                                                *
*           S T A A D - III                      *
*           Revision 16.0b                       *
*           Proprietary Program of               *
*           RESEARCH ENGINEERS, Inc.             *
*           Date=    JUL 18, 1995                *
*           Time=    10:20:35                    *
*                                                *
**************************************************

 1. STAAD PLANE  BABEE0000-01717-0200-00003  ATTACHMENT I
 2. * ESF GROUND SUPPORT-STRUCTURAL STEEL ANALYSIS  REV 00
 3. * FILE STLRV3C
 4. * 25 TON JACKS APPLIED BOTH SIDES @ 49 DEGREES
 5. * MOMENT MZ RELEASED AT THE END OF MEMBERS 15 & 29
 6. * MOMENT MZ RELEASED AT THE START OF MEMBERS 16 & 30
 7. UNIT FT KIP
 8. JOINT COORDINATES
 9. 3 2.98 2.45 ; 4 2.43 3.13
10. 5 1.58 4.44 ; 6 0.90 5.85 ; 7 0.40 7.33 ; 8 0.10 8.87
11. 9 0.0 10.43 ; 10 0.08 11.79 ; 11 0.31 13.14 ; 12 0.68 14.45
12. 13 1.21 15.71 ; 14 1.86 16.90 ; 15 2.65 18.02 ; 16 3.56 19.03
13. 17 4.58 19.94 ; 18 5.69 20.73 ; 19 6.89 21.39 ; 20 8.15 21.91
14. 21 9.46 22.29 ; 22 10.80 22.52 ; 23 12.17 22.60 ; 24 13.53 22.52
15. 25 14.87 22.29 ; 26 16.18 21.91 ; 27 17.45 21.39 ; 28 18.64 20.73
16. 29 19.75 19.94 ; 30 20.77 19.03 ; 31 21.68 18.02 ; 32 22.47 16.90
17. 33 23.13 15.71 ; 34 23.65 14.45 ; 35 24.03 13.14 ; 36 24.26 11.79
18. 37 24.33 10.43 ; 38 24.23 8.87 ; 39 23.93 7.33 ; 40 23.44 5.85
19. 41 22.76 4.44 ; 42 21.90 3.13 ; 43 21.35 2.45
20. MEMBER INCIDENCE
21. 3 3 4 42
22. UNIT KIP INCH
23. MEMBER RELEASE
24. 15 29 END MZ
25. 16 30 START MZ
26. MEMBER PROPERTIES
27. 3 TO 42 TA STA W8X31
28. CONSTANTS
29. E 29000.0 ALL
30. DENSITY 0.00028 ALL
31. BETA 0 ALL
32. UNIT FT
33. SUPPORT
34. 3 7 11 35 39 43 FIXED BUT FY MZ
35. 22 24 FIXED BUT FX MZ
36. 16 30 PINNED
37. UNIT KIP
38. LOAD 1
39. SELF WEIGHT Y -1.0
40. LOADING 2
41. * 25 TON JACKS & SIMULTANEOUS JACKING
42. JOINT LOADING
43. 3 FX -32.8
44. 43 FX 32.8
45. 3 FY 37.74
46. 43 FY 37.74
47. 43 MZ -25.00
```

```
48. 3 MZ 25.00
49. LOADING COMBINATION 3
50. 1 2.5 2 1.0
51. PERFORM ANALYSIS

        P R O B L E M   S T A T I S T I C S
        -----------------------------------

   NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS =    41/   40/   10
   ORIGINAL/FINAL BAND-WIDTH =     1/    1
   TOTAL PRIMARY LOAD CASES  =     2, TOTAL DEGREES OF FREEDOM =    111
   SIZE OF STIFFNESS MATRIX =      666 DOUBLE PREC. WORDS
   TOTAL REQUIRED DISK SPACE =     0.07 MEGA-BYTES


++ PROCESSING ELEMENT STIFFNESS MATRIX.                10:20:38
++ PROCESSING GLOBAL STIFFNESS MATRIX.                 10:20:39
++ PROCESSING TRIANGULAR FACTORIZATION.                10:20:39
++ CALCULATING JOINT DISPLACEMENTS.                    10:20:39
++ CALCULATING MEMBER  FORCES.                         10:20:40

  52. LOAD LIST 3
  53. PRINT ANALYSIS RESULTS
```

JOINT DISPLACEMENT (INCH RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
3	3	0.00000	0.06548	0.00000	0.00000	0.00000	0.00307
4	3	-0.02030	0.04668	0.00000	0.00000	0.00000	0.00205
5	3	-0.03527	0.03303	0.00000	0.00000	0.00000	0.00031
6	3	-0.02385	0.03493	0.00000	0.00000	0.00000	-0.00080
7	3	0.00000	0.03968	0.00000	0.00000	0.00000	-0.00064
8	3	0.00203	0.03742	0.00000	0.00000	0.00000	-0.00006
9	3	0.00112	0.03473	0.00000	0.00000	0.00000	0.00002
10	3	0.00161	0.03242	0.00000	0.00000	0.00000	0.00009
11	3	0.00000	0.03040	0.00000	0.00000	0.00000	0.00055
12	3	-0.01788	0.03279	0.00000	0.00000	0.00000	0.00080
13	3	-0.03076	0.03536	0.00000	0.00000	0.00000	0.00031
14	3	-0.03162	0.03283	0.00000	0.00000	0.00000	-0.00051
15	3	-0.01954	0.02107	0.00000	0.00000	0.00000	-0.00130
16	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
17	3	0.00016	-0.00024	0.00000	0.00000	0.00000	-0.00001
18	3	0.00024	-0.00042	0.00000	0.00000	0.00000	-0.00001
19	3	0.00025	-0.00050	0.00000	0.00000	0.00000	0.00000
20	3	0.00019	-0.00043	0.00000	0.00000	0.00000	0.00001
21	3	0.00010	-0.00023	0.00000	0.00000	0.00000	0.00001
22	3	0.00003	0.00000	0.00000	0.00000	0.00000	0.00001
23	3	0.00000	0.00005	0.00000	0.00000	0.00000	0.00000
24	3	-0.00003	0.00000	0.00000	0.00000	0.00000	-0.00001
25	3	-0.00010	-0.00023	0.00000	0.00000	0.00000	-0.00001
26	3	-0.00019	-0.00043	0.00000	0.00000	0.00000	-0.00001
27	3	-0.00025	-0.00050	0.00000	0.00000	0.00000	0.00000
28	3	-0.00024	-0.00042	0.00000	0.00000	0.00000	0.00001
29	3	-0.00016	-0.00024	0.00000	0.00000	0.00000	0.00001
30	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
31	3	0.01951	0.02105	0.00000	0.00000	0.00000	0.00130
32	3	0.03160	0.03282	0.00000	0.00000	0.00000	0.00051
33	3	0.03086	0.03543	0.00000	0.00000	0.00000	-0.00031
34	3	0.01777	0.03286	0.00000	0.00000	0.00000	-0.00080
35	3	0.00000	0.03038	0.00000	0.00000	0.00000	-0.00055
36	3	-0.00166	0.03239	0.00000	0.00000	0.00000	-0.00010
37	3	-0.00141	0.03468	0.00000	0.00000	0.00000	-0.00002
38	3	-0.00229	0.03737	0.00000	0.00000	0.00000	0.00007
39	3	0.00000	0.03958	0.00000	0.00000	0.00000	0.00066
40	3	0.02432	0.03482	0.00000	0.00000	0.00000	0.00082
41	3	0.03581	0.03288	0.00000	0.00000	0.00000	-0.00031
42	3	0.02048	0.04691	0.00000	0.00000	0.00000	-0.00207
43	3	0.00000	0.06587	0.00000	0.00000	0.00000	-0.00309

SUPPORT REACTIONS -UNIT KIP FEET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
3	3	5.06	0.00	0.00	0.00	0.00	0.00
7	3	27.44	0.00	0.00	0.00	0.00	0.00
11	3	22.48	0.00	0.00	0.00	0.00	0.00
35	3	-22.54	0.00	0.00	0.00	0.00	0.00
39	3	-27.45	0.00	0.00	0.00	0.00	0.00
43	3	-5.03	0.00	0.00	0.00	0.00	0.00
22	3	0.00	0.20	0.00	0.00	0.00	0.00
24	3	0.00	0.20	0.00	0.00	0.00	0.00
16	3	-21.71	-35.81	0.00	0.00	0.00	0.00
30	3	21.75	-35.81	0.00	0.00	0.00	0.00

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
3	3	3	46.79	2.16	0.00	0.00	0.00	-25.00
		4	-46.74	-2.12	0.00	0.00	0.00	26.87
4	3	4	46.70	-2.77	0.00	0.00	0.00	-26.87
		5	-46.60	2.83	0.00	0.00	0.00	22.50
5	3	5	45.88	-8.68	0.00	0.00	0.00	-22.50
		6	-45.77	8.73	0.00	0.00	0.00	8.88
6	3	6	44.34	-14.30	0.00	0.00	0.00	-8.88
		7	-44.23	14.34	0.00	0.00	0.00	-13.49
7	3	7	36.68	6.84	0.00	0.00	0.00	13.49
		8	-36.56	-6.82	0.00	0.00	0.00	-2.78
8	3	8	37.14	2.08	0.00	0.00	0.00	2.78
		9	-37.02	-2.07	0.00	0.00	0.00	0.47
9	3	9	36.99	2.48	0.00	0.00	0.00	0.47
		10	-36.89	-2.47	0.00	0.00	0.00	2.90
10	3	10	36.39	6.50	0.00	0.00	0.00	-2.90
		11	-36.29	-6.49	0.00	0.00	0.00	11.80
11	3	11	41.50	-11.32	0.00	0.00	0.00	-11.80
		12	-41.40	11.35	0.00	0.00	0.00	-3.63
12	3	12	42.48	-6.19	0.00	0.00	0.00	3.63
		13	-42.39	6.23	0.00	0.00	0.00	-12.12
13	3	13	42.80	-1.89	0.00	0.00	0.00	12.12
		14	-42.71	1.94	0.00	0.00	0.00	-14.72
14	3	14	42.65	2.95	0.00	0.00	0.00	14.72
		15	-42.56	-2.89	0.00	0.00	0.00	-10.72
15	3	15	41.92	7.92	0.00	0.00	0.00	10.72
		16	-41.84	-7.85	0.00	0.00	0.00	0.00
16	3	16	0.70	0.09	0.00	0.00	0.00	0.00
		17	-0.63	-0.01	0.00	0.00	0.00	0.07
17	3	17	0.62	0.08	0.00	0.00	0.00	-0.07
		18	-0.56	0.01	0.00	0.00	0.00	0.12
18	3	18	0.56	0.06	0.00	0.00	0.00	-0.12
		19	-0.51	0.03	0.00	0.00	0.00	0.13

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
19	3	19	0.51	0.02	0.00	0.00	0.00	-0.13
		20	-0.47	0.07	0.00	0.00	0.00	0.10
20	3	20	0.48	-0.02	0.00	0.00	0.00	-0.10
		21	-0.45	0.12	0.00	0.00	0.00	0.00
21	3	21	0.46	-0.07	0.00	0.00	0.00	0.00
		22	-0.44	0.17	0.00	0.00	0.00	-0.16
22	3	22	0.47	0.08	0.00	0.00	0.00	0.16
		23	-0.46	0.03	0.00	0.00	0.00	-0.13
23	3	23	0.46	0.03	0.00	0.00	0.00	0.13
		24	-0.47	0.08	0.00	0.00	0.00	-0.16
24	3	24	0.44	0.17	0.00	0.00	0.00	0.16
		25	-0.46	-0.07	0.00	0.00	0.00	0.00
25	3	25	0.45	0.12	0.00	0.00	0.00	0.00
		26	-0.48	-0.02	0.00	0.00	0.00	0.10
26	3	26	0.47	0.07	0.00	0.00	0.00	-0.10
		27	-0.51	0.03	0.00	0.00	0.00	0.13
27	3	27	0.51	0.03	0.00	0.00	0.00	-0.13
		28	-0.56	0.06	0.00	0.00	0.00	0.12
28	3	28	0.56	0.01	0.00	0.00	0.00	-0.12
		29	-0.62	0.08	0.00	0.00	0.00	0.07
29	3	29	0.63	-0.01	0.00	0.00	0.00	-0.07
		30	-0.70	0.09	0.00	0.00	0.00	0.00
30	3	30	41.87	-7.82	0.00	0.00	0.00	0.00
		31	-41.95	7.89	0.00	0.00	0.00	-10.68
31	3	31	42.59	-2.85	0.00	0.00	0.00	10.68
		32	-42.67	2.91	0.00	0.00	0.00	-14.63
32	3	32	42.74	1.70	0.00	0.00	0.00	14.63
		33	-42.83	-1.65	0.00	0.00	0.00	-12.34
33	3	33	42.36	6.55	0.00	0.00	0.00	12.34
		34	-42.45	-6.51	0.00	0.00	0.00	-3.44
34	3	34	41.49	11.10	0.00	0.00	0.00	3.44
		35	-41.59	-11.07	0.00	0.00	0.00	11.68
35	3	35	36.29	-6.51	0.00	0.00	0.00	-11.68
		36	-36.39	6.52	0.00	0.00	0.00	2.76

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
36	3	36	36.90	-2.22	0.00	0.00	0.00	-2.76
		37	-37.01	2.22	0.00	0.00	0.00	-0.27
37	3	37	37.02	-2.05	0.00	0.00	0.00	-0.27
		38	-37.14	2.06	0.00	0.00	0.00	-2.95
38	3	38	36.57	-6.80	0.00	0.00	0.00	2.95
		39	-36.69	6.82	0.00	0.00	0.00	-13.63
39	3	39	44.15	14.64	0.00	0.00	0.00	13.63
		40	-44.26	-14.60	0.00	0.00	0.00	9.16
40	3	40	45.78	8.75	0.00	0.00	0.00	-9.16
		41	-45.89	-8.70	0.00	0.00	0.00	22.82
41	3	41	46.63	2.61	0.00	0.00	0.00	-22.82
		42	-46.73	-2.54	0.00	0.00	0.00	26.85
42	3	42	46.76	-2.10	0.00	0.00	0.00	-26.85
		43	-46.81	2.14	0.00	0.00	0.00	25.00

********** END OF LATEST ANALYSIS RESULT **********

54. CHECK CODE ALL

STAAD-III CODE CHECKING - (AISC)
****

ALL UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
3	ST W8X 31	PASS	AISC- H1-2	0.731	3
		46.74 C	0.00	26.87	0.87
4	ST W8X 31	PASS	AISC- H1-2	0.730	3
		46.70 C	0.00	-26.87	0.00
5	ST W8X 31	PASS	AISC- H1-2	0.646	3
		45.88 C	0.00	-22.50	0.00
6	ST W8X 31	PASS	AISC- H1-2	0.472	3
		44.23 C	0.00	-13.49	1.56
7	ST W8X 31	PASS	AISC- H1-2	0.434	3
		36.68 C	0.00	13.49	0.00
8	ST W8X 31	PASS	AISC- H1-2	0.239	3
		37.14 C	0.00	2.78	0.00
9	ST W8X 31	PASS	AISC- H1-2	0.240	3
		36.89 C	0.00	2.90	1.36
10	ST W8X 31	PASS	AISC- H1-2	0.401	3
		36.29 C	0.00	11.80	1.37
11	ST W8X 31	PASS	AISC- H1-2	0.427	3
		41.50 C	0.00	-11.80	0.00
12	ST W8X 31	PASS	AISC- H1-2	0.438	3
		42.39 C	0.00	-12.12	1.37
13	ST W8X 31	PASS	AISC- H1-2	0.487	3
		42.71 C	0.00	-14.72	1.36
14	ST W8X 31	PASS	AISC- H1-2	0.487	3
		42.65 C	0.00	14.72	0.00
15	ST W8X 31	PASS	AISC- H1-2	0.409	3
		41.92 C	0.00	10.72	0.00
16	ST W8X 31	PASS	AISC- H1-3	0.004	3
		0.63 C	0.00	0.07	1.37
17	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.56 C	0.00	0.12	1.36
18	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.56 C	0.00	-0.12	0.00
19	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.51 C	0.00	-0.13	0.00
20	ST W8X 31	PASS	AISC- H1-3	0.004	3
		0.48 C	0.00	-0.10	0.00
21	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.44 C	0.00	-0.16	1.36
22	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.47 C	0.00	0.16	0.00
23	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.47 C	0.00	-0.16	1.36
24	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.44 C	0.00	0.16	0.00
25	ST W8X 31	PASS	AISC- H1-3	0.004	3
		0.48 C	0.00	0.10	1.36
26	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.51 C	0.00	0.13	1.37

L UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
27	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.51 C	0.00	-0.13	0.00
28	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.56 C	0.00	-0.12	0.00
29	ST W8X 31	PASS	AISC- H1-3	0.004	3
		0.63 C	0.00	-0.07	0.00
30	ST W8X 31	PASS	AISC- H1-2	0.409	3
		41.95 C	0.00	-10.68	1.36
31	ST W8X 31	PASS	AISC- H1-2	0485	3
		42.67 C	0.00	-14.63	1.37
32	ST W8X 31	PASS	AISC- H1-2	0.485	3
		42.74 C	0.00	14.63	0.00
33	ST W8X 31	PASS	AISC- H1-2	0.442	3
		42.36 C	0.00	12.34	0.00
34	ST W8X 31	PASS	AISC- H1-2	0.425	3
		41.59 C	0.00	11.68	1.36
35	ST W8X 31	PASS	AISC- H1-2	0.398	3
		36.29 C	0.00	-11.68	0.00
36	ST W8X 31	PASS	AISC- H1-2	0.238	3
		36.90 C	0.00	-2.76	0.00
37	ST W8X 31	PASS	AISC- H1-2	0.242	3
		37.14 C	0.00	-2.95	1.56
38	ST W8X 31	PASS	AISC- H1-2	0.436	3
		36.69 C	0.00	-13.63	1.57
39	ST W8X 31	PASS	AISC- H1-2	0.474	3
		44.15 C	0.00	13.63	0.00
40	ST W8X 31	PASS	AISC- H1-2	0.652	3
		45.89 C	0.00	22.82	1.57
41	ST W8X 31	PASS	AISC- H1-2	0.730	3
		46.73 C	0.00	26.85	1.57
42	ST W8X 31	PASS	AISC- H1-2	0.730	3
		46.76 C	0.00	-26.85	0.00

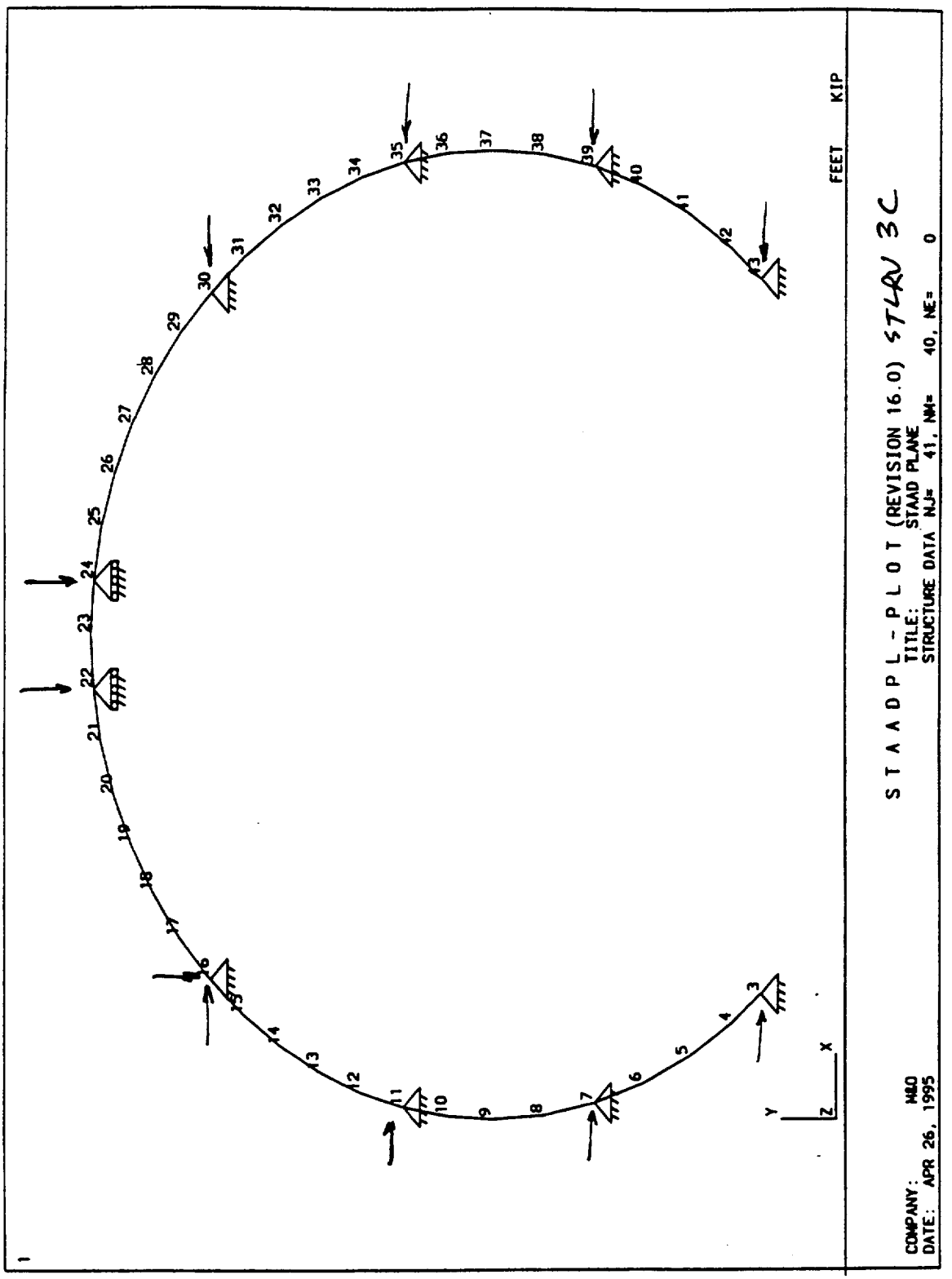
********** END OF TABULATED RESULT OF DESIGN **********

55. PLOT DISPLACEMENT FILE
56. PLOT BENDING FILE
57. FINISH

********** END OF STAAD-III **********

DATE= JUL 18,1995 TIME= 10:20:43 ******

****
* For questions on STAAD-III/ISDS, contact: *
* RESEARCH ENGINEERS, Inc at (714) 974-2500 *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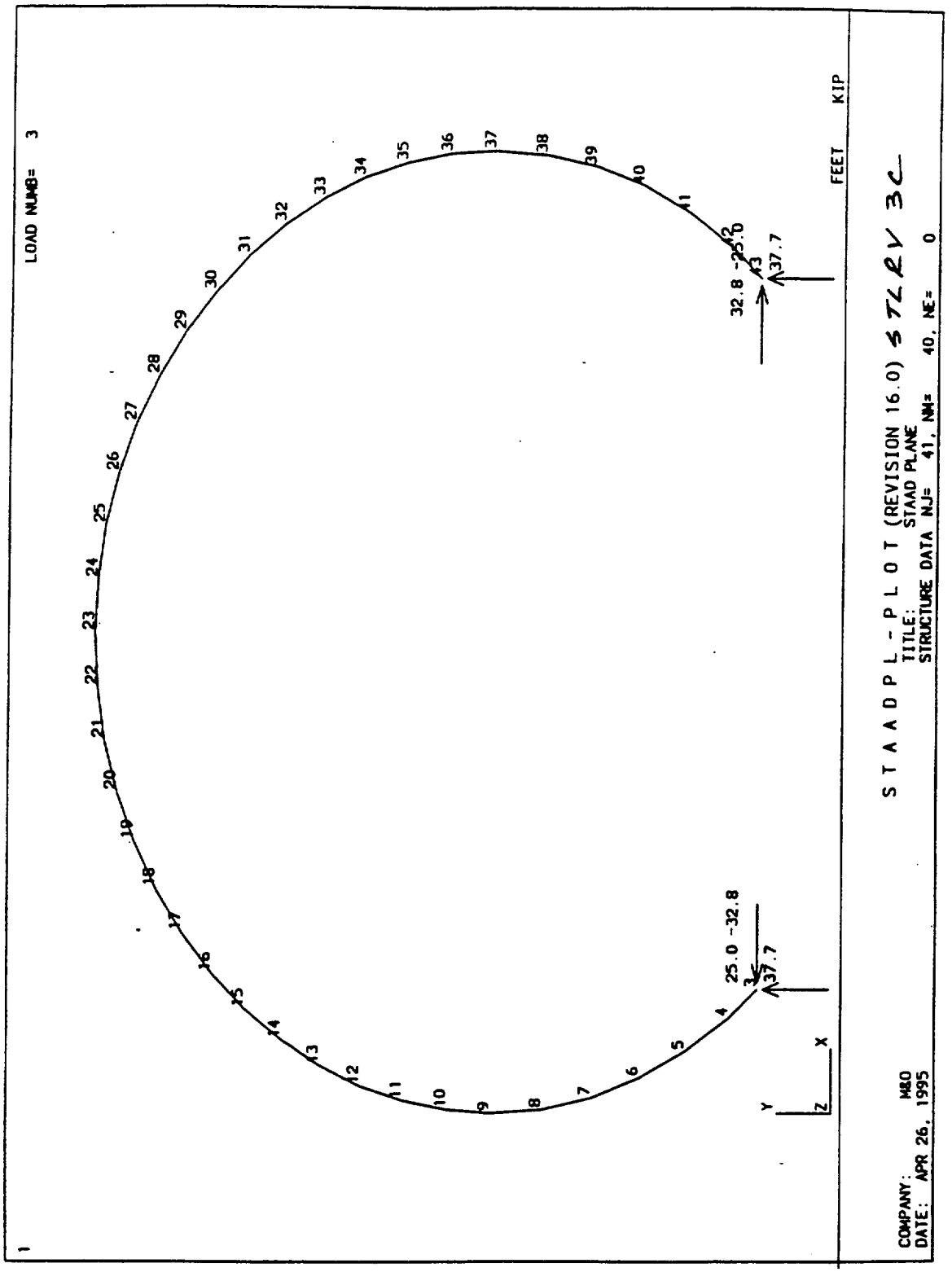
COMPANY: M&O
DATE: APR 26, 1995
X
Y
Z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37.7
25.0 -32.8
37.7
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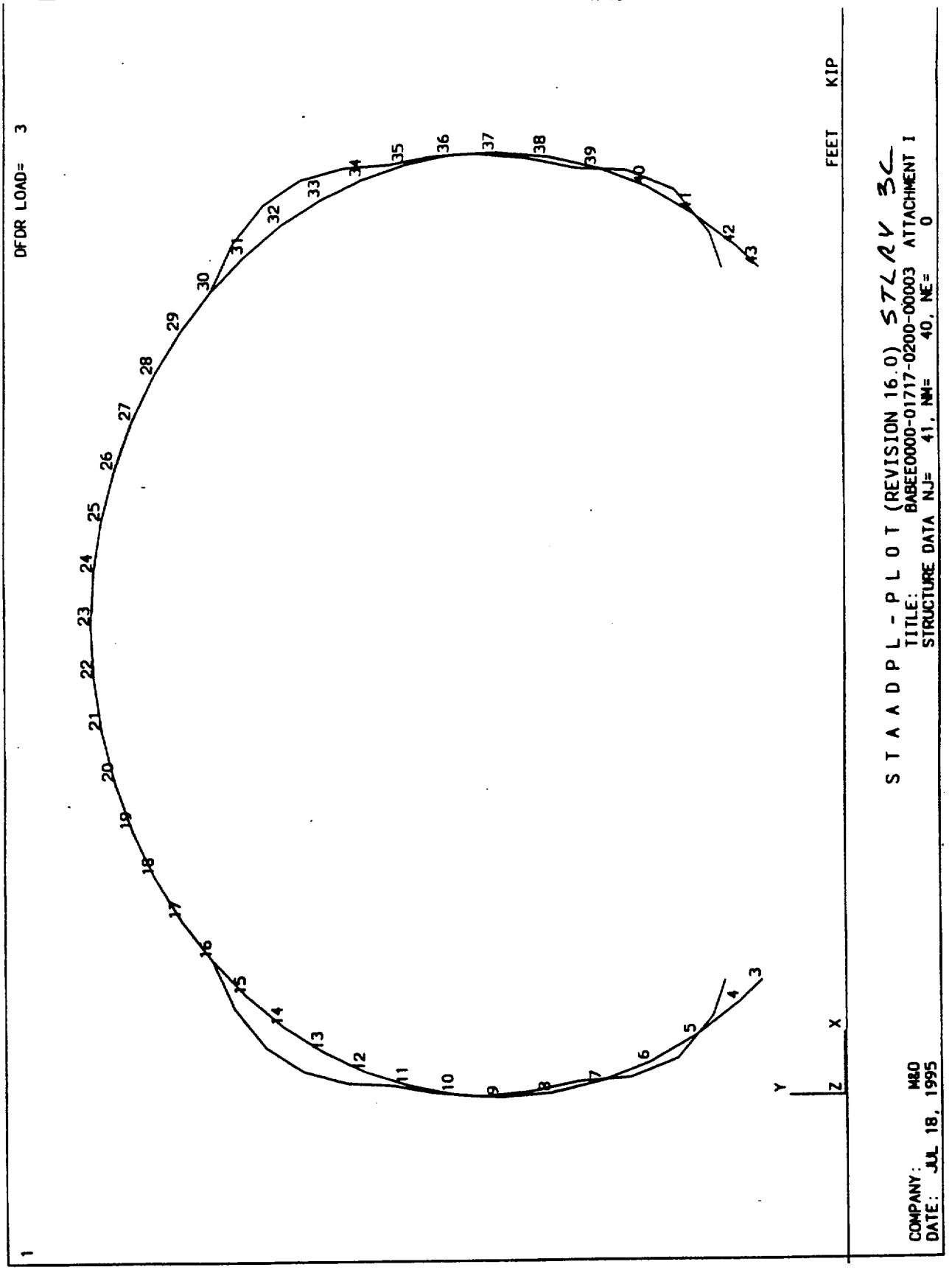
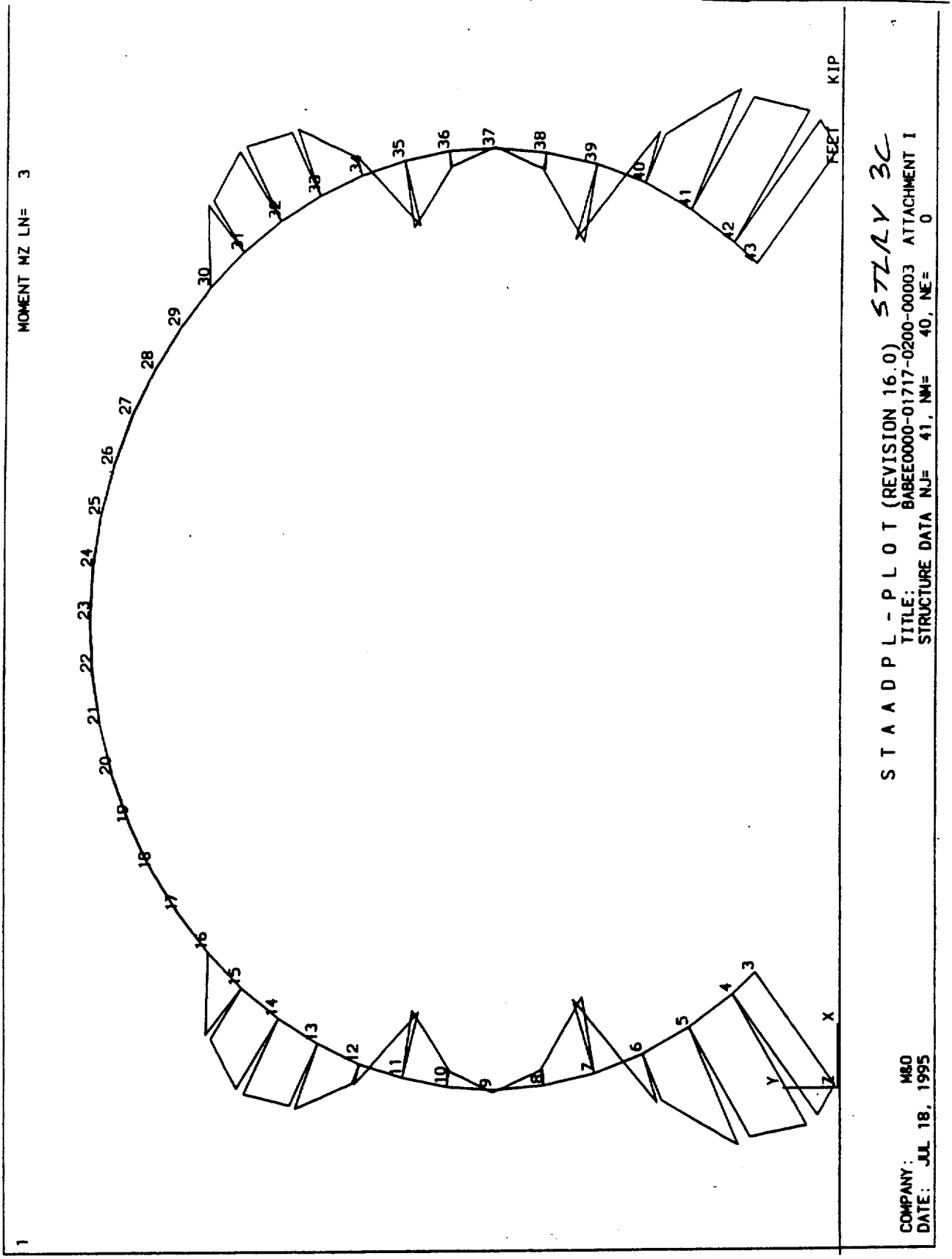
STRUCTURE DATA NJ= 41, NM= 40, NE= 0
COMPANY: M&O
DATE: APR 26, 1995
X
Y
Z


DFDR LOAD= 3
FEET KIP
STAADPL - PLOT (REVISION 16.0) STLRV 3C
TITLE: BABEE0000-01717-0200-00003 ATTACHMENT I
STRUCTURE DATA NJ= 41, NM= 40, NE= 0
COMPANY: M&O
DATE: JUL 18, 1995
X
Y
Z
1


MOMENT MZ LN= 3
KIP
FEET
STAADPL - PLOT (REVISION 16.0)
TITLE: BABEE0000-01717-0200-00003 ATTACHMENT I
STRUCTURE DATA NJ= 41, NM= 40, NE= 0
COMPANY: M&O
DATE: JUL 18, 1995
STAAD 3C
X
Y
Z

```
**************************************************
*                                                *
*           S T A A D - III                      *
*           Revision 16.0b                       *
*           Proprietary Program of               *
*           RESEARCH ENGINEERS, Inc.             *
*           Date=    JUL 18, 1995                *
*           Time=    10:36:37                    *
*                                                *
**************************************************

 1. STAAD PLANE BABEE0000-01717-0200-00003  ATTACHMENT I
 2. * ESF GROUND SUPPORT-STRUCTURAL STEEL ANALYSIS REV 00
 3. * FILE STLRV3A1
 4. * 25 TON JACKS APPLIED BOTH SIDES @ 47 DEGREES
 5. * WITH ROCK ENGAGEMENT AT MOST JOINTS
 6. UNIT FT KIP
 7. JOINT COORDINATES
 8. 3 3.27 2.13 ; 4 2.43 3.13
 9. 5 1.58 4.44 ; 6 0.90 5.85 ; 7 0.40 7.33 ; 8 0.10 8.87
10. 9 0.0 10.43 ; 10 0.08 11.79 ; 11 0.31 13.14 ; 12 0.68 14.45
11. 13 1.21 15.71 ; 14 1.86 16.90 ; 15 2.65 18.02 ; 16 3.56 19.03
12. 17 4.58 19.94 ; 18 5.69 20.73 ; 19 6.89 21.39 ; 20 8.15 21.91
13. 21 9.46 22.29 ; 22 10.80 22.52 ; 23 12.17 22.60 ; 24 13.53 22.52
14. 25 14.87 22.29 ; 26 16.18 21.91 ; 27 17.45 21.39 ; 28 18.64 20.73
15. 29 19.75 19.94 ; 30 20.77 19.03 ; 31 21.68 18.02 ; 32 22.47 16.90
16. 33 23.13 15.71 ; 34 23.65 14.45 ; 35 24.03 13.14 ; 36 24.26 11.79
17. 37 24.33 10.43 ; 38 24.23 8.87 ; 39 23.93 7.33 ; 40 23.44 5.85
18. 41 22.76 4.44 ; 42 21.90 3.13 ; 43 21.06 2.13
19. MEMBER INCIDENCE
20. 3 3 4 42
21. UNIT KIP INCH
22. MEMBER PROPERTIES
23. 3 TO 42 TA STA W8X31
24. CONSTANTS
25. E 29000.0 ALL
26. DENSITY 0.00028 ALL
27. BETA 0 ALL
28. UNIT FT
29. SUPPORT
30. 3 5 7 9 11 35 37 39 41 43 FIXED BUT FY MZ
31. 20 21 22 23 24 25 26 FIXED BUT FX MZ
32. 14 16 18 28 30 32 PINNED
33. UNIT KIP
34. LOAD 1
35. SELF WEIGHT Y -1.0
36. LOADING 2
37. * 25 TON JACKS & SIMULTANEOUS JACKING
38. JOINT LOADING
39. 3 FX -34.1
40. 43 FX 34.1
41. 3 FY 36.57
42. 43 FY 36.57
43. 43 MZ -25.00
44. 3 MZ 25.00
45. LOADING COMBINATION 3
46. 1 2.5 2 1.0
47. PERFORM ANALYSIS
```

P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 41/ 40/ 23
ORIGINAL/FINAL BAND-WIDTH = 1/ 1
TOTAL PRIMARY LOAD CASES = 2, TOTAL DEGREES OF FREEDOM = 94
SIZE OF STIFFNESS MATRIX = 564 DOUBLE PREC. WORDS
TOTAL REQUIRED DISK SPACE = 0.07 MEGA-BYTES

++ PROCESSING ELEMENT STIFFNESS MATRIX. 10:36:40
++ PROCESSING GLOBAL STIFFNESS MATRIX. 10:36:41
++ PROCESSING TRIANGULAR FACTORIZATION. 10:36:41
++ CALCULATING JOINT DISPLACEMENTS. 10:36:41
++ CALCULATING MEMBER FORCES. 10:36:42

48. LOAD LIST 3
49. PRINT ANALYSIS RESULTS

JOINT DISPLACEMENT (INCH RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
3	3	0.00000	0.03461	0.00000	0.00000	0.00000	0.00163
4	3	-0.00727	0.02439	0.00000	0.00000	0.00000	0.00040
5	3	0.00000	0.02473	0.00000	0.00000	0.00000	-0.00004
6	3	-0.00104	0.02118	0.00000	0.00000	0.00000	0.00005
7	3	0.00000	0.01864	0.00000	0.00000	0.00000	0.00006
8	3	-0.00191	0.01564	0.00000	0.00000	0.00000	0.00002
9	3	0.00000	0.01319	0.00000	0.00000	0.00000	-0.00002
10	3	-0.00079	0.01102	0.00000	0.00000	0.00000	-0.00001
11	3	0.00000	0.00863	0.00000	0.00000	0.00000	0.00005
12	3	-0.00371	0.00722	0.00000	0.00000	0.00000	0.00002
13	3	-0.00337	0.00451	0.00000	0.00000	0.00000	-0.00016
14	3	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00015
15	3	0.00053	-0.00042	0.00000	0.00000	0.00000	-0.00002
16	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001
17	3	-0.00002	0.00002	0.00000	0.00000	0.00000	0.00000
18	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
19	3	0.00002	-0.00003	0.00000	0.00000	0.00000	0.00000
20	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
21	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
22	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
23	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
24	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
25	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
26	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
27	3	-0.00002	-0.00003	0.00000	0.00000	0.00000	0.00000
28	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
29	3	0.00002	0.00003	0.00000	0.00000	0.00000	0.00000
30	3	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00001
31	3	-0.00054	-0.00043	0.00000	0.00000	0.00000	0.00002
32	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00016
33	3	0.00345	0.00460	0.00000	0.00000	0.00000	0.00016
34	3	0.00358	0.00722	0.00000	0.00000	0.00000	-0.00003
35	3	0.00000	0.00864	0.00000	0.00000	0.00000	-0.00004
36	3	0.00090	0.01105	0.00000	0.00000	0.00000	0.00001
37	3	0.00000	0.01322	0.00000	0.00000	0.00000	0.00002
38	3	0.00188	0.01567	0.00000	0.00000	0.00000	-0.00002
39	3	0.00000	0.01866	0.00000	0.00000	0.00000	-0.00005
40	3	0.00115	0.02116	0.00000	0.00000	0.00000	-0.00005
41	3	0.00000	0.02476	0.00000	0.00000	0.00000	0.00004
42	3	0.00719	0.02446	0.00000	0.00000	0.00000	-0.00040
43	3	0.00000	0.03462	0.00000	0.00000	0.00000	-0.00162

SUPPORT REACTIONS -UNIT KIP FEET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
3	3	-5.08	0.00	0.00	0.00	0.00	0.00
5	3	25.28	0.00	0.00	0.00	0.00	0.00
7	3	9.28	0.00	0.00	0.00	0.00	0.00
9	3	8.23	0.00	0.00	0.00	0.00	0.00
11	3	10.91	0.00	0.00	0.00	0.00	0.00
35	3	-11.09	0.00	0.00	0.00	0.00	0.00
37	3	-8.12	0.00	0.00	0.00	0.00	0.00
39	3	-9.17	0.00	0.00	0.00	0.00	0.00
41	3	-25.55	0.00	0.00	0.00	0.00	0.00
43	3	5.24	0.00	0.00	0.00	0.00	0.00
20	3	0.00	0.17	0.00	0.00	0.00	0.00
21	3	0.00	0.09	0.00	0.00	0.00	0.00
22	3	0.00	0.10	0.00	0.00	0.00	0.00
23	3	0.00	0.10	0.00	0.00	0.00	0.00
24	3	0.00	0.10	0.00	0.00	0.00	0.00
25	3	0.00	0.09	0.00	0.00	0.00	0.00
26	3	0.00	0.17	0.00	0.00	0.00	0.00
14	3	-13.16	-35.48	0.00	0.00	0.00	0.00
16	3	-1.44	0.51	0.00	0.00	0.00	0.00
18	3	0.10	0.15	0.00	0.00	0.00	0.00
28	3	-0.10	0.15	0.00	0.00	0.00	0.00
30	3	1.46	0.52	0.00	0.00	0.00	0.00
32	3	13.22	-35.49	0.00	0.00	0.00	0.00

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
3	3	3	53.20	-6.48	0.00	0.00	0.00	-25.00
		4	-53.13	6.55	0.00	0.00	0.00	16.49
4	3	4	51.92	-13.02	0.00	0.00	0.00	-16.49
		5	-51.82	13.08	0.00	0.00	0.00	-3.89
5	3	5	38.78	3.26	0.00	0.00	0.00	3.89
		6	-38.67	-3.21	0.00	0.00	0.00	1.18
6	3	6	38.78	-1.58	0.00	0.00	0.00	-1.18
		7	-38.66	1.62	0.00	0.00	0.00	-1.31
7	3	7	36.33	2.37	0.00	0.00	0.00	1.31
		8	-36.21	-2.34	0.00	0.00	0.00	2.38
8	3	8	36.21	-2.31	0.00	0.00	0.00	-2.38
		9	-36.09	2.32	0.00	0.00	0.00	-1.24
9	3	9	36.02	-1.49	0.00	0.00	0.00	-1.24
		10	-35.92	1.50	0.00	0.00	0.00	-0.79
10	3	10	35.86	2.45	0.00	0.00	0.00	0.79
		11	-35.76	-2.44	0.00	0.00	0.00	2.56
11	3	11	38.26	-4.27	0.00	0.00	0.00	-2.56
		12	-38.16	4.30	0.00	0.00	0.00	-3.28
12	3	12	38.40	0.41	0.00	0.00	0.00	3.28
		13	-38.30	-0.37	0.00	0.00	0.00	-2.75
13	3	13	38.07	4.26	0.00	0.00	0.00	2.75
		14	-37.98	-4.21	0.00	0.00	0.00	2.99
14	3	14	0.66	-1.18	0.00	0.00	0.00	-2.99
		15	-0.58	1.24	0.00	0.00	0.00	1.33
15	3	15	0.72	-1.16	0.00	0.00	0.00	-1.33
		16	-0.64	1.23	0.00	0.00	0.00	-0.29
16	3	16	0.04	0.18	0.00	0.00	0.00	0.29
		17	0.03	-0.10	0.00	0.00	0.00	-0.10
17	3	17	-0.04	0.10	0.00	0.00	0.00	0.10
		18	0.10	-0.02	0.00	0.00	0.00	-0.02
18	3	18	0.06	0.09	0.00	0.00	0.00	0.02
		19	-0.01	0.00	0.00	0.00	0.00	0.04

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
19	3	19	0.01	0.00	0.00	0.00	0.00	-0.04
		20	0.03	0.10	0.00	0.00	0.00	-0.03
20	3	20	0.03	0.06	0.00	0.00	0.00	0.03
		21	0.00	0.04	0.00	0.00	0.00	-0.01
21	3	21	0.02	0.05	0.00	0.00	0.00	0.01
		22	0.00	0.05	0.00	0.00	0.00	-0.01
22	3	22	0.02	0.05	0.00	0.00	0.00	0.01
		23	-0.01	0.05	0.00	0.00	0.00	-0.01
23	3	23	0.01	0.05	0.00	0.00	0.00	0.01
		24	-0.02	0.05	0.00	0.00	0.00	-0.01
24	3	24	0.00	0.05	0.00	0.00	0.00	0.01
		25	-0.02	0.05	0.00	0.00	0.00	-0.01
25	3	25	0.00	0.04	0.00	0.00	0.00	0.01
		26	-0.03	0.06	0.00	0.00	0.00	-0.03
26	3	26	-0.03	0.10	0.00	0.00	0.00	0.03
		27	-0.01	0.00	0.00	0.00	0.00	0.04
27	3	27	0.01	0.00	0.00	0.00	0.00	-0.04
		28	-0.06	0.09	0.00	0.00	0.00	-0.02
28	3	28	-0.10	-0.02	0.00	0.00	0.00	0.02
		29	0.04	0.10	0.00	0.00	0.00	-0.10
29	3	29	-0.03	-0.11	0.00	0.00	0.00	0.10
		30	-0.04	0.18	0.00	0.00	0.00	-0.30
30	3	30	0.66	1.25	0.00	0.00	0.00	0.30
		31	-0.73	-1.18	0.00	0.00	0.00	1.35
31	3	31	0.59	1.26	0.00	0.00	0.00	-1.35
		32	-0.67	-1.20	0.00	0.00	0.00	3.04
32	3	32	37.99	-4.39	0.00	0.00	0.00	-3.04
		33	-38.08	4.44	0.00	0.00	0.00	-2.96
33	3	33	38.34	-0.04	0.00	0.00	0.00	2.96
		34	-38.43	0.08	0.00	0.00	0.00	-3.04
34	3	34	38.21	4.11	0.00	0.00	0.00	3.04
		35	-38.31	-4.08	0.00	0.00	0.00	2.54
35	3	35	35.74	-2.54	0.00	0.00	0.00	-2.54
		36	-35.84	2.56	0.00	0.00	0.00	-0.95

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
36	3	36	35.90	1.65	0.00	0.00	0.00	0.95
		37	-36.00	-1.65	0.00	0.00	0.00	1.29
37	3	37	36.09	2.32	0.00	0.00	0.00	1.29
		38	-36.21	-2.31	0.00	0.00	0.00	2.33
38	3	38	36.21	-2.34	0.00	0.00	0.00	-2.33
		39	-36.33	2.37	0.00	0.00	0.00	-1.37
39	3	39	38.62	1.75	0.00	0.00	0.00	1.37
		40	-38.73	-1.71	0.00	0.00	0.00	1.33
40	3	40	38.63	-3.31	0.00	0.00	0.00	-1.33
		41	-38.73	3.36	0.00	0.00	0.00	-3.90
41	3	41	51.98	12.94	0.00	0.00	0.00	3.90
		42	-52.08	-12.88	0.00	0.00	0.00	16.33
42	3	42	53.23	6.67	0.00	0.00	0.00	-16.33
		43	-53.31	-6.60	0.00	0.00	0.00	25.00

********** END OF LATEST ANALYSIS RESULT **********

50. CHECK CODE ALL

STAAD-III CODE CHECKING - (AISC)
****

ALL UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
3	ST W8X 31	PASS	AISC- H1-2	0.729	3
		53.20 C	0.00	-25.00	0.00
4	ST W8X 31	PASS	AISC- H1-2	0.566	3
		51.92 C	0.00	-16.49	0.00
5	ST W8X 31	PASS	AISC- H1-2	0.268	3
		38.78 C	0.00	3.89	0.00
6	ST W8X 31	PASS	AISC- H1-1	0.220	3
		38.66 C	0.00	-1.31	1.56
7	ST W8X 31	PASS	AISC- H1-2	0.227	3
		36.21 C	0.00	2.38	1.57
8	ST W8X 31	PASS	AISC- H1-2	0.227	3
		36.21 C	0.00	-2.38	0.00
9	ST W8X 31	PASS	AISC- H1-2	0.205	3
		36.02 C	0.00	-1.24	0.00
10	ST W8X 31	PASS	AISC- H1-2	0.228	3
		35.76 C	0.00	2.56	1.37
11	ST W8X 31	PASS	AISC- H1-2	0.254	3
		38.16 C	0.00	-3.28	1.36
12	ST W8X 31	PASS	AISC- H1-2	0.255	3
		38.40 C	0.00	3.28	0.00
13	ST W8X 31	PASS	AISC- H1-2	0.248	3
		37.98 C	0.00	2.99	1.36
14	ST W8X 31	PASS	AISC- H1-3	0.058	3
		0.66 C	0.00	-2.99	0.00
15	ST W8X 31	PASS	SHEAR -Y	0.038	3
		0.64 C	0.00	-0.29	1.36
16	ST W8X 31	PASS	AISC- H1-3	0.006	3
		0.04 C	0.00	0.29	0.00
17	ST W8X 31	PASS	SHEAR -Y	0.003	3
		0.04 T	0.00	0.10	0.00
18	ST W8X 31	PASS	SHEAR -Y	0.003	3
		0.06 C	0.00	0.02	0.00
19	ST W8X 31	PASS	SHEAR -Y	0.003	3
		0.03 T	0.00	-0.03	1.36
20	ST W8X 31	PASS	SHEAR -Y	0.002	3
		0.03 C	0.00	0.03	0.00
21	ST W8X 31	PASS	SHEAR -Y	0.002	3
		0.02 C	0.00	0.01	0.00
22	ST W8X 31	PASS	SHEAR -Y	0.002	3
		0.02 C	0.00	0.01	0.00
23	ST W8X 31	PASS	SHEAR -Y	0.002	3
		0.01 C	0.00	0.01	0.00
24	ST W8X 31	PASS	SHEAR -Y	0.002	3
		0.00 C	0.00	0.01	0.00
25	ST W8X 31	PASS	SHEAR -Y	0.002	3
		0.03 C	0.00	-0.03	1.36
26	ST W8X 31	PASS	SHEAR -Y	0.003	3
		0.03 T	0.00	0.03	0.00

ALL UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
27	ST W8X 31	PASS	SHEAR -Y	0.003	3
		0.06 C	0.00	-0.02	1.36
28	ST W8X 31	PASS	SHEAR -Y	0.003	3
		0.04 T	0.00	-0.10	1.36
29	ST W8X 31	PASS	AISC- H1-3	0.006	3
		0.04 C	0.00	-0.30	1.37
30	ST W8X 31	PASS	SHEAR -Y	0.038	3
		0.66 C	0.00	0.30	0.00
31	ST W8X 31	PASS	AISC- H1-3	0.059	3
		0.67 C	0.00	3.04	1.37
32	ST W8X 31	PASS	AISC- H1-2	0.248	3
		37.99 C	0.00	-3.04	0.00
33	ST W8X 31	PASS	AISC- H1-2	0.251	3
		38.43 C	0.00	-3.04	1.36
34	ST W8X 31	PASS	AISC- H1-2	0.250	3
		38.21 C	0.00	3.04	0.00
35	ST W8X 31	PASS	AISC- H1-2	0.228	3
		35.74 C	0.00	-2.54	0.00
36	ST W8X 31	PASS	AISC- H1-2	0.206	3
		36.00 C	0.00	1.29	1.36
37	ST W8X 31	PASS	AISC- H1-2	0.226	3
		36.21 C	0.00	2.33	1.56
38	ST W8X 31	PASS	AISC- H1-2	0.226	3
		36.21 C	0.00	-2.33	0.00
39	ST W8X 31	PASS	AISC- H1-1	0.221	3
		38.62 C	0.00	1.37	0.00
40	ST W8X 31	PASS	AISC- H1-2	0.268	3
		38.73 C	0.00	-3.90	1.57
41	ST W8X 31	PASS	AISC- H1-2	0.564	3
		52.08 C	0.00	16.33	1.57
42	ST W8X 31	PASS	AISC- H1-2	0.729	3
		53.31 C	0.00	25.00	1.31

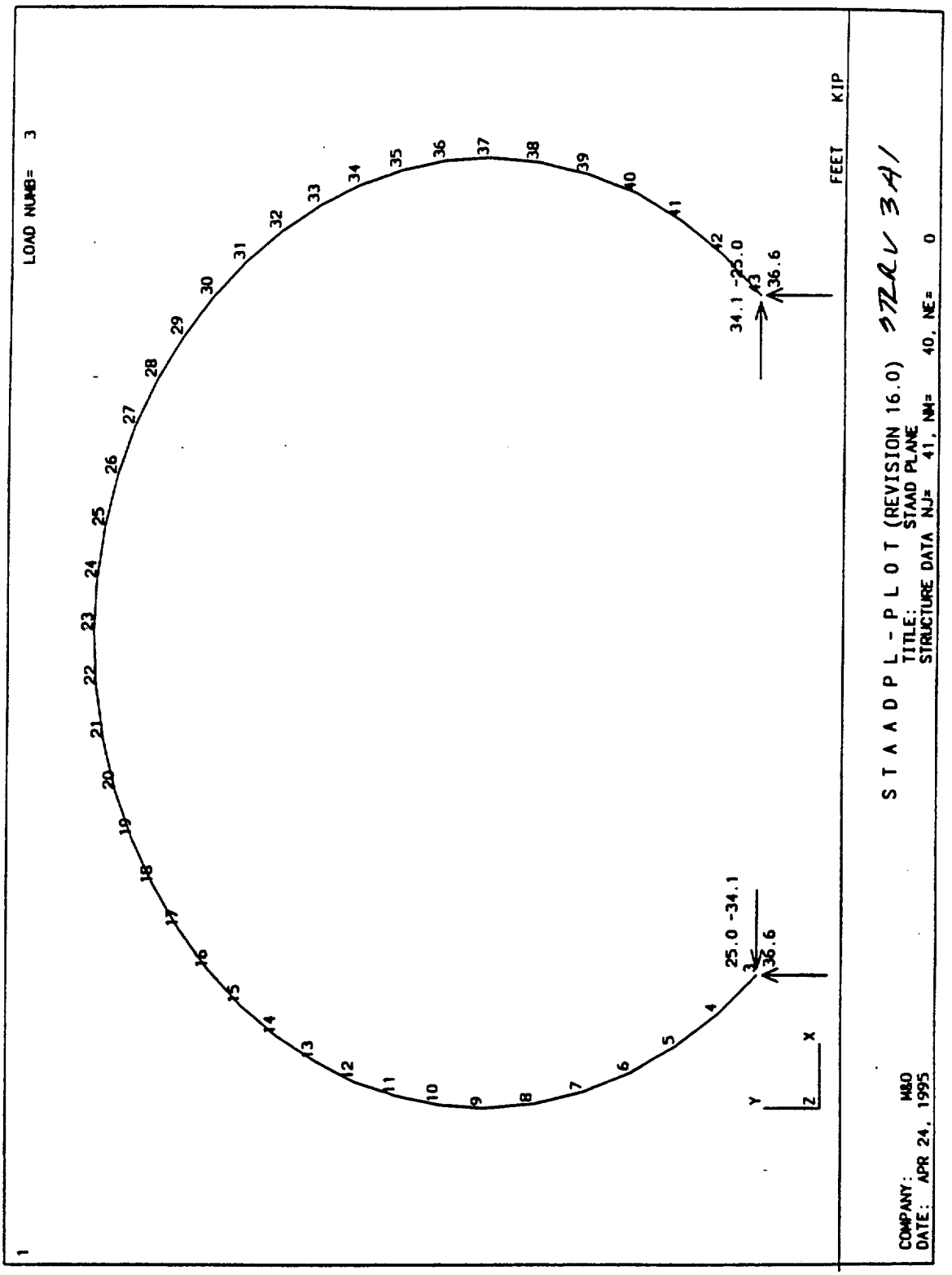
********** END OF TABULATED RESULT OF DESIGN **********

51. PLOT DISPLACEMENT FILE
52. PLOT BENDING FILE
53. FINISH

********** END OF STAAD-III **********

DATE= JUL 18,1995 TIME= 10:36:45 ******

****
* For questions on STAAD-III/ISDS, contact: *
* RESEARCH ENGINEERS, Inc at (714) 974-2500 *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TITLE:
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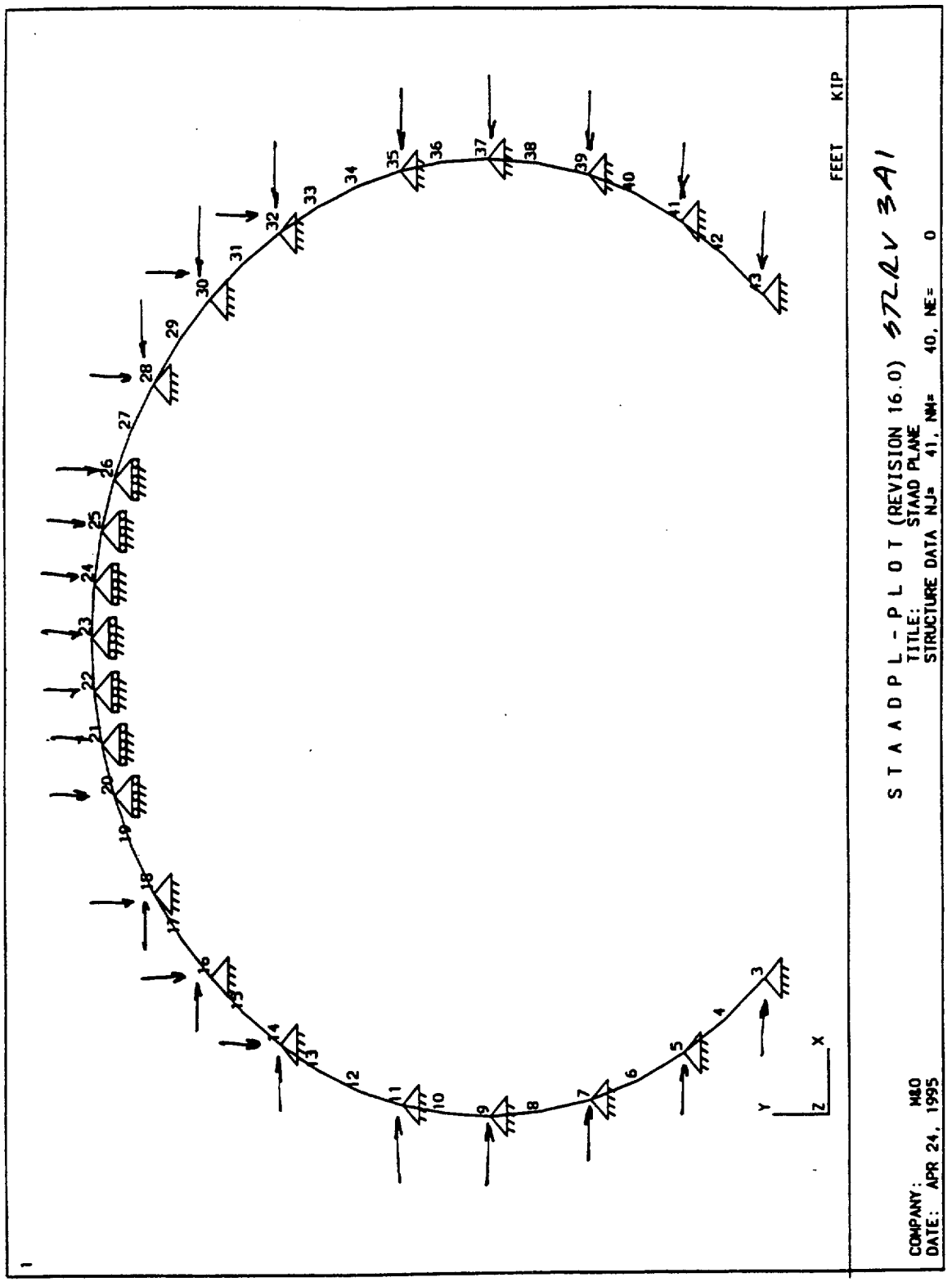
STAAD PLANE
STEEL 34/
25.0 -34.1
36.6
34.1 -25.0
36.6
COMPANY:
DATE: APR 24, 1995
M&O
1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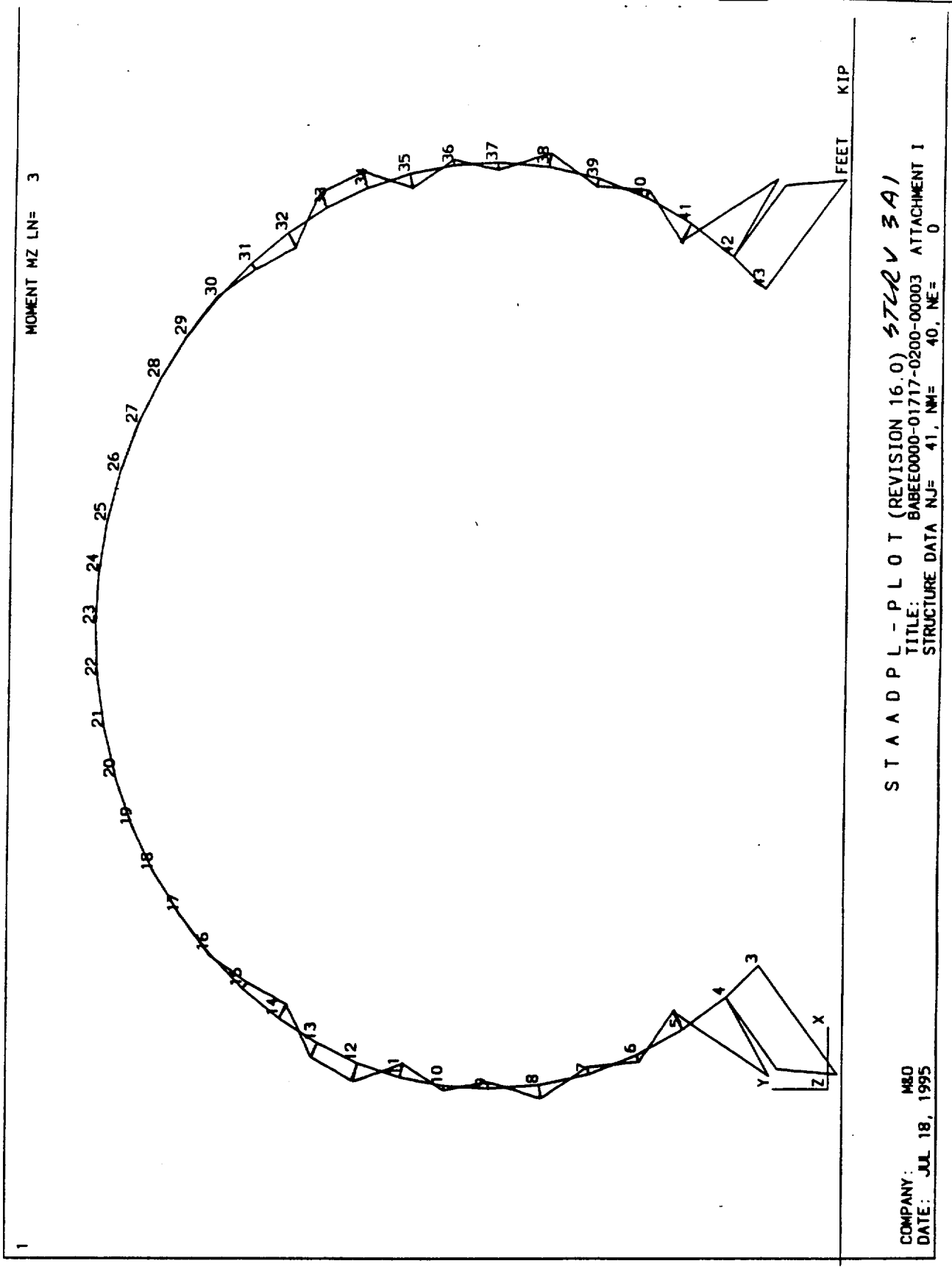
FEET KIP
STRUCTURE 3A1
COMPANY: M&O
DATE: APR 24, 1995
X
Y
Z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KIP
FEET
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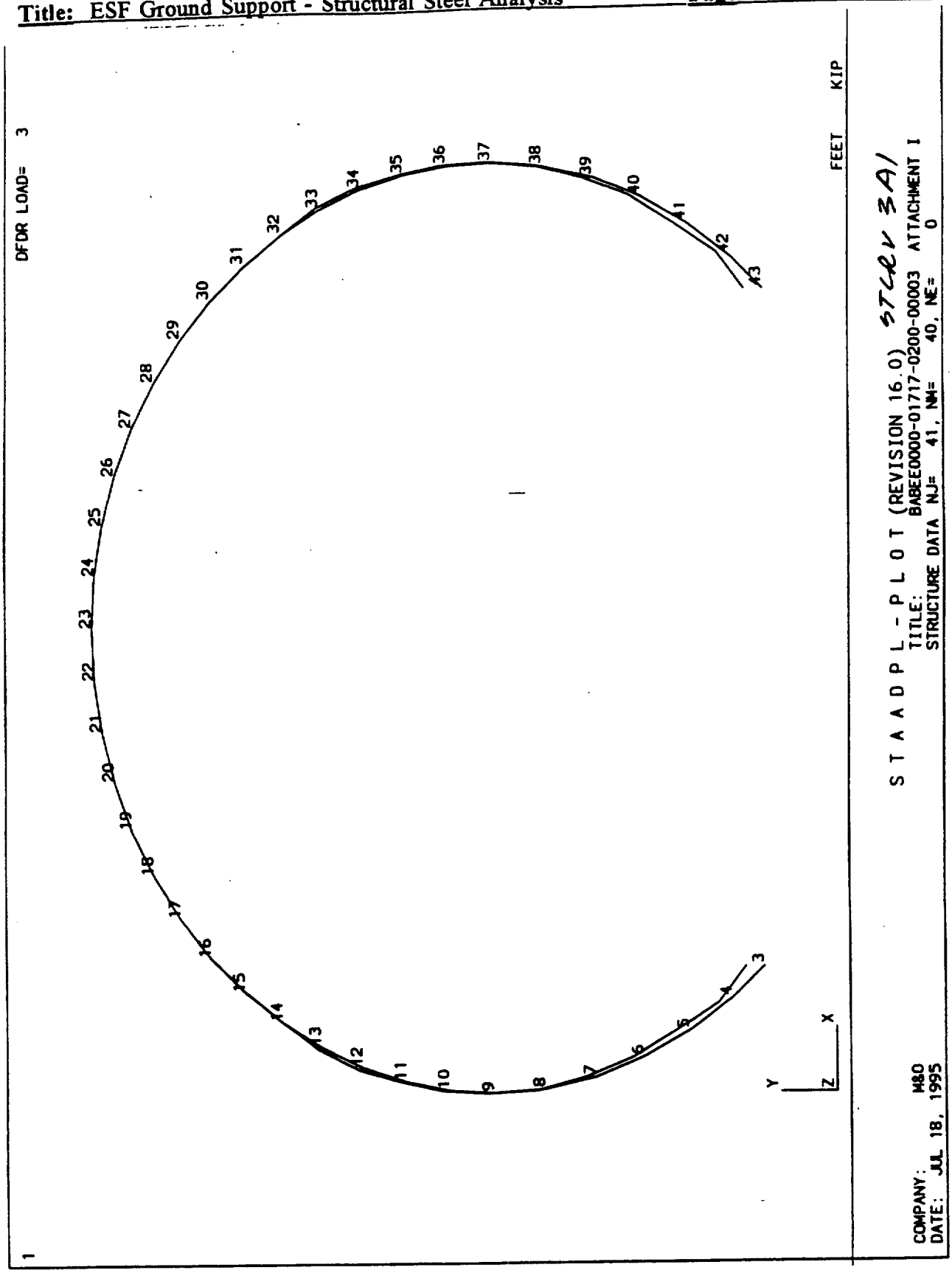
TITLE: BABEE0000-01717-0200-00003 ATTACHMENT I
STRUCTURE DATA NJ= 41, NM= 40, NE= 0
COMPANY: M&O
DATE: JUL 18, 1995
X
Y
Z


DFOR LOAD= 3
FEET KIP
STAADPL - PLOT (REVISION 16.0)
TITLE: BABEE0000-01717-0200-00003 ATTACHMENT I
STRUCTURE DATA NJ= 41, NM= 40, NE= 0
COMPANY: M&O
DATE: JUL 18, 1995
STAAD 3A/
1
Y
X
Z

```
**************************************************
*                                                *
*           S T A A D - III                      *
*           Revision 16.0b                       *
*           Proprietary Program of               *
*           RESEARCH ENGINEERS, Inc.             *
*           Date=    JUL 18, 1995                *
*           Time=    11: 2:59                    *
*                                                *
**************************************************

 1. STAAD PLANE  BABEE0000-01717-0200-00003  ATTACHMENT I
 2. * ESF GROUND SUPPORT-STRUCTURAL STEEL ANALYSIS  REV 00
 3. * FILE STLRV3A2
 4. * 25 TON JACKS APPLIED BOTH SIDES @ 47 DEGREES
 5. * WITH ROCK ENGAGEMENT AT ALL JOINTS
 6. UNIT FT KIP
 7. JOINT COORDINATES
 8. 3 3.27 2.13 ; 4 2.43 3.13
 9. 5 1.58 4.44 ; 6 0.90 5.85 ; 7 0.40 7.33 ; 8 0.10 8.87
10. 9 0.0 10.43 ; 10 0.08 11.79 ; 11 0.31 13.14 ; 12 0.68 14.45
11. 13 1.21 15.71 ; 14 1.86 16.90 ; 15 2.65 18.02 ; 16 3.56 19.03
12. 17 4.58 19.94 ; 18 5.69 20.73 ; 19 6.89 21.39 ; 20 8.15 21.91
13. 21 9.46 22.29 ; 22 10.80 22.52 ; 23 12.17 22.60 ; 24 13.53 22.52
14. 25 14.87 22.29 ; 26 16.18 21.91 ; 27 17.45 21.39 ; 28 18.64 20.73
15. 29 19.75 19.94 ; 30 20.77 19.03 ; 31 21.68 18.02 ; 32 22.47 16.90
16. 33 23.13 15.71 ; 34 23.65 14.45 ; 35 24.03 13.14 ; 36 24.26 11.79
17. 37 24.33 10.43 ; 38 24.23 8.87 ; 39 23.93 7.33 ; 40 23.44 5.85
18. 41 22.76 4.44 ; 42 21.90 3.13 ; 43 21.06 2.13
19. MEMBER INCIDENCE
20. 3 3 4 42
21. UNIT KIP INCH
22. MEMBER PROPERTIES
23. 3 TO 42 TA STA W8X31
24. CONSTANTS
25. E 29000.0 ALL
26. DENSITY 0.00028 ALL
27. BETA 0 ALL
28. UNIT FT
29. SUPPORT
30. 3 4 5 6 7 8 9 10 11 12 13 FIXED BUT FY MZ
31. 33 34 35 36 37 38 39 40 41 42 43 FIXED BUT FY MZ
32. 19 20 21 22 23 24 25 26 27 FIXED BUT FX MZ
33. 14 15 16 17 18 28 29 30 31 32 PINNED
34. UNIT KIP
35. LOAD 1
36. SELF WEIGHT Y -1.0
37. LOADING 2
38. * 25 TON JACKS & SIMULTANEOUS JACKING
39. JOINT LOADING
40. 3 FX -34.1
41. 43 FX 34.1
42. 3 FY 36.57
43. 43 FY 36.57
44. 43 MZ -25.00
45. 3 MZ 25.00
46. LOADING COMBINATION 3
47. 1 2.5 2 1.0
```

48. PERFORM ANALYSIS

P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 41/ 40/ 41
ORIGINAL/FINAL BAND-WIDTH = 1/ 1
TOTAL PRIMARY LOAD CASES = 2, TOTAL DEGREES OF FREEDOM = 72
SIZE OF STIFFNESS MATRIX = 288 DOUBLE PREC. WORDS
TOTAL REQUIRED DISK SPACE = 0.07 MEGA-BYTES

++ PROCESSING ELEMENT STIFFNESS MATRIX. 11: 3: 1
++ PROCESSING GLOBAL STIFFNESS MATRIX. 11: 3: 2
++ PROCESSING TRIANGULAR FACTORIZATION. 11: 3: 2
++ CALCULATING JOINT DISPLACEMENTS. 11: 3: 3
++ CALCULATING MEMBER FORCES. 11: 3: 3

49. LOAD LIST 3
50. PRINT ANALYSIS RESULTS

JOINT DISPLACEMENT (INCH RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
3	3	0.00000	0.03200	0.00000	0.00000	0.00000	0.00120
4	3	0.00000	0.02731	0.00000	0.00000	0.00000	0.00031
5	3	0.00000	0.02351	0.00000	0.00000	0.00000	0.00011
6	3	0.00000	0.02032	0.00000	0.00000	0.00000	0.00006
7	3	0.00000	0.01747	0.00000	0.00000	0.00000	0.00004
8	3	0.00000	0.01481	0.00000	0.00000	0.00000	0.00002
9	3	0.00000	0.01225	0.00000	0.00000	0.00000	0.00000
10	3	0.00000	0.01003	0.00000	0.00000	0.00000	-0.00002
11	3	0.00000	0.00775	0.00000	0.00000	0.00000	-0.00003
12	3	0.00000	0.00538	0.00000	0.00000	0.00000	-0.00005
13	3	0.00000	0.00279	0.00000	0.00000	0.00000	-0.00006
14	3	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00004
15	3	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00001
16	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
17	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
18	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
19	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
20	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
21	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
22	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
23	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
24	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
25	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
26	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
27	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
28	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
29	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
30	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
31	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00001
32	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00004
33	3	0.00000	0.00282	0.00000	0.00000	0.00000	0.00006
34	3	0.00000	0.00539	0.00000	0.00000	0.00000	0.00005
35	3	0.00000	0.00777	0.00000	0.00000	0.00000	0.00003
36	3	0.00000	0.01005	0.00000	0.00000	0.00000	0.00002
37	3	0.00000	0.01227	0.00000	0.00000	0.00000	0.00000
38	3	0.00000	0.01483	0.00000	0.00000	0.00000	-0.00002
39	3	0.00000	0.01749	0.00000	0.00000	0.00000	-0.00004
40	3	0.00000	0.02033	0.00000	0.00000	0.00000	-0.00006
41	3	0.00000	0.02351	0.00000	0.00000	0.00000	-0.00011
42	3	0.00000	0.02735	0.00000	0.00000	0.00000	-0.00032
43	3	0.00000	0.03204	0.00000	0.00000	0.00000	-0.00120

SUPPORT REACTIONS -UNIT KIP FEET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
3	3	-16.66	0.00	0.00	0.00	0.00	0.00
4	3	24.06	0.00	0.00	0.00	0.00	0.00
5	3	8.84	0.00	0.00	0.00	0.00	0.00
6	3	5.58	0.00	0.00	0.00	0.00	0.00
7	3	5.22	0.00	0.00	0.00	0.00	0.00
8	3	4.74	0.00	0.00	0.00	0.00	0.00
9	3	4.42	0.00	0.00	0.00	0.00	0.00
10	3	3.99	0.00	0.00	0.00	0.00	0.00
11	3	4.00	0.00	0.00	0.00	0.00	0.00
12	3	4.72	0.00	0.00	0.00	0.00	0.00
13	3	3.59	0.00	0.00	0.00	0.00	0.00
33	3	-4.09	0.00	0.00	0.00	0.00	0.00
34	3	-4.23	0.00	0.00	0.00	0.00	0.00
35	3	-4.24	0.00	0.00	0.00	0.00	0.00
36	3	-4.24	0.00	0.00	0.00	0.00	0.00
37	3	-4.17	0.00	0.00	0.00	0.00	0.00
38	3	-4.73	0.00	0.00	0.00	0.00	0.00
39	3	-5.00	0.00	0.00	0.00	0.00	0.00
40	3	-5.81	0.00	0.00	0.00	0.00	0.00
41	3	-9.09	0.00	0.00	0.00	0.00	0.00
42	3	-23.83	0.00	0.00	0.00	0.00	0.00
43	3	16.68	0.00	0.00	0.00	0.00	0.00
19	3	0.00	0.11	0.00	0.00	0.00	0.00
20	3	0.00	0.10	0.00	0.00	0.00	0.00
21	3	0.00	0.10	0.00	0.00	0.00	0.00
22	3	0.00	0.10	0.00	0.00	0.00	0.00
23	3	0.00	0.11	0.00	0.00	0.00	0.00
24	3	0.00	0.10	0.00	0.00	0.00	0.00
25	3	0.00	0.10	0.00	0.00	0.00	0.00
26	3	0.00	0.11	0.00	0.00	0.00	0.00
27	3	0.00	0.11	0.00	0.00	0.00	0.00
14	3	-17.91	-35.64	0.00	0.00	0.00	0.00
15	3	-0.43	0.39	0.00	0.00	0.00	0.00
16	3	-0.06	0.15	0.00	0.00	0.00	0.00
17	3	-0.01	0.11	0.00	0.00	0.00	0.00
18	3	0.00	0.11	0.00	0.00	0.00	0.00
28	3	0.00	0.11	0.00	0.00	0.00	0.00
29	3	0.01	0.11	0.00	0.00	0.00	0.00
30	3	0.06	0.15	0.00	0.00	0.00	0.00
31	3	0.44	0.40	0.00	0.00	0.00	0.00
32	3	18.16	-35.65	0.00	0.00	0.00	0.00

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
3	3	3	60.65	-15.34	0.00	0.00	0.00	-25.00
		4	-60.57	15.41	0.00	0.00	0.00	4.92
4	3	4	45.13	-2.55	0.00	0.00	0.00	-4.92
		5	-45.03	2.61	0.00	0.00	0.00	0.89
5	3	5	40.50	-0.30	0.00	0.00	0.00	-0.89
		6	-40.39	0.35	0.00	0.00	0.00	0.39
6	3	6	38.25	-0.03	0.00	0.00	0.00	-0.39
		7	-38.14	0.07	0.00	0.00	0.00	0.31
7	3	7	36.79	-0.02	0.00	0.00	0.00	-0.31
		8	-36.67	0.04	0.00	0.00	0.00	0.26
8	3	8	36.06	0.00	0.00	0.00	0.00	-0.26
		9	-35.94	0.01	0.00	0.00	0.00	0.25
9	3	9	35.93	0.00	0.00	0.00	0.00	0.25
		10	-35.83	0.00	0.00	0.00	0.00	-0.25
10	3	10	36.28	0.00	0.00	0.00	0.00	0.25
		11	-36.18	0.02	0.00	0.00	0.00	-0.27
11	3	11	37.06	-0.02	0.00	0.00	0.00	0.27
		12	-36.96	0.05	0.00	0.00	0.00	-0.32
12	3	12	38.52	0.13	0.00	0.00	0.00	0.32
		13	-38.42	-0.09	0.00	0.00	0.00	-0.16
13	3	13	39.93	0.85	0.00	0.00	0.00	0.16
		14	-39.84	-0.80	0.00	0.00	0.00	0.95
14	3	14	0.04	-0.57	0.00	0.00	0.00	-0.95
		15	0.04	0.63	0.00	0.00	0.00	0.13
15	3	15	0.04	-0.05	0.00	0.00	0.00	-0.13
		16	0.04	0.12	0.00	0.00	0.00	0.01
16	3	16	0.03	0.03	0.00	0.00	0.00	-0.01
		17	0.03	0.05	0.00	0.00	0.00	-0.01
17	3	17	0.03	0.04	0.00	0.00	0.00	0.01
		18	0.03	0.04	0.00	0.00	0.00	-0.01
18	3	18	0.03	0.05	0.00	0.00	0.00	0.01
		19	0.03	0.05	0.00	0.00	0.00	-0.01

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
19	3	19	0.02	0.05	0.00	0.00	0.00	0.01
		20	0.02	0.05	0.00	0.00	0.00	-0.01
20	3	20	0.01	0.05	0.00	0.00	0.00	0.01
		21	0.01	0.05	0.00	0.00	0.00	-0.01
21	3	21	0.01	0.05	0.00	0.00	0.00	0.01
		22	0.01	0.05	0.00	0.00	0.00	-0.01
22	3	22	0.00	0.05	0.00	0.00	0.00	0.01
		23	0.00	0.05	0.00	0.00	0.00	-0.01
23	3	23	0.00	0.05	0.00	0.00	0.00	0.01
		24	0.00	0.05	0.00	0.00	0.00	-0.01
24	3	24	-0.01	0.05	0.00	0.00	0.00	0.01
		25	-0.01	0.05	0.00	0.00	0.00	-0.01
25	3	25	-0.01	0.05	0.00	0.00	0.00	0.01
		26	-0.01	0.05	0.00	0.00	0.00	-0.01
26	3	26	-0.02	0.05	0.00	0.00	0.00	0.01
		27	-0.02	0.05	0.00	0.00	0.00	-0.01
27	3	27	-0.03	0.05	0.00	0.00	0.00	0.01
		28	-0.03	0.04	0.00	0.00	0.00	-0.01
28	3	28	-0.03	0.04	0.00	0.00	0.00	0.01
		29	-0.03	0.04	0.00	0.00	0.00	-0.01
29	3	29	-0.03	0.05	0.00	0.00	0.00	0.01
		30	-0.03	0.03	0.00	0.00	0.00	0.01
30	3	30	-0.04	0.12	0.00	0.00	0.00	-0.01
		31	-0.04	-0.05	0.00	0.00	0.00	0.13
31	3	31	-0.04	0.64	0.00	0.00	0.00	-0.13
		32	-0.04	-0.58	0.00	0.00	0.00	0.97
32	3	32	39.96	-0.83	0.00	0.00	0.00	-0.97
		33	-40.05	0.88	0.00	0.00	0.00	-0.19
33	3	33	38.33	-0.06	0.00	0.00	0.00	0.19
		34	-38.43	0.10	0.00	0.00	0.00	-0.29
34	3	34	37.03	0.02	0.00	0.00	0.00	0.29
		35	-37.13	0.01	0.00	0.00	0.00	-0.28
35	3	35	36.18	0.02	0.00	0.00	0.00	0.28
		36	-36.28	0.00	0.00	0.00	0.00	-0.27

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
36	3	36	35.81	0.02	0.00	0.00	0.00	0.27
		37	-35.92	-0.01	0.00	0.00	0.00	-0.24
37	3	37	35.94	0.01	0.00	0.00	0.00	-0.24
		38	-36.06	-0.01	0.00	0.00	0.00	0.26
38	3	38	36.67	0.04	0.00	0.00	0.00	-0.26
		39	-36.79	-0.01	0.00	0.00	0.00	0.30
39	3	39	38.07	0.09	0.00	0.00	0.00	-0.30
		40	-38.18	-0.05	0.00	0.00	0.00	0.40
40	3	40	40.39	0.35	0.00	0.00	0.00	-0.40
		41	-40.50	-0.29	0.00	0.00	0.00	0.91
41	3	41	45.18	2.58	0.00	0.00	0.00	-0.91
		42	-45.28	-2.51	0.00	0.00	0.00	4.90
42	3	42	60.58	15.42	0.00	0.00	0.00	-4.90
		43	-60.66	-15.36	0.00	0.00	0.00	25.00

********** END OF LATEST ANALYSIS RESULT **********

51. CHECK CODE ALL

STAAD-III CODE CHECKING - (AISC)
****

ALL UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
3	ST W8X 31	PASS	AISC- H1-2	0.767	3
		60.65 C	0.00	-25.00	0.00
4	ST W8X 31	PASS	AISC- H1-2	0.319	3
		45.13 C	0.00	-4.92	0.00
5	ST W8X 31	PASS	AISC- H1-1	0.223	3
		40.50 C	0.00	-0.89	0.00
6	ST W8X 31	PASS	AISC- H1-1	0.204	3
		38.25 C	0.00	-0.39	0.00
7	ST W8X 31	PASS	AISC- H1-1	0.195	3
		36.79 C	0.00	-0.31	0.00
8	ST W8X 31	PASS	AISC- H1-1	0.191	3
		36.06 C	0.00	-0.26	0.00
9	ST W8X 31	PASS	AISC- H1-1	0.189	3
		35.93 C	0.00	0.25	0.00
10	ST W8X 31	PASS	AISC- H1-1	0.191	3
		36.28 C	0.00	0.25	0.00
11	ST W8X 31	PASS	AISC- H1-1	0.195	3
		36.96 C	0.00	-0.32	1.36
12	ST W8X 31	PASS	AISC- H1-1	0.204	3
		38.52 C	0.00	0.32	0.00
13	ST W8X 31	PASS	AISC- H1-1	0.220	3
		39.84 C	0.00	0.95	1.36
14	ST W8X 31	PASS	SHEAR -Y	0.019	3
		0.04 T	0.00	0.13	1.37
15	ST W8X 31	PASS	SHEAR -Y	0.004	3
		0.04 T	0.00	0.01	1.36
16	ST W8X 31	PASS	SHEAR -Y	0.002	3
		0.03 T	0.00	-0.01	1.37
17	ST W8X 31	PASS	SHEAR -Y	0.001	3
		0.03 T	0.00	-0.01	1.36
18	ST W8X 31	PASS	SHEAR -Y	0.001	3
		0.03 C	0.00	0.01	0.00
19	ST W8X 31	PASS	SHEAR -Y	0.001	3
		0.02 C	0.00	0.01	0.00
20	ST W8X 31	PASS	SHEAR -Y	0.002	3
		0.01 C	0.00	0.01	0.00
21	ST W8X 31	PASS	SHEAR -Y	0.002	3
		0.01 C	0.00	0.01	0.00
22	ST W8X 31	PASS	SHEAR -Y	0.002	3
		0.00 C	0.00	0.01	0.00
23	ST W8X 31	PASS	SHEAR -Y	0.002	3
		0.00 T	0.00	0.01	0.00
24	ST W8X 31	PASS	SHEAR -Y	0.002	3
		0.01 T	0.00	0.01	0.00
25	ST W8X 31	PASS	SHEAR -Y	0.002	3
		0.01 T	0.00	0.01	0.00
26	ST W8X 31	PASS	SHEAR -Y	0.001	3
		0.02 T	0.00	0.01	0.00

L UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
27	ST W8X 31	PASS	SHEAR -Y	0.001	3
		0.03 T	0.00	0.01	0.00
28	ST W8X 31	PASS	SHEAR -Y	0.001	3
		0.03 T	0.00	0.01	0.00
29	ST W8X 31	PASS	SHEAR -Y	0.002	3
		0.03	0.00	0.01	0.00
30	ST W8X 31	PASS	SHEAR -Y	0.004	3
		0.04 T	0.00	-0.01	0.00
31	ST W8X 31	PASS	SHEAR -Y	0.020	3
		0.04 T	0.00	-0.13	0.00
32	ST W8X 31	PASS	AISC- H1-1	0.221	3
		39.96 C	0.00	-0.97	0.00
33	ST W8X 31	PASS	AISC- H1-1	0.203	3
		38.43 C	0.00	-0.29	1.36
34	ST W8X 31	PASS	AISC- H1-1	0.196	3
		37.13 C	0.00	-0.28	1.36
35	ST W8X 31	PASS	AISC- H1-1	0.191	3
		36.28 C	0.00	-0.27	1.37
36	ST W8X 31	PASS	AISC- H1-1	0.189	3
		35.92 C	0.00	-0.24	1.36
37	ST W8X 31	PASS	AISC- H1-1	0.190	3
		36.06 C	0.00	0.26	1.56
38	ST W8X 31	PASS	AISC- H1-1	0.195	3
		36.79 C	0.00	0.30	1.57
39	ST W8X 31	PASS	AISC- H1-1	0.204	3
		38.18 C	0.00	0.40	1.56
40	ST W8X 31	PASS	AISC- H1-1	0.224	3
		40.50 C	0.00	0.91	1.57
41	ST W8X 31	PASS	AISC- H1-2	0.320	3
		45.28 C	0.00	4.90	1.57
42	ST W8X 31	PASS	AISC- H1-2	0.767	3
		60.66 C	0.00	25.00	1.31

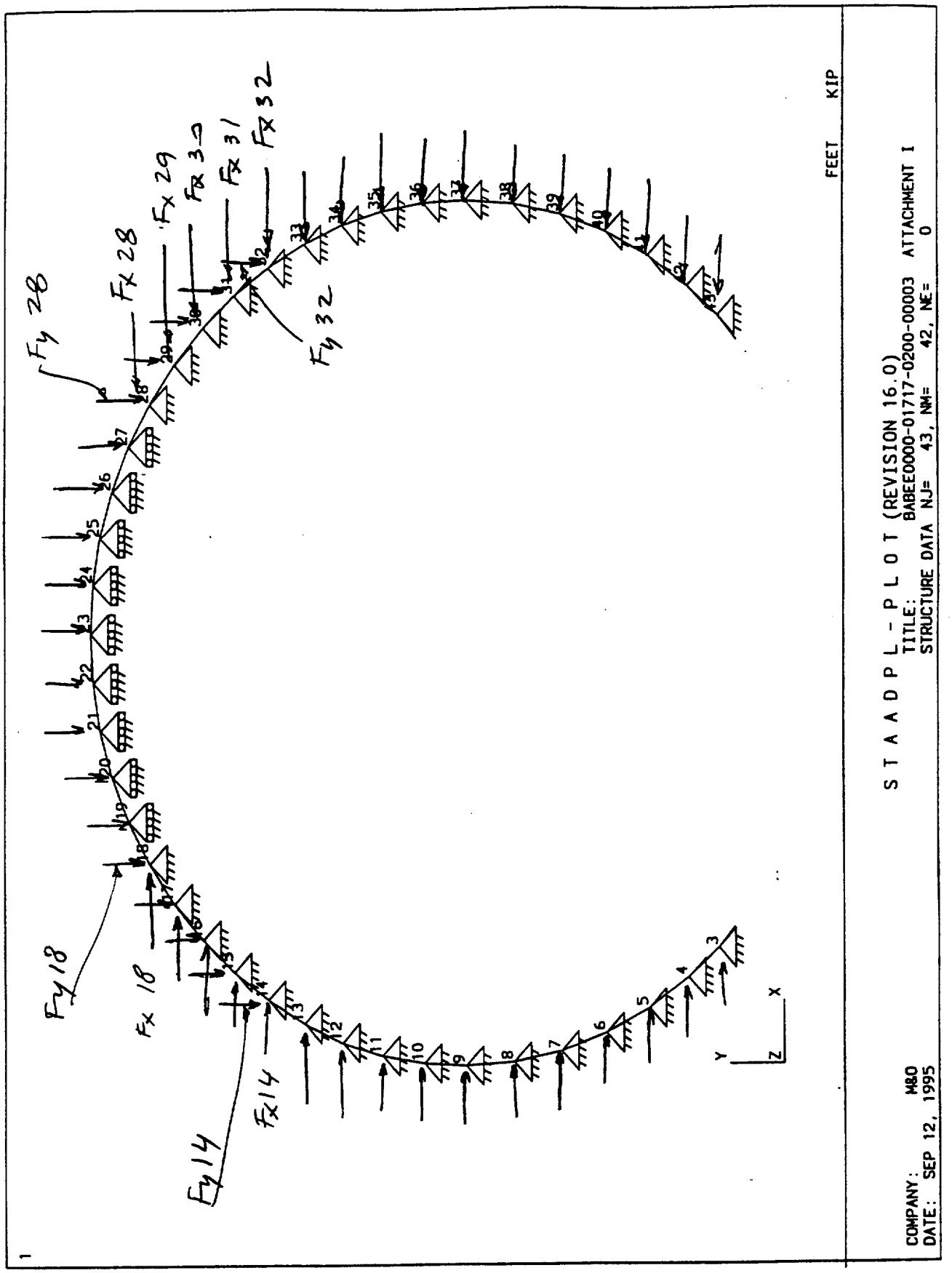
********** END OF TABULATED RESULT OF DESIGN **********

52. PLOT DISPLACEMENT FILE
53. PLOT BENDING FILE
54. FINISH

********** END OF STAAD-III **********

DATE= JUL 18,1995 TIME= 11: 3: 7 ******

****
* For questions on STAAD-III/ISDS, contact: *
* RESEARCH ENGINEERS, Inc at (714) 974-2500 *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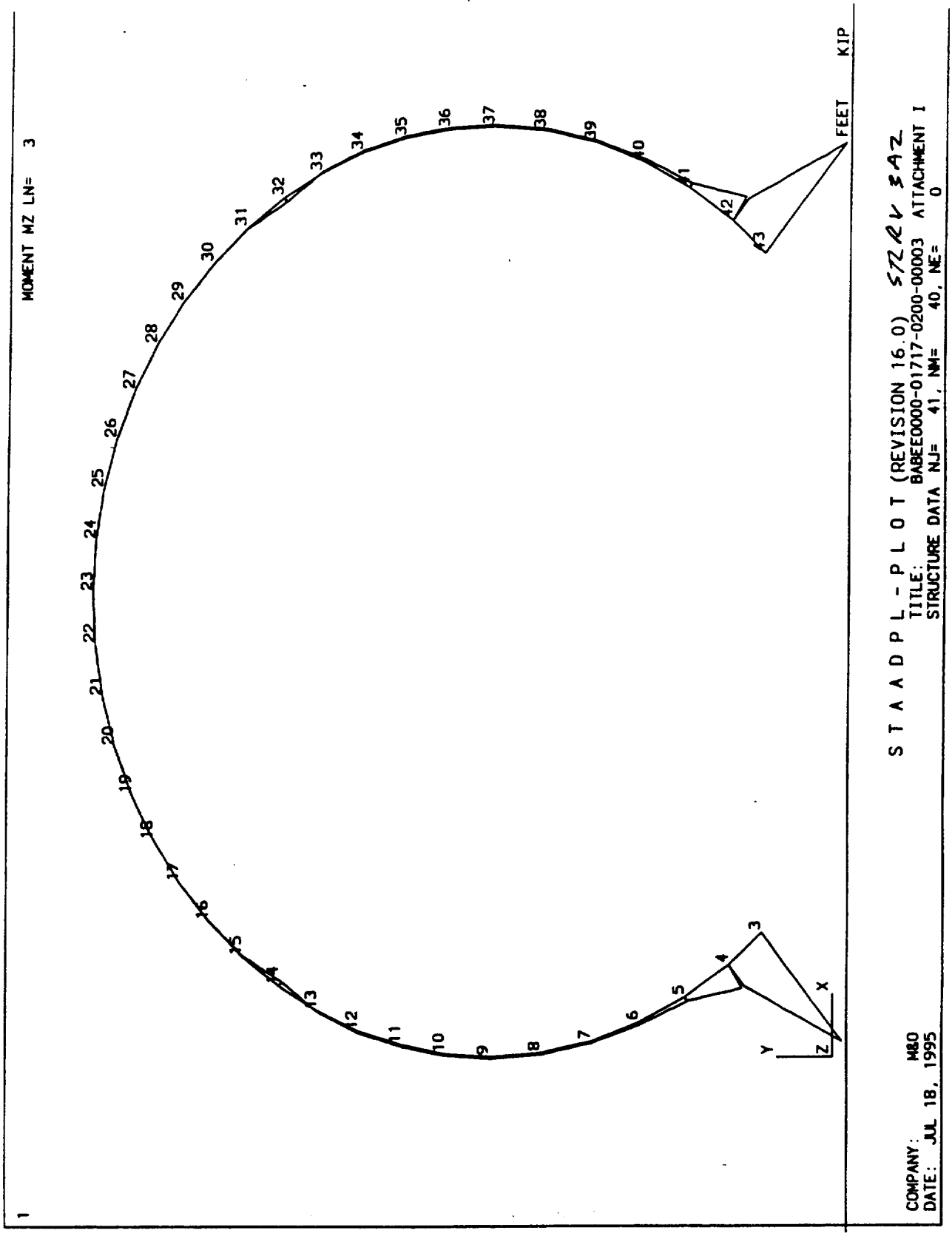
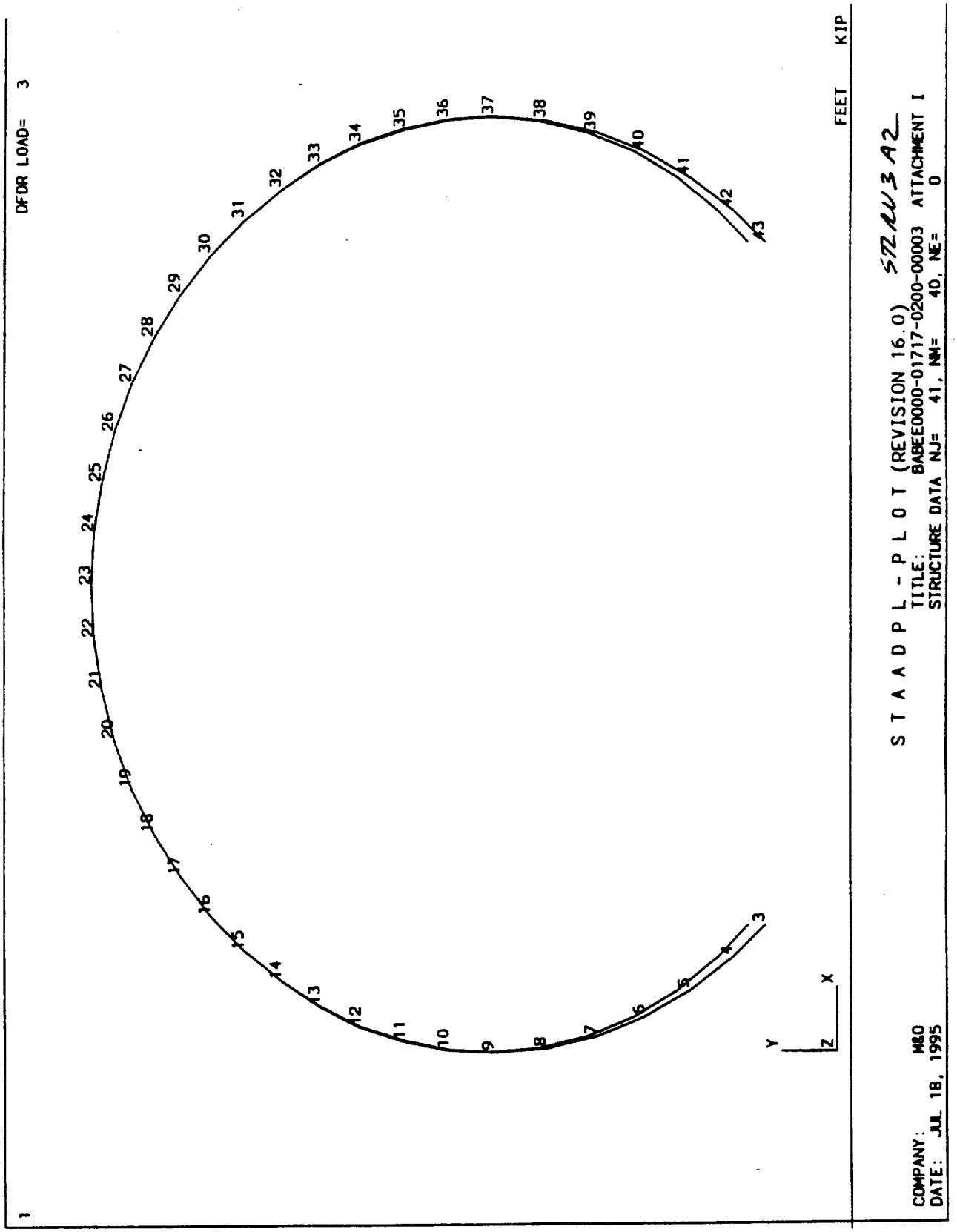
Fx 28
Fx 29
Fx 30
Fx 31
Fx 32
Fy 32
Fy 18
Fx 18
Fx 14
Fy 14
FEET KIP
STAADPL - PLOT (REVISION 16.0)
TITLE: BABEE0000-01717-0200-00003 ATTACHMENT 1
STRUCTURE DATA NJ= 43, NM= 42, NE= 0
COMPANY: M&O
DATE: SEP 12, 1995
X
Y
Z
1


MOMENT MZ LN= 3
KIP
FEET
STAADPL - PLOT (REVISION 16.0) STRUCTURE
TITLE: BABEE0000-01717-0200-00003 ATTACHMENT I
STRUCTURE DATA NJ= 41, NM= 40, NE= 0
COMPANY: M&O
DATE: JUL 18, 1995
X
Y
Z


DFOR LOAD= 3
FEET KIP
STAADPL - PLOT (REVISION 16.0) STRUC32
TITLE: BABEE0000-01717-0200-00003 ATTACHMENT I
STRUCTURE DATA NJ= 41, NM= 40, NE= 0
COMPANY: M&O
DATE: JUL 18, 1995
Y X Z

```
*                                                    *
*           S T A A D - III                          *
*           Revision 16.0b                           *
*           Proprietary Program of                   *
*           RESEARCH ENGINEERS, Inc.                 *
*           Date=    JUL 18, 1995                    *
*           Time=     7:30: 6                        *
*                                                    *
******************************************************
```

```
 1. STAAD PLANE BABEE0000-01717-0200-00003  ATTACHMENT I
 2. * ESF GROUND SUPPORT-STRUCTURAL STEEL ANALYSIS REV 00
 3. *
 4. * FILE STLRV4
 5. * 25 TON JACK APPLIED ONE SIDE @ 47 DEGREES
 6. UNIT FT KIP
 7. JOINT COORDINATES
 8. 3 3.27 2.13 ; 4 2.43 3.13
 9. 5 1.58 4.44 ; 6 0.90 5.85 ; 7 0.40 7.33 ; 8 0.10 8.87
10. 9 0.0 10.43 ; 10 0.08 11.79 ; 11 0.31 13.14 ; 12 0.68 14.45
11. 13 1.21 15.71 ; 14 1.86 16.90 ; 15 2.65 18.02 ; 16 3.56 19.03
12. 17 4.58 19.94 ; 18 5.69 20.73 ; 19 6.89 21.39 ; 20 8.15 21.91
13. 21 9.46 22.29 ; 22 10.80 22.52 ; 23 12.17 22.60 ; 24 13.53 22.52
14. 25 14.87 22.29 ; 26 16.18 21.91 ; 27 17.45 21.39 ; 28 18.64 20.73
15. 29 19.75 19.94 ; 30 20.77 19.03 ; 31 21.68 18.02 ; 32 22.47 16.90
16. 33 23.13 15.71 ; 34 23.65 14.45 ; 35 24.03 13.14 ; 36 24.26 11.79
17. 37 24.33 10.43 ; 38 24.23 8.87 ; 39 23.93 7.33 ; 40 23.44 5.85
18. 41 22.76 4.44 ; 42 21.90 3.13 ; 43 20.88 1.94 ; 44 19.72 0.89
19. 45 18.43 0.00
20. MEMBER INCIDENCE
21. 3 3 4 44
22. UNIT KIP INCH
23. MEMBER PROPERTIES
24. 3 TO 44 TA STA W8X31
25. CONSTANTS
26. E 29000.0 ALL
27. DENSITY 0.00028 ALL
28. BETA 0 ALL
29. UNIT FT
30. SUPPORT
31. 3 7 11 35 39 43 FIXED BUT FY MZ
32. 22 24 FIXED BUT FX MZ
33. 16 30 45 PINNED
34. UNIT KIP
35. LOAD 1
36. SELF WEIGHT Y -1.0
37. LOADING 2
38. * 25 TON JACK & ONE SIDED JACKING
39. JOINT LOADING
40. 3 FX -34.1
41. 3 FY 36.57
42. 3 MZ 25.00
43. LOADING COMBINATION 3
44. 1 2.5 2 1.0
45. PERFORM ANALYSIS
```

P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 43/ 42/ 11
ORIGINAL/FINAL BAND-WIDTH = 1/ 1
TOTAL PRIMARY LOAD CASES = 2, TOTAL DEGREES OF FREEDOM = 115
SIZE OF STIFFNESS MATRIX = 690 DOUBLE PREC. WORDS
TOTAL REQUIRED DISK SPACE = 0.08 MEGA-BYTES

++ PROCESSING ELEMENT STIFFNESS MATRIX. 7:30: 9
++ PROCESSING GLOBAL STIFFNESS MATRIX. 7:30:10
++ PROCESSING TRIANGULAR FACTORIZATION. 7:30:10
++ CALCULATING JOINT DISPLACEMENTS. 7:30:10
++ CALCULATING MEMBER FORCES. 7:30:11

46. LOAD LIST 3
47. PRINT ANALYSIS RESULTS

JOINT DISPLACEMENT (INCH RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
3	3	0.00000	0.06495	0.00000	0.00000	0.00000	0.00341
4	3	-0.03076	0.03557	0.00000	0.00000	0.00000	0.00185
5	3	-0.04196	0.02445	0.00000	0.00000	0.00000	0.00008
6	3	-0.02664	0.02831	0.00000	0.00000	0.00000	-0.00099
7	3	0.00000	0.03408	0.00000	0.00000	0.00000	-0.00073
8	3	0.00247	0.03201	0.00000	0.00000	0.00000	-0.00006
9	3	0.00080	0.02935	0.00000	0.00000	0.00000	0.00004
10	3	0.00077	0.02714	0.00000	0.00000	0.00000	0.00007
11	3	0.00000	0.02505	0.00000	0.00000	0.00000	0.00040
12	3	-0.01365	0.02637	0.00000	0.00000	0.00000	0.00057
13	3	-0.02259	0.02741	0.00000	0.00000	0.00000	0.00016
14	3	-0.02196	0.02423	0.00000	0.00000	0.00000	-0.00044
15	3	-0.01240	0.01443	0.00000	0.00000	0.00000	-0.00088
16	3	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00077
17	3	0.00533	-0.00621	0.00000	0.00000	0.00000	-0.00035
18	3	0.00669	-0.00840	0.00000	0.00000	0.00000	-0.00007
19	3	0.00608	-0.00763	0.00000	0.00000	0.00000	0.00010
20	3	0.00487	-0.00514	0.00000	0.00000	0.00000	0.00016
21	3	0.00384	-0.00221	0.00000	0.00000	0.00000	0.00015
22	3	0.00328	0.00000	0.00000	0.00000	0.00000	0.00008
23	3	0.00307	0.00026	0.00000	0.00000	0.00000	0.00002
24	3	0.00288	0.00000	0.00000	0.00000	0.00000	0.00003
25	3	0.00289	0.00123	0.00000	0.00000	0.00000	0.00006
26	3	0.00302	0.00239	0.00000	0.00000	0.00000	0.00004
27	3	0.00300	0.00288	0.00000	0.00000	0.00000	-0.00001
28	3	0.00253	0.00246	0.00000	0.00000	0.00000	-0.00006
29	3	0.00147	0.00133	0.00000	0.00000	0.00000	-0.00010
30	3	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00009
31	3	-0.00093	-0.00089	0.00000	0.00000	0.00000	-0.00006
32	3	-0.00136	-0.00125	0.00000	0.00000	0.00000	-0.00001
33	3	-0.00124	-0.00122	0.00000	0.00000	0.00000	0.00002
34	3	-0.00068	-0.00102	0.00000	0.00000	0.00000	0.00003
35	3	0.00000	-0.00084	0.00000	0.00000	0.00000	0.00003
36	3	0.00023	-0.00081	0.00000	0.00000	0.00000	0.00001
37	3	0.00023	-0.00081	0.00000	0.00000	0.00000	0.00000
38	3	0.00010	-0.00079	0.00000	0.00000	0.00000	0.00000
39	3	0.00000	-0.00075	0.00000	0.00000	0.00000	0.00000
40	3	0.00027	-0.00081	0.00000	0.00000	0.00000	0.00001
41	3	0.00041	-0.00083	0.00000	0.00000	0.00000	0.00000
42	3	0.00027	-0.00068	0.00000	0.00000	0.00000	-0.00001
43	3	0.00000	-0.00038	0.00000	0.00000	0.00000	-0.00001
44	3	0.00006	-0.00029	0.00000	0.00000	0.00000	-0.00001
45	3	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00001

SUPPORT REACTIONS -UNIT KIP FEET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
3	3	6.29	0.00	0.00	0.00	0.00	0.00
7	3	28.29	0.00	0.00	0.00	0.00	0.00
11	3	19.23	0.00	0.00	0.00	0.00	0.00
35	3	0.48	0.00	0.00	0.00	0.00	0.00
39	3	-0.41	0.00	0.00	0.00	0.00	0.00
43	3	-0.93	0.00	0.00	0.00	0.00	0.00
22	3	0.00	1.24	0.00	0.00	0.00	0.00
24	3	0.00	-2.05	0.00	0.00	0.00	0.00
16	3	-16.75	-34.69	0.00	0.00	0.00	0.00
30	3	-3.37	2.49	0.00	0.00	0.00	0.00
45	3	1.26	1.03	0.00	0.00	0.00	0.00

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
3	3	3	45.89	2.23	0.00	0.00	0.00	-25.00
		4	-45.81	-2.16	0.00	0.00	0.00	27.87
4	3	4	45.73	-3.48	0.00	0.00	0.00	-27.87
		5	-45.63	3.54	0.00	0.00	0.00	22.39
5	3	5	44.82	-9.26	0.00	0.00	0.00	-22.39
		6	-44.71	9.31	0.00	0.00	0.00	7.85
6	3	6	43.22	-14.75	0.00	0.00	0.00	-7.85
		7	-43.11	14.79	0.00	0.00	0.00	-15.22
7	3	7	35.35	7.38	0.00	0.00	0.00	15.22
		8	-35.23	-7.35	0.00	0.00	0.00	-3.66
8	3	8	35.89	2.78	0.00	0.00	0.00	3.66
		9	-35.77	-2.78	0.00	0.00	0.00	0.68
9	3	9	35.84	1.63	0.00	0.00	0.00	0.68
		10	-35.73	-1.62	0.00	0.00	0.00	1.53
10	3	10	35.34	5.53	0.00	0.00	0.00	-1.53
		11	-35.23	-5.51	0.00	0.00	0.00	9.09
11	3	11	39.68	-9.28	0.00	0.00	0.00	-9.09
		12	-39.58	9.31	0.00	0.00	0.00	-3.56
12	3	12	40.42	-4.39	0.00	0.00	0.00	3.56
		13	-40.32	4.43	0.00	0.00	0.00	-9.59
13	3	13	40.56	-0.31	0.00	0.00	0.00	9.59
		14	-40.47	0.36	0.00	0.00	0.00	-10.04
14	3	14	40.25	4.26	0.00	0.00	0.00	10.04
		15	-40.16	-4.20	0.00	0.00	0.00	-4.24
15	3	15	39.38	8.94	0.00	0.00	0.00	4.24
		16	-39.30	-8.87	0.00	0.00	0.00	7.88
16	3	16	2.51	-1.64	0.00	0.00	0.00	-7.88
		17	-2.44	1.72	0.00	0.00	0.00	5.58
17	3	17	2.62	-1.44	0.00	0.00	0.00	-5.58
		18	-2.56	1.53	0.00	0.00	0.00	3.56
18	3	18	2.72	-1.22	0.00	0.00	0.00	-3.56
		19	-2.67	1.31	0.00	0.00	0.00	1.82

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
19	3	19	2.80	-1.01	0.00	0.00	0.00	-1.82
		20	-2.76	1.10	0.00	0.00	0.00	0.38
20	3	20	2.86	-0.80	0.00	0.00	0.00	-0.38
		21	-2.83	0.90	0.00	0.00	0.00	-0.77
21	3	21	2.91	-0.58	0.00	0.00	0.00	0.77
		22	-2.90	0.68	0.00	0.00	0.00	-1.62
22	3	22	3.03	0.89	0.00	0.00	0.00	1.62
		23	-3.02	-0.78	0.00	0.00	0.00	-0.48
23	3	23	2.91	1.13	0.00	0.00	0.00	0.48
		24	-2.91	-1.02	0.00	0.00	0.00	0.99
24	3	24	3.13	-0.68	0.00	0.00	0.00	-0.99
		25	-3.15	0.78	0.00	0.00	0.00	0.00
25	3	25	3.21	-0.42	0.00	0.00	0.00	0.00
		26	-3.24	0.52	0.00	0.00	0.00	-0.65
26	3	26	3.28	-0.18	0.00	0.00	0.00	0.65
		27	-3.32	0.27	0.00	0.00	0.00	-0.96
27	3	27	3.33	0.12	0.00	0.00	0.00	0.96
		28	-3.38	-0.03	0.00	0.00	0.00	-0.86
28	3	28	3.36	0.40	0.00	0.00	0.00	0.86
		29	-3.42	-0.32	0.00	0.00	0.00	-0.37
29	3	29	3.36	0.69	0.00	0.00	0.00	0.37
		30	-3.43	-0.61	0.00	0.00	0.00	0.52
30	3	30	-0.76	0.15	0.00	0.00	0.00	-0.52
		31	0.68	-0.08	0.00	0.00	0.00	0.68
31	3	31	-0.69	0.00	0.00	0.00	0.00	-0.68
		32	0.60	0.06	0.00	0.00	0.00	0.64
32	3	32	-0.59	-0.13	0.00	0.00	0.00	-0.64
		33	0.50	0.18	0.00	0.00	0.00	0.43
33	3	33	-0.48	-0.23	0.00	0.00	0.00	-0.43
		34	0.38	0.27	0.00	0.00	0.00	0.09
34	3	34	-0.35	-0.31	0.00	0.00	0.00	-0.09
		35	0.25	0.34	0.00	0.00	0.00	-0.36
35	3	35	-0.13	0.11	0.00	0.00	0.00	0.36
		36	0.02	-0.09	0.00	0.00	0.00	-0.23

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
36	3	36	-0.03	0.09	0.00	0.00	0.00	0.23
		37	-0.07	-0.08	0.00	0.00	0.00	-0.11
37	3	37	0.06	-0.09	0.00	0.00	0.00	-0.11
		38	-0.18	0.10	0.00	0.00	0.00	-0.03
38	3	38	0.17	-0.12	0.00	0.00	0.00	0.03
		39	-0.28	0.14	0.00	0.00	0.00	-0.23
39	3	39	0.39	0.22	0.00	0.00	0.00	0.23
		40	-0.51	-0.18	0.00	0.00	0.00	0.08
40	3	40	0.53	0.11	0.00	0.00	0.00	-0.08
		41	-0.63	-0.06	0.00	0.00	0.00	0.21
41	3	41	0.64	-0.02	0.00	0.00	0.00	-0.21
		42	-0.74	0.09	0.00	0.00	0.00	0.12
42	3	42	0.72	-0.18	0.00	0.00	0.00	-0.12
		43	-0.81	0.26	0.00	0.00	0.00	-0.22
43	3	43	1.46	0.26	0.00	0.00	0.00	0.22
		44	-1.54	-0.18	0.00	0.00	0.00	0.12
44	3	44	1.55	-0.03	0.00	0.00	0.00	-0.12
		45	-1.62	0.13	0.00	0.00	0.00	0.00

********** END OF LATEST ANALYSIS RESULT **********

48. CHECK CODE ALL

STAAD-III CODE CHECKING - (AISC)
****

ALL UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
3	ST W8X 31	PASS	AISC- H1-2	0.744	3
		45.81 C	0.00	27.87	1.31
4	ST W8X 31	PASS	AISC- H1-2	0.744	3
		45.73 C	0.00	-27.87	0.00
5	ST W8X 31	PASS	AISC- H1-2	0.638	3
		44.82 C	0.00	-22.39	0.00
6	ST W8X 31	PASS	AISC- H1-2	0.498	3
		43.11 C	0.00	-15.22	1.56
7	ST W8X 31	PASS	AISC- H1-2	0.459	3
		35.35 C	0.00	15.22	0.00
8	ST W8X 31	PASS	AISC- H1-2	0.249	3
		35.89 C	0.00	3.66	0.00
9	ST W8X 31	PASS	AISC- H1-2	0.209	3
		35.73 C	0.00	1.53	1.36
10	ST W8X 31	PASS	AISC- H1-2	0.346	3
		35.23 C	0.00	9.09	1.37
11	ST W8X 31	PASS	AISC- H1-2	0.368	3
		39.68 C	0.00	-9.09	0.00
12	ST W8X 31	PASS	AISC- H1-2	0.381	3
		40.32 C	0.00	-9.59	1.37
13	ST W8X 31	PASS	AISC- H1-2	0.390	3
		40.47 C	0.00	-10.04	1.36
14	ST W8X 31	PASS	AISC- H1-2	0.388	3
		40.25 C	0.00	10.04	0.00
15	ST W8X 31	PASS	AISC- H1-2	0.344	3
		39.30 C	0.00	7.88	1.36
16	ST W8X 31	PASS	AISC- H1-3	0.158	3
		2.51 C	0.00	-7.88	0.00
17	ST W8X 31	PASS	AISC- H1-3	0.116	3
		2.62 C	0.00	-5.58	0.00
18	ST W8X 31	PASS	AISC- H1-3	0.079	3
		2.72 C	0.00	-3.56	0.00
19	ST W8X 31	PASS	AISC- H1-3	0.048	3
		2.80 C	0.00	-1.82	0.00
20	ST W8X 31	PASS	AISC- H1-3	0.029	3
		2.83 C	0.00	-0.77	1.36
21	ST W8X 31	PASS	AISC- H1-3	0.045	3
		2.90 C	0.00	-1.62	1.36
22	ST W8X 31	PASS	AISC- H1-3	0.045	3
		3.03 C	0.00	1.62	0.00
23	ST W8X 31	PASS	SHEAR -Y	0.034	3
		2.91 C	0.00	0.48	0.00
24	ST W8X 31	PASS	AISC- H1-3	0.034	3
		3.13 C	0.00	-0.99	0.00
25	ST W8X 31	PASS	AISC- H1-3	0.029	3
		3.24 C	0.00	-0.65	1.36
26	ST W8X 31	PASS	AISC- H1-3	0.035	3
		3.32 C	0.00	-0.96	1.37

ALL UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
27	ST W8X 31	PASS	AISC- H1-3	0.035	3
		3.33 C	0.00	0.96	0.00
28	ST W8X 31	PASS	AISC- H1-3	0.033	3
		3.36 C	0.00	0.86	0.00
29	ST W8X 31	PASS	AISC- H1-3	0.027	3
		3.43 C	0.00	0.52	1.37
30	ST W8X 31	PASS	AISC- H2-1	0.016	3
		0.68 T	0.00	0.68	1.36
31	ST W8X 31	PASS	AISC- H2-1	0.016	3
		0.69 T	0.00	-0.68	0.00
32	ST W8X 31	PASS	AISC- H2-1	0.015	3
		0.59 T	0.00	-0.64	0.00
33	ST W8X 31	PASS	AISC- H2-1	0.010	3
		0.48 T	0.00	-0.43	0.00
34	ST W8X 31	PASS	SHEAR -Y	0.010	3
		0.25 T	0.00	-0.36	1.36
35	ST W8X 31	PASS	AISC- H2-1	0.007	3
		0.13 T	0.00	0.36	0.00
36	ST W8X 31	PASS	AISC- H2-1	0.004	3
		0.03 T	0.00	0.23	0.00
37	ST W8X 31	PASS	SHEAR -Y	0.003	3
		0.18 C	0.00	-0.03	1.56
38	ST W8X 31	PASS	AISC- H1-3	0.006	3
		0.28 C	0.00	-0.23	1.57
39	ST W8X 31	PASS	SHEAR -Y	0.007	3
		0.39 C	0.00	0.23	0.00
40	ST W8X 31	PASS	AISC- H1-3	0.007	3
		0.63 C	0.00	0.21	1.57
41	ST W8X 31	PASS	AISC- H1-3	0.007	3
		0.64 C	0.00	-0.21	0.00
42	ST W8X 31	PASS	AISC- H1-3	0.008	3
		0.81 C	0.00	-0.22	1.57
43	ST W8X 31	PASS	AISC- H1-3	0.012	3
		1.46 C	0.00	0.22	0.00
44	ST W8X 31	PASS	AISC- H1-3	0.010	3
		1.55 C	0.00	-0.12	0.00

********** END OF TABULATED RESULT OF DESIGN **********

49. PLOT DISPLACEMENT FILE
50. PLOT BENDING FILE
51. FINISH

********** END OF STAAD-III **********

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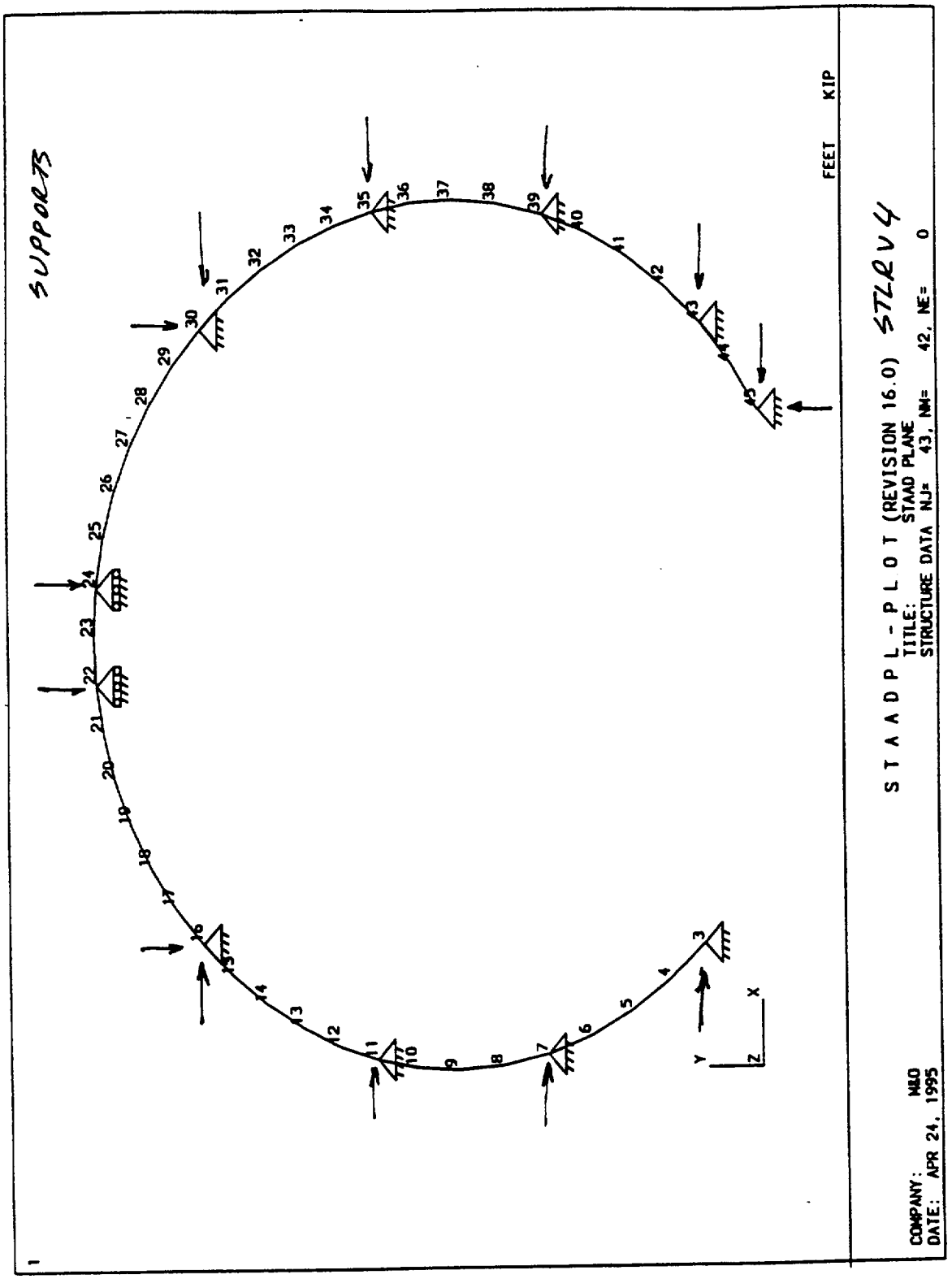
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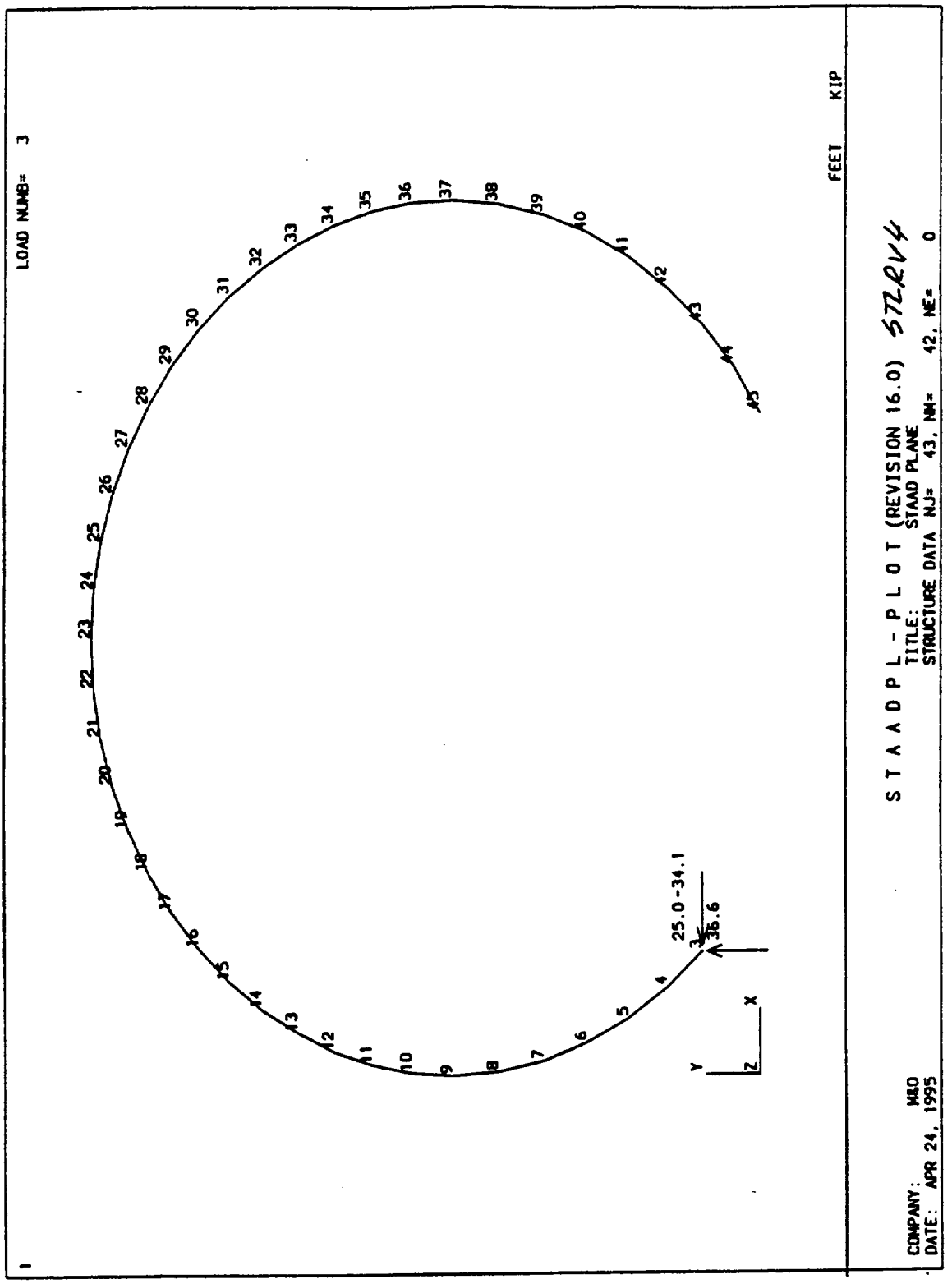
COMPANY: M&O
DATE: APR 24, 1995
X
Y
Z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DATE: APR 24, 1995
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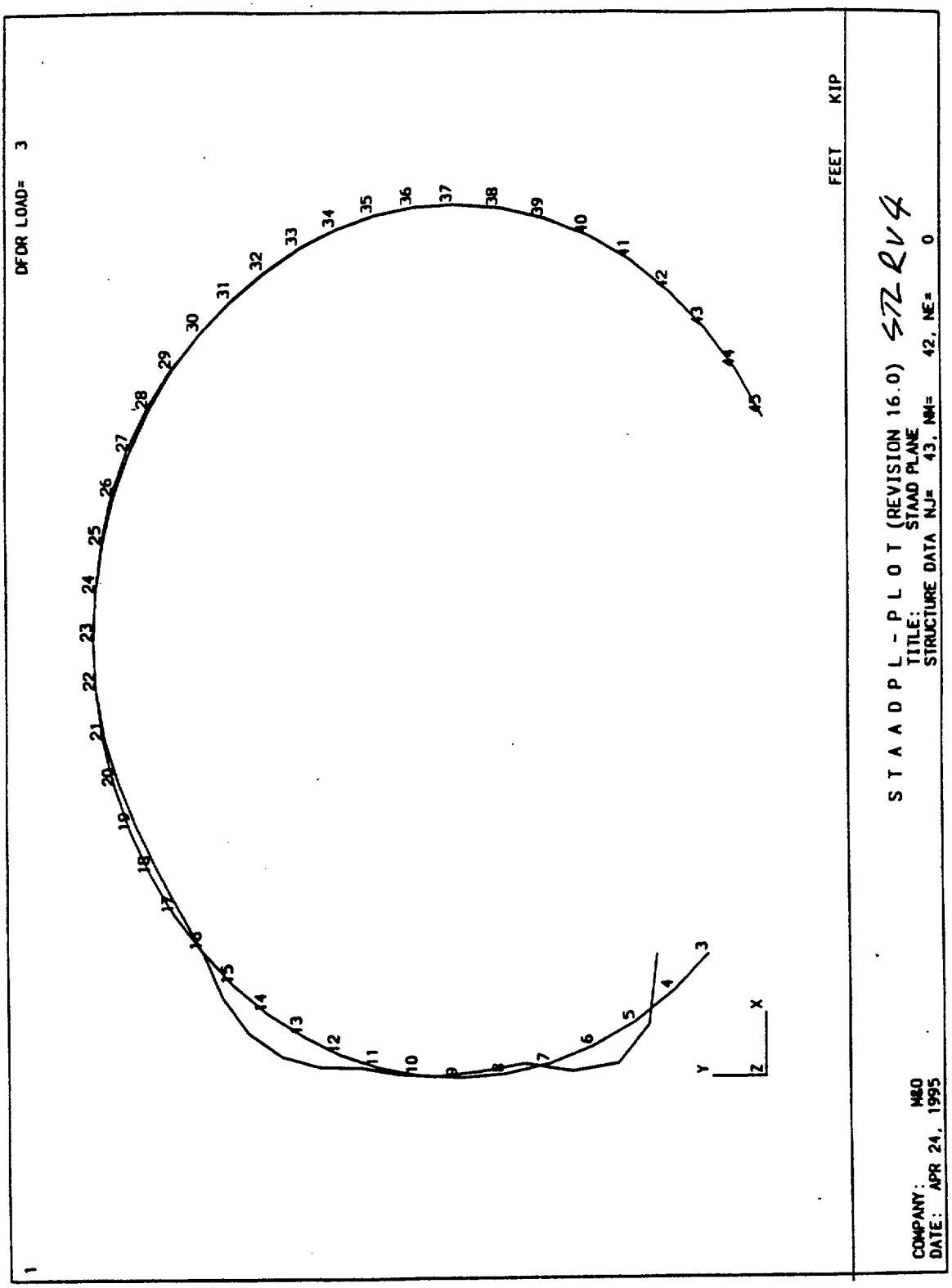
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COMPANY:
DATE: APR 24, 1995
M&O
SZRV4
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X
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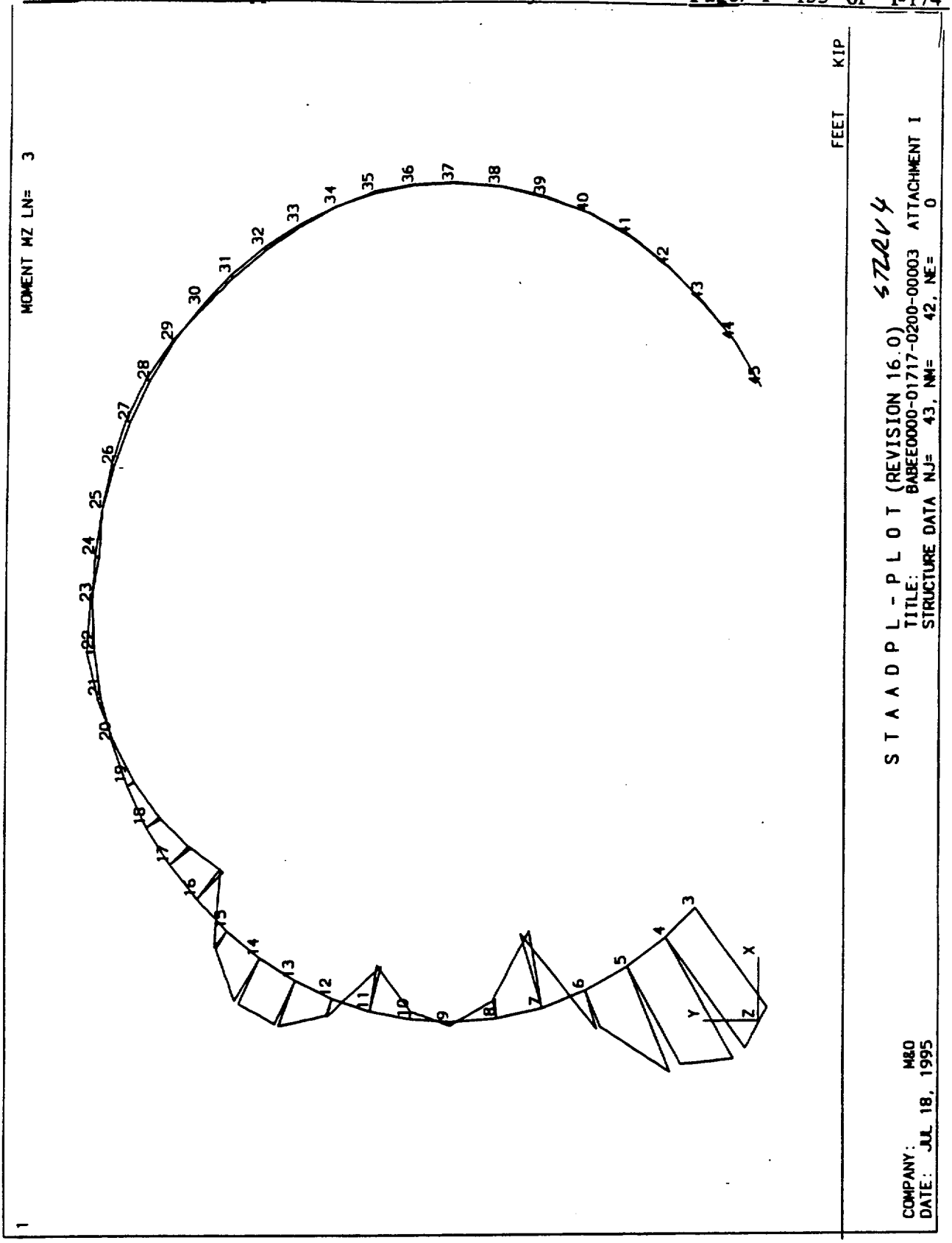
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STRUCTURE DATA NJ= 43, NM= 42, NE= 0
COMPANY: M&O
DATE: JUL 18, 1995
1
X
Y
Z

```
**************************************************
*                                                *
*           S T A A D - III                      *
*           Revision 16.0b                       *
*           Proprietary Program of               *
*           RESEARCH ENGINEERS, Inc.             *
*           Date=    JUL 18, 1995                *
*           Time=     7:58:50                    *
*                                                *
**************************************************
```

```
 1. STAAD PLANE  BABEE0000-01717-0200-00003  ATTACHMENT  I
 2. * ESF GROUND SUPPORT-STRUCTURAL STEEL ANALYSIS REV 00
 3. *
 4. * FILE STLRV4A
 5. * 25 TON JACK APPLIED ONE SIDE @ 49 DEGREES
 6. UNIT FT KIP
 7. JOINT COORDINATES
 8. 3 2.98 2.45 ; 4 2.43 3.13
 9. 5 1.58 4.44 ; 6 0.90 5.85 ; 7 0.40 7.33 ; 8 0.10 8.87
10. 9 0.0 10.43 ; 10 0.08 11.79 ; 11 0.31 13.14 ; 12 0.68 14.45
11. 13 1.21 15.71 ; 14 1.86 16.90 ; 15 2.65 18.02 ; 16 3.56 19.03
12. 17 4.58 19.94 ; 18 5.69 20.73 ; 19 6.89 21.39 ; 20 8.15 21.91
13. 21 9.46 22.29 ; 22 10.80 22.52 ; 23 12.17 22.60 ; 24 13.53 22.52
14. 25 14.87 22.29 ; 26 16.18 21.91 ; 27 17.45 21.39 ; 28 18.64 20.73
15. 29 19.75 19.94 ; 30 20.77 19.03 ; 31 21.68 18.02 ; 32 22.47 16.90
16. 33 23.13 15.71 ; 34 23.65 14.45 ; 35 24.03 13.14 ; 36 24.26 11.79
17. 37 24.33 10.43 ; 38 24.23 8.87 ; 39 23.93 7.33 ; 40 23.44 5.85
18. 41 22.76 4.44 ; 42 21.90 3.13 ; 43 20.88 1.94 ; 44 19.72 0.89
19. 45 18.43 0.00
20. MEMBER INCIDENCE
21. 3 3 4 44
22. UNIT KIP INCH
23. MEMBER PROPERTIES
24. 3 TO 44 TA STA W8X31
25. CONSTANTS
26. E 29000.0 ALL
27. DENSITY 0.00028 ALL
28. BETA 0 ALL
29. UNIT FT
30. SUPPORT
31. 3 7 11 35 39 43 FIXED BUT FY MZ
32. 22 24 FIXED BUT FX MZ
33. 16 30 45 PINNED
34. UNIT KIP
35. LOAD 1
36. SELF WEIGHT Y -1.0
37. LOADING 2
38. * 25 TON JACK & ONE SIDED JACKING
39. JOINT LOADING
40. 3 FX -32.80
41. 3 FY 37.74
42. 3 MZ 25.00
43. LOADING COMBINATION 3
44. 1 2.5 2 1.0
```

P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 43/ 42/ 11
ORIGINAL/FINAL BAND-WIDTH = 1/ 1
TOTAL PRIMARY LOAD CASES = 2, TOTAL DEGREES OF FREEDOM = 115
SIZE OF STIFFNESS MATRIX = 690 DOUBLE PREC. WORDS
TOTAL REQUIRED DISK SPACE = 0.08 MEGA-BYTES

++ PROCESSING ELEMENT STIFFNESS MATRIX. 7:58:52
++ PROCESSING GLOBAL STIFFNESS MATRIX. 7:58:53
++ PROCESSING TRIANGULAR FACTORIZATION. 7:58:53
++ CALCULATING JOINT DISPLACEMENTS. 7:58:54
++ CALCULATING MEMBER FORCES. 7:58:54

46. LOAD LIST 3
47. PRINT ANALYSIS RESULTS

JOINT DISPLACEMENT (INCH RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
3	3	0.00000	0.06126	0.00000	0.00000	0.00000	0.00306
4	3	-0.02016	0.04257	0.00000	0.00000	0.00000	0.00203
5	3	-0.03492	0.02905	0.00000	0.00000	0.00000	0.00030
6	3	-0.02348	0.03095	0.00000	0.00000	0.00000	-0.00079
7	3	0.00000	0.03557	0.00000	0.00000	0.00000	-0.00060
8	3	0.00097	0.03312	0.00000	0.00000	0.00000	-0.00002
9	3	-0.00074	0.03038	0.00000	0.00000	0.00000	0.00002
10	3	-0.00004	0.02805	0.00000	0.00000	0.00000	0.00003
11	3	0.00000	0.02575	0.00000	0.00000	0.00000	0.00037
12	3	-0.01379	0.02701	0.00000	0.00000	0.00000	0.00057
13	3	-0.02296	0.02807	0.00000	0.00000	0.00000	0.00017
14	3	-0.02241	0.02483	0.00000	0.00000	0.00000	-0.00045
15	3	-0.01268	0.01480	0.00000	0.00000	0.00000	-0.00090
16	3	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00079
17	3	0.00545	-0.00635	0.00000	0.00000	0.00000	-0.00036
18	3	0.00685	-0.00859	0.00000	0.00000	0.00000	-0.00007
19	3	0.00622	-0.00780	0.00000	0.00000	0.00000	0.00010
20	3	0.00498	-0.00526	0.00000	0.00000	0.00000	0.00017
21	3	0.00392	-0.00226	0.00000	0.00000	0.00000	0.00016
22	3	0.00335	0.00000	0.00000	0.00000	0.00000	0.00008
23	3	0.00314	0.00026	0.00000	0.00000	0.00000	0.00002
24	3	0.00294	0.00000	0.00000	0.00000	0.00000	0.00003
25	3	0.00296	0.00126	0.00000	0.00000	0.00000	0.00006
26	3	0.00309	0.00245	0.00000	0.00000	0.00000	0.00004
27	3	0.00307	0.00295	0.00000	0.00000	0.00000	-0.00001
28	3	0.00259	0.00252	0.00000	0.00000	0.00000	-0.00006
29	3	0.00151	0.00137	0.00000	0.00000	0.00000	-0.00010
30	3	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010
31	3	-0.00094	-0.00091	0.00000	0.00000	0.00000	-0.00006
32	3	-0.00138	-0.00127	0.00000	0.00000	0.00000	-0.00001
33	3	-0.00125	-0.00123	0.00000	0.00000	0.00000	0.00002
34	3	-0.00069	-0.00103	0.00000	0.00000	0.00000	0.00004
35	3	0.00000	-0.00085	0.00000	0.00000	0.00000	0.00003
36	3	0.00023	-0.00081	0.00000	0.00000	0.00000	0.00001
37	3	0.00024	-0.00081	0.00000	0.00000	0.00000	0.00000
38	3	0.00010	-0.00079	0.00000	0.00000	0.00000	-0.00001
39	3	0.00000	-0.00076	0.00000	0.00000	0.00000	0.00000
40	3	0.00027	-0.00081	0.00000	0.00000	0.00000	0.00001
41	3	0.00041	-0.00083	0.00000	0.00000	0.00000	0.00000
42	3	0.00027	-0.00069	0.00000	0.00000	0.00000	-0.00001
43	3	0.00000	-0.00038	0.00000	0.00000	0.00000	-0.00001
44	3	0.00006	-0.00029	0.00000	0.00000	0.00000	-0.00001
45	3	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00001

SUPPORT REACTIONS -UNIT KIP FEET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
3	3	4.97	0.00	0.00	0.00	0.00	0.00
7	3	27.95	0.00	0.00	0.00	0.00	0.00
11	3	20.34	0.00	0.00	0.00	0.00	0.00
35	3	0.48	0.00	0.00	0.00	0.00	0.00
39	3	-0.42	0.00	0.00	0.00	0.00	0.00
43	3	-0.94	0.00	0.00	0.00	0.00	0.00
22	3	0.00	1.26	0.00	0.00	0.00	0.00
24	3	0.00	-2.10	0.00	0.00	0.00	0.00
16	3	-17.43	-35.89	0.00	0.00	0.00	0.00
30	3	-3.43	2.52	0.00	0.00	0.00	0.00
45	3	1.27	1.03	0.00	0.00	0.00	0.00

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
3	3	3	46.85	2.09	0.00	0.00	0.00	-25.00
		4	-46.79	-2.05	0.00	0.00	0.00	26.81
4	3	4	46.75	-2.84	0.00	0.00	0.00	-26.81
		5	-46.65	2.91	0.00	0.00	0.00	22.32
5	3	5	45.91	-8.76	0.00	0.00	0.00	-22.32
		6	-45.81	8.81	0.00	0.00	0.00	8.58
6	3	6	44.37	-14.39	0.00	0.00	0.00	-8.58
		7	-44.26	14.42	0.00	0.00	0.00	-13.93
7	3	7	36.60	7.25	0.00	0.00	0.00	13.93
		8	-36.48	-7.23	0.00	0.00	0.00	-2.56
8	3	8	37.11	2.50	0.00	0.00	0.00	2.56
		9	-36.99	-2.49	0.00	0.00	0.00	1.34
9	3	9	37.02	2.06	0.00	0.00	0.00	1.34
		10	-36.91	-2.05	0.00	0.00	0.00	1.46
10	3	10	36.46	6.09	0.00	0.00	0.00	-1.46
		11	-36.36	-6.07	0.00	0.00	0.00	9.78
11	3	11	41.04	-9.67	0.00	0.00	0.00	-9.78
		12	-40.94	9.70	0.00	0.00	0.00	-3.41
12	3	12	41.82	-4.61	0.00	0.00	0.00	3.41
		13	-41.72	4.65	0.00	0.00	0.00	-9.74
13	3	13	41.98	-0.39	0.00	0.00	0.00	9.74
		14	-41.89	0.44	0.00	0.00	0.00	-10.30
14	3	14	41.66	4.34	0.00	0.00	0.00	10.30
		15	-41.58	-4.28	0.00	0.00	0.00	-4.38
15	3	15	40.77	9.19	0.00	0.00	0.00	4.38
		16	-40.70	-9.12	0.00	0.00	0.00	8.07
16	3	16	2.56	-1.68	0.00	0.00	0.00	-8.07
		17	-2.49	1.76	0.00	0.00	0.00	5.71
17	3	17	2.67	-1.48	0.00	0.00	0.00	-5.71
		18	-2.61	1.56	0.00	0.00	0.00	3.64
18	3	18	2.77	-1.25	0.00	0.00	0.00	-3.64
		19	-2.72	1.34	0.00	0.00	0.00	1.86

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
19	3	19	2.85	-1.03	0.00	0.00	0.00	-1.86
		20	-2.81	1.13	0.00	0.00	0.00	0.39
20	3	20	2.92	-0.82	0.00	0.00	0.00	-0.39
		21	-2.89	0.92	0.00	0.00	0.00	-0.79
21	3	21	2.98	-0.59	0.00	0.00	0.00	0.79
		22	-2.96	0.69	0.00	0.00	0.00	-1.66
22	3	22	3.09	0.90	0.00	0.00	0.00	1.66
		23	-3.08	-0.80	0.00	0.00	0.00	-0.49
23	3	23	2.97	1.15	0.00	0.00	0.00	0.49
		24	-2.98	-1.05	0.00	0.00	0.00	1.01
24	3	24	3.20	-0.70	0.00	0.00	0.00	-1.01
		25	-3.21	0.80	0.00	0.00	0.00	-0.01
25	3	25	3.28	-0.44	0.00	0.00	0.00	0.01
		26	-3.31	0.54	0.00	0.00	0.00	-0.67
26	3	26	3.35	-0.18	0.00	0.00	0.00	0.67
		27	-3.39	0.28	0.00	0.00	0.00	-0.99
27	3	27	3.40	0.12	0.00	0.00	0.00	0.99
		28	-3.45	-0.03	0.00	0.00	0.00	-0.88
28	3	28	3.43	0.42	0.00	0.00	0.00	0.88
		29	-3.49	-0.33	0.00	0.00	0.00	-0.37
29	3	29	3.43	0.71	0.00	0.00	0.00	0.37
		30	-3.50	-0.63	0.00	0.00	0.00	0.54
30	3	30	-0.76	0.15	0.00	0.00	0.00	-0.54
		31	0.68	-0.08	0.00	0.00	0.00	0.70
31	3	31	-0.69	-0.01	0.00	0.00	0.00	-0.70
		32	0.60	0.07	0.00	0.00	0.00	0.65
32	3	32	-0.59	-0.13	0.00	0.00	0.00	-0.65
		33	0.50	0.18	0.00	0.00	0.00	0.44
33	3	33	-0.47	-0.24	0.00	0.00	0.00	-0.44
		34	0.38	0.28	0.00	0.00	0.00	0.09
34	3	34	-0.35	-0.32	0.00	0.00	0.00	-0.09
		35	0.24	0.34	0.00	0.00	0.00	-0.36
35	3	35	-0.12	0.11	0.00	0.00	0.00	0.36
		36	0.02	-0.09	0.00	0.00	0.00	-0.23

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
36	3	36	-0.03	0.09	0.00	0.00	0.00	0.23
		37	-0.07	-0.08	0.00	0.00	0.00	-0.12
37	3	37	0.07	-0.09	0.00	0.00	0.00	-0.12
		38	-0.18	0.10	0.00	0.00	0.00	-0.03
38	3	38	0.17	-0.12	0.00	0.00	0.00	0.03
		39	-0.29	0.14	0.00	0.00	0.00	-0.23
39	3	39	0.40	0.22	0.00	0.00	0.00	0.23
		40	-0.51	-0.18	0.00	0.00	0.00	0.08
40	3	40	0.53	0.11	0.00	0.00	0.00	-0.08
		41	-0.64	-0.06	0.00	0.00	0.00	0.21
41	3	41	0.64	-0.02	0.00	0.00	0.00	-0.21
		42	-0.74	0.09	0.00	0.00	0.00	0.13
42	3	42	0.73	-0.18	0.00	0.00	0.00	-0.13
		43	-0.82	0.26	0.00	0.00	0.00	-0.22
43	3	43	1.47	0.27	0.00	0.00	0.00	0.22
		44	-1.55	-0.18	0.00	0.00	0.00	0.12
44	3	44	1.56	-0.03	0.00	0.00	0.00	-0.12
		45	-1.63	0.13	0.00	0.00	0.00	0.00

********** END OF LATEST ANALYSIS RESULT **********

48. CHECK CODE ALL

STAAD-III CODE CHECKING - (AISC)
****

ALL UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
3	ST W8X 31	PASS	AISC- H1-2	0.730	3
		46.79 C	0.00	26.81	0.87
4	ST W8X 31	PASS	AISC- H1-2	0.730	3
		46.75 C	0.00	-26.81	0.00
5	ST W8X 31	PASS	AISC- H1-2	0.643	3
		45.91 C	0.00	-22.32	0.00
6	ST W8X 31	PASS	AISC- H1-2	0.480	3
		44.26 C	0.00	-13.93	1.56
7	ST W8X 31	PASS	AISC- H1-2	0.441	3
		36.60 C	0.00	13.93	0.00
8	ST W8X 31	PASS	AISC- H1-2	0.235	3
		37.11 C	0.00	2.56	0.00
9	ST W8X 31	PASS	AISC- H1-2	0.214	3
		36.91 C	0.00	1.46	1.36
10	ST W8X 31	PASS	AISC- H1-2	0.364	3
		36.36 C	0.00	9.78	1.37
11	ST W8X 31	PASS	AISC- H1-2	0.388	3
		41.04 C	0.00	-9.78	0.00
12	ST W8X 31	PASS	AISC- H1-2	0.390	3
		41.72 C	0.00	-9.74	1.37
13	ST W8X 31	PASS	AISC- H1-2	0.401	3
		41.89 C	0.00	-10.30	1.36
14	ST W8X 31	PASS	AISC- H1-2	0.400	3
		41.66 C	0.00	10.30	0.00
15	ST W8X 31	PASS	AISC- H1-2	0.355	3
		40.70 C	0.00	8.07	1.36
16	ST W8X 31	PASS	AISC- H1-3	0.161	3
		2.56 C	0.00	-8.07	0.00
17	ST W8X 31	PASS	AISC- H1-3	0.119	3
		2.67 C	0.00	-5.71	0.00
18	ST W8X 31	PASS	AISC- H1-3	0.081	3
		2.77 C	0.00	-3.64	0.00
19	ST W8X 31	PASS	AISC- H1-3	0.049	3
		2.85 C	0.00	-1.86	0.00
20	ST W8X 31	PASS	AISC- H1-3	0.029	3
		2.89 C	0.00	-0.79	1.36
21	ST W8X 31	PASS	AISC- H1-3	0.046	3
		2.96 C	0.00	-1.66	1.36
22	ST W8X 31	PASS	AISC- H1-3	0.046	3
		3.09 C	0.00	1.66	0.00
23	ST W8X 31	PASS	SHEAR -Y	0.035	3
		2.97 C	0.00	0.49	0.00
24	ST W8X 31	PASS	AISC- H1-3	0.035	3
		3.20 C	0.00	-1.01	0.00
25	ST W8X 31	PASS	AISC- H1-3	0.029	3
		3.31 C	0.00	-0.67	1.36
26	ST W8X 31	PASS	AISC- H1-3	0.036	3
		3.39 C	0.00	-0.99	1.37

ALL UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
27	ST W8X 31	PASS	AISC- H1-3	0.036	3
		3.40 C	0.00	0.99	0.00
28	ST W8X 31	PASS	AISC- H1-3	0.034	3
		3.43 C	0.00	0.88	0.00
29	ST W8X 1	PASS	AISC- H1-3	0.028	3
		3.50 C	0.00	0.54	1.37
30	ST W8X 31	PASS	AISC- H2-1	0.016	3
		0.68 T	0.00	0.70	1.36
31	ST W8X 31	PASS	AISC- H2-1	0.016	3
		0.69 T	0.00	-0.70	0.00
32	ST W8X 31	PASS	AISC- H2-1	0.015	3
		0.59 T	0.00	-0.65	0.00
33	ST W8X 31	PASS	AISC- H2-1	0.010	3
		0.47 T	0.00	-0.44	0.00
34	ST W8X 31	PASS	SHEAR -Y	0.011	3
		0.24 T	0.00	-0.36	1.36
35	ST W8X 31	PASS	AISC- H2-1	0.007	3
		0.12 T	0.00	0.36	0.00
36	ST W8X 31	PASS	AISC- H2-1	0.004	3
		0.03 T	0.00	0.23	0.00
37	ST W8X 31	PASS	SHEAR -Y	0.003	3
		0.18 C	0.00	-0.03	1.56
38	ST W8X 31	PASS	AISC- H1-3	0.006	3
		0.29 C	0.00	-0.23	1.57
39	ST W8X 31	PASS	SHEAR -Y	0.007	3
		0.40 C	0.00	0.23	0.00
40	ST W8X 31	PASS	AISC- H1-3	0.007	3
		0.64 C	0.00	0.21	1.57
41	ST W8X 31	PASS	AISC- H1-3	0.007	3
		0.64 C	0.00	-0.21	0.00
42	ST W8X 31	PASS	AISC- H1-3	0.008	3
		0.82 C	0.00	-0.22	1.57
43	ST W8X 31	PASS	AISC- H1-3	0.012	3
		1.47 C	0.00	0.22	0.00
44	ST W8X 31	PASS	AISC- H1-3	0.010	3
		1.56 C	0.00	-0.12	0.00

********** END OF TABULATED RESULT OF DESIGN **********

49. PLOT DISPLACEMENT FILE
50. PLOT BENDING FILE
51. FINISH

********** END OF STAAD-III **********

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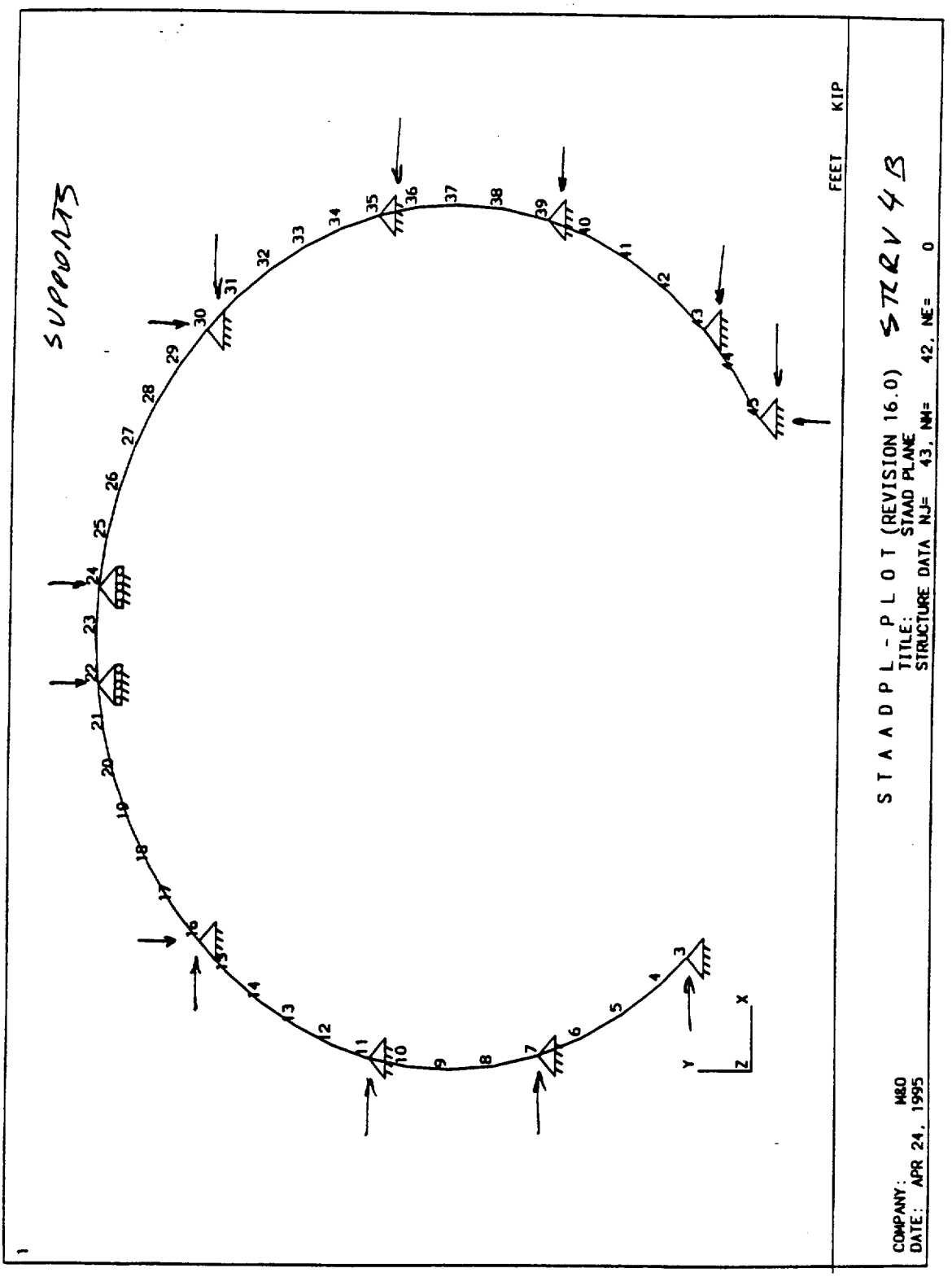
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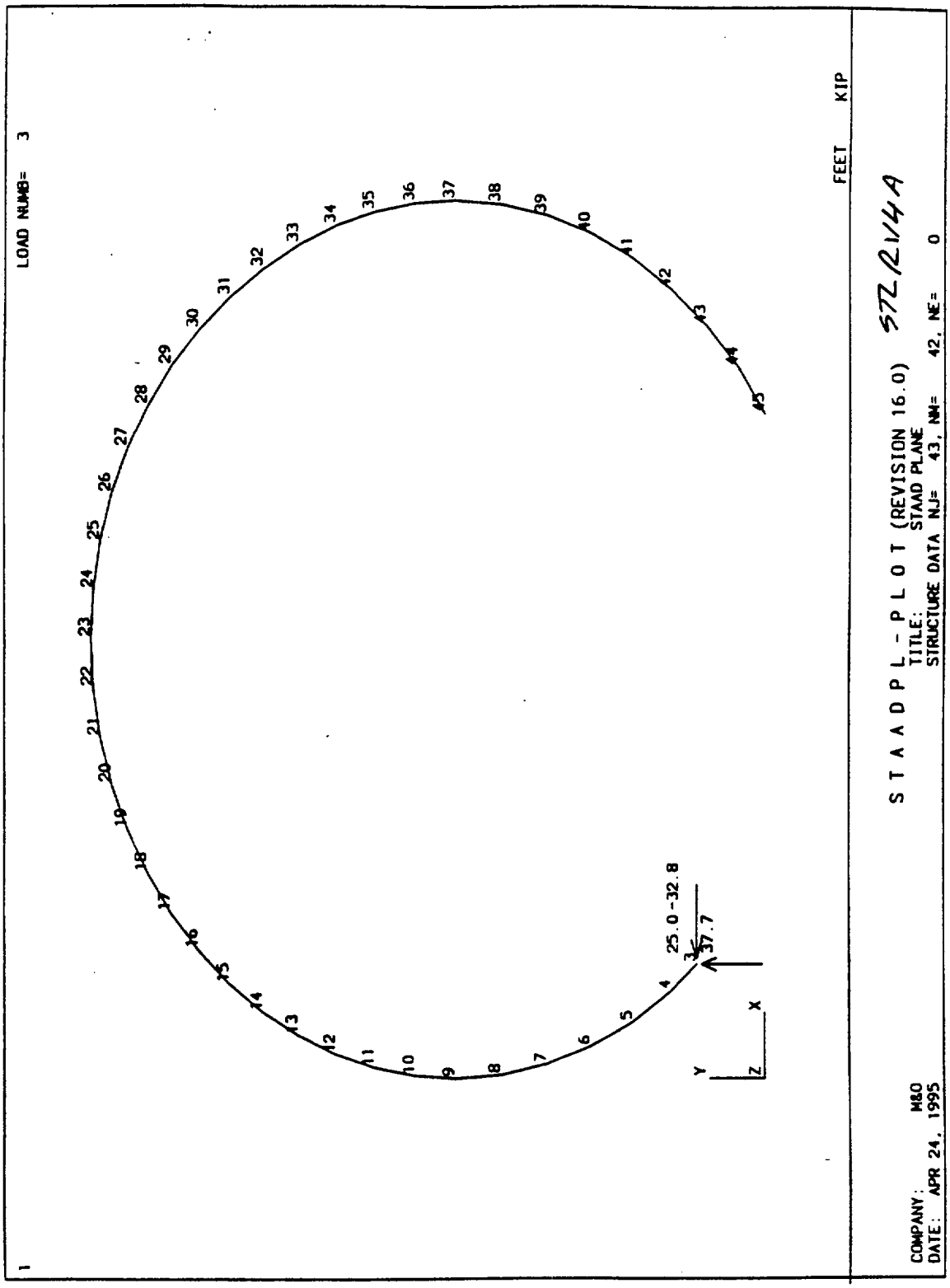
FEET KIP
COMPANY: M&O
DATE: APR 24, 1995
STRV 43
X
Y
Z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COMPANY:
DATE: APR 24, 1995
M&O
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37.7
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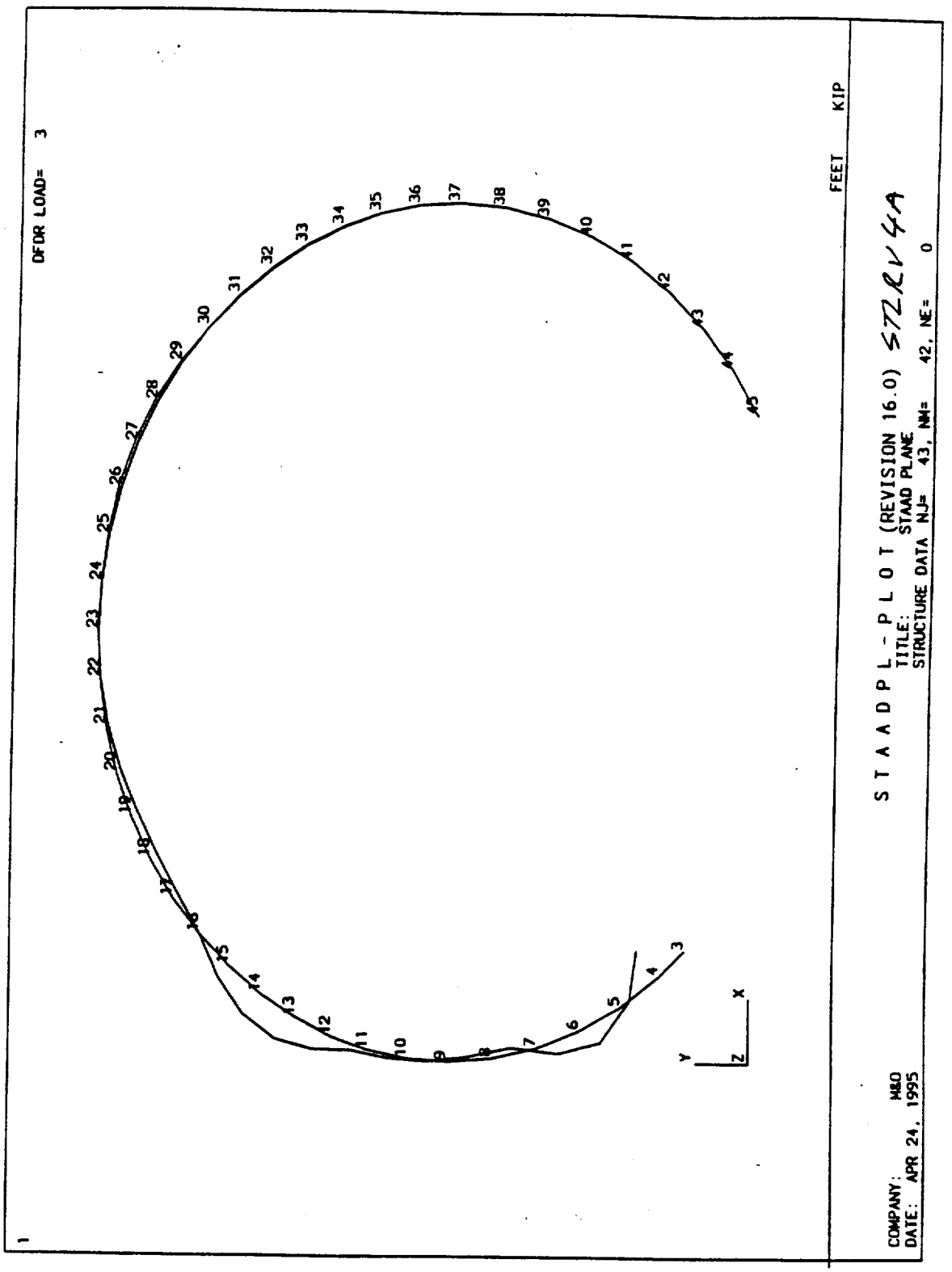
Z
1

STZ 12/94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COMPANY: M&O
DATE: APR 24, 1995
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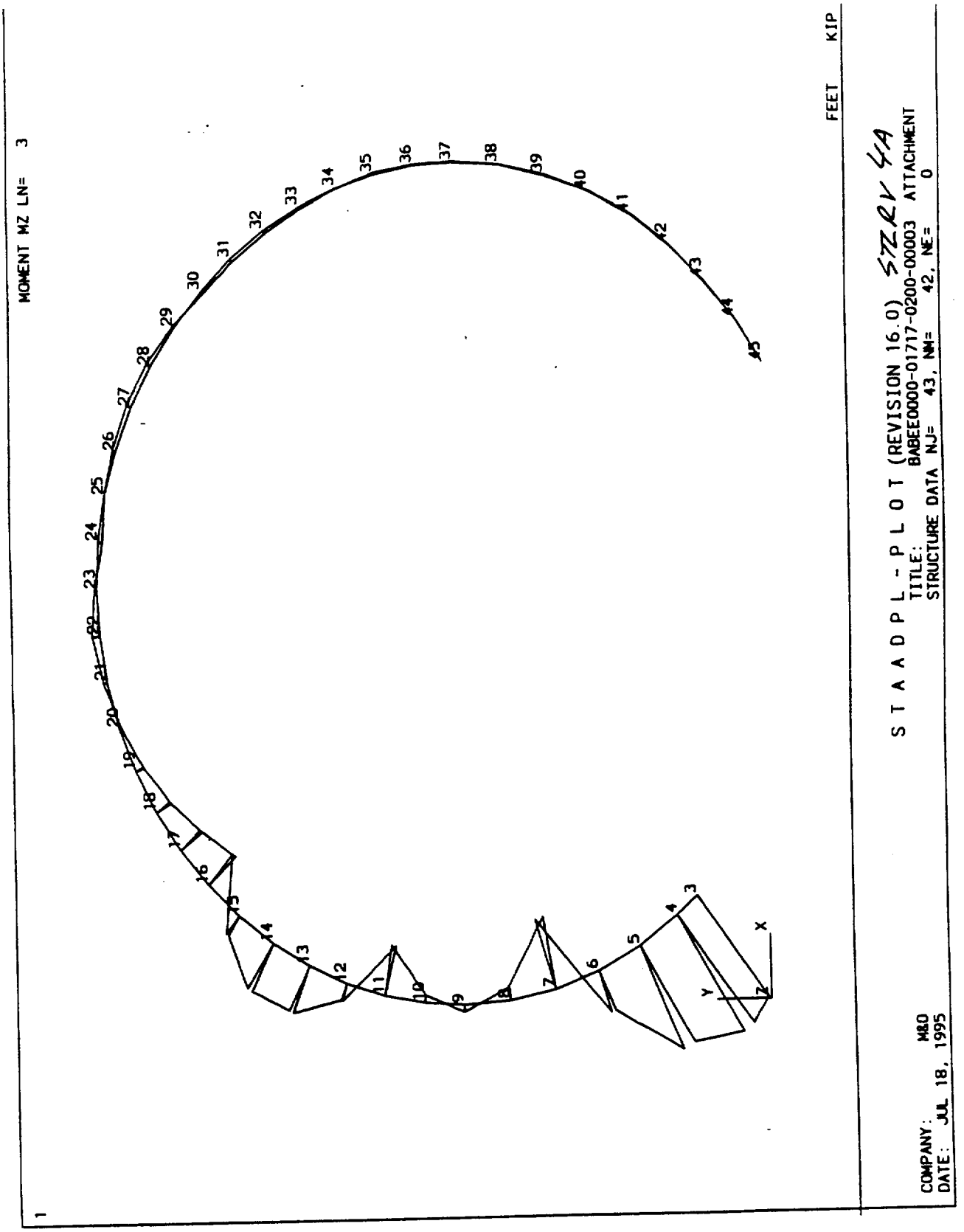
Y
Z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TITLE: BABEE0000-01717-0200-00003 ATTACHMENT
NJ= 43, NM= 42, NE= 0
COMPANY: M&O
DATE: JUL 18, 1995
1

```
**************************************************
*                                                *
*           S T A A D - III                      *
*           Revision 16.0b                       *
*           Proprietary Program of               *
*           RESEARCH ENGINEERS, Inc.             *
*           Date=    JUL 18, 1995                *
*           Time=     8:26:52                    *
*                                                *
**************************************************

 1. STAAD PLANE  BABEE0000-01717-0200-00003  ATTACHMENT  I
 2. * ESF GROUND SUPPORT-STRUCTURAL STEEL ANALYSIS REV 00
 3. *
 4. * FILE STLRV4B
 5. * 25 TON JACK APPLIED ONE SIDE @ 51 DEGREES
 6. UNIT FT KIP
 7. JOINT COORDINATES
 8. 3 2.71 2.77 ; 4 2.43 3.13
 9. 5 1.58 4.44 ; 6 0.90 5.85 ; 7 0.40 7.33 ; 8 0.10 8.87
10. 9 0.0 10.43 ; 10 0.08 11.79 ; 11 0.31 13.14 ; 12 0.68 14.45
11. 13 1.21 15.71 ; 14 1.86 16.90 ; 15 2.65 18.02 ; 16 3.56 19.03
12. 17 4.58 19.94 ; 18 5.69 20.73 ; 19 6.89 21.39 ; 20 8.15 21.91
13. 21 9.46 22.29 ; 22 10.80 22.52 ; 23 12.17 22.60 ; 24 13.53 22.52
14. 25 14.87 22.29 ; 26 16.18 21.91 ; 27 17.45 21.39 ; 28 18.64 20.73
15. 29 19.75 19.94 ; 30 20.77 19.03 ; 31 21.68 18.02 ; 32 22.47 16.90
16. 33 23.13 15.71 ; 34 23.65 14.45 ; 35 24.03 13.14 ; 36 24.26 11.79
17. 37 24.33 10.43 ; 38 24.23 8.87 ; 39 23.93 7.33 ; 40 23.44 5.85
18. 41 22.76 4.44 ; 42 21.90 3.13 ; 43 20.88 1.94 ; 44 19.72 0.89
19. 45 18.43 0.00
20. MEMBER INCIDENCE
21. 3 3 4 44
22. UNIT KIP INCH
23. MEMBER PROPERTIES
24. 3 TO 44 TA STA W8X31
25. CONSTANTS
26. E 29000.0 ALL
27. DENSITY 0.00028 ALL
28. BETA 0 ALL
29. UNIT FT
30. SUPPORT
31. 3 7 11 35 39 43 FIXED BUT FY MZ
32. 22 24 FIXED BUT FX MZ
33. 16 30 45 PINNED
34. UNIT KIP
35. LOAD 1
36. SELF WEIGHT Y -1.0
37. LOADING 2
38. * 25 TON JACK & ONE SIDED JACKING
39. JOINT LOADING
40. 3 FX -31.47
41. 3 FY 38.86
42. 3 MZ 25.00
43. LOADING COMBINATION 3
44. 1 2.5 2 1.0
```

P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 43/ 42/ 11
ORIGINAL/FINAL BAND-WIDTH = 1/ 1
TOTAL PRIMARY LOAD CASES = 2, TOTAL DEGREES OF FREEDOM = 115
SIZE OF STIFFNESS MATRIX = 690 DOUBLE PREC. WORDS
TOTAL REQUIRED DISK SPACE = 0.08 MEGA-BYTES

++ PROCESSING ELEMENT STIFFNESS MATRIX. 8:26:55
++ PROCESSING GLOBAL STIFFNESS MATRIX. 8:26:55
++ PROCESSING TRIANGULAR FACTORIZATION. 8:26:56
++ CALCULATING JOINT DISPLACEMENTS. 8:26:56
++ CALCULATING MEMBER FORCES. 8:26:56

46. LOAD LIST 3
47. PRINT ANALYSIS RESULTS

JOINT DISPLACEMENT (INCH RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
3	3	0.00000	0.05839	0.00000	0.00000	0.00000	0.00273
4	3	-0.01030	0.04913	0.00000	0.00000	0.00000	0.00221
5	3	-0.02838	0.03337	0.00000	0.00000	0.00000	0.00051
6	3	-0.02056	0.03345	0.00000	0.00000	0.00000	-0.00061
7	3	0.00000	0.03700	0.00000	0.00000	0.00000	-0.00048
8	3	-0.00043	0.03418	0.00000	0.00000	0.00000	0.00002
9	3	-0.00218	0.03135	0.00000	0.00000	0.00000	0.00001
10	3	-0.00080	0.02892	0.00000	0.00000	0.00000	-0.00001
11	3	0.00000	0.02642	0.00000	0.00000	0.00000	0.00036
12	3	-0.01392	0.02764	0.00000	0.00000	0.00000	0.00058
13	3	-0.02333	0.02870	0.00000	0.00000	0.00000	0.00017
14	3	-0.02285	0.02541	0.00000	0.00000	0.00000	-0.00045
15	3	-0.01295	0.01516	0.00000	0.00000	0.00000	-0.00092
16	3	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00080
17	3	0.00557	-0.00649	0.00000	0.00000	0.00000	-0.00037
18	3	0.00700	-0.00877	0.00000	0.00000	0.00000	-0.00007
19	3	0.00635	-0.00796	0.00000	0.00000	0.00000	0.00010
20	3	0.00509	-0.00536	0.00000	0.00000	0.00000	0.00017
21	3	0.00401	-0.00230	0.00000	0.00000	0.00000	0.00016
22	3	0.00342	0.00000	0.00000	0.00000	0.00000	0.00008
23	3	0.00321	0.00027	0.00000	0.00000	0.00000	0.00002
24	3	0.00301	0.00000	0.00000	0.00000	0.00000	0.00003
25	3	0.00303	0.00129	0.00000	0.00000	0.00000	0.00007
26	3	0.00316	0.00252	0.00000	0.00000	0.00000	0.00005
27	3	0.00314	0.00303	0.00000	0.00000	0.00000	-0.00001
28	3	0.00265	0.00258	0.00000	0.00000	0.00000	-0.00006
29	3	0.00154	0.00140	0.00000	0.00000	0.00000	-0.00010
30	3	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00010
31	3	-0.00096	-0.00092	0.00000	0.00000	0.00000	-0.00006
32	3	-0.00140	-0.00128	0.00000	0.00000	0.00000	-0.00001
33	3	-0.00127	-0.00125	0.00000	0.00000	0.00000	0.00002
34	3	-0.00070	-0.00104	0.00000	0.00000	0.00000	0.00004
35	3	0.00000	-0.00086	0.00000	0.00000	0.00000	0.00003
36	3	0.00023	-0.00082	0.00000	0.00000	0.00000	0.00001
37	3	0.00024	-0.00082	0.00000	0.00000	0.00000	0.00000
38	3	0.00011	-0.00080	0.00000	0.00000	0.00000	-0.00001
39	3	0.00000	-0.00076	0.00000	0.00000	0.00000	0.00000
40	3	0.00027	-0.00082	0.00000	0.00000	0.00000	0.00001
41	3	0.00041	-0.00084	0.00000	0.00000	0.00000	0.00000
42	3	0.00027	-0.00069	0.00000	0.00000	0.00000	-0.00001
43	3	0.00000	-0.00038	0.00000	0.00000	0.00000	-0.00001
44	3	0.00006	-0.00029	0.00000	0.00000	0.00000	-0.00001
45	3	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00001

SUPPORT REACTIONS -UNIT KIP FEET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
3	3	3.60	0.00	0.00	0.00	0.00	0.00
7	3	27.66	0.00	0.00	0.00	0.00	0.00
11	3	21.39	0.00	0.00	0.00	0.00	0.00
35	3	0.49	0.00	0.00	0.00	0.00	0.00
39	3	-0.42	0.00	0.00	0.00	0.00	0.00
43	3	-0.94	0.00	0.00	0.00	0.00	0.00
22	3	0.00	1.28	0.00	0.00	0.00	0.00
24	3	0.00	-2.15	0.00	0.00	0.00	0.00
16	3	-18.09	-37.04	0.00	0.00	0.00	0.00
30	3	-3.49	2.54	0.00	0.00	0.00	0.00
45	3	1.28	1.04	0.00	0.00	0.00	0.00

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
3	3	3	47.79	1.86	0.00	0.00	0.00	-25.00
		4	-47.76	-1.83	0.00	0.00	0.00	25.84
4	3	4	47.74	-2.25	0.00	0.00	0.00	-25.84
		5	-47.64	2.31	0.00	0.00	0.00	22.28
5	3	5	46.97	-8.29	0.00	0.00	0.00	-22.28
		6	-46.86	8.34	0.00	0.00	0.00	9.26
6	3	6	45.48	-14.06	0.00	0.00	0.00	-9.26
		7	-45.36	14.10	0.00	0.00	0.00	-12.73
7	3	7	37.80	7.15	0.00	0.00	0.00	12.73
		8	-37.68	-7.12	0.00	0.00	0.00	-1.54
8	3	8	38.28	2.24	0.00	0.00	0.00	1.54
		9	-38.16	-2.23	0.00	0.00	0.00	1.95
9	3	9	38.15	2.46	0.00	0.00	0.00	1.95
		10	-38.04	-2.45	0.00	0.00	0.00	1.39
10	3	10	37.54	6.61	0.00	0.00	0.00	-1.39
		11	-37.44	-6.60	0.00	0.00	0.00	10.44
11	3	11	42.34	-10.05	0.00	0.00	0.00	-10.44
		12	-42.24	10.08	0.00	0.00	0.00	-3.26
12	3	12	43.16	-4.82	0.00	0.00	0.00	3.26
		13	-43.06	4.86	0.00	0.00	0.00	-9.88
13	3	13	43.33	-0.46	0.00	0.00	0.00	9.88
		14	-43.24	0.51	0.00	0.00	0.00	-10.55
14	3	14	43.02	4.42	0.00	0.00	0.00	10.55
		15	-42.93	-4.36	0.00	0.00	0.00	-4.52
15	3	15	42.11	9.43	0.00	0.00	0.00	4.52
		16	-42.03	-9.36	0.00	0.00	0.00	8.25
16	3	16	2.61	-1.72	0.00	0.00	0.00	-8.25
		17	-2.54	1.80	0.00	0.00	0.00	5.84
17	3	17	2.72	-1.51	0.00	0.00	0.00	-5.84
		18	-2.66	1.60	0.00	0.00	0.00	3.72
18	3	18	2.83	-1.28	0.00	0.00	0.00	-3.72
		19	-2.77	1.37	0.00	0.00	0.00	1.90

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
19	3	19	2.91	-1.06	0.00	0.00	0.00	-1.90
		20	-2.87	1.15	0.00	0.00	0.00	0.40
20	3	20	2.98	-0.83	0.00	0.00	0.00	-0.40
		21	-2.95	0.93	0.00	0.00	0.00	-0.81
21	3	21	3.04	-0.60	0.00	0.00	0.00	0.81
		22	-3.02	0.70	0.00	0.00	0.00	-1.69
22	3	22	3.15	0.92	0.00	0.00	0.00	1.69
		23	-3.15	-0.82	0.00	0.00	0.00	-0.50
23	3	23	3.03	1.18	0.00	0.00	0.00	0.50
		24	-3.04	-1.08	0.00	0.00	0.00	1.04
24	3	24	3.26	-0.72	0.00	0.00	0.00	-1.04
		25	-3.28	0.82	0.00	0.00	0.00	-0.01
25	3	25	3.35	-0.45	0.00	0.00	0.00	0.01
		26	-3.38	0.55	0.00	0.00	0.00	-0.69
26	3	26	3.42	-0.19	0.00	0.00	0.00	0.69
		27	-3.46	0.28	0.00	0.00	0.00	-1.01
27	3	27	3.47	0.12	0.00	0.00	0.00	1.01
		28	-3.52	-0.03	0.00	0.00	0.00	-0.90
28	3	28	3.49	0.43	0.00	0.00	0.00	0.90
		29	-3.55	-0.34	0.00	0.00	0.00	-0.38
29	3	29	3.49	0.73	0.00	0.00	0.00	0.38
		30	-3.56	-0.65	0.00	0.00	0.00	0.56
30	3	30	-0.76	0.14	0.00	0.00	0.00	-0.56
		31	0.68	-0.07	0.00	0.00	0.00	0.71
31	3	31	-0.68	-0.01	0.00	0.00	0.00	-0.71
		32	0.60	0.07	0.00	0.00	0.00	0.66
32	3	32	-0.59	-0.13	0.00	0.00	0.00	-0.66
		33	0.49	0.18	0.00	0.00	0.00	0.44
33	3	33	-0.47	-0.24	0.00	0.00	0.00	-0.44
		34	0.37	0.28	0.00	0.00	0.00	0.09
34	3	34	-0.34	-0.32	0.00	0.00	0.00	-0.09
		35	0.24	0.35	0.00	0.00	0.00	-0.37
35	3	35	-0.12	0.11	0.00	0.00	0.00	0.37
		36	0.01	-0.09	0.00	0.00	0.00	-0.23

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
36	3	36	-0.02	0.09	0.00	0.00	0.00	0.23
		37	-0.08	-0.08	0.00	0.00	0.00	-0.12
37	3	37	0.07	-0.09	0.00	0.00	0.00	-0.12
		38	-0.19	0.10	0.00	0.00	0.00	-0.03
38	3	38	0.18	-0.12	0.00	0.00	0.00	0.03
		39	-0.29	0.14	0.00	0.00	0.00	-0.24
39	3	39	0.41	0.22	0.00	0.00	0.00	0.24
		40	-0.52	-0.18	0.00	0.00	0.00	0.08
40	3	40	0.54	0.11	0.00	0.00	0.00	-0.08
		41	-0.65	-0.06	0.00	0.00	0.00	0.21
41	3	41	0.65	-0.02	0.00	0.00	0.00	-0.21
		42	-0.75	0.09	0.00	0.00	0.00	0.13
42	3	42	0.73	-0.18	0.00	0.00	0.00	-0.13
		43	-0.82	0.26	0.00	0.00	0.00	-0.22
43	3	43	1.48	0.27	0.00	0.00	0.00	0.22
		44	-1.56	-0.18	0.00	0.00	0.00	0.12
44	3	44	1.57	-0.03	0.00	0.00	0.00	-0.12
		45	-1.64	0.13	0.00	0.00	0.00	0.00

********** END OF LATEST ANALYSIS RESULT **********

48. CHECK CODE ALL

STAAD-III CODE CHECKING - (AISC)
****

ALL UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
3	ST W8X 31	PASS	AISC- H1-2	0.717	3
		47.76 C	0.00	25.84	0.46
4	ST W8X 31	PASS	AISC- H1-2	0.717	3
		47.74 C	0.00	-25.84	0.00
5	ST W8X 31	PASS	AISC- H1-2	0.647	3
		46.97 C	0.00	-22.28	0.00
6	ST W8X 31	PASS	AISC- H1-2	0.464	3
		45.36 C	0.00	-12.73	1.56
7	ST W8X 31	PASS	AISC- H1-2	0.426	3
		37.80 C	0.00	12.73	0.00
8	ST W8X 31	PASS	AISC- H1-2	0.229	3
		38.16 C	0.00	1.95	1.56
9	ST W8X 31	PASS	AISC- H1-2	0.229	3
		38.15 C	0.00	1.95	0.00
10	ST W8X 31	PASS	AISC- H1-2	0.382	3
		37.44 C	0.00	10.44	1.37
11	ST W8X 31	PASS	AISC- H1-2	0.406	3
		42.34 C	0.00	-10.44	0.00
12	ST W8X 31	PASS	AISC- H1-2	0.400	3
		43.06 C	0.00	-9.88	1.37
13	ST W8X 31	PASS	AISC- H1-2	0.413	3
		43.24 C	0.00	-10.55	1.36
14	ST W8X 31	PASS	AISC- H1-2	0.412	3
		43.02 C	0.00	10.55	0.00
15	ST W8X 31	PASS	AISC- H1-2	0.365	3
		42.03 C	0.00	8.25	1.36
16	ST W8X 31	PASS	AISC- H1-3	0.165	3
		2.61 C	0.00	-8.25	0.00
17	ST W8X 31	PASS	AISC- H1-3	0.121	3
		2.72 C	0.00	-5.84	0.00
18	ST W8X 31	PASS	AISC- H1-3	0.083	3
		2.83 C	0.00	-3.72	0.00
19	ST W8X 31	PASS	AISC- H1-3	0.050	3
		2.91 C	0.00	-1.90	0.00
20	ST W8X 31	PASS	AISC- H1-3	0.030	3
		2.95 C	0.00	-0.81	1.36
21	ST W8X 31	PASS	AISC- H1-3	0.047	3
		3.02 C	0.00	-1.69	1.36
22	ST W8X 31	PASS	AISC- H1-3	0.047	3
		3.15 C	0.00	1.69	0.00
23	ST W8X 31	PASS	SHEAR -Y	0.036	3
		3.03 C	0.00	0.50	0.00
24	ST W8X 31	PASS	AISC- H1-3	0.036	3
		3.26 C	0.00	-1.04	0.00
25	ST W8X 31	PASS	AISC- H1-3	0.030	3
		3.38 C	0.00	-0.69	1.36
26	ST W8X 31	PASS	AISC- H1-3	0.036	3
		3.46 C	0.00	-1.01	1.37

L UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
27	ST W8X 31	PASS	AISC- H1-3	0.036	3
		3.47 C	0.00	1.01	0.00
28	ST W8X 31	PASS	AISC- H1-3	0.035	3
		3.49 C	0.00	0.90	0.00
29	ST W8X 1	PASS	AISC- H1-3	0.029	3
		3.56 C	0.00	0.56	1.37
30	ST W8X 31	PASS	AISC- H2-1	0.016	3
		0.68 T	0.00	0.71	1.36
31	ST W8X 31	PASS	AISC- H2-1	0.017	3
		0.68 T	0.00	-0.71	0.00
32	ST W8X 31	PASS	AISC- H2-1	0.015	3
		0.59 T	0.00	-0.66	0.00
33	ST W8X 31	PASS	AISC- H2-1	0.010	3
		0.47 T	0.00	-0.44	0.00
34	ST W8X 31	PASS	SHEAR -Y	0.011	3
		0.24 T	0.00	-0.37	1.36
35	ST W8X 31	PASS	AISC- H2-1	0.007	3
		0.12 T	0.00	0.37	0.00
36	ST W8X 31	PASS	AISC- H2-1	0.004	3
		0.02 T	0.00	0.23	0.00
37	ST W8X 31	PASS	SHEAR -Y	0.003	3
		0.19 C	0.00	-0.03	1.56
38	ST W8X 31	PASS	AISC- H1-3	0.006	3
		0.29 C	0.00	-0.24	1.57
39	ST W8X 31	PASS	SHEAR -Y	0.007	3
		0.41 C	0.00	0.24	0.00
40	ST W8X 31	PASS	AISC- H1-3	0.007	3
		0.65 C	0.00	0.21	1.57
41	ST W8X 31	PASS	AISC- H1-3	0.007	3
		0.65 C	0.00	-0.21	0.00
42	ST W8X 31	PASS	AISC- H1-3	0.008	3
		0.82 C	0.00	-0.22	1.57
43	ST W8X 31	PASS	AISC- H1-3	0.012	3
		1.48 C	0.00	0.22	0.00
44	ST W8X 31	PASS	AISC- H1-3	0.010	3
		1.57 C	0.00	-0.12	0.00

********** END OF TABULATED RESULT OF DESIGN **********

49. PLOT DISPLACEMENT FILE
50. PLOT BENDING FILE
51. FINISH

********** END OF STAAD-III **********

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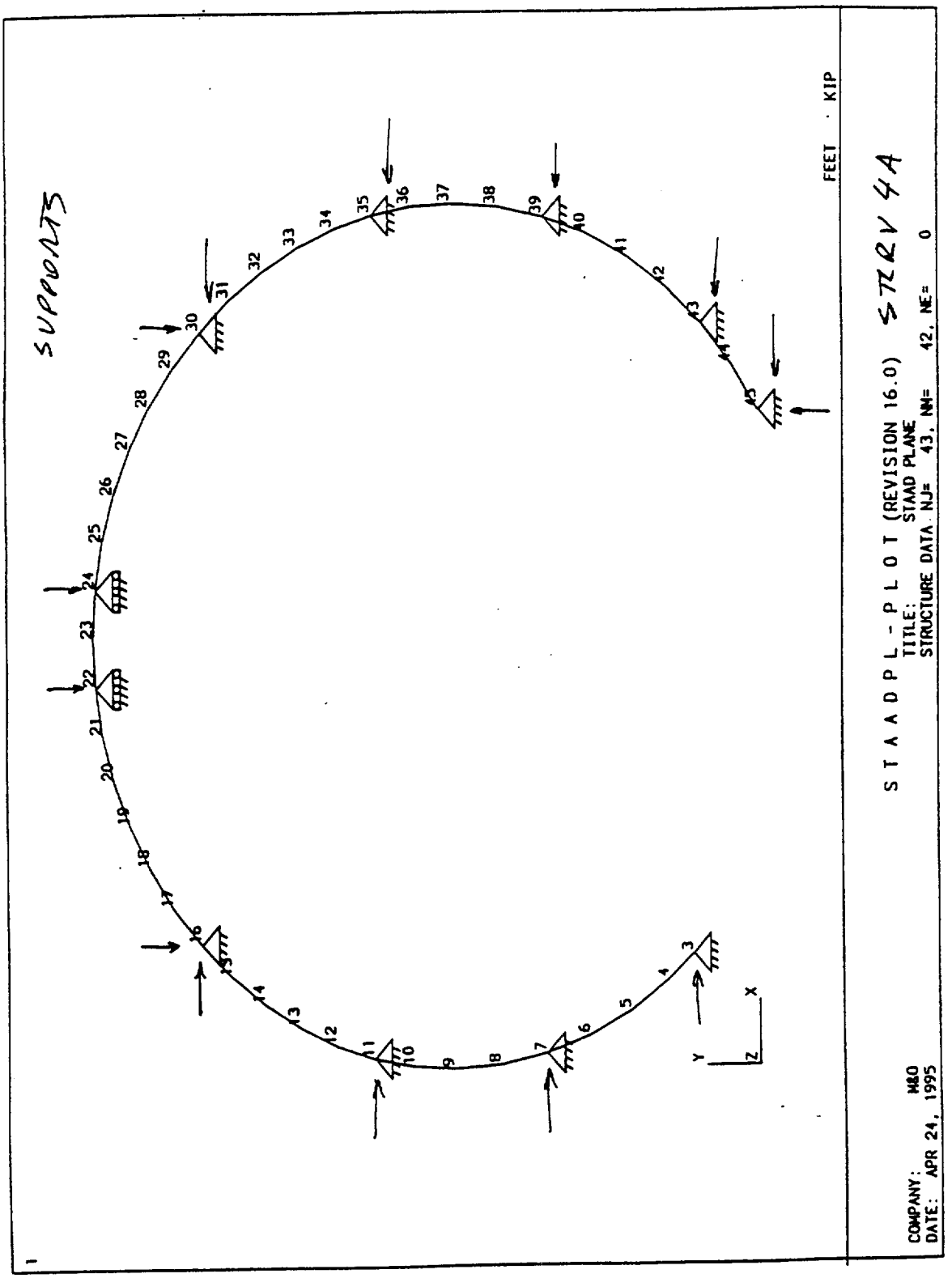
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STRUCTURE DATA NJ= 43, NM= 42, NE= 0
COMPANY: M&O
DATE: APR 24, 1995
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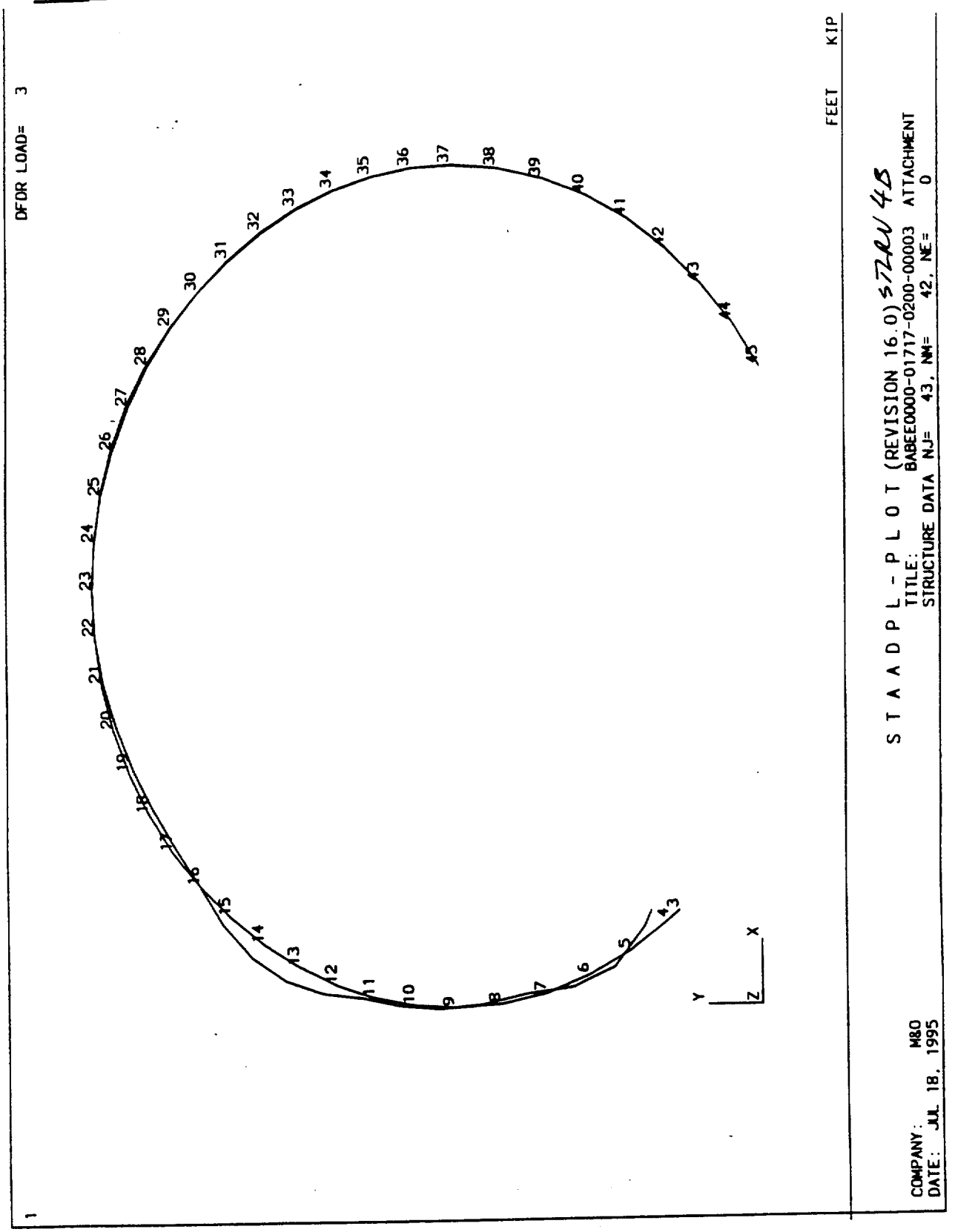
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COMPANY: M&O
DATE: JUL 18, 1995
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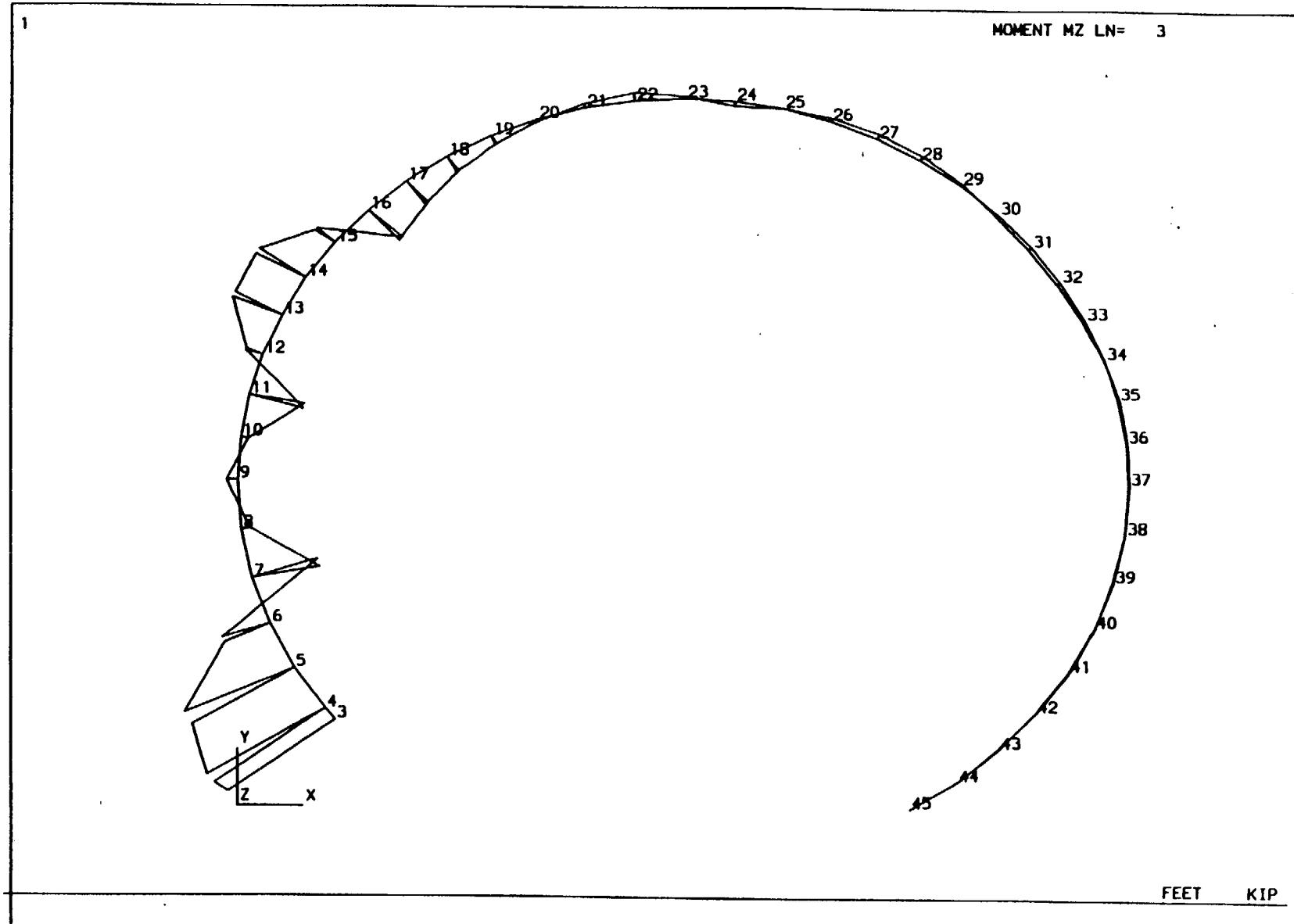
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FEET KIP
S T A A D P L - P L O T (REVISION 16.0) STRV 4B
TITLE: BABEE0000-01717-0200-00003 ATTACHMENT
STRUCTURE DATA NJ= 43, NM= 42, NE= 0
COMPANY: M&O
DATE: JUL 18, 1995

```
**************************************************
*                                                *
*           S T A A D - III                      *
*           Revision 16.0b                       *
*           Proprietary Program of               *
*           RESEARCH ENGINEERS, Inc.             *
*           Date=    JUL 18, 1995                *
*           Time=    11:28:30                    *
*                                                *
**************************************************

 1. STAAD PLANE  BABEE0000-01717-0200-00003  ATTACHMENT  I
 2. * ESF GROUND SUPPORT-STRUCTURAL STEEL ANALYSIS REV 00
 3. *
 4. * FILE STLRV4C
 5. * 25 TON JACK APPLIED ONE SIDE @ 47 DEGREES
 6. * MOMENT MZ RELEASED AT THE END OF MEMBERS 15 & 29
 7. * MOMENT MZ RELEASED AT THE START OF MEMBERS 16 & 30
 8. UNIT FT KIP
 9. JOINT COORDINATES
10. 3 3.27 2.13 ; 4 2.43 3.13
11. 5 1.58 4.44 ; 6 0.90 5.85 ; 7 0.40 7.33 ; 8 0.10 8.87
12. 9 0.0 10.43 ; 10 0.08 11.79 ; 11 0.31 13.14 ; 12 0.68 14.45
13. 13 1.21 15.71 ; 14 1.86 16.90 ; 15 2.65 18.02 ; 16 3.56 19.03
14. 17 4.58 19.94 ; 18 5.69 20.73 ; 19 6.89 21.39 ; 20 8.15 21.91
15. 21 9.46 22.29 ; 22 10.80 22.52 ; 23 12.17 22.60 ; 24 13.53 22.52
16. 25 14.87 22.29 ; 26 16.18 21.91 ; 27 17.45 21.39 ; 28 18.64 20.73
17. 29 19.75 19.94 ; 30 20.77 19.03 ; 31 21.68 18.02 ; 32 22.47 16.90
18. 33 23.13 15.71 ; 34 23.65 14.45 ; 35 24.03 13.14 ; 36 24.26 11.79
19. 37 24.33 10.43 ; 38 24.23 8.87 ; 39 23.93 7.33 ; 40 23.44 5.85
20. 41 22.76 4.44 ; 42 21.90 3.13 ; 43 20.88 1.94 ; 44 19.72 0.89
21. 45 18.43 0.00
22. MEMBER INCIDENCE
23. 3 3 4 44
24. UNIT KIP INCH
25. MEMBER RELEASE
26. 15 29 END MZ
27. 16 30 START MZ
28. MEMBER PROPERTIES
29. 3 TO 44 TA STA W8X31
30. CONSTANTS
31. E 29000.0 ALL
32. DENSITY 0.00028 ALL
33. BETA 0 ALL
34. UNIT FT
35. SUPPORT
36. 3 7 11 35 39 43 FIXED BUT FY MZ
37. 22 24 FIXED BUT FX MZ
38. 16 30 45 PINNED
39. UNIT KIP
40. LOAD 1
41. SELF WEIGHT Y -1.0
42. LOADING 2                                  45. 3 FX -34.1
43. * 25 TON JACK & ONE SIDED JACKING          46. 3 FY 36.57
44. JOINT LOADING                              47. 3 MZ 25.00
```

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48. LOADING COMBINATION 3
49. 1 2.5 2 1.0
50. PERFORM ANALYSIS

        P R O B L E M   S T A T I S T I C S
        -----------------------------------

 NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS =    43/   42/   11
 ORIGINAL/FINAL BAND-WIDTH =     1/    1
 TOTAL PRIMARY LOAD CASES  =     2, TOTAL DEGREES OF FREEDOM =   115
 SIZE OF STIFFNESS MATRIX =      690 DOUBLE PREC. WORDS
 TOTAL REQUIRED DISK SPACE =     0.08 MEGA-BYTES


++ PROCESSING ELEMENT STIFFNESS MATRIX.                 11:28:33
++ PROCESSING GLOBAL STIFFNESS MATRIX.                  11:28:34
++ PROCESSING TRIANGULAR FACTORIZATION.                 11:28:34
++ CALCULATING JOINT DISPLACEMENTS.                     11:28:35
++ CALCULATING MEMBER  FORCES.                          11:28:35

51. LOAD LIST 3
52. PRINT ANALYSIS RESULTS
```

JOINT DISPLACEMENT (INCH RADIANS) STRUCTURE TYPE = PLANE

JOINT	LOAD	X-TRANS	Y-TRANS	Z-TRANS	X-ROTAN	Y-ROTAN	Z-ROTAN
3	3	0.00000	0.06910	0.00000	0.00000	0.00000	0.00342
4	3	-0.03097	0.03955	0.00000	0.00000	0.00000	0.00186
5	3	-0.04236	0.02831	0.00000	0.00000	0.00000	0.00008
6	3	-0.02702	0.03218	0.00000	0.00000	0.00000	-0.00100
7	3	0.00000	0.03808	0.00000	0.00000	0.00000	-0.00077
8	3	0.00352	0.03621	0.00000	0.00000	0.00000	-0.00011
9	3	0.00263	0.03360	0.00000	0.00000	0.00000	0.00003
10	3	0.00239	0.03141	0.00000	0.00000	0.00000	0.00013
11	3	0.00000	0.02960	0.00000	0.00000	0.00000	0.00056
12	3	-0.01765	0.03201	0.00000	0.00000	0.00000	0.00079
13	3	-0.03021	0.03454	0.00000	0.00000	0.00000	0.00030
14	3	-0.03095	0.03205	0.00000	0.00000	0.00000	-0.00050
15	3	-0.01909	0.02056	0.00000	0.00000	0.00000	-0.00127
16	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
17	3	0.00016	-0.00024	0.00000	0.00000	0.00000	-0.00001
18	3	0.00024	-0.00042	0.00000	0.00000	0.00000	-0.00001
19	3	0.00025	-0.00050	0.00000	0.00000	0.00000	0.00000
20	3	0.00019	-0.00043	0.00000	0.00000	0.00000	0.00001
21	3	0.00010	-0.00023	0.00000	0.00000	0.00000	0.00001
22	3	0.00003	0.00000	0.00000	0.00000	0.00000	0.00001
23	3	0.00000	0.00005	0.00000	0.00000	0.00000	0.00000
24	3	-0.00003	0.00000	0.00000	0.00000	0.00000	-0.00001
25	3	-0.00010	-0.00023	0.00000	0.00000	0.00000	-0.00001
26	3	-0.00019	-0.00043	0.00000	0.00000	0.00000	-0.00001
27	3	-0.00025	-0.00050	0.00000	0.00000	0.00000	0.00000
28	3	-0.00024	-0.00042	0.00000	0.00000	0.00000	0.00001
29	3	-0.00016	-0.00024	0.00000	0.00000	0.00000	0.00001
30	3	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
31	3	-0.00055	-0.00056	0.00000	0.00000	0.00000	-0.00003
32	3	-0.00087	-0.00085	0.00000	0.00000	0.00000	-0.00001
33	3	-0.00084	-0.00087	0.00000	0.00000	0.00000	0.00001
34	3	-0.00048	-0.00076	0.00000	0.00000	0.00000	0.00002
35	3	0.00000	-0.00065	0.00000	0.00000	0.00000	0.00002
36	3	0.00012	-0.00064	0.00000	0.00000	0.00000	0.00000
37	3	0.00010	-0.00065	0.00000	0.00000	0.00000	0.00000
38	3	0.00002	-0.00065	0.00000	0.00000	0.00000	0.00000
39	3	0.00000	-0.00063	0.00000	0.00000	0.00000	0.00001
40	3	0.00025	-0.00069	0.00000	0.00000	0.00000	0.00001
41	3	0.00037	-0.00072	0.00000	0.00000	0.00000	0.00000
42	3	0.00024	-0.00059	0.00000	0.00000	0.00000	-0.00001
43	3	0.00000	-0.00033	0.00000	0.00000	0.00000	-0.00001
44	3	0.00006	-0.00025	0.00000	0.00000	0.00000	-0.00001
45	3	0.00000	0.00000	0.00000	0.00000	0.00000	-0.00001

SUPPORT REACTIONS -UNIT KIP FEET STRUCTURE TYPE = PLANE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
3	3	6.37	0.00	0.00	0.00	0.00	0.00
7	3	27.80	0.00	0.00	0.00	0.00	0.00
11	3	21.31	0.00	0.00	0.00	0.00	0.00
35	3	0.43	0.00	0.00	0.00	0.00	0.00
39	3	-0.31	0.00	0.00	0.00	0.00	0.00
43	3	-0.84	0.00	0.00	0.00	0.00	0.00
22	3	0.00	0.20	0.00	0.00	0.00	0.00
24	3	0.00	0.20	0.00	0.00	0.00	0.00
16	3	-20.92	-34.61	0.00	0.00	0.00	0.00
30	3	-0.83	1.33	0.00	0.00	0.00	0.00
45	3	1.08	0.89	0.00	0.00	0.00	0.00

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
3	3	3	45.84	2.29	0.00	0.00	0.00	-25.00
		4	-45.76	-2.22	0.00	0.00	0.00	27.95
4	3	4	45.69	-3.41	0.00	0.00	0.00	-27.95
		5	-45.59	3.48	0.00	0.00	0.00	22.57
5	3	5	44.79	-9.19	0.00	0.00	0.00	-22.57
		6	-44.68	9.24	0.00	0.00	0.00	8.15
6	3	6	43.20	-14.67	0.00	0.00	0.00	-8.15
		7	-43.09	14.71	0.00	0.00	0.00	-14.80
7	3	7	35.43	6.98	0.00	0.00	0.00	14.80
		8	-35.31	-6.95	0.00	0.00	0.00	-3.88
8	3	8	35.91	2.37	0.00	0.00	0.00	3.88
		9	-35.79	-2.37	0.00	0.00	0.00	-0.17
9	3	9	35.81	2.03	0.00	0.00	0.00	-0.17
		10	-35.71	-2.03	0.00	0.00	0.00	2.94
10	3	10	35.27	5.94	0.00	0.00	0.00	-2.94
		11	-35.17	-5.92	0.00	0.00	0.00	11.05
11	3	11	40.13	-10.89	0.00	0.00	0.00	-11.05
		12	-40.03	10.92	0.00	0.00	0.00	-3.79
12	3	12	41.07	-5.93	0.00	0.00	0.00	3.79
		13	-40.97	5.97	0.00	0.00	0.00	-11.92
13	3	13	41.36	-1.77	0.00	0.00	0.00	11.92
		14	-41.27	1.82	0.00	0.00	0.00	-14.35
14	3	14	41.21	2.90	0.00	0.00	0.00	14.35
		15	-41.13	-2.84	0.00	0.00	0.00	-10.42
15	3	15	40.50	7.70	0.00	0.00	0.00	10.42
		16	-40.42	-7.63	0.00	0.00	0.00	0.00
16	3	16	0.70	0.09	0.00	0.00	0.00	0.00
		17	-0.63	-0.01	0.00	0.00	0.00	0.07
17	3	17	0.62	0.08	0.00	0.00	0.00	-0.07
		18	-0.56	0.01	0.00	0.00	0.00	0.12
18	3	18	0.56	0.06	0.00	0.00	0.00	-0.12
		19	-0.51	0.03	0.00	0.00	0.00	0.13

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
19	3	19	0.51	0.02	0.00	0.00	0.00	-0.13
		20	-0.47	0.07	0.00	0.00	0.00	0.10
20	3	20	0.48	-0.02	0.00	0.00	0.00	-0.10
		21	-0.45	0.12	0.00	0.00	0.00	0.00
21	3	21	0.46	-0.07	0.00	0.00	0.00	0.00
		22	-0.44	0.17	0.00	0.00	0.00	-0.16
22	3	22	0.47	0.08	0.00	0.00	0.00	0.16
		23	-0.46	0.03	0.00	0.00	0.00	-0.13
23	3	23	0.46	0.03	0.00	0.00	0.00	0.13
		24	-0.47	0.08	0.00	0.00	0.00	-0.16
24	3	24	0.44	0.17	0.00	0.00	0.00	0.16
		25	-0.46	-0.07	0.00	0.00	0.00	0.00
25	3	25	0.45	0.12	0.00	0.00	0.00	0.00
		26	-0.48	-0.02	0.00	0.00	0.00	0.10
26	3	26	0.47	0.07	0.00	0.00	0.00	-0.10
		27	-0.51	0.03	0.00	0.00	0.00	0.13
27	3	27	0.51	0.03	0.00	0.00	0.00	-0.13
		28	-0.56	0.06	0.00	0.00	0.00	0.12
28	3	28	0.56	0.01	0.00	0.00	0.00	-0.12
		29	-0.62	0.08	0.00	0.00	0.00	0.07
29	3	29	0.63	-0.01	0.00	0.00	0.00	-0.07
		30	-0.70	0.09	0.00	0.00	0.00	0.00
30	3	30	-0.84	0.26	0.00	0.00	0.00	0.00
		31	0.76	-0.19	0.00	0.00	0.00	0.31
31	3	31	-0.78	0.10	0.00	0.00	0.00	-0.31
		32	0.69	-0.04	0.00	0.00	0.00	0.40
32	3	32	-0.69	-0.04	0.00	0.00	0.00	-0.40
		33	0.60	0.09	0.00	0.00	0.00	0.32
33	3	33	-0.59	-0.16	0.00	0.00	0.00	-0.32
		34	0.49	0.20	0.00	0.00	0.00	0.08
34	3	34	-0.47	-0.25	0.00	0.00	0.00	-0.08
		35	0.37	0.28	0.00	0.00	0.00	-0.28
35	3	35	-0.26	0.11	0.00	0.00	0.00	0.28
		36	0.16	-0.09	0.00	0.00	0.00	-0.14

MEMBER END FORCES STRUCTURE TYPE = PLANE

ALL UNITS ARE -- KIP FEET

MEMB	LOAD	JT	AXIAL	SHEAR-Y	SHEAR-Z	TORSION	MOM-Y	MOM-Z
36	3	36	-0.17	0.07	0.00	0.00	0.00	0.14
		37	0.06	-0.06	0.00	0.00	0.00	-0.05
37	3	37	-0.07	-0.06	0.00	0.00	0.00	-0.05
		38	-0.05	0.06	0.00	0.00	0.00	-0.04
38	3	38	0.04	-0.07	0.00	0.00	0.00	0.04
		39	-0.16	0.09	0.00	0.00	0.00	-0.17
39	3	39	0.24	0.18	0.00	0.00	0.00	0.17
		40	-0.36	-0.14	0.00	0.00	0.00	0.08
40	3	40	0.37	0.10	0.00	0.00	0.00	-0.08
		41	-0.48	-0.04	0.00	0.00	0.00	0.19
41	3	41	0.48	-0.02	0.00	0.00	0.00	-0.19
		42	-0.58	0.09	0.00	0.00	0.00	0.11
42	3	42	0.57	-0.16	0.00	0.00	0.00	-0.11
		43	-0.66	0.24	0.00	0.00	0.00	-0.20
43	3	43	1.24	0.24	0.00	0.00	0.00	0.20
		44	-1.32	-0.15	0.00	0.00	0.00	0.11
44	3	44	1.33	-0.02	0.00	0.00	0.00	-0.11
		45	-1.40	0.12	0.00	0.00	0.00	0.00

********** END OF LATEST ANALYSIS RESULT **********

53. CHECK CODE ALL

STAAD-III CODE CHECKING - (AISC)
****

ALL UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
3	ST W8X 31	PASS	AISC- H1-2	0.745	3
		45.76 C	0.00	27.95	1.31
4	ST W8X 31	PASS	AISC- H1-2	0.745	3
		45.69 C	0.00	-27.95	0.00
5	ST W8X 31	PASS	AISC- H1-2	0.642	3
		44.79 C	0.00	-22.57	0.00
6	ST W8X 31	PASS	AISC- H1-2	0.490	3
		43.09 C	0.00	-14.80	1.56
7	ST W8X 31	PASS	AISC- H1-2	0.452	3
		35.43 C	0.00	14.80	0.00
8	ST W8X 31	PASS	AISC- H1-2	0.253	3
		35.91 C	0.00	3.88	0.00
9	ST W8X 31	PASS	AISC- H1-2	0.235	3
		35.71 C	0.00	2.94	1.36
10	ST W8X 31	PASS	AISC- H1-2	0.381	3
		35.17 C	0.00	11.05	1.37
11	ST W8X 31	PASS	AISC- H1-2	0.407	3
		40.13 C	0.00	-11.05	0.00
12	ST W8X 31	PASS	AISC- H1-2	0.427	3
		40.97 C	0.00	-11.92	1.37
13	ST W8X 31	PASS	AISC- H1-2	0.473	3
		41.27 C	0.00	-14.35	1.36
14	ST W8X 31	PASS	AISC- H1-2	0.473	3
		41.21 C	0.00	14.35	0.00
15	ST W8X 31	PASS	AISC- H1-2	0.397	3
		40.50 C	0.00	10.42	0.00
16	ST W8X 31	PASS	AISC- H1-3	0.004	3
		0.63 C	0.00	0.07	1.37
17	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.56 C	0.00	0.12	1.36
18	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.56 C	0.00	-0.12	0.00
19	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.51 C	0.00	-0.13	0.00
20	ST W8X 31	PASS	AISC- H1-3	0.004	3
		0.48 C	0.00	-0.10	0.00
21	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.44 C	0.00	-0.16	1.36
22	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.47 C	0.00	0.16	0.00
23	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.47 C	0.00	-0.16	1.36
24	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.44 C	0.00	0.16	0.00
25	ST W8X 31	PASS	AISC- H1-3	0.004	3
		0.48 C	0.00	0.10	1.36
26	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.51 C	0.00	0.13	1.37

L UNITS ARE - KIP FEET (UNLESS OTHERWISE NOTED)

MEMBER	TABLE	RESULT/ FX	CRITICAL COND/ MY	RATIO/ MZ	LOADING/ LOCATION
27	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.51 C	0.00	-0.13	0.00
28	ST W8X 31	PASS	AISC- H1-3	0.005	3
		0.56 C	0.00	-0.12	0.00
29	ST W8X 31	PASS	AISC- H1-3	0.004	3
		0.63 C	0.00	-0.07	0.00
30	ST W8X 31	PASS	AISC- H2-1	0.010	3
		0.76 T	0.00	0.31	1.36
31	ST W8X 31	PASS	AISC- H2-1	0.011	3
		0.69 T	0.00	0.40	1.37
32	ST W8X 31	PASS	AISC- H2-1	0.011	3
		0.69 T	0.00	-0.40	0.00
33	ST W8X 31	PASS	AISC- H2-1	0.009	3
		0.59 T	0.00	-0.32	0.00
34	ST W8X 31	PASS	SHEAR -Y	0.008	3
		0.37 T	0.00	-0.28	1.36
35	ST W8X 31	PASS	AISC- H2-1	0.006	3
		0.26 T	0.00	0.28	0.00
36	ST W8X 31	PASS	AISC- H2-1	0.003	3
		0.17 T	0.00	0.14	0.00
37	ST W8X 31	PASS	SHEAR -Y	0.002	3
		0.05 C	0.00	-0.04	1.56
38	ST W8X 31	PASS	AISC- H1-3	0.004	3
		0.16 C	0.00	-0.17	1.57
39	ST W8X 31	PASS	SHEAR -Y	0.006	3
		0.24 C	0.00	0.17	0.00
40	ST W8X 31	PASS	AISC- H1-3	0.006	3
		0.48 C	0.00	0.19	1.57
41	ST W8X 31	PASS	AISC- H1-3	0.006	3
		0.48 C	0.00	-0.19	0.00
42	ST W8X 31	PASS	SHEAR -Y	0.007	3
		0.66 C	0.00	-0.20	1.57
43	ST W8X 31	PASS	AISC- H1-3	0.010	3
		1.24 C	0.00	0.20	0.00
44	ST W8X 31	PASS	AISC- H1-3	0.009	3
		1.33 C	0.00	-0.11	0.00

********** END OF TABULATED RESULT OF DESIGN **********

54. PLOT DISPLACEMENT FILE
55. PLOT BENDING FILE
56. FINISH

********** END OF STAAD-III **********

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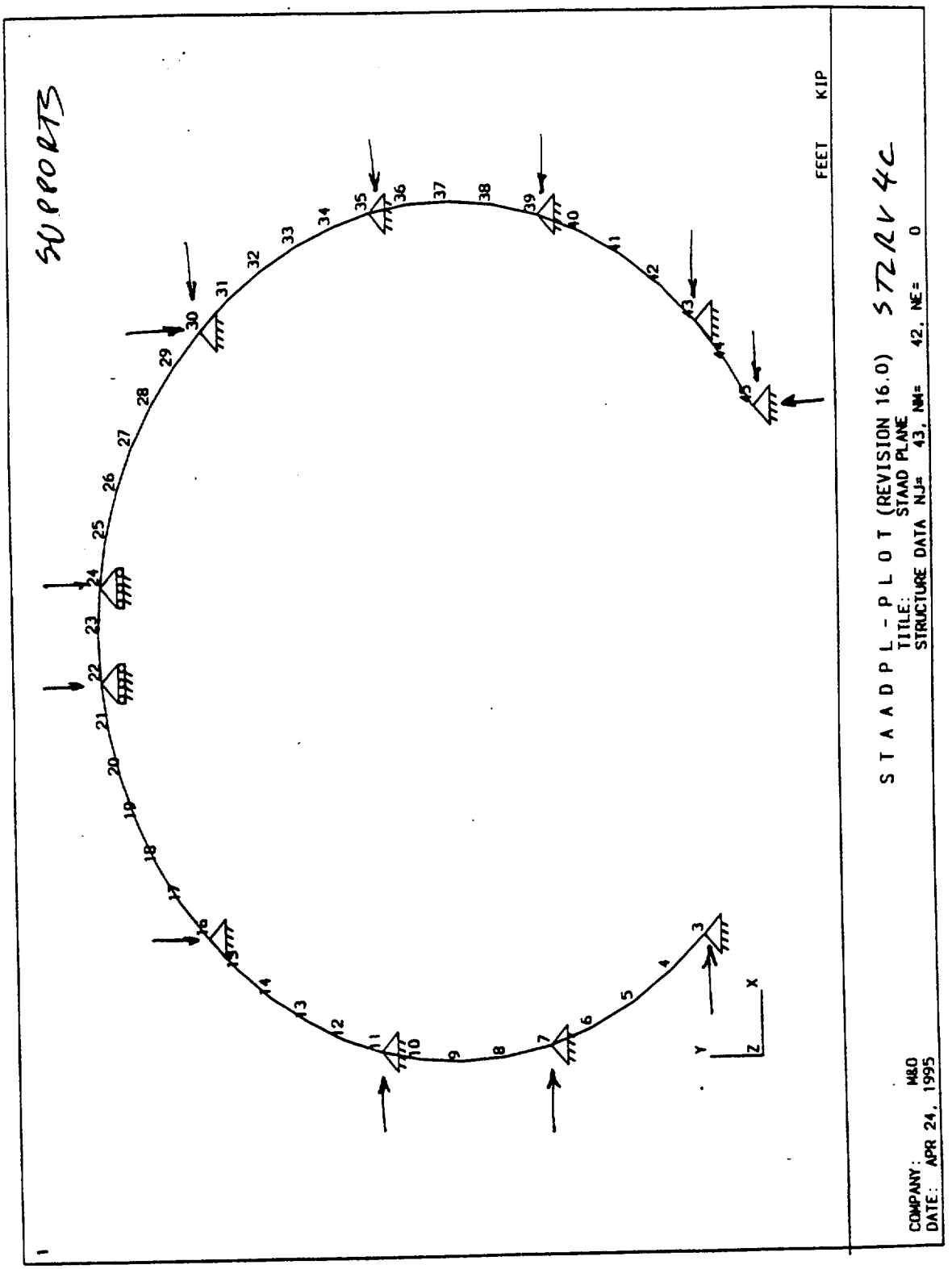
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DATE: APR 24, 1995
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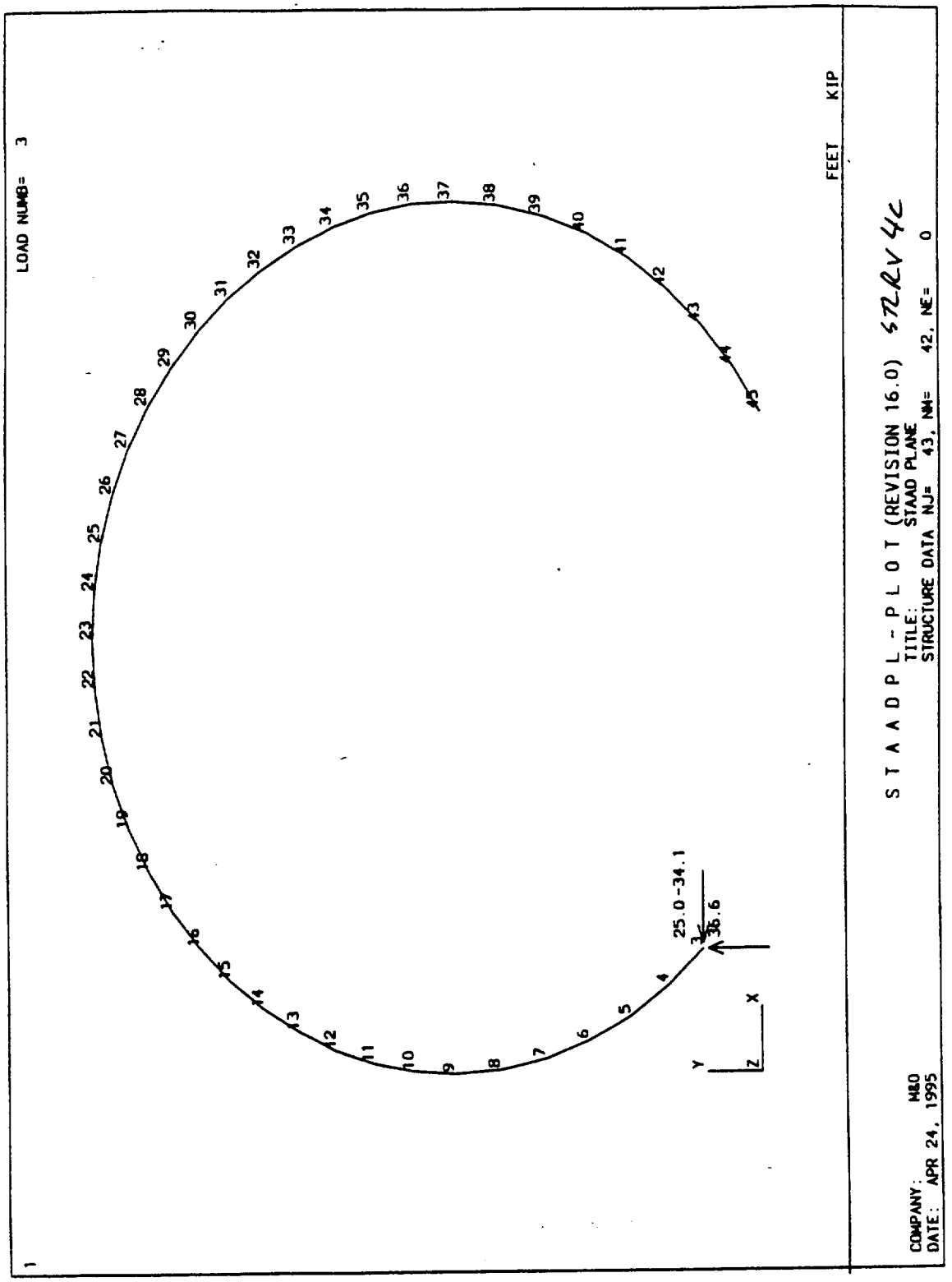
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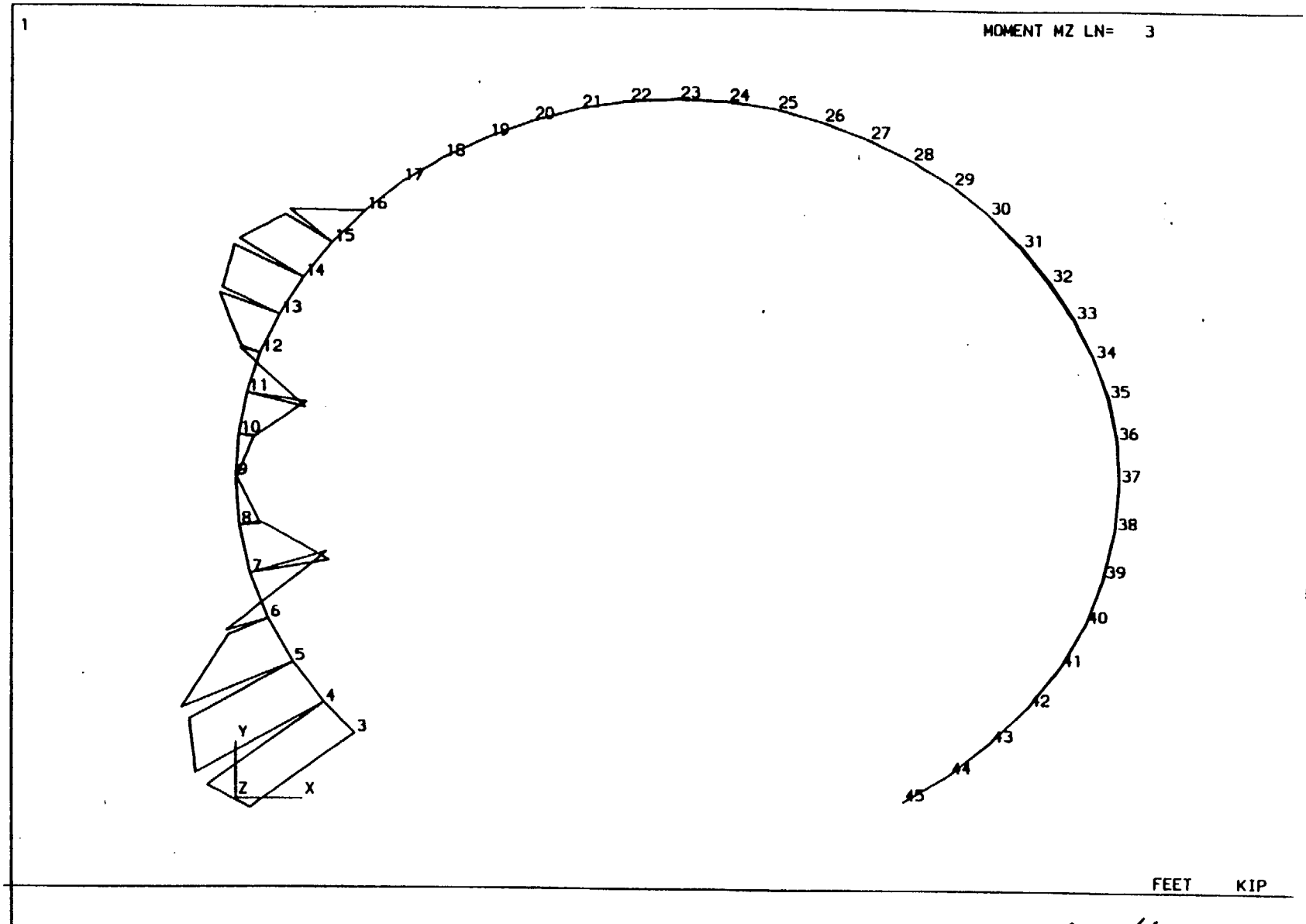
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FEET KIP
S T A A D P L - P L O T (REVISION 16.0)
COMPANY: M&O
DATE: JUL 18, 1995
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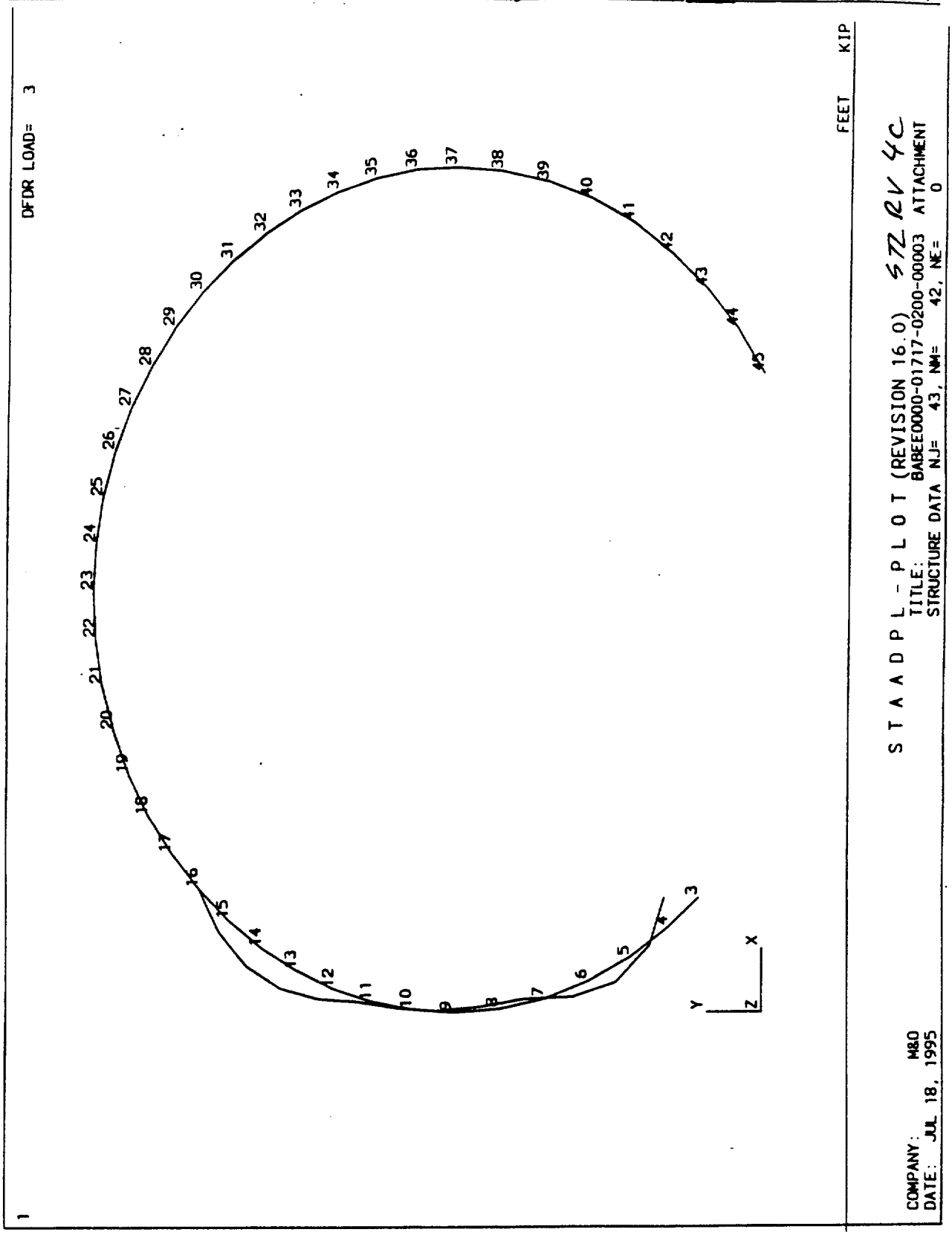
STZ RV 4C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STRUCTURE DATA NJ= 43, NM= 42, NE= 0
COMPANY: M&O
DATE: JUL 18, 1995
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SUMMARY OF COMPUTER ANALYSES FOR JACKING LOADS

Analysis No.	LOAD	SCOPE	Supports	Interaction coefficient	Member	Comparison Conclusion
1. STLRV2	50T @ 47 30T @ 47 25T @ 47 Both sides	Determine jack capacity to be used	@ every 4th node	50T: 1.488 30T: 0.893 25T: 0.744	3 3 3, 4, 42	Steel set not adequate Too close Steel set adequate
2. STLRV3A	25T @ 49 Both sides	)Check W8X31 size of)steel set	@ every 4th node	0.730	3	Size of steel set W8X31 is adequate
3. STLRV3D	25T @ 51 Both sides	)Compare results of)varying the angle of)application of the jack	@ every 4th node	0.717	3,4,41,42	47 degree governs by a very small margin.
4. STLRV3B	25T @ 47 Both sides	)) Same as above)with moment released	@ every 4th node	0.745	3,4,41,42	Moment release at splice can be accommodated by
5. STLRV3C	25T @ 49 Both sides	)at splice)	@ every 4th node	0.731	3	the steel set W8X31
6. STLRV3A1	25T @ 47 Both sides	)) Check stresses for) partial and full	@ most nodes	0.729	3, 42	Full rock engagement governs
7. STLRV3A2	25 T @ 47 Both sides	)rock engagement)	@ all nodes	0.767	3, 42	Size of W8X31 steel set is adequate
8. STLRV4	25T @ 47 on one side	)Evaluate stresses)in the steel set due)to one side jacking	@ every 4th node	0.744	3, 4	Jacking from one side only, can be accommodated by the
9. STLRV4A	25T @ 49 on one side	)for the applicable)angles of application)of the jacking load	@ every 4th node	0.730	3,4	steel sets. 47 deg. governs by a small margin.

10. STLRV4B	25T @ 51 on one side	) See above on)previous page	@ every 4th node	0.717	3, 4	
11. STLRV4C	25T @ 47 on one side	)Check stresses in the)steel set with the)moment released)at splice.	@ every 4th node	0.745	3, 4	Moment release at splice can be accommodated by the steel sets

JACKING PROCESS CONCLUSIONS

A W8X31 shape is selected as a trial member for the steel set ring member, to be verified in Attachment III, provided that the Contractor uses the following controls in the jacking procedure:

- The jacking force shall not exceed 27 tons per jack. (See File STLRV2 and Attachment III page III-27)

- The jack centerline position shall be no more than 6 inch from the X-X axis of the W8X31.
(see pages I-7 and I - 23).

- Jacking forces may be applied on both sides or one one side only of the steel set, since stresses are the same in either condition. (See Summary of Computer Analyses for Jacking Loads).