SEISMIC AND STRUCTURAL ANALYSIS
FOR THE
LACROSSE BOILING WATER REACTOR
TURBINE BUILDING

Prepared For

DAIRYLAND POWER COOPERATIVE

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1. SUMMARY

This report, prepared for Dairyland Power Cooperative (DPC), presents the results of the seismic/structural analysis of the turbine building. The NRC's site specific spectra was used in this analysis for the Safe Shutdown Earthquake Event (SSE).

Most structural elements of the turbine building including the reinforced concrete lower portion, the turbine foundation, and the piles foundation were evaluated for the SSE event and were found acceptable. The analysis indicated certain members will be overstressed during the SSE event. The top portion of the building which is a basic structural steel-framed building with bracing members in the walls to resist lateral loads. This bracing and some of the diagonal roof bracing were calculated to be overstressed. These items are discussed further in Sections 8 and 9.

2. BACKGROUND INFORMATION

The turbine building of LACBWR was designed and constructed in the early 1960's. It was designed using the codes and guides required at that time. Recently, the NRC has instituted an evaluation of certain older plants, including LACBWR, as to their capability to maintain their structural integrity during and after a Safe Shutdown Earthquake (SSE) event. The Systematic Evaluation Program (SEP) requires all facilities and equipment required for safe shutdown to be evaluated. Since the turbine building does contain numerous safety-related items, an analysis was required.

3. DESCRIPTION OF THE TURBINE BUILDING

The turbine building contains a major part of the power plant equipment. A general layout plan of the main floor, mezzanine floor and grade floor of the turbine building is shown in Figures 3.1, 3.2 and 3.3. The location of the turbine building with respect to the reactor containment building can also be determined from these figures.

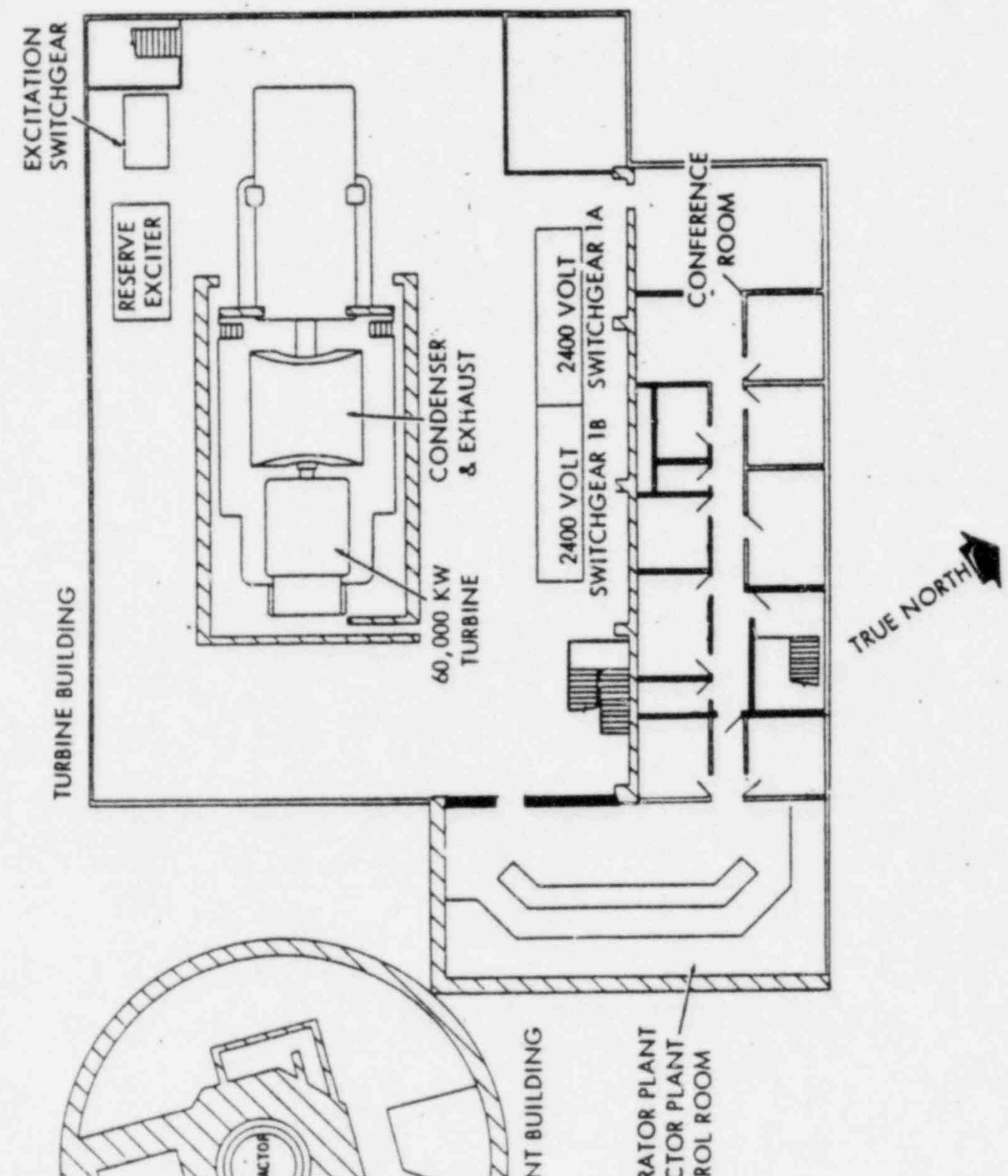

FIGURE 3.1

MAIN FLOOR OF TURBINE BLDG. EL. 668'-0"

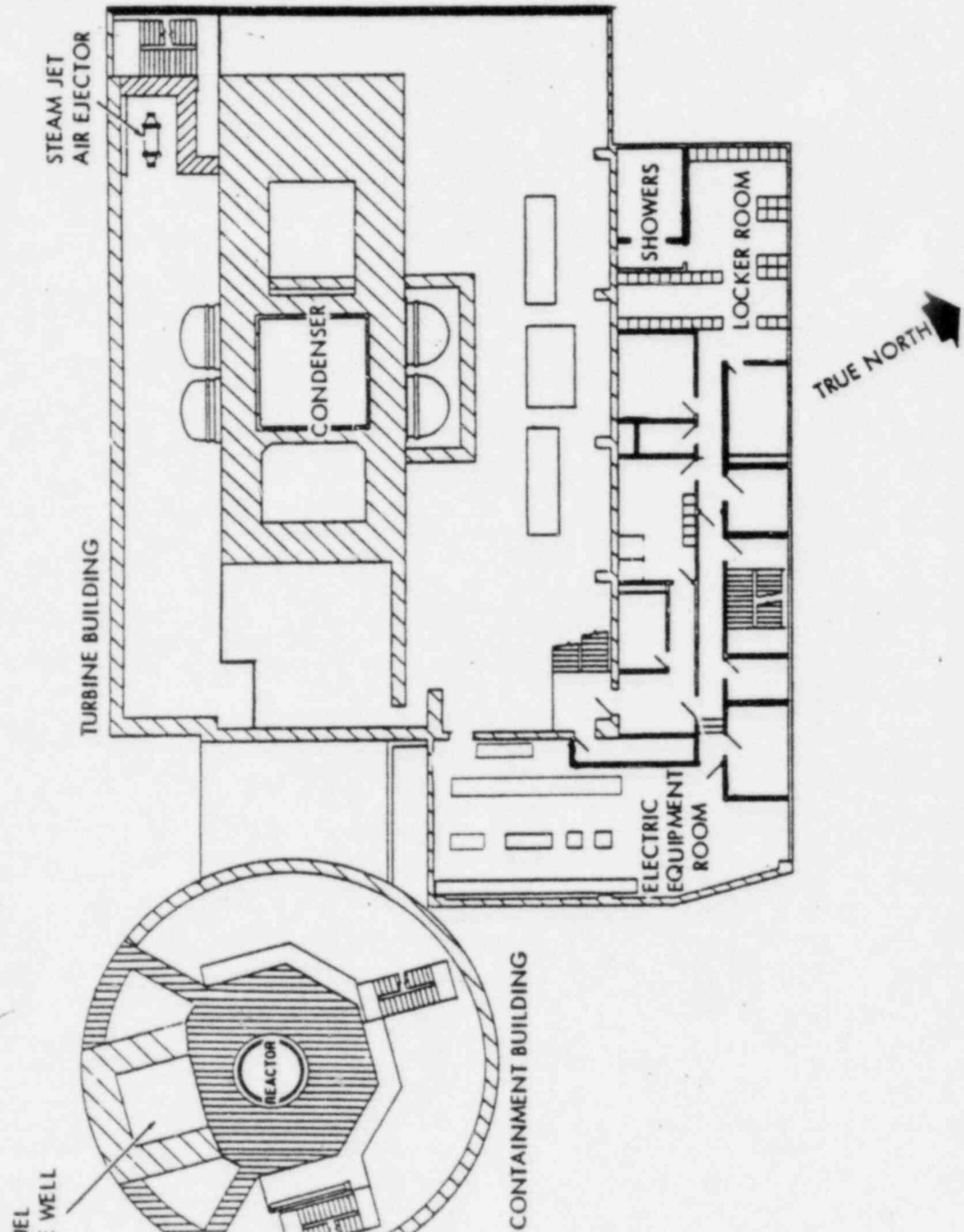

FIGURE 3.2

MEZZANINE FLOOR OF TURBINE BLDG, EL. 654'-0"

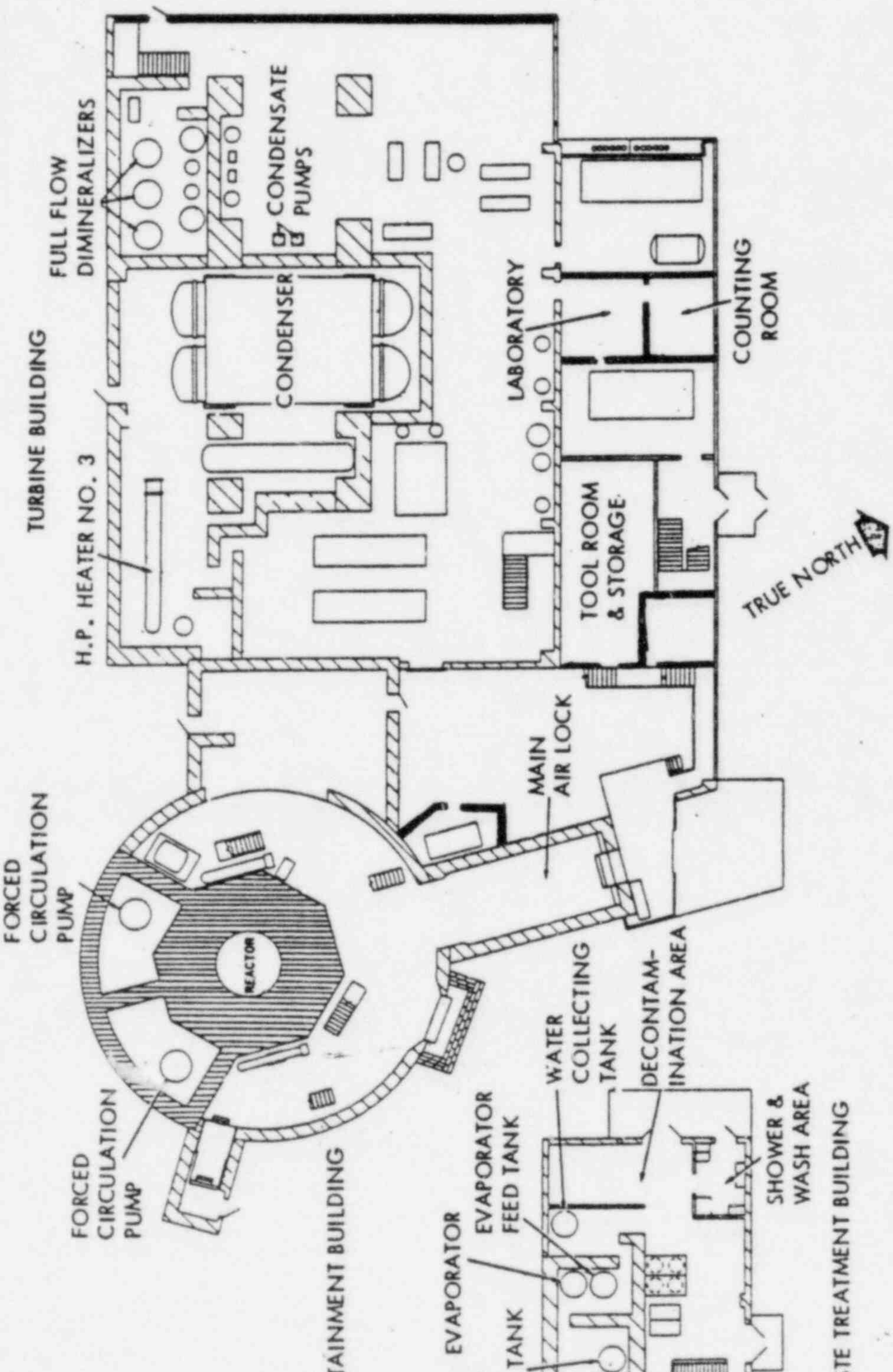

FIGURE 3.3

GRADE FLOOR OF TURBINE BLDG, EL. 640'-0"

The structure of the first two floors is basically reinforced concrete.

In the area of the electrical equipment and control rooms, the East, South and North walls are insulated steel siding and the West wall is concrete block.

The structure above the main floor outside the control room is mostly structural steel framing covered with insulated steel siding. The roof is a structural steel frame with precast concrete slabs and a built up roof over it.

4. APPLICABLE CODES, STANDARDS AND SPECIFICATIONS

1. US NRC Reg. Guide 1.61, "Damping Values for Seismic Design of Nuclear Power Plants," October 1973.

2. US NRC Reg. Guide 1.92, "Combination of Modes and Spatial Components in Seismic Response Analysis", Rev. 1, February 1976.

3. US NRC Reg. Guide 1.60, "Design Response Spectra for Seismic Design of Nuclear Power Plants," Rev. 1, December 1973.

4. US NRC NUREG/CR 0098, "Development of Criteria for Seismic Review of Selected Nuclear Power Plants", N. W. Newmark, W. J. Hall, May 1978.

5. US NRC Standard Review Plan*, "Other Seismic Category I Structures", Rev. 1, July 1981.

6. "Manual of Steel Construction", Eighth Ed., American Institute of Steel Construction Inc., Chicago, Illinois.

7. Sargent & Lundy Drawings for Allis-Chalmers for the LACBWR Generator Plant B-1 thru B-70.

5. LOADS AND LOADING COMBINATION

The turbine building structure and its foundation analyzed for conditions during and after the Safe Shutdown Earthquake Event (SSE). The seismic inertia loads were found using the site specific ground response spectra modified to 7% damping. Individual responses were found for each of the three directions (two horizontal and one vertical). Stresses were calculated corresponding to each direction. The stresses were combined in accordance with Reg. Guide 1.92.

In addition to the seismic inertia loadings, dead loads and live loads were included in the analysis. The following load combination equations were used to evaluate the adequacy of the main structure of the turbine building to withstand an SSE event.

For the elastic working stress method of the AISC:

1. D + L
2. D + L + E'

   D = Dead Load

   L = Live Load

   E'= SSE Seismic Loads (stresses are SRSS of seismic stresses)

The following load combination equations were used to evaluate the adequacy of the reinforced concrete and the precast concrete roof panels to withstand an SSE event using the ultimate strength method of the ACI 318-77.

1. 1.4 + 1.7L
2. D + L + E'

6. STRUCTURAL ACCEPTANCE CRITERIA

The following allowable limits constitute the structural acceptance criteria for each of the loading combinations presented in Section 4.

Structural Steel Frame

Load Combinations	Limit
D + L	S
D + L + E'	1.6S, but not greater than F_y

Where S is the required section strength based on the design methods and the allowable stresses defined in the AISC Specifications, and F_y is the Yield Stress

Reinforced Concrete, Precast Concrete Roof Panels

Load Combinations	Limit
1.4D + 1.7L	U
D + L + E'	U

Where U is the required section strength based on the strength design method defined in the ACI.

7. ANALYTICAL PROCEDURES

7.1 MATHEMATICAL MODEL

In order to perform the seismic analysis, the turbine building is mathematically modeled as an assembly of elastic-structural elements interconnected at discrete nodal points (Figures 7.1 through 7.6). Two models, a dynamic model and static model were made. The purpose of the dynamic model was to establish accelerations and displacement responses of the building during the Safe Shutdown Earthquake (SSE) while the static model was used in the stress analysis, and the stiffness calculation of the upper portion of the building.

7.1.1 Dynamic Model of Turbine Building

The dynamic model used in the turbine building analysis is shown in Figure 7.7. The turbine building is modeled as a cantilever beam. The three dimensional, multidegree of freedom model of the turbine building is attached to the ground by means of foundation springs, representing the deformations of soil under the turbine building foundation. Lateral, as well as rocking springs, have been provided in the turbine building dynamic model to account for the shear and vertical deformation of the soil under the turbine building foundation. The distributed mass of the turbine building is lumped at the model nodal points. Each mass represents the tributory weight of the turbine building walls above and below the nodal point plus the floor dead weight and live loads. For the turbine building lower part (Mezz. and Main floor) eccentricities are taken as 5% of its width in direction of the earthquake. These are minimum eccentricities according to Reference 1. For the upper part no eccentricity is taken since the structure is basically symmetrical in that area. Masses are lumped so that the lumped mass, multidegree of freedom model represents the dynamic characteristics of the Turbine building.

7.1.2 Turbine Foundation Analysis

Since the turbine pedestal has no points of significant common attachment to the remainder of the turbine building above the foundation mat, a worst-case analysis was performed by considering the turbine and its foundation to be independent structures. A separate dynamic model was constructed for the turbine and pedestal; its response was compared with the response of the model for the remainder of the turbine building to determine if any destructive interaction would occur between the two major substructures. Finally a combined model was constructed and employed in the determination of the adequacy of the pile foundation. The turbine and turbine pedestal dynamic model is illustrated in Figure 7.8. Resulting deflections are given in Table 7.3.

7.1.3 Static Model of the Upper Portion

A static model of the upper portion was used to verify the structural stiffness and do a detailed stress analysis of that portion. The lower portion of the LACBWR Turbine Building gets its lateral rigidity from reinforced concrete shear walls. Above the main floor the structure is mostly structural steel and gets its lateral stiffness from the steel bracing. The roof is also steel framed with bracing to assure uniform distribution of the lateral forces. Since the top portion of the building is an open steel frame, it is fairly flexible as compared to the lower structure. This can be seen from Table 7.2 which indicates the deflection versus height of the building.

7.2 FOUNDATION SPRING STIFFNESS

The stiffness of the lateral, vertical and rocking springs representing the shear and vertical deformation of the soil beneath the foundation mat are obtained using the equations shown in Table 7.1 and using Figure 7.9. These equations are taken from Reference 2.

C = Damping matrix

$\dot{U}_t$ = Velocity time history vector

U_t = Relative displacement time history vector

Rearranging equation (2):

$$M\ddot{U}_t + C\dot{U}_t + KU_t = -M\ddot{U}_{gt} = P_{eff} \quad (3)$$

To uncouple equation (3), assume:

$$U = \phi Y_t$$

Where:

ϕ = Characteristic free vibration mode shapes matrix

Y_t = Generalized coordinate displacement time history vector

Pre- and post- multiplying equation (3) by the transpose of ϕ and ϕ respectively and using orthogonality conditions, the following uncoupled equations of motion are obtained:

$$\ddot{Y}_{nt} + 2\,\omega_n \lambda_n \dot{Y}_{nt} + \omega_n^2 Y_{nt} = M_n^{*^{-1}} R_n \ddot{U}_{gt} \quad (4)$$

Where:

Y_{nt} = Generalized displacement coordinate time history for n^{th} mode.

λ_n = Damping ratio for the n^{th} mode expressed as percent of critical damping.

7.3 EIGENVALUE ANALYSIS

The eigenvalues (natural frequencies) and the eigenvectors (mode shapes) for each of the natural modes of vibration are calculated by solving the following frequency equation:

$$(K - \omega_n^2 M) \{\phi_n\} = \{0\} \quad (1)$$

Where:

ω_n = Natural angular frequency for the n^{th} mode

M = System mass matrix

ϕ_n = Mode shape vector for the n^{th} mode

0 = Null vector

The eigenvalue/eigenvector extraction is performed using the Householder QR Modal Extraction Methods.

7.4 DYNAMIC (SEISMIC) LOAD ANALYSIS

Considering only translational degrees of freedom and assuming viscous (velocity proportional) form of damping, the equation of motion in matrix form can be expressed as follows:

$$M(\ddot{U}_t + \ddot{U}_{gt}) + C\dot{U}_t + KU_t = 0 \quad (2)$$

Where:

$\ddot{U}_t$ = Relative acceleration time history vector

$\ddot{U}_{gt}$ = Ground acceleration time history vector

M_n^* = Generalized mass for the n^{th} mode

$= \phi_n^T M \phi_n = \sum M_i \phi_{in}^2$

The mode shape ϕ_n is normalized such that $M_n^* = 1$

R_n = Participation factor for the n^{th} mode.

$= \phi_n^T MI = \sum M_i \phi_{in}$

I = Column vector whose elements are generally unity

The solution for the differential equation (4) is given by the Duhamel Integral:

$$Y_{nt} = \frac{R_n}{M_n^* \omega_n} \int_o^t \ddot{U}_{gt} e^{-\lambda_n \omega_n (t-\tau)} \sin \omega_n (t-\tau)\, d\tau$$

Using the response spectrum method of analysis, the maximum values of the generalized response for each mode is given by:

$$\ddot{Y}_{n\,max} = \frac{R_n S_{an}}{M_n^*} \qquad (5)$$

Where:

$\ddot{Y}_{n\,max}$ = Maximum generalized coordinate acceleration response for the n^{th} mode.

S_{an} = Spectral acceleration value for the n^{th} mode (from the applicable response spectrum curve)

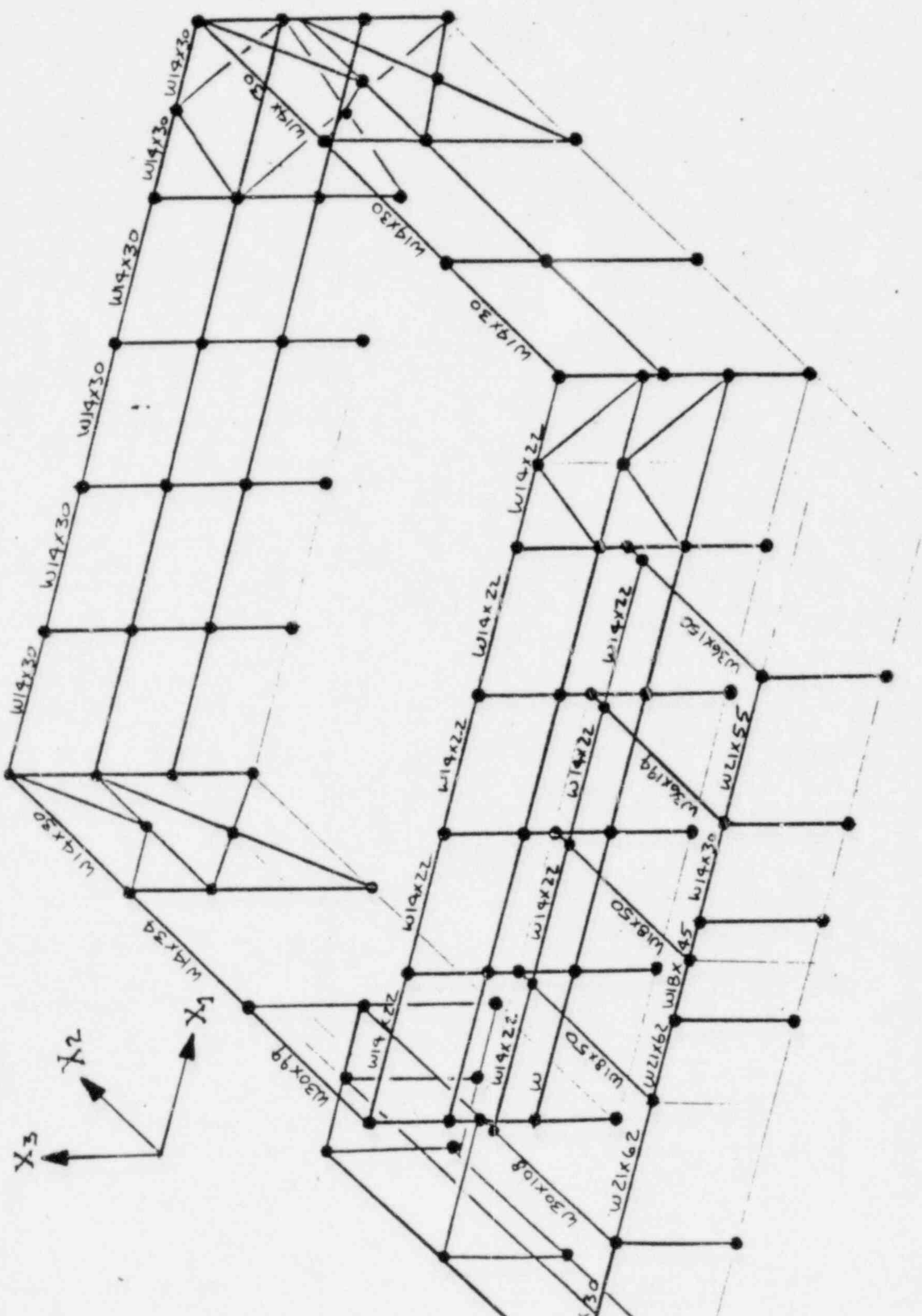

FIGURE 7.1

FRAMING PLAN

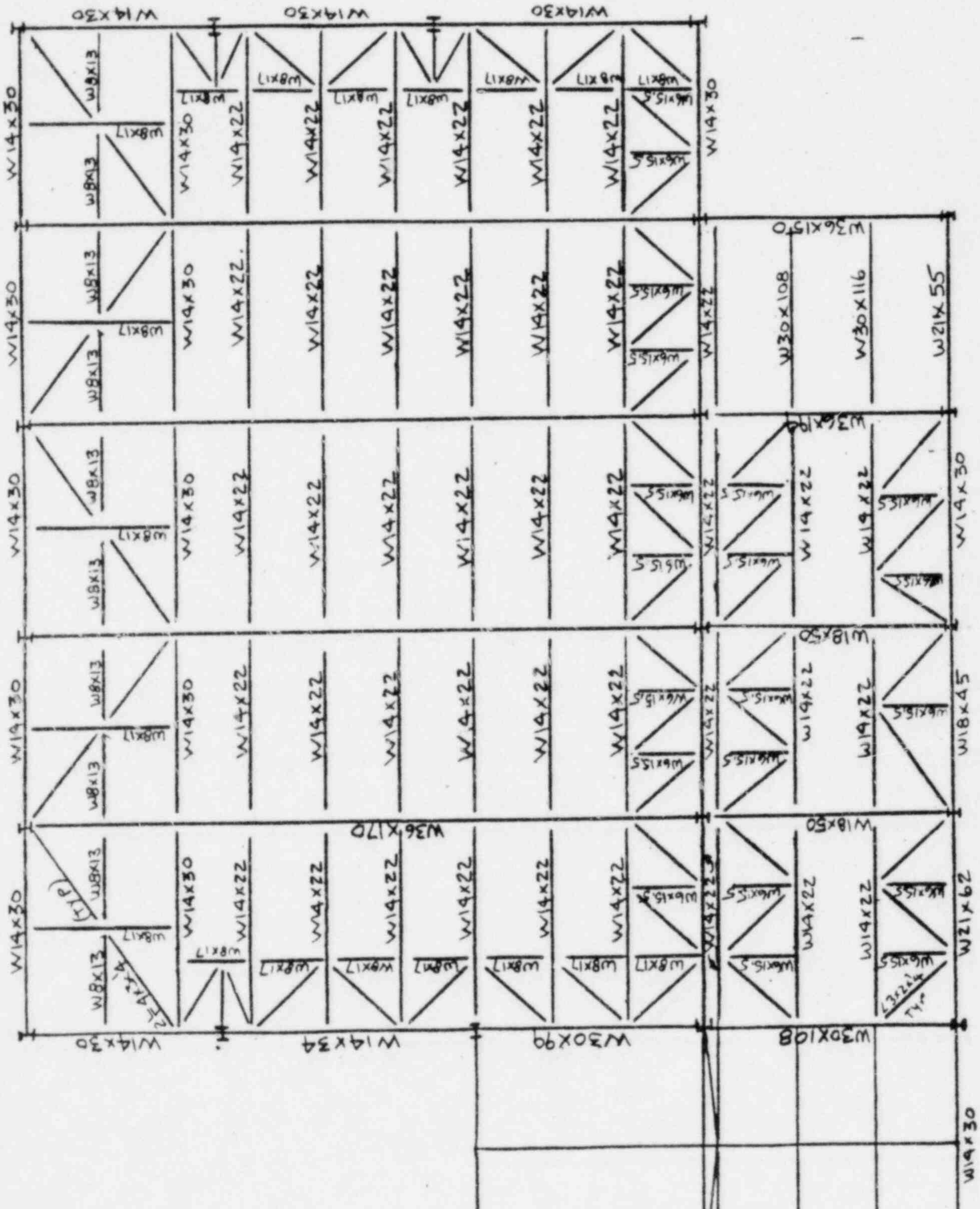

FIGURE 7.2

ROOF FRAMING PLAN

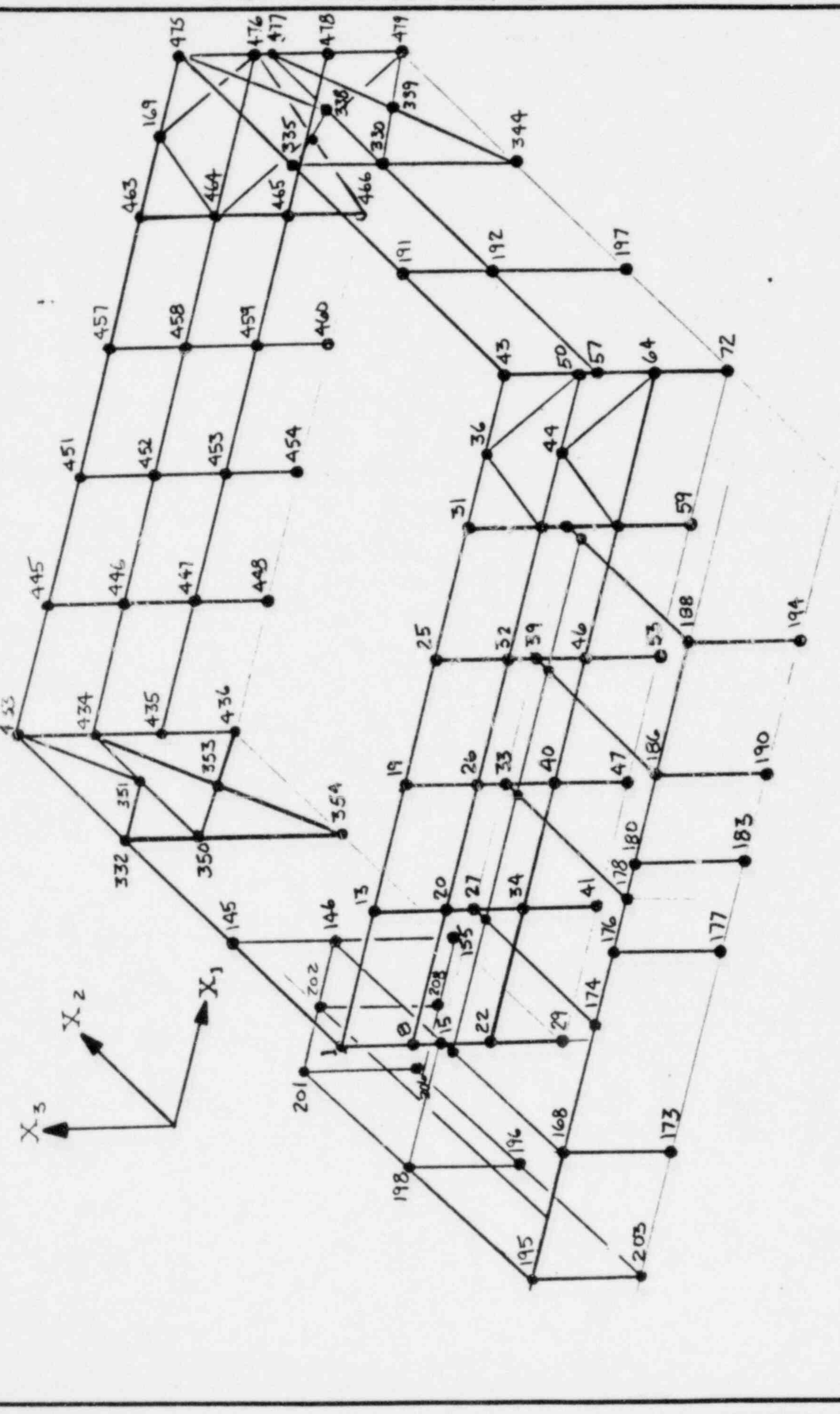

FIGURE 7.3

NODES FOR STATIC MODEL

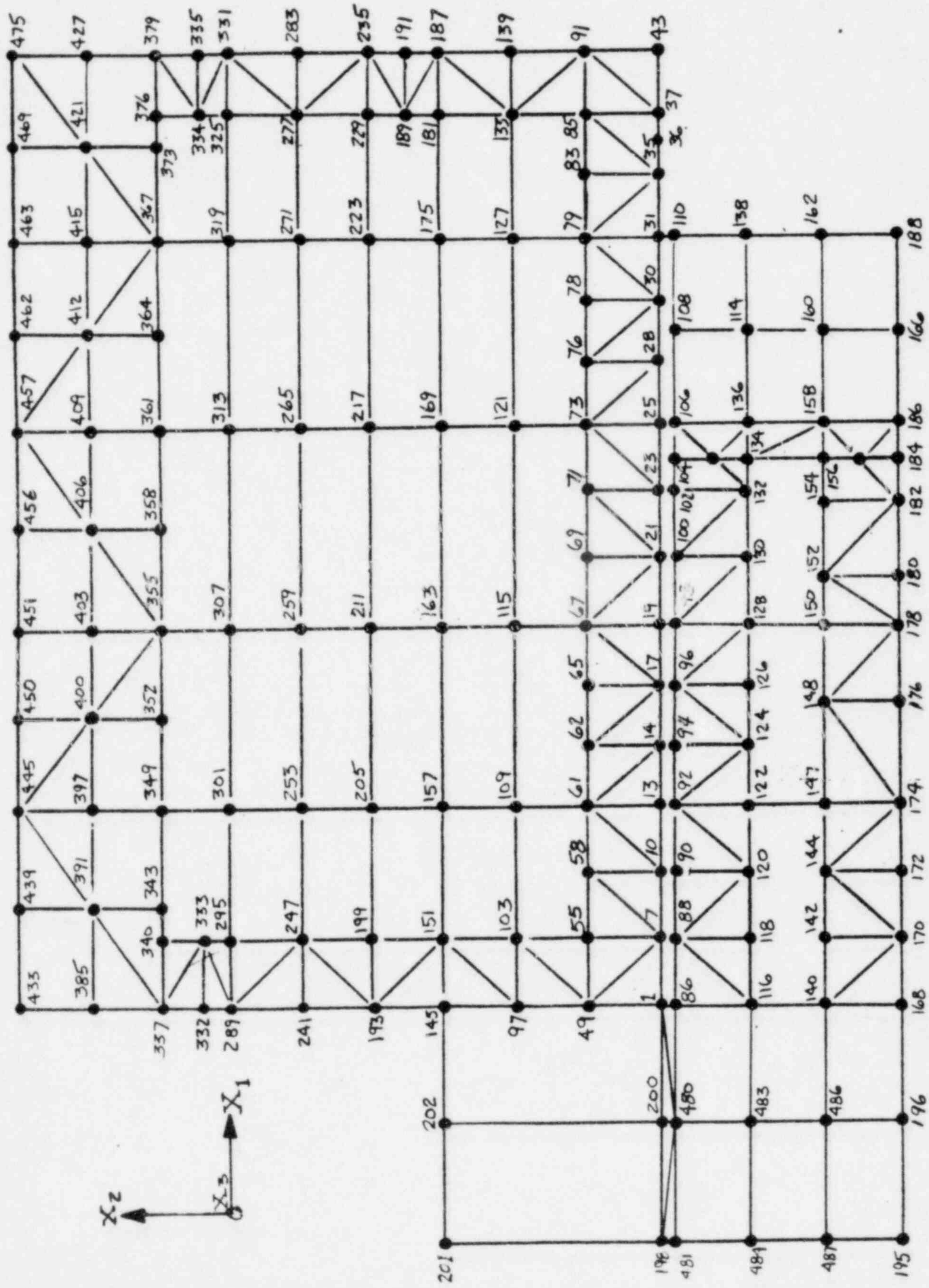

FIGURE 7.4

NODES AT ROOF ELEVATIONS

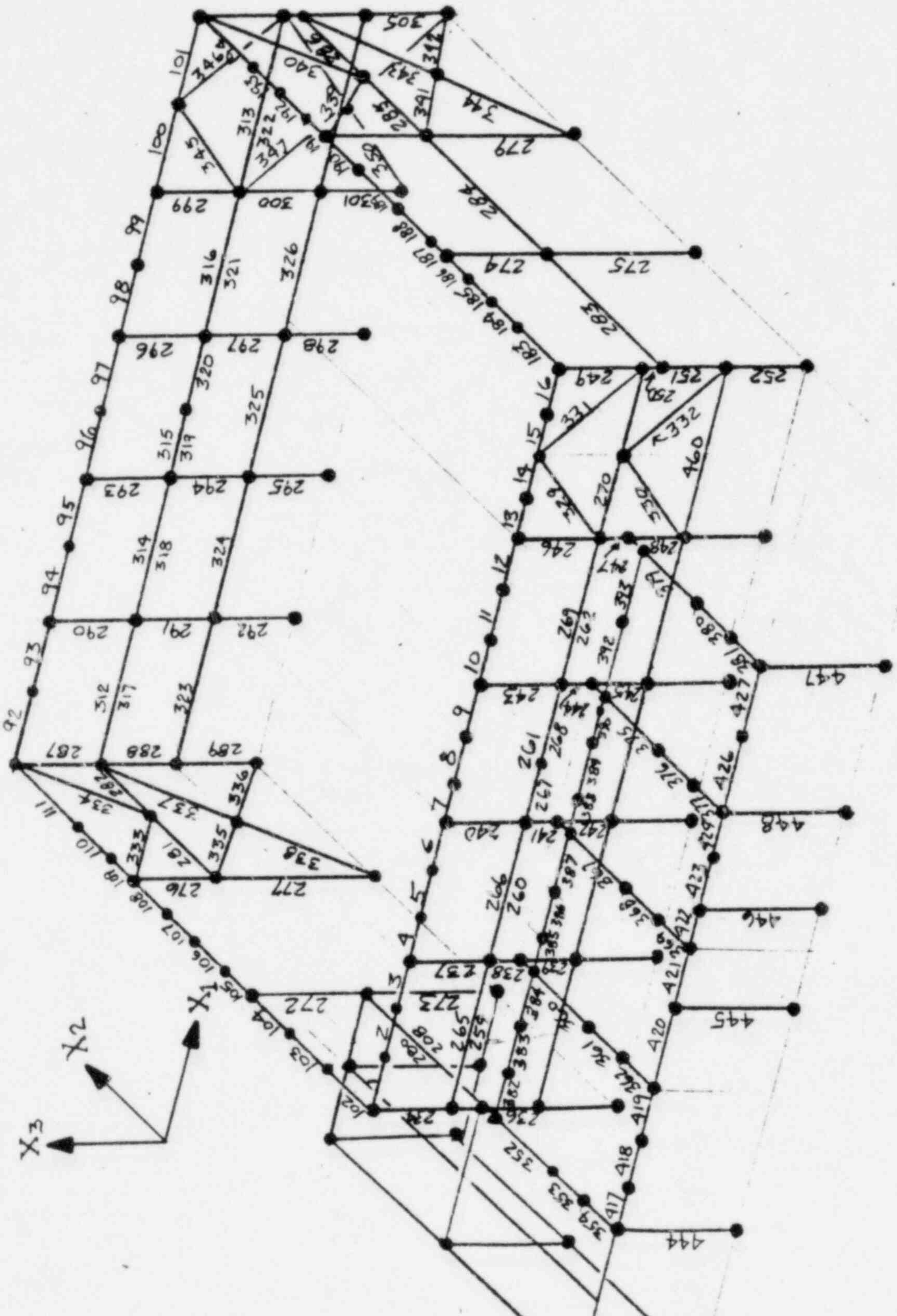

FIGURE 7.5

BEAM AND PLATE ELEMENTS FOR STATIC MODEL

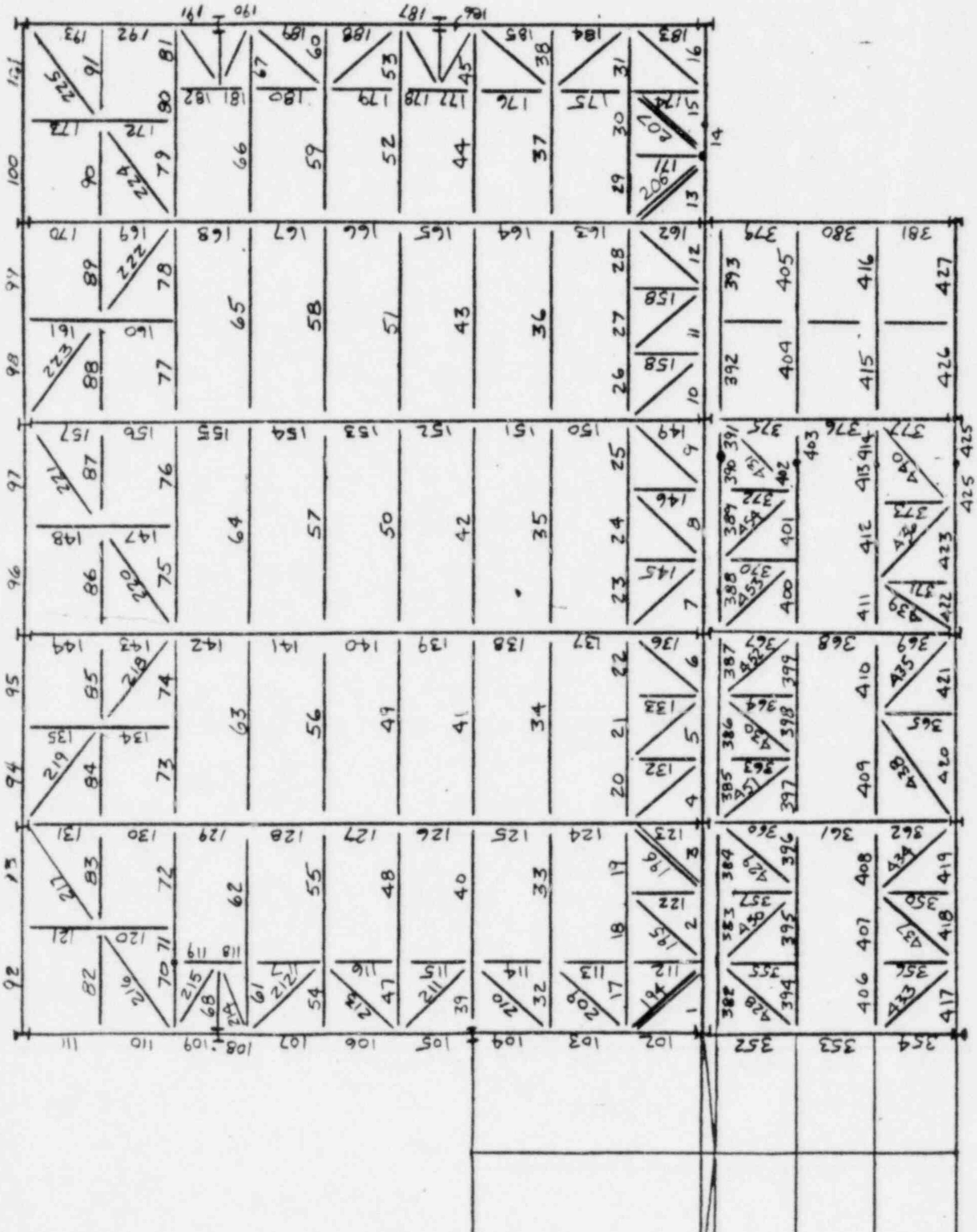

FIGURE 7.6

BEAM AND PLATE ELEMENTS FOR STATIC MODEL

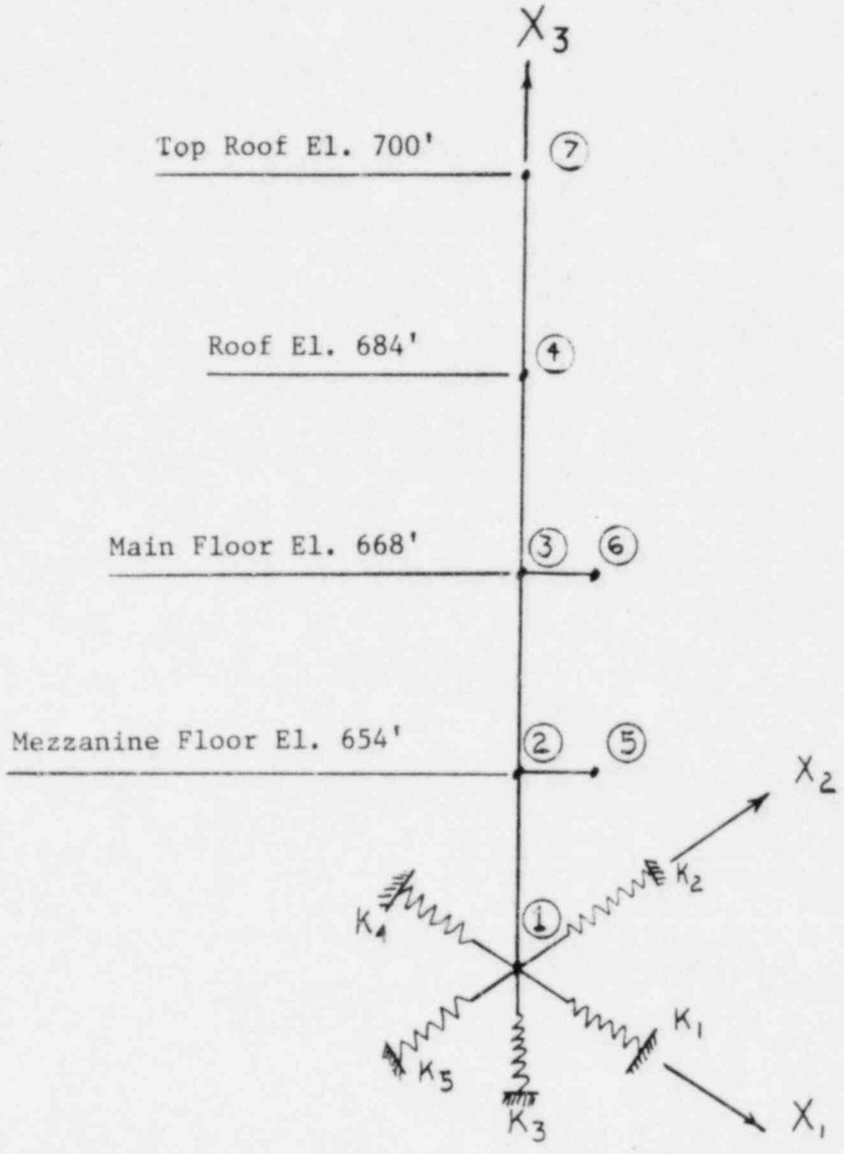

FIGURE 7.7

MATHEMATICAL DYNAMIC MODEL OF TURBINE BUILDING

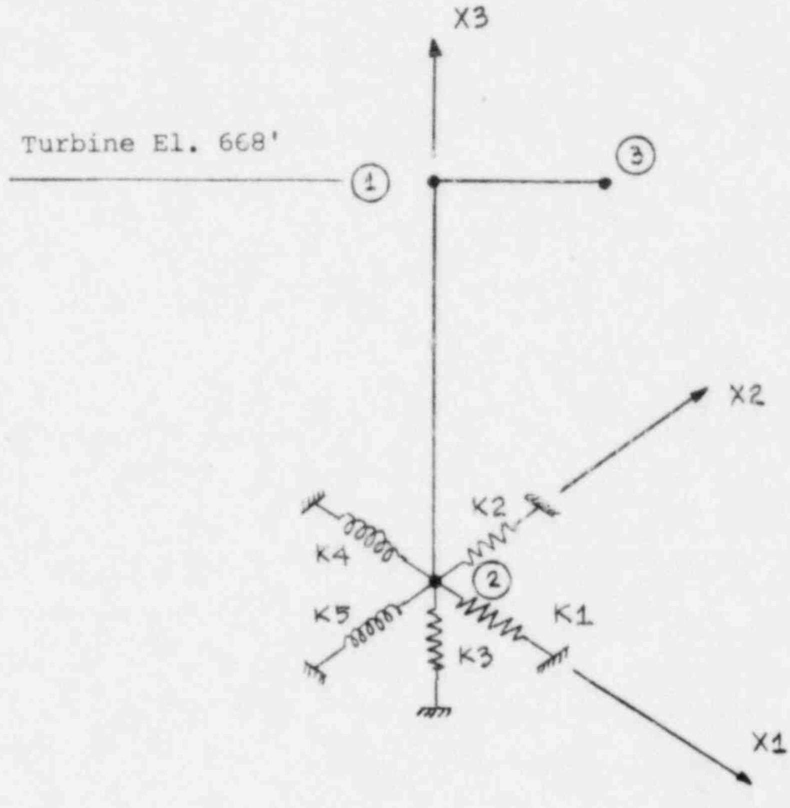

FIGURE 7.8

MATHEMATICAL DYNAMIC MODEL OF TURBINE FOUNDATION

TABLE 7-1

Spring Constants for Rigid Rectangular Footing Resting on Elastic Half-Space

Motion	Spring Constant	Reference
Vertical	$k_z = \frac{G}{1-\nu}\beta_z\sqrt{4cd}$	Barkan (1962)
Horizontal	$k_x = 4(1+\nu)G\beta_x\sqrt{cd}$	Barkan (1962)
Rocking	$k_\psi = \frac{G}{1-\nu}\beta_\psi 8cd^2$	Gorbunov-Possadov (1961)

(Note: values for B_z, B_x, and $B\psi$ are given in Figure 7-9 for various values of d/c)

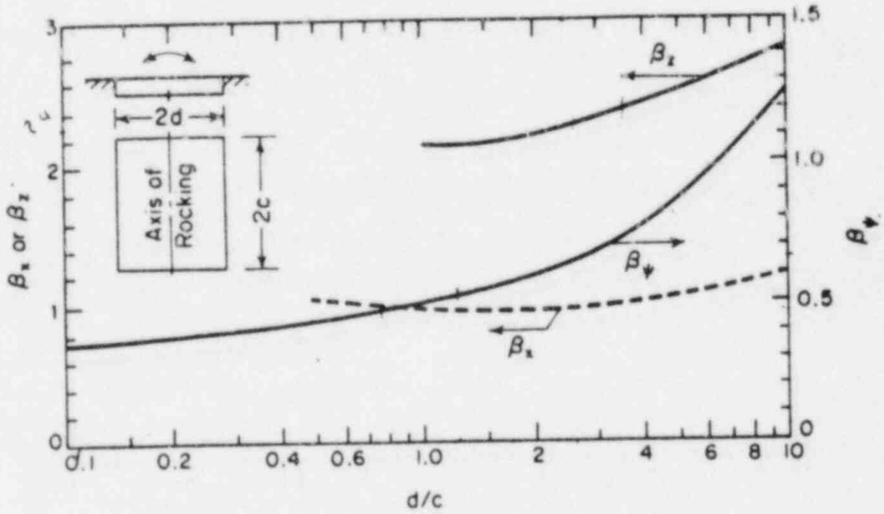

Figure 7-9. coefficients B_z, B_x, and $B\psi$ for rectangular footings (after Whitman and Richart, 1967)

TABLE 7.2 DISPLACEMENT RESPONSES TURBINE BUILDING DYNAMIC MODEL

X_1, X_2, X_3 in inches
X_4, X_5, X_6 in radians

NODE	X1	X2	X3	X4	X5	X6
1	3.06135E-02	2.77084E-02	3.15505E-02	1.96245E-05	1.35073E-05	0.
2	3.77272E-02	3.75936E-02	3.27015E-02	2.12974E-05	1.48662E-05	8.00248E-07
3	4.25814E-02	4.46590E-02	3.34241E-02	2.18104E-05	1.52228E-05	1.16962E-06
4	9.22784E-01	1.09686E+00	4.19406E-02	2.18104E-05	1.52228E-05	1.16962E-06
5	3.77468E-02	3.76454E-02	3.38399E-02	2.12974E-05	1.48662E-05	8.00248E-07
6	4.26101E-02	4.47343E-02	3.45977E-02	2.18104E-05	1.52228E-05	1.16962E-06
7	1.31425E+00	1.56281E+00	4.50215E-02	2.18104E-05	1.52228E-05	1.16962E-06

MAXIMUM RESPONSES FOR EACH NODE . . .

X_1 = 1.31425 AT NODE 7
X_2 = 1.56281 AT NODE 7
X_3 = .04502 AT NODE 7
X_4 = .00002 AT NODE 7
X_5 = .00002 AT NODE 7
X_6 = .00000 AT NODE 3

TABLE 7.3 TURBINE FOUNDATION DISPLACEMENT RESPONSES

X_1, X_2, X_3 in inches

X_4, X_5, X_6 in radians

NODE	X1	X2	X3	X4	X5	X6
1	5.36608E-02	7.75986E-02	1.77965E-02	1.48725E-04	7.31989E-05	1.09439E-06
2	2.36448E-02	2.31833E-02	1.68226E-02	1.36985E-04	7.12031E-05	0.
3	5.37048E-02f	7.76049E-02	1.98809E-02	1.48725E-04	7.31989E-05	1.09439E-06

MAXIMUM RESPONSES FOR EACH NODE . . .

X_1 = .05370 AT NODE 3

X_2 = .07760 AT NODE 3

X_3 = .01988 AT NODE 3

X_4 = .00015 AT NODE 1

X_5 = .00007 AT NODE 1

X_6 = .00000 AT NODE 1

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From the maximum generalized coordinate response the maximum acceleration ($\ddot{U}_{n\ max}$) and maximum inertia forces ($F_{n\ max}$) at each mass point are given by:

$$\ddot{U}_{n\ max} = \ddot{Y}_{n\ max}\ \phi_{in}$$

$$F_{n\ max} = M_n\ \ddot{U}_{n\ max}$$

The inertia forces ($F_{n\ max}$) for each of the systems' natural modes are applied as external static forces, and system response (displacements, member internal forces and stresses) are calculated. Total system response is that obtained by combining the individual modal response values by the square root of the sum of the squares method; lower modes having large contribution to the response (all modes having natural frequency under 35 cycles per second) are considered and higher modes with negligible participation are neglected.

8. RESULTS OF ANALYSIS AND CONCLUSIONS

The results of the seismic analysis of the Turbine Building and the Turbine Foundation performed by Stardyne Computer Code are contained in References 3 and 4. The following items were included in the analysis: structural steel frame (Turbine Building upper portion), reinforced concrete structure (Turbine Building lower portion, Turbine Foundation) and pile foundation. Except for certain parts of the steel frame upper portion, all structural elements of the turbine building are capable of withstanding a SSE event. The results of the structural evaluation are discussed below.

8.1 Turbine Building Upper Portion: (Main floor up to roof)

The results from the static analysis show that some bracings of this steel frame structure are not strong enough to withstand lateral load in the event of SSE.

Critical members, (beams that are overstressed) are listed in Table 8.1. Among these members, beam elements 195, 196, 206, 207 Figure 7.6 (bracing on top roof) have a slenderness ratio $\ell/r > 200$.

8.2 Turbine Building Lower Portion: (Ground floor up to main floor)

The stress in this portion is small compared to the allowable stress. There is no tension stress since the magnitude of axial stress caused by dead load is greater than seismic bending stress. Table 8.2 show results of analysis.

8.3 Pile Foundation

Pile load, which was calculated from combination model of Turbine Building and Turbine Foundation, is subject to a maximum compressive load of 81.82K. The piles were driven to a safe bearing capacity of 100K per pile (Ref 5). Hence the maximum pile load is lower than its rated capacity. No tensile loads exist in any of the piles (Table 8.3).

8.4 Turbine Foundation

Table 8.4 summarizes the stresses results for the Turbine Foundation analysis, and it shows that the foundation is safe under a SSE event.

Maximum horizontal displacement of the Turbine Building and the Turbine Foundation at El 668' (Mainfloor) are .045" and .078" respectively (X2 direction) (See Table 7.2 and 7.3). These displacements show that even in the worst case that the turbine building and the turbine foundation are separate and vibrating out of phase, they will not interact and damage each other since the gap between two structures is 1".

CRITICAL BRACING TABLE 8.1

Element Nº	Beam Type	ℓ/r	A.I.S.C. Buckling Allowable (Kpsi)	S.S.E. Buckling Allowable (Kpsi)	Axial Stress (Kpsi)	Location
195	3x3x¼ Angle	219	6.22*	9.95	19.54	Top Roof
196	3x3x¼ Angle	218	6.22*	9.95	18.82	Top Roof
206	3x3x¼ Angle	213	6.22*	9.95	25.65	Top Roof
207	3x3x¼ Angle	213	6.22*	9.52	26.02	Top Roof
224	2 Angles 4x3x¼	119	10.43	16.668	19.39	Top Roof
225	2 Angles 4x3x¼	119	10.43	16.668	18.21	Top Roof
329	2 Angles 3x2x 3/8	172	6.82	10.91	11.74	Column Bracing
330	2 Angles 3x2x 3/8	166	7.04	11.26	13.97	Column Bracing
331	2 Angles 3x2x 3/8	172	6.82	10.91	11.68	Column Bracing
332	2 Angles 3x2x 3/8	166	7.04	11.26	14.13	Column Bracing
333	2 Angles 4x3x¼	141	8.39	13.42	14.12	Column Bracing
334	2 Angles 4x3x¼	141	8.39	13.42	13.89	Column Bracing
335	2 Angles 4x3x¼	134	8.94	14.3	14.25	Column Bracing
336	2 Angles 4x3x¼	134	8.94	14.3	14.33	Column Bracing
337	2 Angles 4x3x¼	134	8.94	14.3	13.72	Column Bracing
338	2 Angles 4x3x¼	134	8.94	14.3	13.80	Column Bracing
339	2 Angles 3x2x 3/8	187	6.42	10.27	18.20	Column Bracing
340	2 Angles 3x2x 3/8	187	6.42	10.27	18.31	Column Bracing
341	2 Angles 3x2x 3/8	153	7.64	12.22	16.25	Column Bracing
342	2 Angles 3x2x 3/8	153	7.64	12.22	16.33	Column Bracing
343	2 Angles 3x2x 3/8	153	7.64	12.22	15.82	Column Bracing
344	2 Angles 3x2x 3/8	153	7.64	12.22	15.90	Column Bracing

* Using minimum allowable buckling stress of $\frac{\ell}{r} = 200$

CRITICAL BRACINGS TABLE 8.1

Element N°	Beam Type	ℓ/r	A.I.S.C. Buckling Allowable (Kpsi)	S.S.E. Buckling Allowable (Kpsi)	Axial Stress (Kpsi)	Location
345	2 Angles 3x2x 3/8	172	6.82	10.91	13.22	Column Bracing
346	2 Angles 3x2x 3/8	172	6.82	10.91	13.27	Column Bracing
347	2 Angles 3x2x 3/8	163	7.16	11.46	15.71	Column Bracing
348	2 Angles 3x2x 3/8	163	7.16	11.46	15.99	Column Bracing
349	2 Angles 3x2x 3/8	163	7.16	11.46	14.21	Column Bracing
350	2 Angles 3x2x 3/8	163	7.16	11.46	14.42	Column Bracing

TABLE 8.2 TURBINE BUILDING LOWER PORTION SEISMIC/STRUCTURAL EVALUATION

Node	Location	Elevation	Allowable Stress (ksi)		Calculated Stress (ksi)			
					D + L + E		1.7 (D + L)	
			(Compression)	(Shear)	(Compression)	(Shear)	(Compression)	(Shear)
2	Mezzanine Floor	654'	2.957	.118	.2456	.0377	.3292	-
3	Main Floor	668'	2.975	.118	'290	.0301	.1798	-

* This reflects more conservative than 1.4D + 1.7L.

TABLE 8.3

MAXIMUM PILE LOAD

DEAD LOAD AND LIVE LOAD

	Pile Group No.	Acutal Load (Compression)	Design Load
Maximum Pile Load	Each pile	57.57 kps	100 kps

DEAD LOAD AND LIVE LOAD AND SEISMIC

	Pile Group No.	Actual Load (Compression)	Design Load
Maximum Pile Load	8	81.82 kps	100 kps

TABLE 8.4 TURBINE FOUNDATION
SEISMIC/STRUCTURAL EVALUATION

Allowable Stress (ksi)			Calculated Stress (ksi)					
			1.7 (D + L) *			D + L + E'		
Compression	Shear	Tension *	Compression	Shear	Tension	Compression	Shear	Tension
2.975	.118	.444	.152	-	-	.1133	.025	.0132

* This allowable is modulus of ruputre of concrete. Since tension of Turbine Foundation is too small comparing to allowable, no need to check reinforcing.

REFERENCES

1. US NRC NUREG/CR 0098, "Development of Criteria for Seismic Review of Selected Nuclear Power Plants", N.W. Newmark, W.J. Hall, May 1978.
2. "Vibrations of Soils and Foundations", by F.E. Richurt Jr., J.R. Hall Jr., and R.D. Woods, Pub. by Prentice Hall, 1970.
3. Nuclear Energy Services, Inc. computer printout binder S-62 Vol. I (turbine Building Analysis)
4. Nuclear Energy Services, Inc. computer printout binder S-62 Vol. II (Turbine Foundation Analysis)
5. Specification A-4109 "Foundation Piles, LaCrosse Boiling Water Reactor Project Dairyland Power Cooperative Association," Sargent & Lundy Engineers, Chicago, Ill. January 1975.

APPENDIX A

DETAILED
CALCULATIONS

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	REF.

REFERENCES

1. TURBINE BUILDING DRAWING, Sargent & Lundy Engineers, B-1 Through B-70
2. SPECIFICATION AC 41-561 "BUILDING WORK" Sargent & Lundy, Chicago, Ill.
3. REGULATORY GUIDE 1.61, October 1973.
4. SITE SPECIFIC RESPONSE SPECTRA
5. Vibrations of Soils and Foundations, F.E. Richart, Jr., Prentice Hall 1970
6. (SOIL PROPERTY)
7. BASIS OF SEISMIC DESIGN PROVISIONS FOR WELDED STEEL OIL STORAGE TANK
8. DEVELOPMENT OF CRITERIA FOR SEISMIC REVIEW OF SELECTED NUCLEAR POWER PLANTS - N.M. NEWMARK, May 1978.
9. FOUNDATION ENGINEERING - RALPH B. PECK, WALTER E. HANSON, THOMAS H. THORNBURN - SECOND EDITION.
10. REINFORCED CONCRETE DESIGN - CHU KIA WANG, CHARLES G SALMON - THIRD EDITION
11. AISC SPECIFICATION, 1980 Edition
12. MARK'S STANDARD HANDBOOK FOR MECHANICAL ENGINEERS - 8th Edition.
13. RECOMMENDED LATERAL FORCE REQUIREMENTS AND COMMENTARY, 1975 Edition.

TURBINE BUILDING ANALYSIS - SUMMARY | REF.

SUMMARY

The Turbine building is analysed by two methods.

1. Dynamic Analysis : In this analysis displacement and acceleration responce of the Building versus earthquake are found. Building is modeled as a vertical cantilever beam with different cross section due to different level. At ground level, the ground floor is supported by spring stiffness appropriated with soil frictions. Response spectra of the earthquake then is applied to Ground floor.

2. Static Analysis : The upper floor of Turbine building (From Main floor to Roof) is analysed in this anlysis. This level is the most flexible comparing to the lower levels, and is suspected not strong enough to stand earthquake. Acceleration response from Dynamic Analysis is input to Static Analysis and result stresses in element will lead to a conclusion of how strong the Turbine building's upper part is.

From Dynamic and Static Post Run of Turbine building Analysis we get:

* Acceleration response for upper part:
  - X_1 = .1865 G
  - X_2 = .1803 G
  - X_3 = .2350 G

* From Static Post Run of 30lb/ft² Live load and 90lb/ft² Live load, we get following CRITICAL BRACING and CRITICAL BEAM tables:

REF.

TURBINE BLDG ANALYSIS - SUMMARY

CRITICAL BRACINGS TABLE 8.1 FROM OUTPUT S62COKU, POST RUN OF DEADLOAD $\pm\sqrt{x^2+y^2+z^2}$ (EARTHQUAKE)

Element N°	BEAM TYPE	ℓ/r	A.I.S.C. Buckling Allowable (kpsi)	S.S.E. Buckling Allowable (kpsi)	Axial Stress (kpsi)	Location
195	3×3×1/4 L	129.6/.592	6.22	9.95	19.54	TOP ROOF
196	"	129.6/.592	6.22	9.95	18.82	" "
206	"	126/.592	6.22	9.95	25.65	" "
207	"	126/.592	6.22	9.52	26.02	" "
224	2 ⊤⊤ 4×3×1/4	153.6/1.29	10.43	16.668	19.39	" "
225	"	133.6/1.29	10.43	16.668	18.21	" "
329	2 ⊤⊤ 3×2×3/8	183.6/1.07	6.82	10.91	11.74	COLUMN BRACING
330	"	177.3/1.07	7.04	11.26	13.97	" "
331	"	183.6/1.07	6.82	10.91	11.68	" "
332	"	177.3/1.07	7.04	11.26	14.13	" "
333	2 ⊤⊤ 4×3×1/4	181.6/1.29	8.39	13.42	14.12	" "
334	"	181.6/1.29	8.39	13.42	13.89	" "
335	"	172.4/1.29	8.94	14.3	14.25	" "
336	"	172.4/1.29	8.94	14.3	14.33	" "
337	"	172.4/1.29	8.94	14.3	13.72	" "
338	"	172.4/1.29	8.94	14.3	13.80	" "
339	2 ⊤⊤ 3×2×3/8	200/1.07	6.42	10.27	18.20	" "
340	"	200/1.07	6.42	10.27	18.31	" "
341	"	164/1.07	7.64	12.22	16.25	" "
342	"	164/1.07	7.64	12.22	16.33	" "

REF.

TABLE 8.1 CONT'D

Element N°	BEAM	l/r	AI.S.C. Buckling Allowable (kpsi)	S.S.E. Buckling Allowable (kpsi)	Axial Stress (kpsi)	Location
343	2T 3x2x3/8	164/1.07	7.64	12.22	15.82	COLUMN BRACING
344	"	164/1.07	7.64	12.22	15.90	" "
345	"	183.6/1.07	6.82	10.91	13.22	" "
346	"	183.6/1.07	6.82	10.91	13.27	" "
347	"	174.6/1.07	7.16	11.46	15.71	" "
348	"	174.6/1.07	7.16	11.46	15.99	" "
349	"	174.6/1.07	7.16	11.46	14.21	" "
350	"	174.6/1.07	7.16	11.46	14.42	" "

REF.

TURBINE BUILDING ANALYSIS — SUMMARY

LIVE LOAD 30 lb/ft^2.

CRITICAL BEAM:

At El. 664' (Water tank area) we have 8" reinforced concrete slab which support water tank weight. Since this slab is not supported by any Reinforced concrete wall or column, we then make assumptions:

✓ 1.– In plane moment of slab will be taken over by underneath slab or in other words, dead load will be taking care by steel beams

✓ 2.– Out plane moment of slab will be taken over by slab itself, or horizontal seismic will be resisted by slab.

✓ 3.– Between column row (5) and column row (7), we have a 4' long of 8" slab laying over 14B22 framming steel. Since 14B22 is too weak to subject to Watertank + slab load, this part of slab will take the load like a cantilever beam and then transfer it to 18WF50 beam

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TURBINE BUILDING ANALYSIS – SUMMARY | REF.

LIVE LOAD 90lb/ft²

For Live load 90lb/ft², we only look at DEAD LOAD case

From Output SE200PC – Static run for Live load 90lb/ft², we get critical beams as following :

CRITICAL BEAMS :

Element N°	AISC Bending Allowable (ksi)	Bending Stress (ksi)	Location
102	23.76	26.88	Top Roof
103	" "	26.81	" "
104	" "	26.81	" "
105	" "	25.90	" "
106	" "	30.55	" "
107	" "	30.55	" "
120	" "	35.72	" "
121	" "	35.72	" "
124	" "	25.62	" "
125	" "	32.72	" "
126	"	36.00	" "
127	" "	36.00	" "
128	" "	35.77	" "
129	" "	32.09	"
130	" "	24.96	" "
134	" "	32.5	
135	" "	32.5	
137	" "	25.67	" "
138	" "	32.79	"
139	" "	36.07	" "

TURBINE BUILDING ANALYSIS - SUMMARY

REF.

CRITICAL BEAMS LIVE LOAD 90lb/ft²

Element N°	AISC bending Allowable (kpsi)	Bending stress (kpsi)	Location
140	23.76	36.07	Top Roof
141	" "	35.85	" "
142	" "	32.15	" "
143	" "	25.03	" "
147	" "	36.13	" "
148	" "	36.13	" "
150	" "	26.10	" "
151	" "	33.35	" "
152	" "	36.66	" "
153	" "	36.66	" "
154	" "	36.43	" "
155	" "	32.66	" "
156	" "	25.42	" "
160	" "	33.7	" "
161	" "	33.7	" "
163	" "	24.84	" "
164	" "	31.61	" "
165	" "	34.74	" "
166	" "	34.74	" "
167	" "	34.56	" "
168	" "	30.97	" "
169	" "	24.17	" "
172	" "	33.70	" "
173	" "	33.69	" "

	REF.

TURBINE BUILDING ANALYSIS – SUMMARY.

CRITICAL BEAMS LIVE LOAD 90 lb/ft²

Element N°	AISC Bending Allowable (ksi)	Bending stress (ksi)	Location
183	23.76	27.07	Top Roof ✓
184	"	32.16	" " ✓
185	" "	32.16	" " ✓
188	" "	24.51	" " ✓
189	" "	24.51	" " ✓
394	23.76	23.99	El. 684' Roof ✓
395	" "	24.02	" " ✓
406	" "	23.92	" " ✓
407	" "	23.98	" " ✓
412	" "	23.40 OK.	" " ✓
413	" "	23.40 OK.	" " ✓
392	" "	26.89	El. 684' Roof (Underneath water tank area ✓
393	" "	26.89	✓ *
360	" "	29.83	El 684' ROOF ✓
361	" "	29.83	" ✓
362	" "	27.25	" ✓
367	" "	29.59	" ✓
368	"	29.53	" ✓
369	" "	27.13	" " ✓
396	" "	23.72 OK	" " ✓
408	"	23.43 OK	" ✓
419	" "	24.48	" ✓
420	" "	24.38	" ✓

* Underneath beams 392 and 393 is a block wall. This block wall may possibly reduce the stress in the beams enough so that they are ok

NEW SPECTRA HORIZONTAL | REF.

SPECTRA ATTACHMENT 1 MODIFIED FOR 7% DAMPING

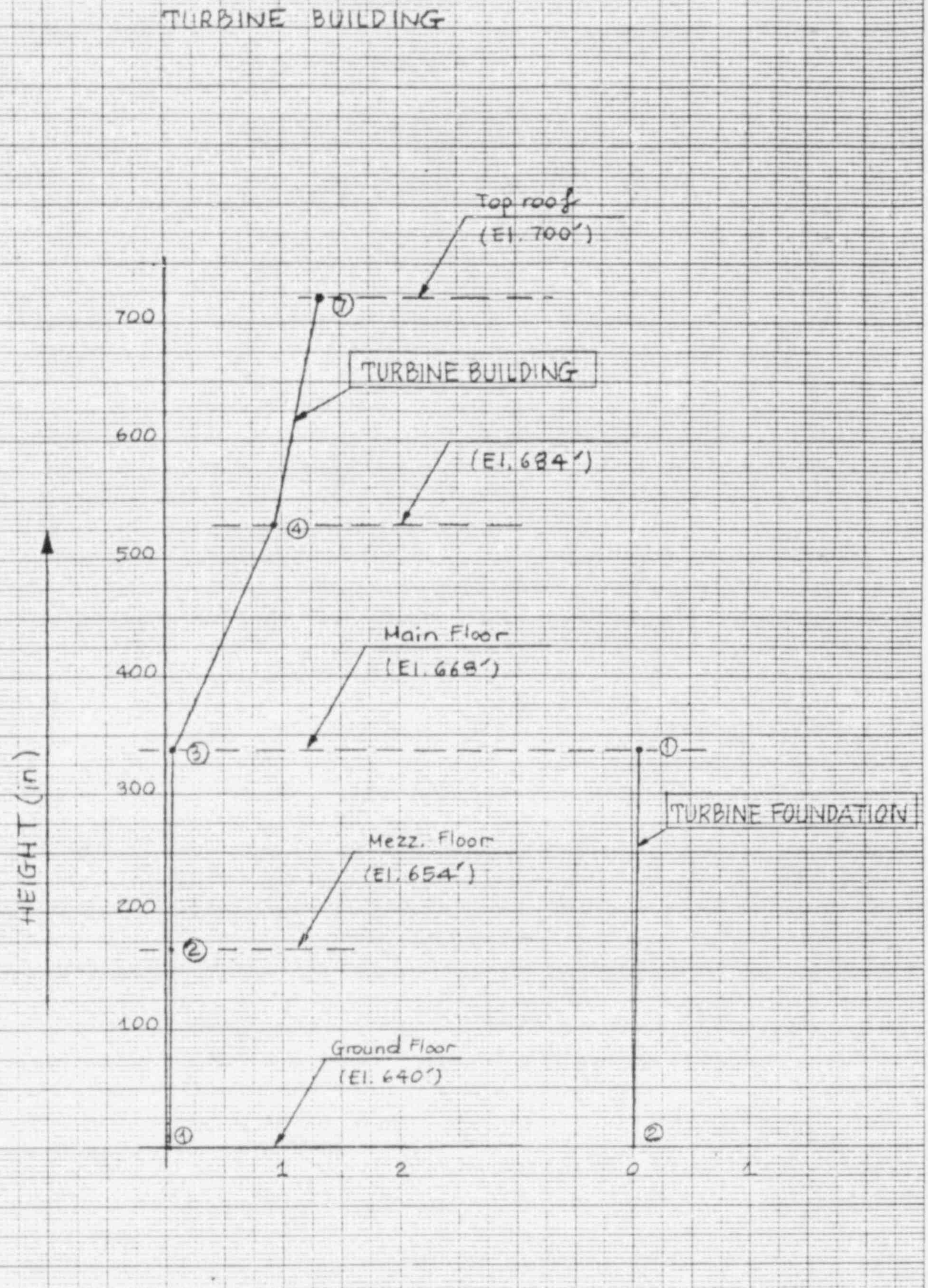
	HORIZONTAL FREQUENCY (Hz)	ACCELERATION	FACTOR (FROM REG GUIDE)
	50	0.110	1.0
A	33	0.110	1.0
	25	0.110	
	22	0.155	USED
	15	0.130	
	10	0.162	
B	8	0.166	0.924
	6	0.176	
	5	0.185	
	4	0.194	
	3	0.179	
	2.5	0.176	
	2.0	0.166	USED
	1.5	0.157	
	1.0	0.139	
	0.8	0.120	
	0.6	0.083	
C	0.4	0.050	0.838
D	0.25	0.036	0.900
	0.15	0.036	0.900
	0.10	0.036	0.900
	0.05	0.036	0.900

VERTICAL SPECTRA	NEW SPECTRA	REF.

VERTICAL 7% DAMPING

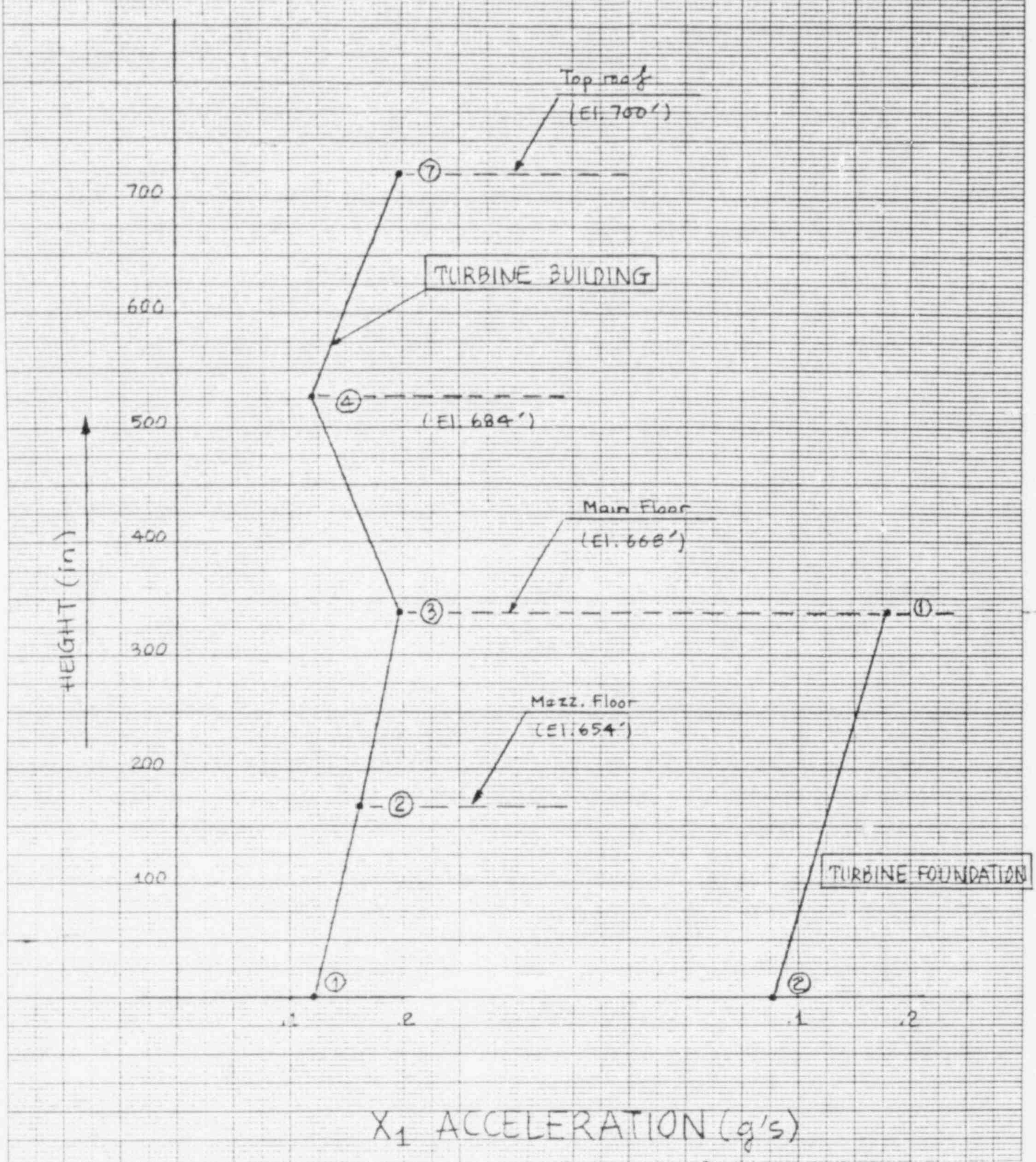
	FREQUENCY (Hz)	ACCELERATION (G)	FACTOR	
	50 ✓	0.110 ✓	1.0	
A	33 ✓	0.110 ✓	1.0	
	25	0.110	1.0	
	22	0.155	1.0	
	15	0.130	1.0	
	10	0.162	1.0	
B —	8	0.166	1.0	
	6	0.176	1.0	
	5	0.185	1.0	
	4	0.194	1.0	
	3	0.170	0.949	Ts
	2.5	0.158	0.898	
	2.0	0.140	0.846	Δ = .333
	1.5	0.125	0.795	
Δ = 3.25	1.0	0.103	0.744	
	0.8	0.087	0.723	
	0.6	0.058	0.703	
C	0.4	0.034	0.682	
D	0.25	0.024	.667	REG GUIDE 1.60
	0.15	0.024	.667	
	0.10	0.024	.667	
	0.05	0.024	.667	

$$\frac{x}{.333} = \frac{1\ Hz}{3.25}$$


TURBINE BUILDING
Top roof
(El. 700')
TURBINE BUILDING
(El. 684')
Main Floor
(El. 669')
TURBINE FOUNDATION
Mezz. Floor
(El. 654')
Ground Floor
(El. 640')
700
600
500
400
300
200
100
HEIGHT (in)
1
2
0
1
X1 DEFLECTION (in)

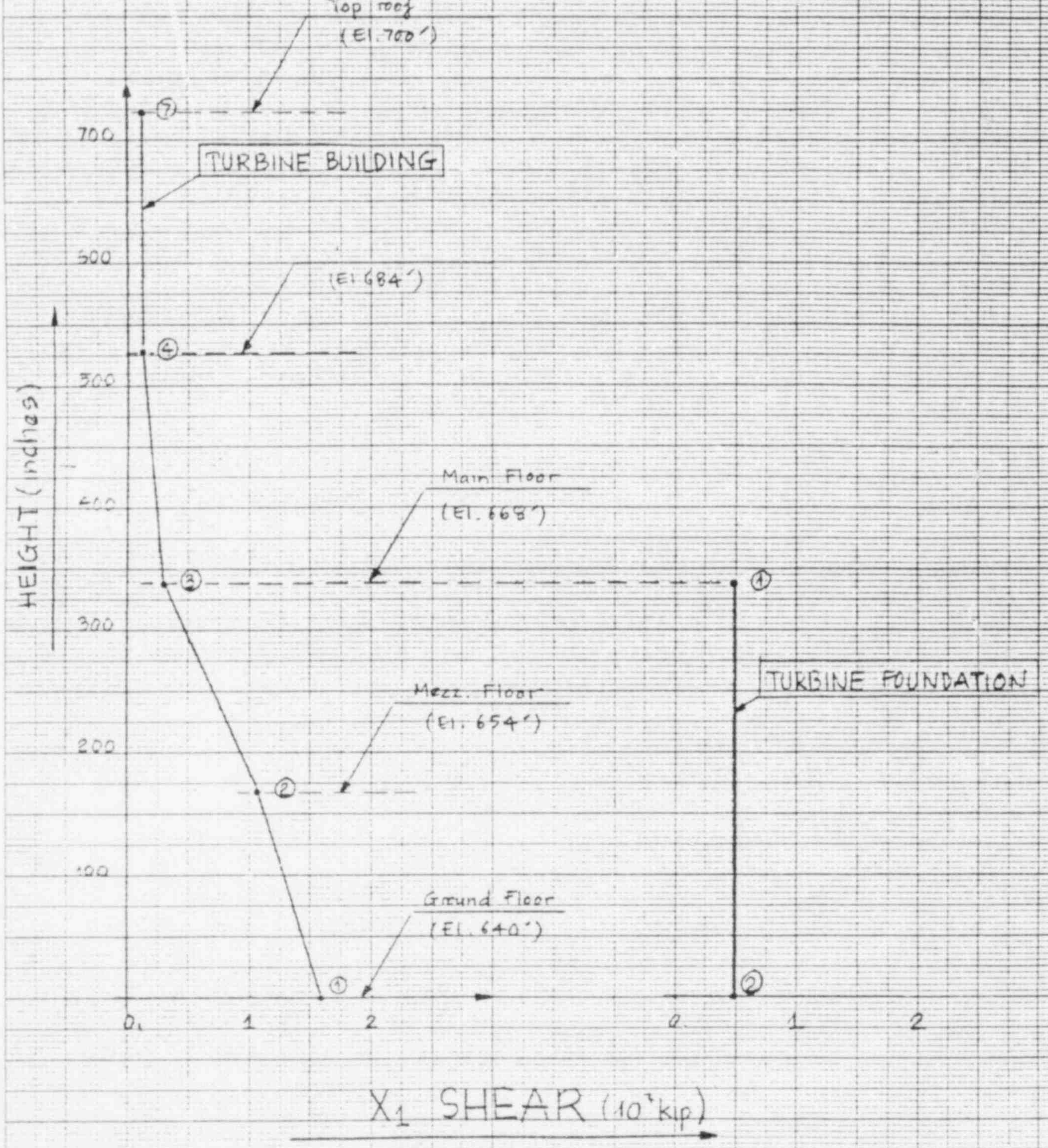
461510

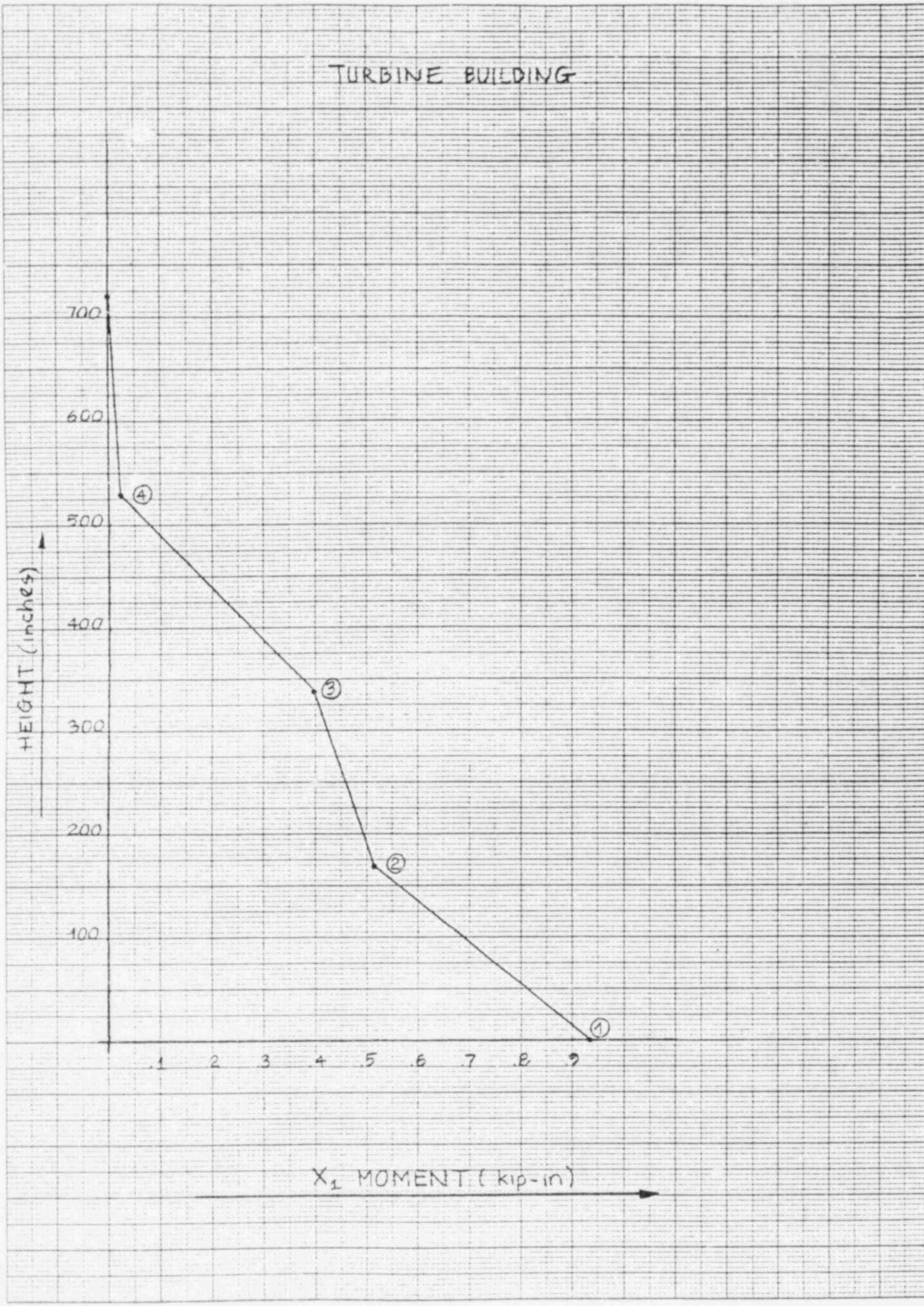
TURBINE BUILDING



461510

TURBINE BUILDING



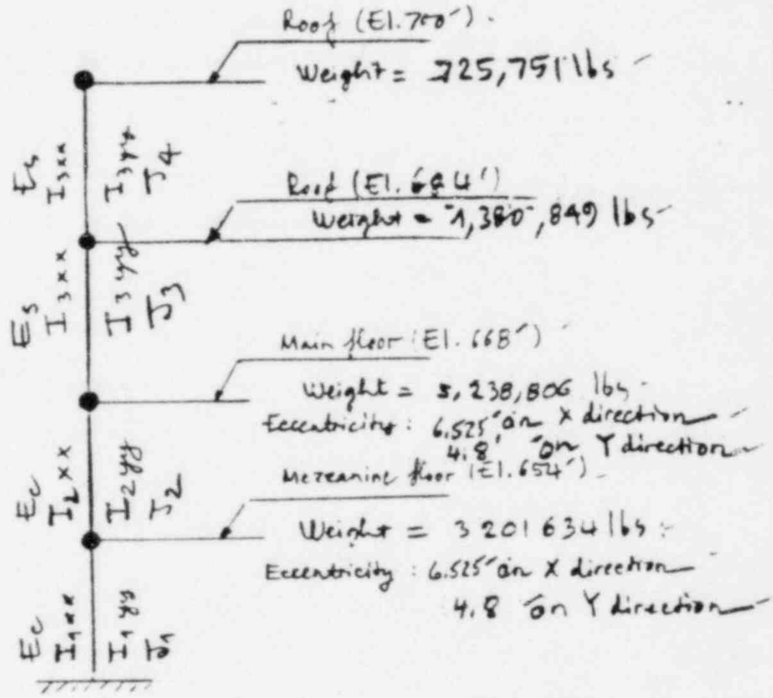

TURBINE BUILDING
HEIGHT (inches)
700
600
500
400
300
200
100
④
③
②
①
.1
.2
.3
.4
.5
.6
.7
.8
.9
X_1 MOMENT (kip-in)

461510

	REF.
TURBINE BUILDING — BUILDING MODAL	

Eccentricity assumption:

For lumped mass at Mezzanine floor and Main floor, eccentricity is taken as 5% of the width of the structure in the direction of the earthquake motion for that earthquake direction..



$I_{1xx} = 478,796\ ft^4$, $I_{1yy} = 613,435\ ft^4$, $E_c = 3.37 \times 10^6\ psi$

$I_{2xx} = 607,783\ ft^4$, $I_{2yy} = 955,654\ ft^4$, $E_c = 3.37 \times 10^6\ psi$

$I_{3xx} = 7867\ ft^4$, $I_{3yy} = 12066\ ft^4$, $E_s = 29 \times 10^6\ psi$

$J_1 = 1,055,332\ ft^4$, $J_2 = 1498661\ ft^4$, $J_3 = 19954\ ft^4$

$1.63 \times 10^8\ in^4$ $\quad$ $2.5 \times 10^8\ in^4$

TURBINE BUILDING - BUILDING MODEL | REF.

From stardyne manual, page B1-112.

To take bracing of the Turbine building upper portion as main structure to resist lateral load, we have to set up properties of beam 3 and 4 of Dynamic model:

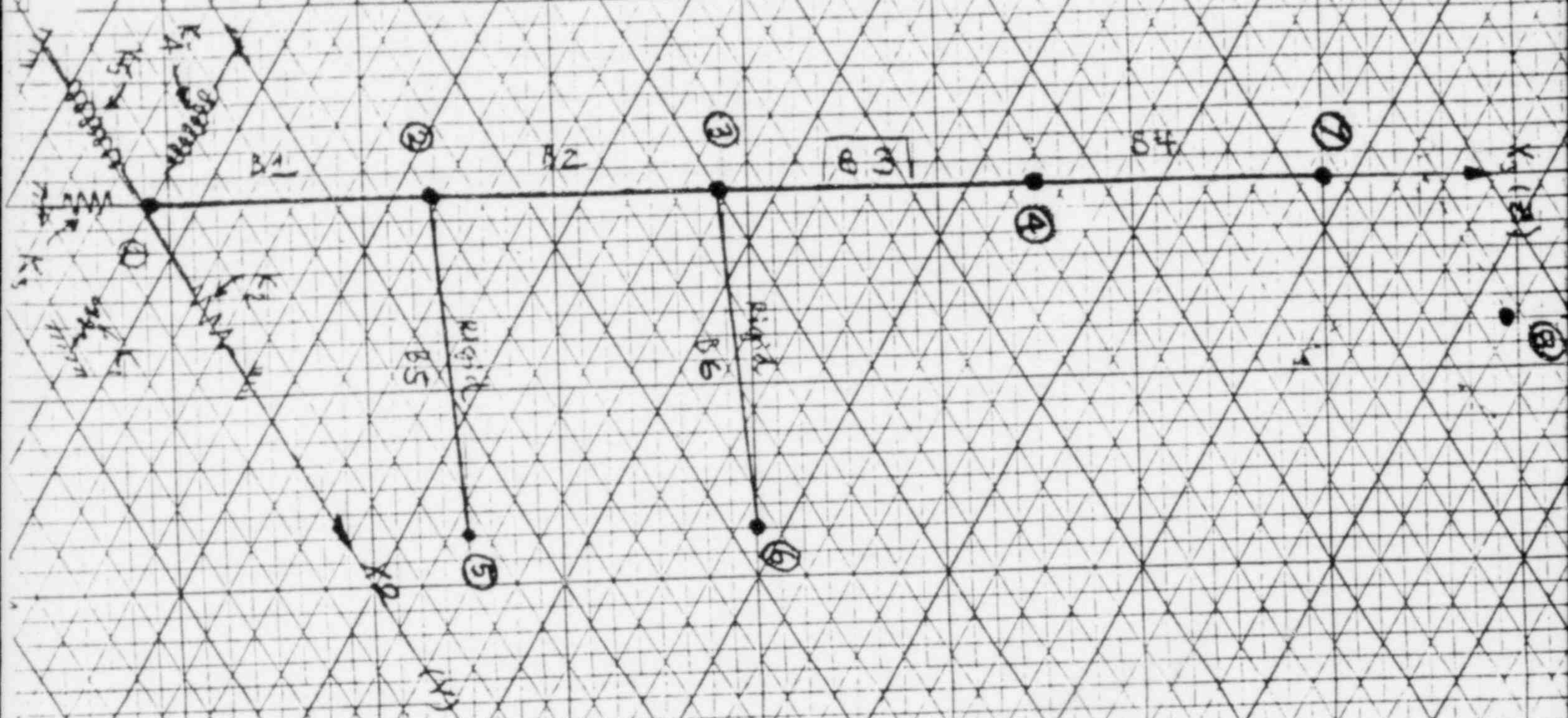
$I_x = I_y = J = 10^{15}\ in^4$ (Arbitrary high number)

$A = 363.2\ in^2$ (area

$SF2 = .016$
$SF3 = .013$ } shear factor, from page 50

Such that SF2 * A = Equivalent shear area of bracing in x direction

SF3 * A = Equivalent shear area of bracing in y direction



TURBINE CULLING MODEL

PREPARED BY: NHAN CAO DATE

CHECKED BY: ALAN ZOLLNER DATE

TURBINE BUILDING — BUILDING WEIGHT | REF.

TURBINE BUILDING WEIGHT SUMMARY TABLE

PART	Mass lumped to mezzanine floor (lbs)	Mass lumped to main floor (lbs)	Mass lumped to Roof El. 684'	Mass lumped to Roof El. 700'
Outer wall	930,925	767,791	165,231	82616
Inner wall	215,775	318,480	—	—
Partition	42,000	90,000	46,000	—
Column	207,109	162,758	39,469	19,735
Mezzanine slab weight	769,489	—	—	—
Mezzanine framing	53,450	—	—	—
Mezzanine live load	982,886	—	—	—
Main floor slab weight	—	1,130,835	—	—
Main floor framing	—	126,042	—	—
Main floor live load	—	2,642,900	—	—
Roof framing	—	—	28037	56074
Roof slab weight	—	—	520,522	234,958
Roof insulating	—	—	18,160	32,918
Roof live load			120,510	219,450
Water tank			440,900	
Gantry				80,000
Σ	3,201,634	5,238,806	1,380,849	725,751

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CHKD. Kepr DATE ____ PAGE 3 OF ____

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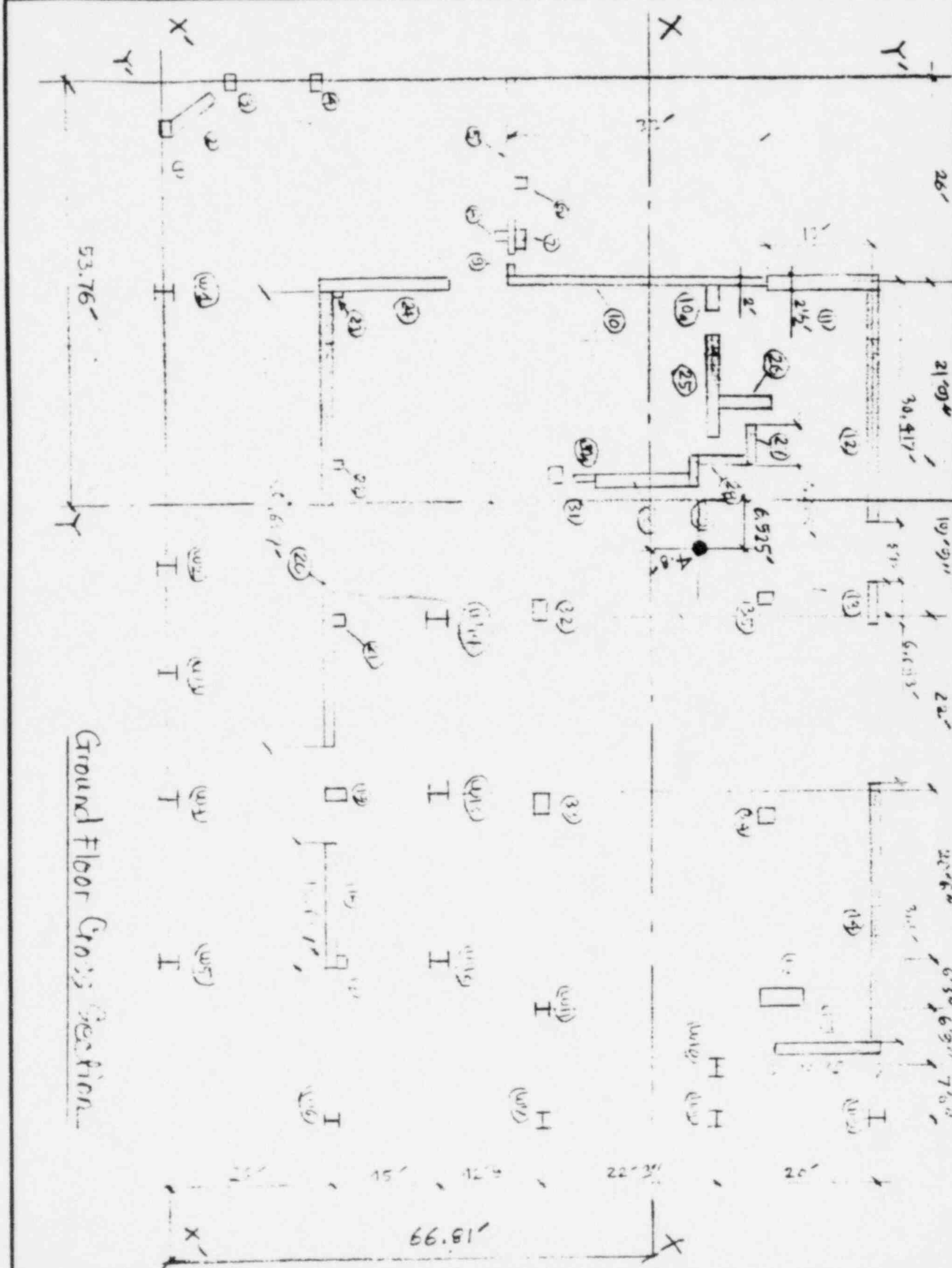
TURBINE BUILDING - GROUND FLOOR CENTROID AND MOMENT INERTIA	REF.



TURBINE BUILDING – GROUND FLOOR CENTROID AND MOMENT INERTIA | REF.

PART	DIMENSION (ft x ft)	Area, A (ft²)	x' (ft)	Ax' (ft³)	y' (ft)	Ay' (ft³)
1	2.5x1.5	3.75	4.917	18.438	0	0
2	5.85x1	5.29	5.435	[illegible].623	4.055	36.301
3	2.5x1	2.5	0	0	14.552	36.38
4	2.5x1.5	3.75	0	0	26	97.5
5	17x1	17	8.5	144.5	52	850
6	1x1	1	6.25	6.25	51	51
7	2.5x1	2.5	14.25	35.625	51	127.5
8	2x2	4	14	56	48.5	194
9	3.66x1	3.66	17.167	62.831	50	183
10	33x2	66	26	1716	66.5	4389
[illegible]	2x2	4	28	112	76.25	305
11	2.5x13	32.5	26.25	853.125	69.5	2258.75
12	30.417x2.5	76.042	41.218	3133.529	96	7300.032
13	6.083x2.5	15.207	65.5	996.0[illegible]	96	1459.872
14	31.5x2	63	85.5	5375.5	96	6048
15	12.75x2	25.5	121	3085.5	64.625	2255.437
16	7x2	14	116	1624	84.646	1185.044
17	2.25x2	4.5	110	495	26	117
18	16.667x1	16.667	101.667	1694.484	24.5	408.342
19	3.25x2	6.5	81.5	531.75	26	169
20	58.667x1	58.667	55.333	3246.22	24.5	1437.341
21	2.25x2	4.5	67.5	[illegible]	26	117
22	2.25x2	4.5	47.75	214.875	26	117
23	2.25x2	4.5	26	117	26	117
24	15.67x1	15.67	24.5	383.915	33.035	520.154
25	12.75x2	25.5	37.125	946.687	76.25	1944.375
26	6.75x1	6.75	35	236.5	80.625	544.219

TURBINE BUILDING — GROUND FLOOR CENTROID AND MOMENT INERTIA | REF.

PART	DIMENSION ft x ft	Area A (ft²)	x' (ft)	Ax' (ft³)	y' (ft)	Ay' (ft³)
27	7.208 x 2	14.416	44.604	643	80.396	1158.989
28	6 x 2	12	47.208	566.496	76.396	916.752
29	4.667 x 2	9.334	48.542	453	72.396	675.744
30	11 x 2	22	49.875	1097.25	66	1452
31	2 x 2	4	48.75	195	55.75	223
32	3 x 2.25	6.75	66	445.5	53.75	362.812
33	3 x 2.25	6.75	91	614.25	53.75	362.812
34	2 x 2	4	91.5	366	82.167	328.668
35	2 x 2	4	65.5	262	82.167	328.668
W1	W12x65	1.197 *	26	31.122	0	0
W2	W12x50	.918 *	59.083	54.238	0	0
W3	W12x45	.828 *	72.75	60.237	0	0
W4	W12x72	1.323 *	89.5	118.409	0	0
W5	W12x45	.828 *	110	91.08	0	0
W6	W12x53	.972 *	130.5	126.846	26	25.272
W7	W12x53	.972 *	130.5	126.846	53.75	52.245
W8	W12x53	.972 *	130.5	126.846	76	73.872
W9	W12x40	.738 *	130.5	96.309	96	70.846
W10	W12x40	.738 *	[illegible]	90.774	[illegible]	56.088
W11	W12x40	.738 *	116.25	85.793	53.75	39.667
W12	W12x40	.738 *	110	81.18	41	30.258
W13	W12x53	.972 *	89.5	86.994	41	39.852
W14	W12x45	.828 *	67.5	55.89	41	33.948
	Σ	587.055		31556.231		39221.145

* Value = 9 x true value (Equivalent of steel to concrete)

$$X' = \frac{\Sigma Ax'}{\Sigma A} = \frac{31556.231}{587.055} = 53.76'$$

$$Y' = \frac{\Sigma Ay'}{\Sigma A} = \frac{39221.145}{587.055} = 66.81'$$

NUCLEAR ENERGY SERVICES

BY [illegible] DATE [illegible] PROJ. [illegible] TASK [illegible]
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TURBINE BUILDING — GROUND FLOOR CENTROID AND MOMENT INERTIA

REF.

PART	Area, A (ft²)	d_x (ft)	d_y (ft)	Ad_x^2	Ad_y^2	I_x (ft⁴)	I_y (ft⁴)
1	3.75	48.843	66.81	8946	16738	.713	4.953
2	8.88	51.325	62.722	23392	34934	78	.74
3	2.5	53.76	52.258	7225	1927	.208	1.3
4	3.75	53.76	[illegible]	10838	6245	.703	4.953
5	17	45.26	16.81	34824	4804	1.417	409
6	1	47.51	15.81	2257	250	.083	.083
7	2.5	39.51	15.81	3903	625	.208	1.302
8	4	39.76	18.31	6323	1341	1.333	1.333
9	3.66	36.593	16.81	4901	1034	.305	4.086
10	66	27.76	.31	50861	6	7980	22
10a	4	25.76	9.44	2654	356	1.333	1.333
11	32.5	27.51	22.69	24596	16732	458	17
12	76.042	12.552	29.19	11981	64792	40	5863
13	15.207	11.74	29.19	2095	12957	7.92	47
14	63	34.74	29.19	76033	53679	21	5209
15	25.5	67.24	22.815	115291	13273	345	8.5
16	14	62.24	17.876	54233	4474	57.166	4.667
17	4.5	56.24	40.81	14233	7494	1.495	1.5
18	16.67	47.707	42.31	37852	29836	1.089	366
19	6.5	35.74	40.51	[illegible]	10625	5.721	2.167
20	57.667	1.573	42.31	145	105822	4.959	16527
21	4.5	10.74	40.81	543	7494	1.496	1.5
22	4.5	6.01	40.81	162	7494	1.496	1.5
23	4.5	27.76	40.81	3468	7494	1.495	1.5
24	15.67	29.26	32.977	13416	17039	321	1.396
25	25.5	16.633	9.44	7056	2272	8.5	345.44
26	6.75	15.76	13.515	1675	1258	26	.563

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NUCLEAR ENERGY SERVICES

BY	[illegible]	DATE	[illegible]	PROJ.	[illegible]	TASK	
CHKD.	[illegible]	DATE	7/20/81	PAGE	7	OF	

TURBINE BUILDING — GROUND FLOOR CENTROID AND MOMENT INERTIA | REF.

PART	Area A (ft^2)	d_x (ft)	d_y (ft)	Ad_x^2 (ft^4)	Ad_y^2 (ft^4)	I_x (ft^4)	I_y (ft^4)
27	14.416	9.156	13.584	1205	2661	4.6	62.4
28	12	6.552	9.766	515	1103	36	4
29	8.334	5.819	5.786	284	281	3.11	16.94
30	22	3.885	.81	332	14.43	221.8	7.33
31	4	5.01	11.06	100	489	1.333	1.333
32	6.75	12.24	13.06	1011	1151	2.85	5.
33	6.75	37.24	13.06	9361	1151	2.85	5
34	4	37.74	15.357	5597	943	1.333	1.333
35	4	11.74	15.357	551	943	1.333	1.333
W1	1.137*	27.76	66.81	922	5343	Negl.	Negl.
W2	.918*	5.323	66.8	26	4095	Negl.	Negl.
W3	.828*	18.99	66.81	299	3696	Negl.	Negl.
W4	1.023*	5.74	66.81	1670	5905	Negl.	Negl.
W5	.828*	56.24	66.81	2619	3696	Negl.	Negl.
W6	.972*	76.74	40.81	5724	1619	Negl.	Negl.
W7	.972*	76.74	13.06	5724	166	Negl.	Negl.
W8	.972*	76.74	9.19	5724	82	Negl.	Negl.
W9	.738*	76.74	29.19	4346	629	Negl.	Negl.
W10	.738*	64.24	9.19	3034	62	Negl.	Negl.
W11	.733*	62.49	13.06	2852	125	Negl.	Negl.
W12	.735*	56.24	25.81	2324	492	Negl.	Negl.
W13	.972*	32.74	25.81	1042	647	Negl.	Negl.
W14	.828*	15.74	25.81	176	551	Negl.	Negl.
Σ				584169	471163.8	7632.88	29265.895

$I_{xx} = \Sigma A d_y^2 + \Sigma I_x = 471{,}163 + 7633 = 478796\ ft^4$

$I_{yy} = \Sigma A d_x^2 + \Sigma I_y = 584{,}169 + 29268 = 613435\ ft^4$

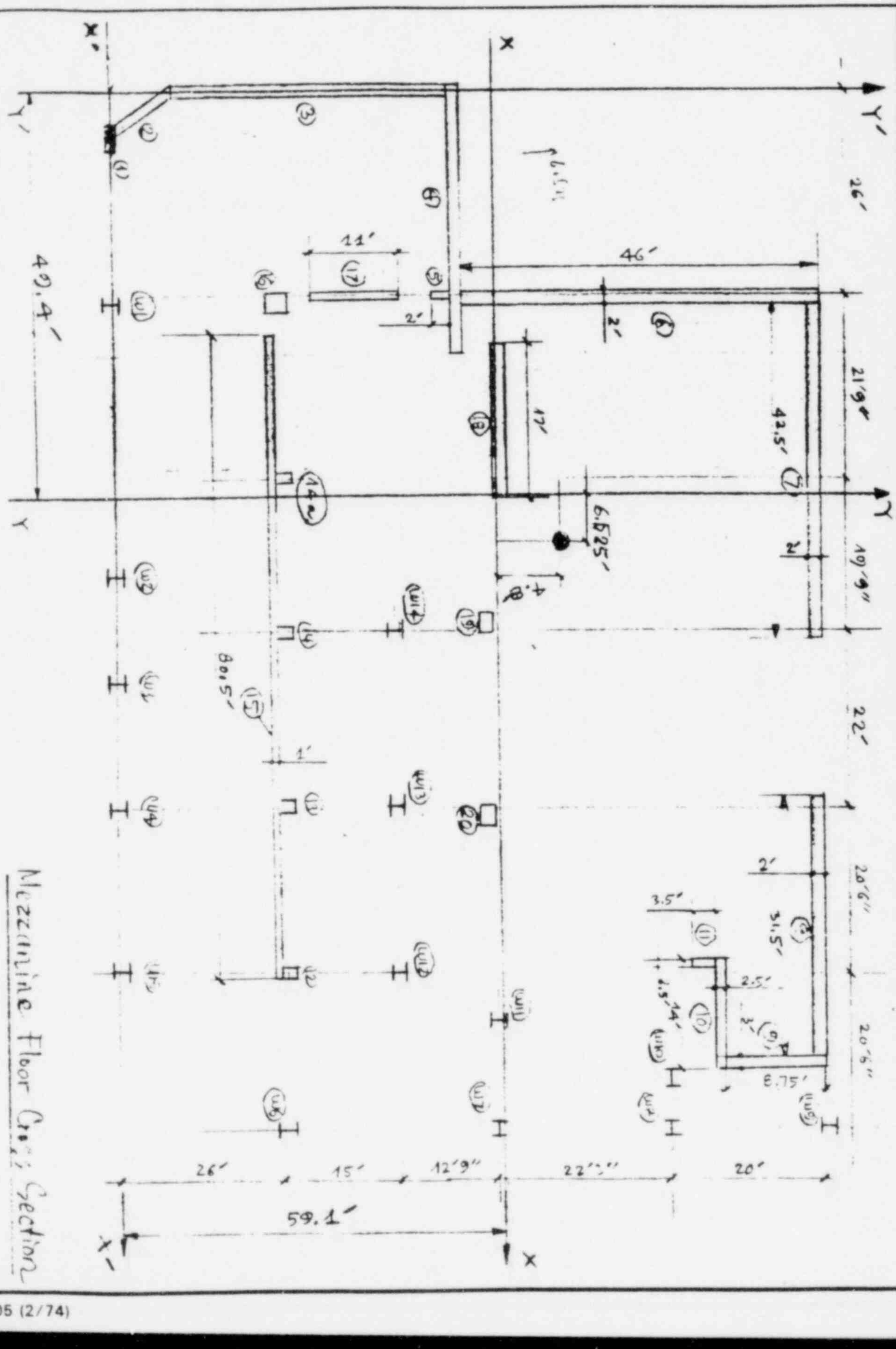
$\bar{J} = \Sigma A r^2 = \Sigma A d_x^2 + A d_y^2 = 471{,}163 + 584{,}169 = 1{,}055{,}332\ ft^4$

Column material is concrete $E_c = 3.37 \times 10$ [illegible]

* [illegible] = 8x [illegible]

E_c = [illegible]

TURBINE BUILDING - MEZZANINE FLOOR CENTROID AND MOMENT INERTIA. | REF.



NUCLEAR ENERGY SERVICES

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TURBINE BUILDING - MEZZANINE FLOOR CENTROID AND MOMENT INERTIA

REF.

PART	DIMENSION ft x ft	Area A (ft²)	x′ (ft)	Ax′ (ft³)	y′ (ft)	Ay′ (ft³)
1	3.25 x 1	3.25	4.542	14.761	0	0
2	16.75 x 2	33.5	1.458	48.843	8.25	276.375
3	33.5 x 2	67	0	0	33.25	2227.75
4	36.5 x 2	73	18.25	1332.25	50	3650
5	2 x 1	2	25.5	51	49	98
6	46 x 2	92	26	2392	74	6808
7	42.5 x 2	85	48.25	4101.25	96	8160
8	31.5 x 2	63	88.5	5575.5	96	6048
9	8.75 x 3	26.25	121	3176.25	91.625	2405.156
10	14 x 2.5	35	115	4025	86	3010
11	3.5 x 2.5	8.75	110	962.5	83	726.25
12	2.25 x 2	4.5	110	495	26	117
13	2.25 x 2	4.5	89.5	402.75	26	117
14	2.25 x 2	4.5	67.5	303.75	26	117
14a	2.25 x 2	4.5	47.75	214.875	26	117
15	80.5 x 1	80.5	70.75	5695.375	24.5	1972.25
16	3.25 x 3	9.75	25.5	248.625	25.375	247.4
17	1 x 1	11	25.5	280.5	35.83	394.13
18	17 x 2	34	42	1428	55.75	1895.5
19	3 x 2.25	6.75	66	445.5	53.75	362.812
20	3 x 2.25	6.75	91	614.25	53.75	362.812
W1	W12x65	1.197 *	26	31.122	0	0
W2	W12x52	.918 *	[illegible]	[illegible]	0	0
W3	W12x45	.828 *	72.75	[illegible]	0	0
W4	W12x72	[illegible] *	83.5	[illegible]	0	0
W5	W12x45	.828 *	110	91.08	0	0
W6	W12x50	.972 *	130.5	126.846	26	25.272

TURBINE BUILDING - MEZZANINE FLOOR CENTROID AND MOMENT INERTIA | REF.

PART	DIMENSION ft × ft	Area A (ft²)	x′ (ft)	Ax′ (ft³)	y′ (ft)	Ay′ (ft³)
W7	W12×53	.972*	130.5	126.846	53.75	52.245
W8	W12×53	.972*	130.5	126.846	76	73.872
W9	W12×40	.738*	130.5	96.309	96	70.846
W10	W12×40	.738*	123	90.774	76	56.088
W11	W12×40	.738*	116.25	85.793	53.75	39.667
W12	W12×40	.738*	110	81.18	41	30.258
W13	W12×53	.972*	89.5	86.994	41	39.852
W14	W12×45	.828*	67.5	55.89	41	33.948
Σ		668.762		33040.543		39534.483

*: Value = 9 × true value (Equivalent of steel to concrete)

Centroid

$$x' = \frac{\Sigma A x'}{\Sigma A} = \frac{33040.543}{668.762} = 49.4'$$

$$y' = \frac{\Sigma A y'}{\Sigma A} = \frac{39534.483}{668.762} = 59.1'$$

TURBINE BUILDING — MEZZANINE FLOOR CENTROID AND MOMENT INERTIA | REF.

PART	Area A (ft^2)	dx (ft)	dy (ft)	Adx^2 (ft^4)	Ady^2 (ft^4)	Ix (Inclg) (ft^4)	Iy (Inclg) (ft^4)
1	3.25	44.858	59.1	6540	11352	.27	2.86
2	33.5	47.942	50.85	76997	86622	783	11.17
3	67	49.4	25.85	163500 171544	44771	6266	22.33
4	73	31.15	9.1	70833	6045	24.33	8104
5	2	23.9	6.1	1142	131	.67	.17
6	92	23.4	14.9	50375	20425	16223	30.67
7	85	1.15	36.9	112	115737	28.33	12794
8	63	39.1	36.9	96315	85781	21	5209
9	26.25	71.6	32.525	~~13457~~ 134592	27769	167.48	19.69
10	35	65.6	26.9	150618	25326	16.33	571.67
11	8.75	60.6	23.9	32135	4998	8.93	4.56
12	4.5	60.6	33.1	16526	4930	1.89	1.5
13	4.5	40.1	33.1	7236	4930	1.89	1.5
14	4.5	18.1	33.1	1474	4930	1.89	1.5
14a	4.5	1.65	33.1	12	4930	1.89	1.5
15	80.5	21.35	34.6	36694	96371	6.7	43471
16	9.75	23.9	33.725	5569	11089	8.58	7.31
17	11	23.9	25.27	6283	5956	111	.92
18	34	7.4	3.35	1862	381	11.33	816.93
19	6.75	16.6	5.35	1860	193	2.25	5
20	6.75	41.6	5.35	11681	193	2.25	5
W1	1.197*	23.4	59.1	655	4181	Negl.	Negl.
W2	.918*	9.683	59.1	86	3206	Negl.	Negl.
W3	.828*	23.35	59.1	451	2892	Negl.	Negl.
W4	1.323*	40.1	59.1	2127	4621	Negl.	Negl.
W5	.828*	60.6	59.1	3040	2892	Negl.	Negl.
W6	.972*	81.1	33.1	6393	1065	Negl.	Negl.

TURBINE BUILDING - MEZZANINE FLOOR CENTROID AND MOMENT INERTIA | REF.

PART	Area (ft^2)	dx (ft)	dy (ft)	Adx^2 (ft^4)	Ady^2 (ft^4)	I_x (ft^4)	I_y (ft^4)
W7	.972*	81.1	5.35	6393	28	Negl.	Negl.
W8	.972*	81.1	16.9	6393	278	Negl.	Negl.
W9	.738*	81.1	36.9	4854	1005	Negl.	Negl.
W10	.738*	73.6	16.9	3998	211	Negl.	Negl.
W11	.738*	66.85	5.35	3298	21	Negl.	Negl.
W12	.738*	60.6	18.1	2710	242	Negl.	Negl.
W13	.972*	40.1	18.1	1563	318	Negl.	Negl.
W14	.828*	18.1	18.1	271	271	Negl.	Negl.
				801495 914570	584091	23692.11	71084.11

*: Value = 9x true value (Equivalent of steel to concrete)

MOMENT INERTIA

$I_{xx} = I_x + Ady^2 = 23692 + 584091 = 607783\ ft^4$

$I_{yy} = I_y + Adx^2 = 71084 + 914570 = 985654\ ft^4$

$J = \Sigma Adx^2 + Ady^2 = 801,295 + 584,091 = 1498661\ ft^4$

(Moment Inertia appropriate with concrete $- E_c = 57000\sqrt{f_c}$ psi

For $f_c = 3500$ psi $E_c = 3.37 \times 10^6$ psi

NUCLEAR ENERGY SERVICES

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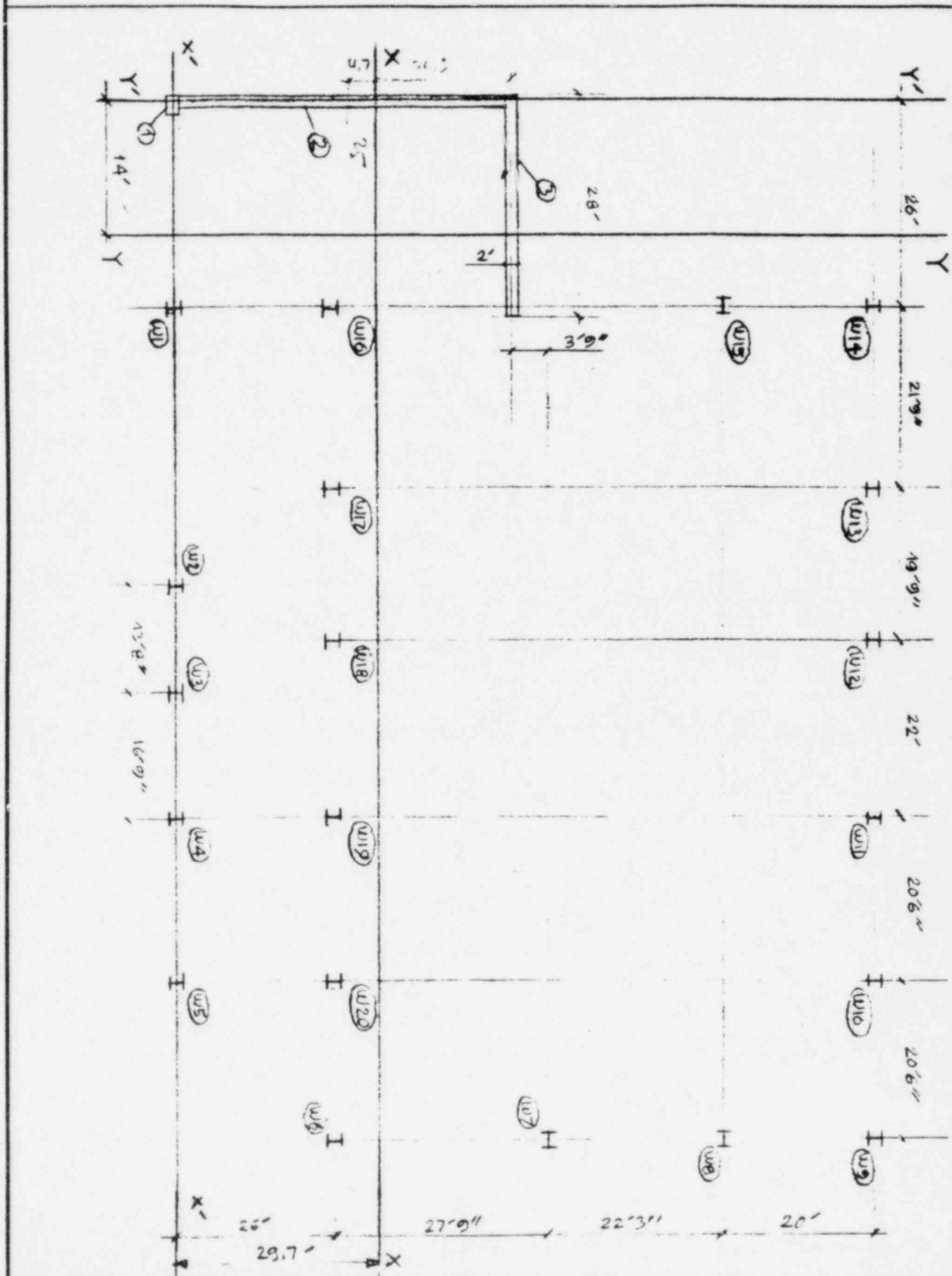
TURBINE BUILDING – MAIN FLOOR CENTROID AND MOMENT INERTIA | REF.



TURBINE BUILDING - MAIN FLOOR CENTROID AND MOMENT INERTIA

REF.

PART	DIMENSION ft x ft	Area A (ft²)	x' (ft)	Ax' (ft³)	y' (ft)	Ay' (ft³)
1	2.5 x 1.5	.417 *	0	0	0	0
2	50 x 2	11.11 *	0	0	14.72	163.555
3	28 x 2	6.22 *	14	87.08	50	311.
W1	W12x40	.082	26	2.132	0	0
W2	W12x40	.082	59.08	4.845	0	0
W3	W12x40	.082	72.75	5.966	0	0
W4	W12x50	.102	89.5	9.129	0	0
W5	W12x40	.082	110	9.02	0	0
W6	W12x40	.082	130.5	10.701	26	2.132
W7	W12x45	.092	130.5	12	53.75	4.945
W8	W12x45	.092	130.5	12	76	6.992
W9	W12x40	.082	130.5	10.701	96	7.872
W10	W14x87	.178	110	19.58	96	17.088
W11	W14x87	.178	89.5	15.931	96	17.088
W12	W14x87	.178	67.5	12.015	96	17.088
W13	W14x87	.178	47.75	8.5	96	17.088
W14	W12x40	.082	26	2.132	96	7.872
W15	W12x50	.102	26	2.652	76	7.752
W16	W12x58	.119	26	3.094	26	3.094
W17	W14x84	.172	47.75	8.213	26	4.472
W18	W14x84	.172	67.5	11.61	26	4.472
W19	W14x103	.21	89.5	18.795	26	5.46
W20	W12x85	.174	110	19.14	26	4.524
Σ		20.268		285.236		602.494

Centroid

$$x' = \frac{\Sigma A x'}{\Sigma A} = \frac{285.236}{20.268} = 14'$$

$$y' = \frac{\Sigma A y'}{\Sigma A} = \frac{602.494}{20.268} = 29.7'$$

*: Value = True value / 9 (Equivalent of concrete to steel)

TURBINE BUILDING - MAIN FLOOR CENTROID & MOMENT INERTIA | REF.

PART	AREA A (ft^2)	dx (ft)	Adx^2 (ft^3)	dy (ft)	Ady^2 (ft^3)	I_x (self) (ft^4)	I_y (self) (ft^4)
1	.417	14.0	81.73	29.7	367.8	Negl	Negle
2	11.11	14.0	2177.5	4.7	245.4	/	/
3	6.22	0.0	0	20.3	2563.1	/	/
W1	0.082	12.0	11.8	29.7	72.33	Negl	Negle
W2	0.082	45.08	166.6	29.7	72.33	/	/
W3	0.082	58.747	282.9	29.7	72.33	/	/
W4	0.102	75.497	581.4	29.7	88.97	/	/
W5	0.082	96.00	755.7	29.7	72.33	/	/
W6	0.082	116.50	1112.9	3.7	1.122	/	/
W7	0.092	116.50	1248.6	24.05	53.21	/	/
W8	0.092	116.50	1248.6	46.30	197.2	/	/
W9	0.082	116.50	1112.9	66.3	360.4	/	/
W10	0.178	96.00	1640.5	66.3	782.4	/	/
W11	0.178	75.50	1014.6	66.3	782.4	/	/
W12	0.178	53.50	509.5	66.3	782.4	/	/
W13	0.178	33.75	202.75	66.3	782.4	/	/
W14	0.082	12.00	11.8	66.3	360.4	/	/
W15	0.102	12.00	14.68	46.3	218.6	/	/
W16	0.119	12.00	17.136	3.7	1.62	/	/
W17	0.172	33.75	193.02	3.7	2.35	/	/
W18	0.172	53.50	492.3	3.7	2.35	/	/
W19	0.21	75.50	1197	3.7	2.87	/	/
W20	0.174	96.00	1603	3.7	2.38	/	/
Σ	20.268		12066.8		7887.6		

$I_{xx} = \Sigma A dy^2 = 7887.6\ ft^4$

$I_{yy} = \Sigma A dx^2 = 12066.8\ ft^4$

$J = \Sigma A dx^2 + \Sigma A dy^2 = 7887.6 + 12066.8 = 19954.4$

TURBINE BUILDING — ASSUMPTION | REF.

* ASSUMPTION ON INSULATED ALUMINUM SIDING WALL (LIGHT WEIGHT WALL)

FOR 100 ft² INSULATED ALUMINUM SIDING WALL

- CORRUGATED SHEET : ASSUMED WEIGHT 4.94 lbs/ft² (from steel)
- FRAMMING : ASSUMED WE HAVE 30 ft W14×22 for 100 ft² wall
  " " 30 ft 3/4" ϕ rod

THEN THE APPROXIMATE WEIGHT FOR LIGHT WEIGHT WALL IS :

- 100 ft² CORRUGATED SHEET :	100 × 4.94	=	494 lbs.
- 30 ft W14×22 :	30 × 22	=	660 lbs.
- 30 ft 3/4" ϕ rod :	30 × 1.5	=	45 lbs.
	Total :		1199 lbs.

Unit weight : $\frac{1199}{100}$ = 11.99 lbs/ft²

We take approximate weight for light weight wall : 12 lbs/ft².

* ASSUMPTION ON PARTITION WALL IN OFFICE AREA

IN OFFICE AREA, WE HAVE DIFFERENT THICKNESS FOR PARTITION WALLS.
TO MAKE PROBLEM SIMPLE, WE ASSUME ALL PARTITION WALL IS
4" HOLLOW CONCRETE BLOCK.
UNIT WEIGHT : 30 lbs/ft²

TURBINE BUILDING — OUTER WALL WEIGHT | REF.

EAST WALL

MATERIAL

- INSULATED ALUMINUM WALL ASSUMED AS LIGHT WALL
- UNINSULATED ALUMINUM WALL ASSUMED AS LIGHT WALL
- Reinforced concrete wall 2½'
- Reinforced concrete wall 2'

A. EAST WALL WEIGHT BETWEEN GROUND FLOOR AND MEZZANINE FLOOR

Height : 654 − 640 = 14'

Total Area : 96 × 14 = 1344 ft²

- Reinforced concrete wall 2½' thick : 13 × 14 = 182 ft² ⇒ W = 182 × 375 = 68250 lbs
- Reinforced concrete wall 2' thick : 33 × 14 = 462 ft² ⇒ W = 300 × 462 = 138600 lbs
- Light weight wall : 1344 − (462 + 182) = 700 ft² ⇒ W = 700 × 12 = 8400 lbs

B. EAST WALL WEIGHT BETWEEN MEZZANINE FLOOR AND MAIN FLOOR

Height : 668 − 654 = 14'

Total Area : 96 × 14 = 1344 ft²

- Reinforced concrete wall 2' thick : 1344 ft² ⇒ W = 1344 × 300 = 403200

C. EAST WALL WEIGHT BETWEEN MAIN FLOOR AND ROOF

Total Area 10 × (684 − 668) + 70 × (700 − 684) = 2656 ft²

- Reinforced concrete wall 2' thick 50 × (684 − 668) = 800 ft² ⇒ W = 800 × 300 = 240000 lbs
- Light weight wall : 2656 − 800 = 1856 ft² ⇒ W = 1856 × 12 = 22272 lbs

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TURBINE BUILDING — OUTER WALL WEIGHT | REF.

WEST WALL

Material:

- 8" concrete block + 4" face brick wall
- Light weight wall

a. WEST WALL WEIGHT BETWEEN GROUND FLOOR AND MEZZANINE FLOOR

Height: 654 − 640 = 14'
Total Area: 96 x 14 = 1344 ft².

- Door: 3.5 x 7 = 24.5 ft²
- 8" concrete block + 4" face brick wall: 1344 − 24.5 = 1319.5 ft² ⇒ W = 1319.5 x 95 = 125352 lbs.

b. WEST WALL WEIGHT BETWEEN MEZZANINE FLOOR AND MAIN FLOOR:

Height: 668 − 654 = 14'
Total Area: 96 x 14 = 1344 ft²

- 8" concrete block + 4" face brick wall: 70 x 14 = 980 ft² ⇒ W = 95 x 980 = 93100 lbs
- Light weight wall: 1344 − 980 = 364 ft² ⇒ W = 364 x 12 = 4368 lbs

c. WEST WALL WEIGHT BETWEEN MAIN FLOOR AND ROOF

Total Area: 26 x (684 − 668) + 70 x (700 − 668) = 2656 ft²

- Windows: (4 x 4) x 5 + (3 x 5) x 6 = 170 ft².
- Light weight wall: 2656 − 170 = 2486 ft² ⇒ W = 2486 x 12 = 29615 lbs.

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TURBINE BUILDING — OUTER WALL WEIGHT | REF.

★ SOUTH WALL

Material

- Reinforced concrete wall 2½' thickness, 2' thickness, 1' thickness
- Solid concrete block wall 2½' thickness, 2' thickness, 1' thickness
- 8" concrete block + 4" face brick wall

A. South wall weight between Ground floor and Mezzanine floor:

Height: 654 − 640 = 14'
Total area: 130.5 x 14 = 1827 ft²

- Door: (6 x 14) + (3 x 7) = 105 ft²
- Solid concr. block wall 2½' thickness: 5 x 14 = 70 ft² ⇒ W = 70 x 360 = 25200 lbs
- Solid concr. block wall 2' thickness: 20 x 14 = 280 ft² ⇒ W = 280 x 288 = 80640 lbs
- Solid concr. block wall 1' thickness: 7 x 8 = 56 ft² ⇒ W = 56 x 144 = 8064 lbs
- Reinforced concrete wall 2½' thickness: 30.417 x 14 = 426 ft² ⇒ W = 426 x 375 = 159750 lbs
- Reinforced concrete wall 2' thickness: 31.5 x 14 = 441 ft² ⇒ W = 441 x 300 = 132300 lbs
- 8" concrete block + 4" face brick wall: 9.5 x 14 = 133 ft² ⇒ W = 133 x 95 = 12635 lbs
- Reinforced concrete wall 1' thickness: 1827 − (105 + 70 + 280 + 56 + 426 + 441 + 133) = 316 ft² ⇒ W = 316 x 150 = 47400 lbs

B. SOUTH wall weight between Mezzanine Floor and Main Floor:

Height: 668 − 654 = 14'
Total area: 130.5 x 14 = 1827 ft²

- 8" solid concrete block + 4" face brick wall: 9.5 x 14 = 133 ft² ⇒ W = 133 x 95 = 12635 lbs
- Reinforced concrete wall 2' thickness: 1827 − 133 = 1694 ft² ⇒ W = 1694 x 300 = 508200 lbs

C. South wall weight between Main Floor and Roof:

- Reinforced concrete wall 2' thickness: 26 x (684 − 668) = 416 ft² ⇒ W = 416 x 300 = 124800 lbs
- Light weight wall: 104.5 x (700 − 668) = 3344 ft² ⇒ W = 3344 x 12 = 40128 lbs

TURBINE BUILDING — OUTER WALL WEIGHT | REF.

* NORTH WALL

Material :

– Light weight wall (consist of Insulated Aluminum layer + steel frame)
UNIT WEIGHT = 12 lbs/ft²

A. NORTH WALL WEIGHT BETWEEN GROUND FLOOR AND MEZZANINE FLOOR

Height : 654 – 640 = 14'
Total area : 130.5 x 14 = 1827 ft²

– Door and window area : (4 x 4) x 17 + 11 x 14 = 426 ft²
(window) (Door)

– Light weight wall = 1827 – 426 = 1401 ft² ⇒ W = 12 x 1401 = 16812 lbs

B. NORTH WALL WEIGHT BETWEEN MEZZANINE FLOOR AND MAIN FLOOR

Height : 668 – 654 = 14'

Total area : 130.5 x 14 = 1827 ft²

– Door and window area : (4 x 4) x 17 + 11 x 13 = 415 ft²

– Light weight wall = 1827 – 415 = 1412 ft² ⇒ W = 12 x 1412 = 16944 lbs

C. NORTH WALL WEIGHT BETWEEN MAIN FLOOR AND ROOF

Total area : 104.5 x (694 – 668) + 84 x (700 – 694) = 3016 ft²

– Windows area : (4 x 4) x 25 = 400 ft²
– Light weight wall : 3016 – 400 = 2616 ft² ⇒ W = 12 x 2616 = 31392 lbs

NUCLEAR ENERGY SERVICES

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TURBINE BUILDING - OUTER WALL WEIGHT

REF.

TABLE OF OUTER WALL WEIGHT LUMPED MASS TO FLOORS

WALL		R. Concrete 2 1/2' (lbs)	R. Concrete 2' (lbs)	R. Concrete 1' (lbs)	Solid C. block 2 1/2' (lbs)	Solid C. block 2' (lbs)	Solid C. block 1' (lbs)	Concrete + Face brick (lbs)	Light Wall (lbs)	TOTAL (lbs)	Lumped to Mezz. Fl. (lbs)	Lumped to Main Fl. (lbs)	Lumped to Roof (lbs)
EAST	Ground to Mezzanine	68250	138600	—	—	—	—	—	8400	215250	107625	—	—
	Mezzanine to Main		40320							403200	201600	201600	—
	Main to Roof		240000	—					22272	262272	—	131136	131136
WEST	Ground to Mezzanine							125352		125352	62676	—	—
	Mezzanine to Main							93100	4368	97468	48734	48734	—
	Main to Roof								29615	29615	—	14807	14037
SOUTH	Ground to Mezzanine	15,9750	132300	47400	25200	60640	8064	12635		465589	232594		—
	Mezzanine to Main		508200					12635		520835	260418	260418	
	Main to Roof		124800						40128	164928	—	82464	82464
NORTH	Ground to Mezzanine								16812	16812	8406	—	—
	Mezzanine to Main								16944	16944	8472	8472	
	Main to Roof								40320	40320	—	20160	20160
								TOTAL		2358,965	930,925	767,791	247,847

NES 105 (2/74)

NUCLEAR ENERGY SERVICES

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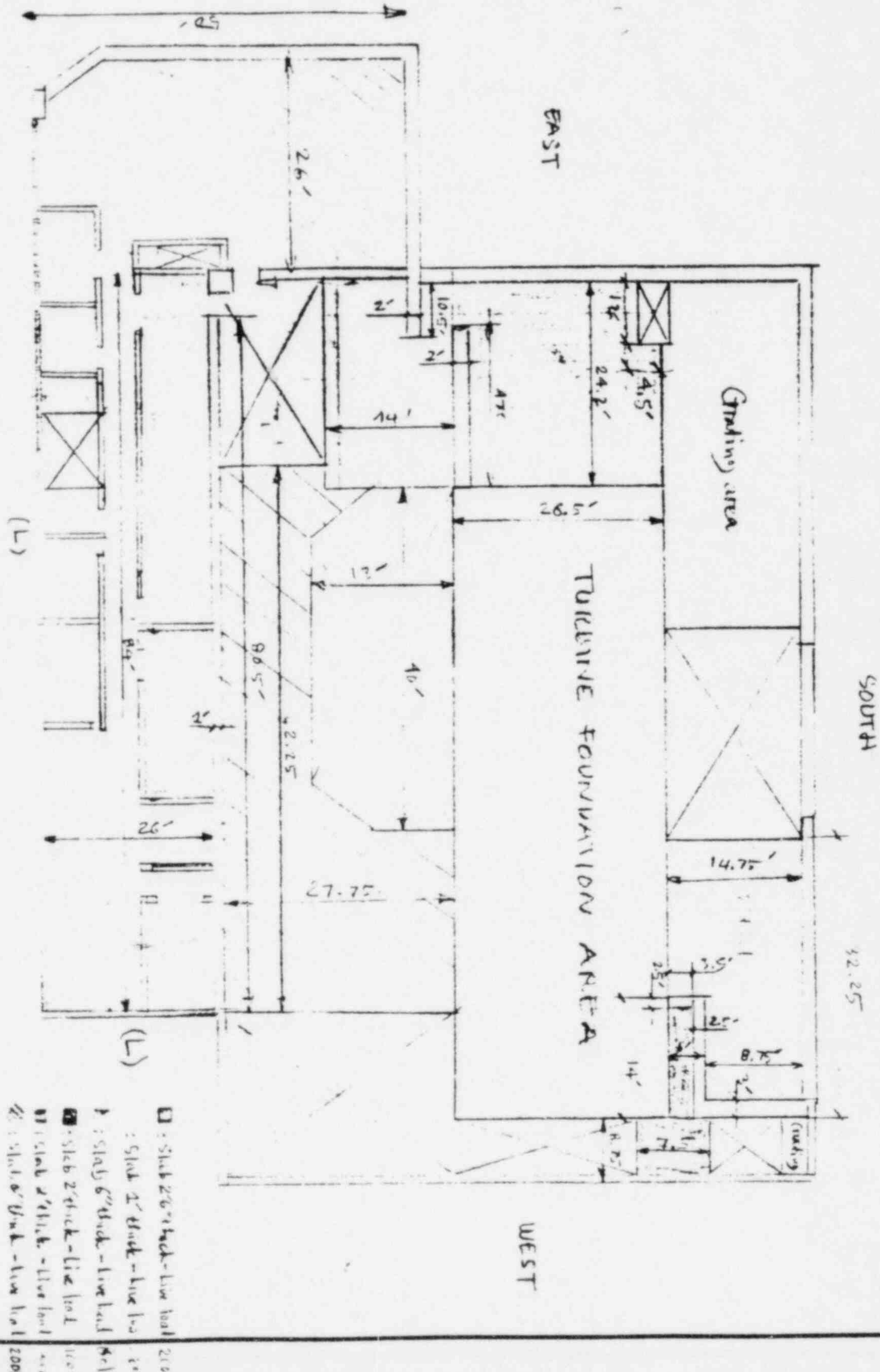
TURBINE BUILDING — MEZZANINE FLOOR SLAB WEIGHT AND LIVE LOAD | REF.



NES 105 (2/74)

TURBINE ... – MEZZANINE SLAB WEIGHT AND LIVE LOAD | REF.

– Slab 2.5' thick. (Live load 200 lb/ft²) Area 26.5 x 24.2 – 4.5 x 12 – 17 x 2 = 553.3 ft², Volume: 553.3 x 2.5 = 1383.25 ft³
Weight = 1383.25 x 150 = 207488 lbs, Live load: 553.3 x 200 = 110660 lbs.

– Slab 2' thick (Live load 300 lb/ft²) Area 32.25 x 14.75 – 14 x 6 = 391.7 ft², Volume 391.7 x 2. = 783.3 ft³
Weight = 783 x 150 = 117506 lbs, Live load 391.7 x 300 = 117506 lbs

– Slab 2' thick (Live load 100 lb/ft²) Area 6 x 14 + 5.75 x 7.5 = 150 ft², Volume 150 x 2 = 300 ft³
Weight = 300 x 150 = 45000 lbs, Live load: 150 x 100 = 15,000 lbs

lbs

– Slab 1' thick. (Live load 200 lb/ft²) Area 14 x 24.2 – 10.5 x 2 = 318 ft², Volume: 339 x 1 = 318 ft³
Weight 318 x 150 = 47670 lbs; Live load 200 x 318 = 63600 lbs

– Slab 6" thick (Live load 200 lb/ft²) Area 26 x 50 + 162.25 x 27.75 – (13 x 40) = 2507 ft², Volume = 2507 x .5 = 1253.5 ft³
Weight = 1253.5 x 150 = 188025 lbs, Live load = 2507 x 200 = 501400 lbs

– Slab 6" thick (Live load 80 lb/ft²) Area 84 x 26 = 2184 ft², Volume 2184 x .5 = 1092 ft³
Weight 1092 x 150 = 163800 lbs, Live load 2184 x 80 = 174720 lbs

Total slab weight of Mezzanine floor

207488 + 117506 + 45000 + 47670 + 188025 + 163800 = 769489 lbs

Total Live Load of Mezzanine floor:

110660 + 117506 + 15,000 + 63600 + 501400 + 174720 = 982886 lbs.

NES

NUCLEAR ENERGY SERVICES

BY NC DATE ____ PROJ. ____ TASK ____

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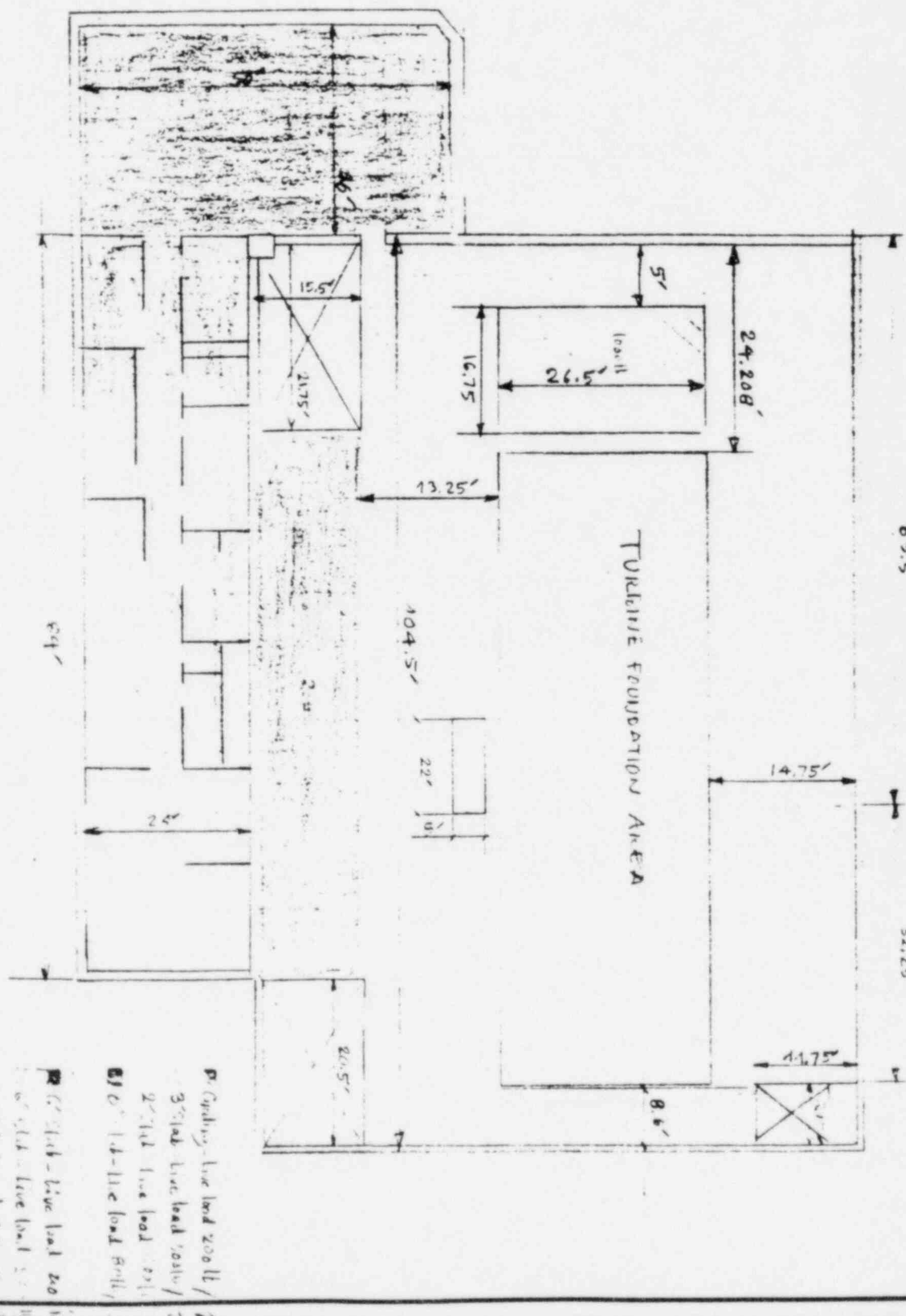
TURBINE BUILDING — MAIN FLOOR SLAB WEIGHT AND LIVE LOAD	REF.



NUCLEAR ENERGY SERVICES

BY VC DATE [illegible] PROJ. 101 TASK [illegible]

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TURBINE BUILDING — MAIN FLOOR SLAB WEIGHT AND LIVE LOAD	REF.
– 3' slab : Area : [illegible].75 x 32.25 = 475.7 ft², Volume 475.7 x 3 = 1427.1 ft³.	
(Live load 500 lb/ft²) Weight = 1427.1 x 150 = 214065 lbs, Live load = 475.7 x 500 = 237,850	lbs
– 2' slab : Area 26.5 x 16.75 = 443.9 ft², Volume 443.9 x 2 = 887.8 ft³	
(Live load 1000 lb/ft²) Weight = 887.8 x 150 = 133170 lbs, Live load = 443.9 x 1000 = 443,900	lbs
– 2' slab : Area 63.5 x 14.75 + 26.5 x (24.208 – 16.75) = 1134.3 ft², Volume 1134.3 x 2 = 226	8.6 ft³
(Live load 500 lb/ft²) Weight = 2268.6 x 150 = 340290 lbs, Live load = 1134.3 x 500 = 567250 lbs	
– 6" slab : Area 104.5 x 13.25 – 8 x 22 +8.6 x 29.5 = 1462 ft², Volume 1208.6 x .5 = 731 ft³	
(Live load 500 lb/ft²) Weight = 731 x 150 = 109650 lbs, Live load = 1208.6 x 500 = 731,000	lbs
– 6" slab : Area : (104.5 – 21.75 – 20.5) x 15.5 + 26 x 50 = 2264.9 ft², Volume 2264.9 x .5 = 1132.4	ft³
(Live load 200 lb/ft²) Weight = 1132.4 x 150 = 169860 lbs, Live load = 2264.9 x 200 = 452,980	
– 6" slab : Area 26 x 84 = 2184 ft², Volume 2184 x .5 = 1092 ft³	
(Live load 80 lb/ft²) Weight = 1092 x 150 = 163800 lbs, Live load 2184 x 80 = 174720 lbs	
– Grating : Weight Neglected	
(Live load 200 lb/ft²) Live load : 200 x (22 x 8) = 35200 lbs	
Total Main floor slab weight : 1,130,835 lbs.	
Total Main floor live load : 2,642,900 lbs.	

NES 105 (2/74)

NUCLEAR ENERGY SERVICES

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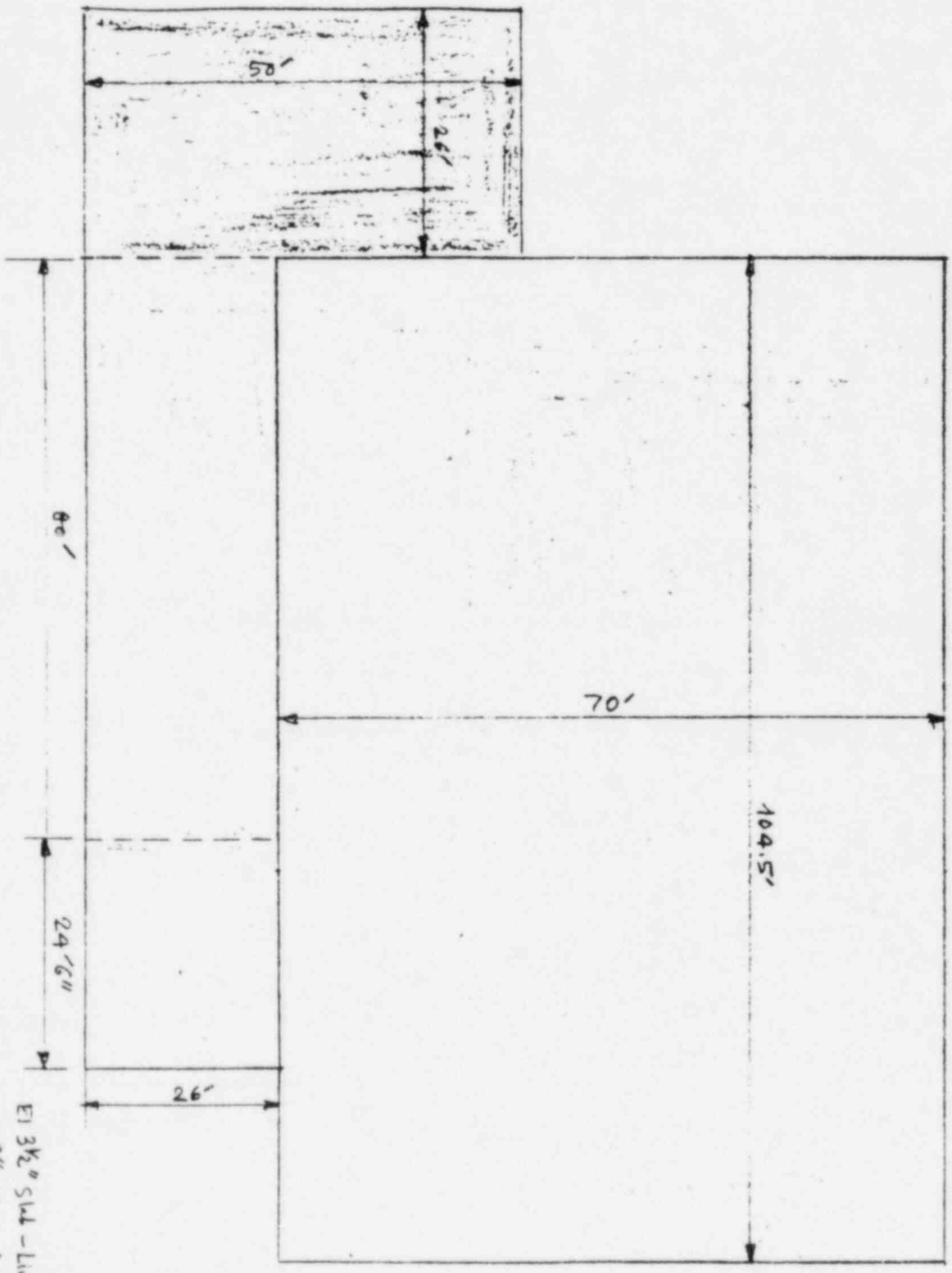
TURBINE BUILDING - ROOF SLAB WEIGHT

REF.



3½" Slab - Live load 30 lb/ft
8" slab - Live load 30 lb/ft
2' Slab - Live load 30 lb/ft

TURBINE BUILDING — ROOF SLAB WEIGHT AND LIVE LOAD | REF.

For 2' and 8" concrete slab : specific volume 150 lb/ft³
For 3½" ——— : ——— 110 lb/ft³ (Light weight).
Insulating : specific weight 27 lb/ft³.
2" insulating concrete cover all slab (specific weight of insulating concrete 100 lb/ft²) ✓

Live load 30 lbs/ft² over the roof ✓

– 2' Slab (30 lb/ft² live load)
Area: 50x26 = 1300 ft², slab volume: 1300x2 = 2600 ft³; Insulating Vol = 1300x.167 = 217.1 ft³
Slab weight = 2600x150 = 390,000 lbs – Insulating weight = 217.1x27 = 5862 lbs ✓
Live load = 1300x30 = 39000 lbs ✓

– 8" slab (30 lb/ft² Live load)
Area 26x24.5 = 637 ft², Slab volume: 637x.667 = 425 ft³
Insulating volume = 637x.167 = 106.4 ft³, Slab weight = 425x150 = 63750 lbs, ✓
Insulating weight = 106.4x27 = 2873 lbs, Live load = 637x30 = 19110 lbs ✓

– 3½" slab (30 lb/ft² Live load)
Area 70x104.5 + 80x26 = 9395 ft², slab vol = 9395x.292 = 2743 ft³ ✓
Insulating volume = 9395x.167 = 1569 ft³, slab weight = 2743x110 = 301730 lbs ✓
Insulating weight = 1569x27 = 42363, Live load = 9395x30 = 281,850 lbs ✓

Total slab weight : 390,000 + 63750 + 301730 = 755480 lbs ✓
Total Insulating weight = 5862 + 2873 + 42363 = 51098 ✓
Total Live load = 39000 + 19110 + 281850 = 339960 lbs. ✓
Total 1,146,538 lbs

700' El. Roof : 234,958 lbs + 32918 + 219,450 = 487326 lbs.
(slab) (Insulating) (Live load)

684' El. Roof : 1146538 – 487326 = 659 212 lbs.

NUCLEAR ENERGY SERVICES

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	REF.
TURBINE BUILDING - INNER WALL AND PARTITION ON MEZZANINE FLOOR	

- INNER WALL.

Height: 668 - 654 = 14'

Volume: (8.75 x 3 + 14 x 2.5 + 3.5 x 25 + 17 x 2 + 10.5 x 2 + 80.5 x 1) x 14 = 2877

Weight 2877 x 150 = 431550 lbs

Lumped mass to Mezzanine and Main Floor 215,775 lbs each.

- PARTITION (4" block wall)

Height: 668 - 654 = 14'

Estimated total length: 200 ft.

Area 200 x 14 = 2800 ft^2

Weight: 2800 ft^2 x 30 lbs/ft^2 = 84000 lbs

Lumped mass to Mezzanine and Main Floor 42000 lbs each.

	REF.
TURBINE BUILDING — MAIN FLOOR INNER WALL AND PARTITION	

- INNER WALL : Wall at column row F, El. up to 677.58'

Height 677.58 − 668 = 9.58'

Volume : 84 x 1 x 9.58 = 804.7 ft³

Weight : 804.7 x 150 = 120,705 lbs.

This mass is lumped to Main floor

- PARTITION

Height : 684 − 668 = 16'

Estimated total length : 200 ft

Area : 200 x 16 = 3200 ft²

Weight : 3200 ft² x 30 lb/ft² = 96,000 lbs

Lumped mass to Main Floor and Roof 48,000 lbs each

NUCLEAR ENERGY SERVICES

BY N.C. DATE 6/24/81 PROJ. 101 TASK

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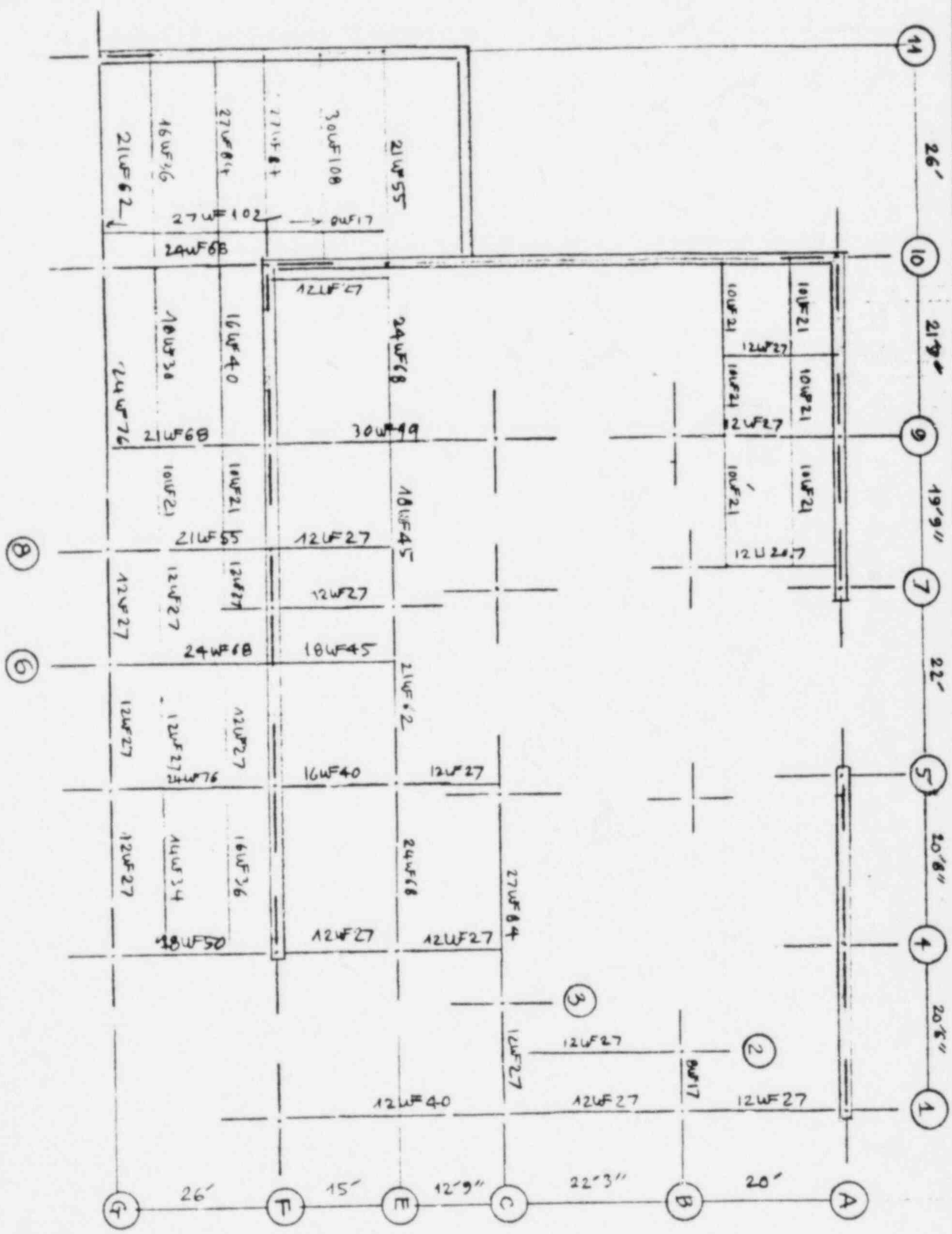
TURBINE BUILDING — MEZZANINE FLOOR FRAMING	REF.



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TURBINE BUILDING - MEZZANINE FLOOR FRAMMING WEIGHT | REF.

FROM MEZZANINE FLOOR FRAMMING DRAWING

MATERIAL	LENGTH (ft)	WEIGHT (lbs)
W8x17	15.5	263.5
W10x21	99	2079
W12x27	303	8181
W12x40	27.75	1110
U12x20.7	13.5	279
W14x34	20.5	697
W16x36	46.5	1674
W16x40	36.75	1470
W16x30	21.75	652.5
W16x45	34.75	1564
W18x50	26	1300
W21x55	52	2860
W21x62	48	2976
W21x68	52	3536
W24x68	68.25	4641
W24x76	59	4484
W27x84	78.75	6615
W27x102	34	3468
W30x99	27.75	2747
W30x108	26	2808
	Total	53405 lb.

TURBINE BUILDING - MAIN FLOOR FRAMING WEIGHT | REF.

FROM MAIN FLOOR FRAMING DRAWING

MATERIAL	LENGTH (ft)	WEIGHT (lbs)
W 8×17	43.65	742.05
W 10×21	20.00	420.00
W 12×27	254.92	6882.84
W 14×30	123.17	3695.10
W 14×34	34.00	1156.00
W 16×36	144.75	5211.00
W 16×40	72.00	2880.00
W 21×55	120.00	6600.00
W 21×62	67.00	4154.00
W 24×68	135.92	9242.56
W 24×76	26.00	1976.00
W 24×84	27.75	2331.00
W 27×84	26.75	2247.00
W 27×102	26.00	2652.00
REINFORCED CONCRETE	Volume	
3'×4.25'×21.75	277.31	41596.87
2'×5.25'×21.75	228.375	34250.00
	Total	126 041.77 ✓

TURBINE BUILDING — ROOF FRAMMING WEIGHT	REF.

FROM ROOF FRAMMING DRAWING

MATERIAL	QUANTITY (ft)	WEIGHT (lbs)
W12x27	22.25	600
W14x22	188.5	4147
W14x34	27.75	944
W18x45	61.42	2764
W14x30	358.5	10755
W21x55	20.5	1127
W21x62	33	2046
W30x99	24	2376
W30x108	26	2808
W36x150	26	3900
W36x194	26	5044
W36x170	280	47600
	Total	84111 lbs

ROOF FRAMMING WEIGHT 84111 lbs

NUCLEAR ENERGY SERVICES

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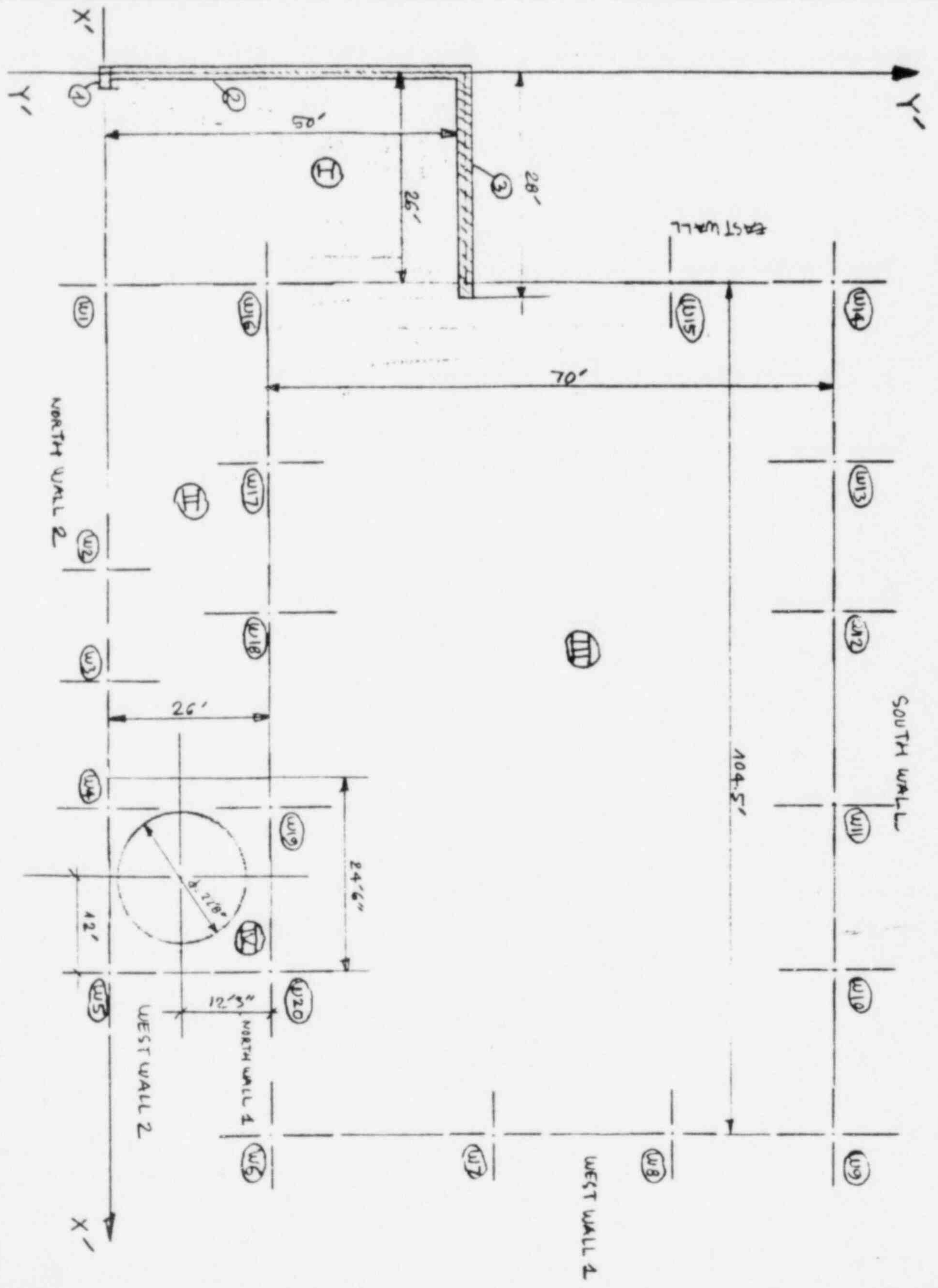
TURBINE BUILDING - ROOF CENTER OF GRAVITY.	REF.



	REF.
TURBINE BUILDING - ROOF CENTER OF GRAVITY	

Wall and column between El. 668' and 684':

Height of part lumped to Roof: $\frac{684-668}{2} = 8'$ ✓

Column between El. 668' and 700':

Height of part lumped to Roof: $\frac{700-668}{2} = 16'$ ✓

Approximate framing weight 15 lbs/ft² ✓

Weight of Roof included framing:

- I (2' slab): 390,000 + 32,500 + 39000 + 15x1300 = 481,000 ✓
- II (3½" slab): Area 80x26 = 2080 ft² ✓ Slab weight 2080x.292x150 = 91104 lbs ✓
  Insulating weight 2080x.25x100 = 52,000 lbs, Live load: 2080x30 = 62400 lbs ✓
  Total weight: 91104 + 52000 + 62400 + 15x2080 = 236,704 ✓
- III (3½" slab): Area 70x104.5 = 7315 ft² ✓ Slab weight 7315x.292x150 = 320397 lbs ✓
  Insulating weight 7315x.25x100 = 182,875 lbs, Live load = 7315x30 = 219450 lbs ✓
  Total weight: 320397 + 182875 + 219450 + 15x7315 = 832,447 lbs ✓
- IV (8" slab): 63750 + 15900 + 10110 + 15x637 = 108,315 lbs. ✓

NUCLEAR ENERGY SERVICES

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TURBINE BUILDING — ROOF CENTER OF GRAVITY | REF.

PART	WEIGHT W (lbs)	x' (ft)	Wx' (lb-ft)	y' (ft)	Wy' (lb-ft)	
EAST WALL	11136	26	289536	73	812928	✓
SOUTH WALL	20064	78.25	1,570,008	96	1,926,144	✓
WEST WALL 1	13440	130.5	1,753,920	61	819,840	✓
WEST WALL 2	2496	110	274560	13	32448	✓
NORTH WALL 1	16128	78.25	1,262,016	26	419328	✓
NORTH WALL 2	10032	78.25	785004	0	0	✓
1	4500	0	0	0	0	✓
2	120000	0	0	25	3,000,000	✓
3	67200	14	940800	50	3,360,000	✓
W1	320	26	8320	0	0	✓
W2	320	59.08	18906	0	0	✓
W3	320	72.75	23280	0	0	✓
W4	400	89.5	35800	0	0	✓
W5	320	110	35200	0	0	✓
W6	640	130.5	83520	26	16,640	✓
W7	720	130.5	93960	53.75	38,700	✓
W8	720	130.5	93960	76	54,720	✓
W9	640	130.5	83520	96	61440	✓
W10	1392	110	153120	96	133632	✓
W11	1392	89.5	124584	96	133632	✓
W12	1392	67.5	93960	96	133632	✓
W13	1392	47.75	66468	96	133632	✓
W14	640	26	16640	96	61440	
W15	800	26	20800	76	60800	
W16	928	26	24128	26	24128	
W17	1344	47.75	64176	26	34944	✓
W18	1344	67.5	90720	26	34944	

REF.

W19	1648	89.5	147496	26	42848
W20	1360	110	149600	26	35360
Slab I	481,000	13	6253000	25	12,025,000
II	236,704	55.75	13,196,248	13	3077,152
III	832,447	78.25	65,138,978	61	50779267
IV	108,315	97.75	10,587791	13	1408095
Water tank	498,670	98	48,869,660	13.75	6,856712
Σ	2,440,164		152,349,619		85,589,596

CENTER OF GRAVITY

$$X = \frac{\Sigma W x'}{\Sigma W} = \frac{152,349,619}{2,440,164} = 62.4' \checkmark$$

$$Y = \frac{\Sigma W y'}{\Sigma W} = 35' \checkmark$$

TURBINE BUILDING - WATERTANK WEIGHT

REF.

WATER TANK DIMENSION :

$\phi = 22.67'$, Height = 702 - 684 = 18'

Capacity $V = \frac{\pi}{4} \times 22.67^2 \times 18 = 7265$ ft³.

Water weight 7265 x 62.4 = 453,336 lbs = 407,7.. kips

Increase 10% for watertank envelope : 453,336 x 1.1 = 498670 lbs

$\phi = 22'$, Thickness of steel = 1/2"

Steel volume :

$\pi \phi \times$ height $\times$ thickness + $\frac{\pi \phi^2}{4} \times$ thickness

$= \pi \times 22 \times 18 \times 1/24 + \frac{\pi \times 22^2}{4} \times 1/24 = 67.68$ ft³

Steel weight 67.68 x 490 = 33.16 kips.

Water tank capacity : 48,880 gallons

Water weight : 48,880 x .13368 x 62.4 = 407.74 kips.

Total Watertank weight : 407.74 + 33.16 = 440.9 kips

REF.

TURBINE BUILDING - COLUMN WEIGHT

COLUMN BETWEEN GROUND FLOOR AND MEZZANINE FLOOR (Height 14')

- COLUMN A4 : Volume 2x2x14 = 56 ft³ Weight = 56x150 = 8400 lbs ✓
- COLUMN A5 : Same with A4 Weight = 8400 lbs
- COLUMN A7 : Volume 2.5x2.5x14 = 87.5 ft³ Weight = 87.5x150 = 13125 lbs
- COLUMN A9 : Same with A7 Weight = 13125 lbs
- COLUMN A10 : Same with A7 Weight = 13125 lbs
- COLUMN A1 : W12x40 WEIGHT = 40x14 = 560 lbs
- COLUMN B1 : W12x53 Weight = 53x14 = 742 lbs
- COLUMN B2 : W12x40 Weight = 40x14 = 560 lbs
- COLUMN B9 : Volume 2x2x14 = 56 ft³ Weight = 56x150 = 8400 lbs
- COLUMN B10 : Same B9 Weight = 8400 lbs
- COLUMN C1 : W12x53 Weight = 53x14 = 742 lbs
- COLUMN C2 : W12x40 Weight = 40x14 = 560 lbs
- COLUMN C5 : Volume = 3x2.25x14 = 94.5 ft³, Weight 94.5x150 = 14175 lbs
- COLUMN C7 : Same with C5 Weight = 14175 lbs
- COLUMN C9 : Same as A4 Weight = 8400 lbs
- COLUMN C10 : Volume 2x3x14 = 84 ft³ Weight = 84x150 = 12600 lbs
- COLUMN E4 : W12x40 Weight 40x14 = 560 lbs
- COLUMN E5 : W12x53 Weight 53x14 = 742 lbs
- COLUMN E7 : W12x45 Weight 45x14 = 630 lbs
- COLUMN F4 : Volume 3.25x2x14 = 91 ft³ Weight 91 ft³x150 = 13650 lbs
- COLUMN F5 : Same as F4 = 13650 lbs
- COLUMN F7 : ——— = 13650 lbs
- COLUMN F9 : ——— = 13650 lbs
- COLUMN F10 : Volume 3x3.25x14 = 136.5 Weight 136.5x150 = 20475 lbs
- COLUMN G4 : W12x45 Weight 45x14 = 630 lbs
- COLUMN G5 : W12x72 Weight 72x14 = 1008 lbs
- COLUMN G6 : W12x45 ——— 45x14 = 630 lbs
- COLUMN G8 : W12x50 Weight 50x14 = 700 lbs

TURBINE BUILDING — COLUMN WEIGHT	REF.

_ COLUMN G10 : W12x65 Weight = 65x14 = 910 lbs

_ COLUMN G11 : Volume 2.5x1.5x14 = 52.5 ft³ Weight = 52.5x14 = 735 lbs

Total 207109 lbs.

* Lumped mass to Mezzanine floor $\frac{207109}{2}$ = 103554 lbs

COLUMN BETWEEN MEZZANINE FLOOR AND MAIN FLOOR :

THE SAME AS ABOVE

* LUMPED MASS IS 103554 lbs EACH FOR MEZZANINE AND MAIN FLOOR.

COLUMN BETWEEN MAIN FLOOR AND ROOF (Heigh 32' from A to F and height 16' for G)

_ COLUMN A1 : W12x40 Weight 40x32 = 1280 lbs.

_ COLUMN A4 : W14x87 Weight 87x32 = 2784 lbs.

_ COLUMN A5 : Same as A4 Weight = 2784 lbs

_ COLUMN A7 : Same as A4 Weight = 2784 lbs

_ COLUMN A9 : Same as A4 Weight = 2784 lbs

_ COLUMN A10 : Same as A1 Weight = 1280 lbs

_ COLUMN B1 : W12x45 Weight 45x32 = 1440 lbs

_ COLUMN B10 : W12x50 Weight 50x32 = 1600 lbs

_ COLUMN C1 : W12x45 Weight 45x32 = 1440 lbs

_ COLUMN D10 :
- Concrete part : Volume 2x3x16 = 96 ft³ Weight 96x150 = 14400 lbs
- Steel part : W12x40 Weight 40x16 = 640 lbs

_ COLUMN F1 : W12x40 Weight 40x32 = 1280 lbs.

_ COLUMN F4 :
- Concrete part : Volume 3.25x2x(678-668) = 65 ft³ Weight 65x150 = 9750 lbs
- Steel part : W14x87 Weight 87x(700-678) = 1914 lbs

_ COLUMN F5
- Concrete part Same as F4 Weight = 9750 lbs
- Steel part W14x103 Weight 103x(700-678) = 2266 lbs

_ COLUMN F7
- Concrete part Same as F4 Weight = 9750 lbs
- Steel part W14x84 Weight 84x(700-678) = 1848 lbs

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TURBINE BUILDING — COLUMN WEIGHT | REF.

- COLUMN F9
  - Concrete part : Same as F4 — Weight = 9750 lbs
  - Steel part : W14×84 — Weight = 84×(700-678) = 1848 lbs
- COLUMN F10
  - Concrete part : Volume 3×3.25×16 = 156 ft³ — Weight = 156×150 = 23400 lbs.
  - Steel part : W12×58 — Weight = 58×(700-678) = 1276 lbs.
- COLUMN G4 : W12×40 — Weight = 40×16 = 640 lbs
- COLUMN G5 : W12×50 — Weight = 50×16 = 800 lbs
- COLUMN G6 : W12×40 — Weight = 40×16 = 640 lbs
- COLUMN G8 : W12×40 — Weight = 40×16 = 640 lbs
- COLUMN G10 : W12×40 — Weight = 40×16 = 640 lbs
- COLUMN G11 : Volume 2.5×1.5×16 = 60 ft³ — Weight = 60×150 = 9000 lbs.

Total 118408 lbs.

* LUMPED TO MAIN FLOOR AND ROOF 59204 lbs each.

TURBINE BUILDING - SPRING STIFFNESS OF SOIL | REF.

Foundation Spring Stiffness

The stiffness of the Vertical, Lateral and Rocking springs representing the shear and vertical deformation of the soil beneath the foundation mat are obtain using following equations These equations are taken from Reference (5)

Vertical spring stiffness : $k_z = \frac{G}{1-\nu}\beta_z\sqrt{4cd}$

Lateral : $k_{x(y)} = 4(1+\nu)G\beta_{x(y)}\sqrt{cd}$

Rocking : $k_\psi = \frac{G}{1-\nu}\beta_\psi 8cd^2$

in which $\beta_z, \beta_x, \beta_y, \beta_\psi$ are functions of values of d/c (Reference 1, Figure 10.16, page 351)

The soil properties are taken from Reference (6). For the standard foundation spring, the soil properties correspond to averaged values for boring number 3

G : Shear Modulus of Soil = 2.4×10^6 lbs/ft²
(Tables 3.1 and 2.2 of Reference 2)

ν : Soil Poisson Ratio = .24 (Calculated from data given in Table 3.1)

Then for Horizontal X (X_1) direction :

$c = \frac{96'}{2}$; $d = \frac{130.5'}{2} \Rightarrow \frac{d}{c} = 1.36 \Rightarrow \beta_x = .94$

$k_x = K1 = 4(1+.24) \times 2.4\times10^6 \times .94 \times \sqrt{\frac{130.5 \times 96}{4}} = 626.23 \times 10^6$ lb/ft

Horizontal Y (X_2) direction :

$c = \frac{130.5}{2}$, $d = \frac{96}{2} \Rightarrow \frac{d}{c} = \frac{96}{130.5} = .74 \Rightarrow \beta_x = 1$

$k_y = K2 = 4(1+.24) \times 2.4\times10^6 \times 1 \times \sqrt{\frac{130.5}{2} \times \frac{96}{2}} = 666.2 \times 10^6$ lb/ft

TURBINE BUILDING - SPRING STIFFNESS OF SOIL | REF.

For rocking around X axis:

$\frac{d}{c} = .736 \Rightarrow \beta\psi = .5$

$K\psi_x = K4 = \frac{2.4\times10^6}{1-.24} \times .5 \times 8 \times \frac{130.5}{2} \times \left(\frac{96}{2}\right)^2 = 1,898,961 \times 10^6$ lbs-ft/radian

For rocking around Y axis

$\frac{d}{c} = 1.36 \Rightarrow \beta\psi = .54$

$K\psi_y = K5 = \frac{2.4\times10^6}{1-.24} \times .54 \times 8 \times \frac{96}{2} \times \left(\frac{130.5}{2}\right)^2 = 2,787,941 \times 10^6$ lbs-ft/radian

For Vertical, with $\frac{d}{c} = 1.36$ we get:

$\frac{d}{c} = 1.36 \Rightarrow \beta_z = 2.10$

Then:

$K_z = K_3 = \frac{2.4\times10^6}{1-.24} \times 2.1 \times \sqrt{4 \times \frac{96}{2} \times \frac{130.5}{2}} = 742.26\times10^6$ lb/ft

0.76

Summarize:

$K_1 = 626.23\times10^6$ lbs/ft $= 52.18\times10^6$ lbs/in

$K_2 = 666.2\times10^6$ lbs/ft $= 55.52\times10^6$ lbs/in

$K_3 = 742.26\times10^6$ lbs/ft $= 61.86\times10^6$ lbs/in

$K_4 = 1,898,961\times10^6$ lbs-ft/radian $= 2.279\times10^{13}$ lbs-in/radian

$K_5 = 2,787,941\times10^6$ lbs-ft/radian $= 3.346\times10^{13}$ lbs-in/radian

TURBINE BUILDING — SHEAR FACTOR OF THE MODEL. | REF.

For a force F applied at center of gravity, there are two kinds of shear stress induced:

- Shear stress caused by direct shear : $\frac{F}{A}$ (A: shear area in appropriate direction of force)
- Shear stress caused by torsion (because of eccentricity) : $\frac{Tr}{J}$.

1. For beam between Ground Floor and Mezzanine Floor : Total cross section area 587 ft²

X direction (X_1) : (Reference drawing page 46)

Shear area = Area part 5 + 12 + 13 + 14 + 18 + 20 + 25 + 27 + 29

= 17 + 76.042 + 15.207 + 63 + 16.667 + 58.667 + 25.5 + 14.416 + 9.334 = 296 ft²

Moment induced by a force F applied at center of gravity and on X direction

$F \times 6.525 = 6.525\,F \times ft = 78.3\,F \times in$

For a rectangular shape, assume we use $\bar{r}$, the average of r_1 and r_2, in which r_1 and r_2 are distances from center of rigid to two ends of rectangular shape, to calculate the average torsion shear stress.

Then the Torsion Shear stress will be :

$$\tau = \frac{T\bar{r}}{J} = \frac{78.3 \times \bar{r} \times F}{1.055 \times 10^{?} \times 12^3} = .04295\,\bar{r} \times 10^{-6}\,F/in^2$$

Part	r_1 (ft)	r_2 (ft)	$\bar{r}$ (ft)	Torsion Shear Stress		Area (in²)	Shear Force (Torsion)
5	52.37	40.42	46.39	2.078×10^{-6} F/in²		17×12²	5.087×10^{-3} F
12	40.28	29.31	34.8	1.494×10^{-6} F/in²		76.042×12²	16.366×10^{-3} F
13	30.44	32.7	31.57	1.356×10^{-6} F/in²		15.207×12²	2.969×10^{-3} F
14	~~46.14~~ 34.82	~~[illegible]~~ 58.32	~~59.72~~ 46.57	~~[illegible]~~ 2.000	—	63×12²	~~23.268~~ 18.146 $\times 10^{-3}$ F
18	56.84	69.43	63.14	2.712	—	16.667×12²	6.509×10^{-3} F
20a	40.81	51.19	46	1.976	—	30.907×12²	5.793×10^{-3} F
20b	40.81	49.36	45.09	1.936	—	27.76×12²	7.739×10^{-3} F
25	[illegible]	[illegible]	19.4?5	.8??	—	[illegible]	$3.0?? \times 10^{-3}$ F
27	14.64	14.68	16.66	.716	—	14.416×12²	1.486×10^{-3} F
29	9.4	7.64	8.52	.366	—	9.334×12²	$.491 \times 10^{-3}$ F
							~~75.7??×10⁻³ F~~
							70.649×10^{-3} F

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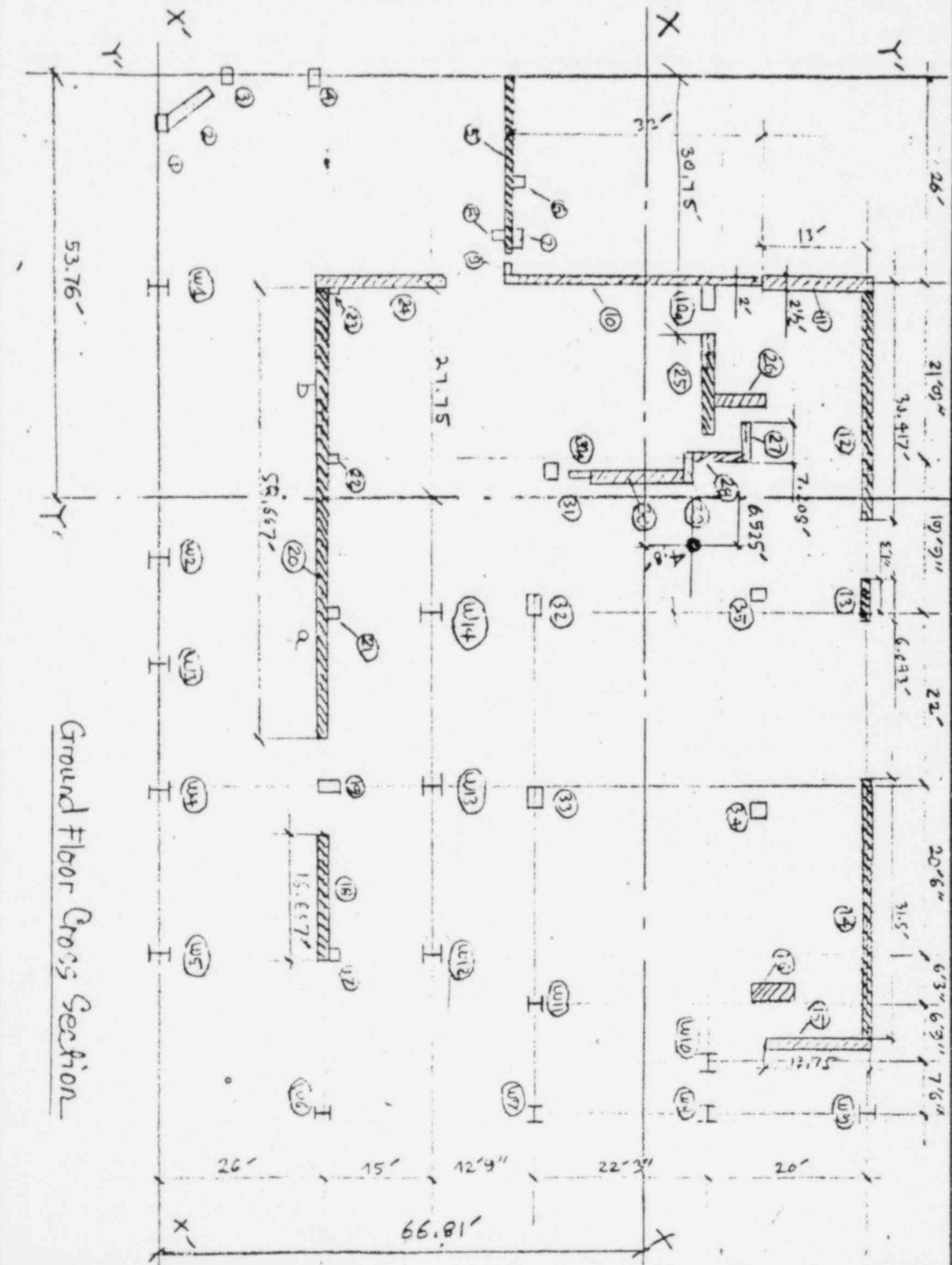
TURBINE BUILDING : - GROUND FLOOR CENTROID AND MOMENT INERTIA | REF.



	REF.

TURBINE BUILDING - SHEAR FACTOR OF THE MODAL

$$\tau = \frac{F + F_{torsion}}{A_{shear}} = \frac{F + \text{~~75.767~~}\,70.649 \times 10^{-3} F}{296} = \frac{F}{A_{total} \times SF_y}$$

$$\Rightarrow SF_y = \frac{296}{A_{total}} \times \frac{1}{(1+.071)} = \frac{296}{587}\,\frac{1}{1.071} = \text{~~.469~~}\ .471$$

Y direction: Total Area = $587\ ft^2$

Shear area = Area part 10 + 11 + 15 + 16 + 24 + 26 + 25 + 30

= 66 + 32.5 + 25.5 + 14 + 15.67 + 6.75 + 12 + 22 = $194\ ft^2$

Moment = F x 4.8 ft = 57.6 F x in

Torsion shear stress : $\frac{Tr}{J} = \frac{57.6 \times F \times F}{1.055 \times 10^6 \times 12^3} = .031596\,F \times 10^{-6}\ F/in^2$.

Part	r_1 (ft)	r_2 (ft)	F (ft)	Torsion Shear Stress (10^{-6} F/in²)	Area (in²)	Shear Force (Torsion)
10	32.45	32.14	32.3	1.02	66 x 12²	9.694 x 10^{-3} F
11	32.14	40.28	36.21	1.144	32.5 x 12²	5.354 —
15	73.3	69.22	71.26	2.252	25.5 x 12²	8.269 —
16	65.78	63.86	64.82	2.048	14 x 12²	4.129 —
24	49.36	37.45	43.4	1.371	15.67 x 12²	3.094 —
26	23.32	18.9	21.11	.667	6.75 x 12²	.648 —
25	14.68	9.4	12.04	.38	12 x 12²	.657 —
30	7.64	3.5	5.57	.176	22 x 12²	.557
						32.402 x 10^{-3} F

$$\Rightarrow SF_x = \frac{194}{587} \times \frac{1}{1.032} = .32$$

2. For beam between Mezzanine and Main Floor : Total Cross section Area : 669 ft²

X direction : (Reference drawing page 48)

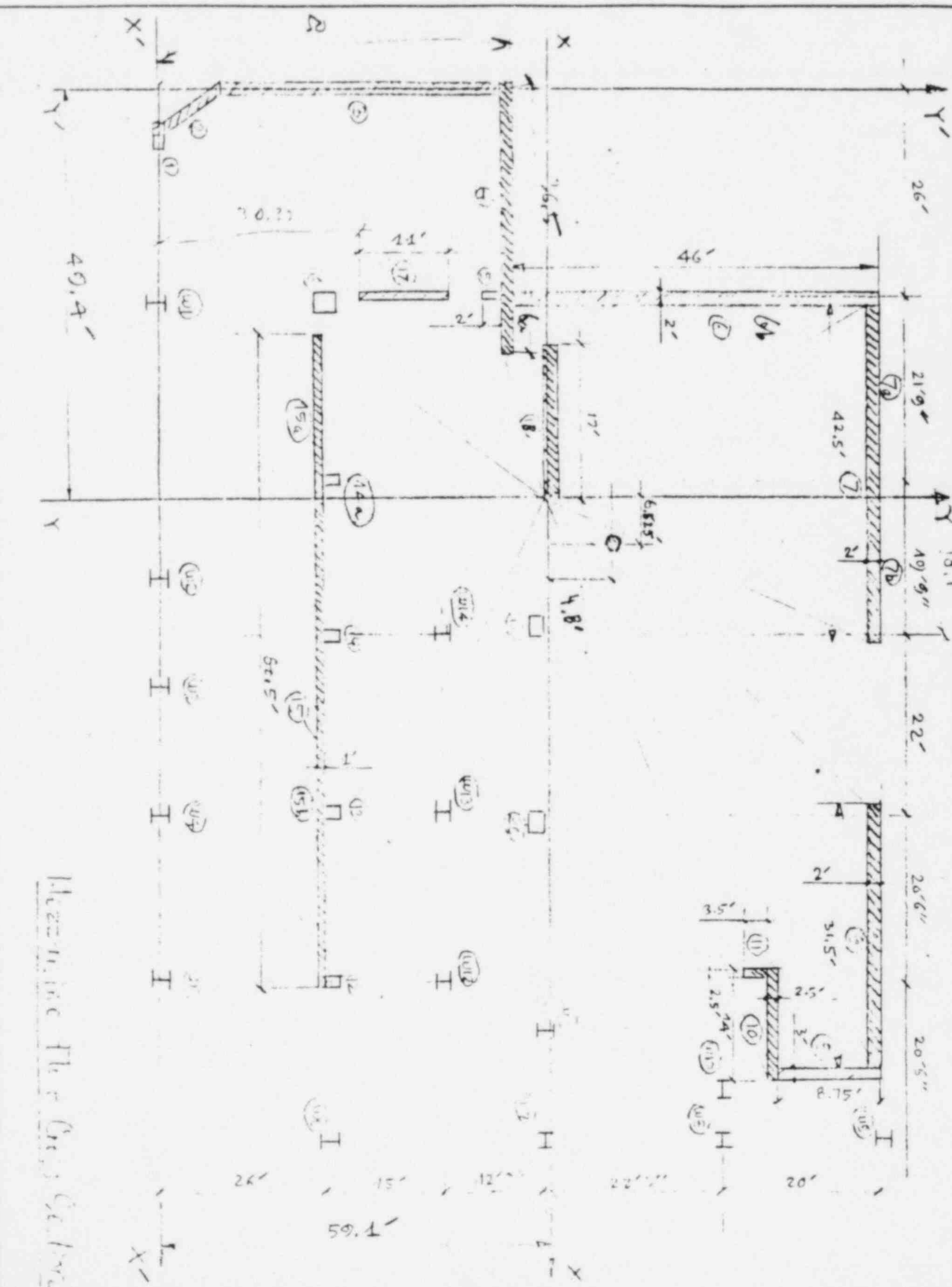
Shear area = Area Part 4 + 7 + 8 + 10 + 15 + 16

= 73 + 85 + 63 + 35 + 80.5 + 34 = 370.5 ft^2

$J = 1.5 \times 10^6\ ft^4$

$$\tau = \frac{Tr}{J} = \frac{76.3 \times F \times F}{1.5 \times 10^6 \times 12^3} = .030208\,F \times 10^{-6}\ F/in^2.$$

TURBINE BUILDING MOVEMENT – MEZZANINE FLOOR CENTROID AND MOMENT INERTIA. | REF.



TURBINE BUILDING – SHEAR FACTOR OF THE MODEL

REF.

Part	r_1 (ft)	r_2 (ft)	F	Torsion Shear Stress (10^{-6} F/in²)	Area (in²)	Shear Force
4	15.70	58.23	33.01	.997	73×12²	10.48×10⁻³ F/in ✓
7a	36.9	43.69	40.3	1.217	48.9×12²	8.552×10⁻³ F/in ✓
7b	36.9	41.1	39	1.178	36.2×12²	6.14 —
8	43.67	66.11	54.89	1.658	63×12²	15.042 — ✓
10	64.11	76.93	70.52	2.13	35×12²	10.735 —
15a	33.1	38.62	35.86	1.083	19.9×12²	3.103 —
15b	33.1	69.05	51.1	1.544	60.6×12²	13.474 — ✓
18	3.35	17.32	10.34	0.312	34×12²	1.529 ✓
					53352 in²	67.528×10⁻³ F/in² ✓

$$SF_x = \frac{370.5}{1.07 \times 669} = .518$$

Y direction : Moment = F×4.8 ft = 57.6 F-in

Shear area = Area Part 2+3+6a+9+17 = 33.5+67+18.2+26.25+8.75 = 238.50 ✓ (+66, +73.8)

Part	r_1 (ft)	r_2 (ft)	F	Torsion Shear Stress (10^{-6} F/in²)	Area (in²)	Shear Force
2	74.20	65.23	69.72	1.543	33.5×12²	7.472×10⁻³ F
3	65.23	58.23	57.73	1.283	67×12²	12.376×10⁻³ F
6a	25.1	23.4	24.25	.533	18.2×12²	1.413 —
6b	23.4	43.7	33.55	.746	73.5×12²	7.925 —
9	80.55	76.93	78.74	1.75	26.5×12²	6.678 —
11	64.11	61.71	62.21	1.465	8.75×12²	1.77 —
17	37.05	29.36	33.23	.738	11×12²	1.169 —
						38.805×10⁻³ F

$$SF_z = \frac{238.5}{1.035 \times 669} = .343$$ ✓

TURBINE BUILDING — SHEAR FACTOR OF THE MODAL | REF.

3. Between Main Floor and Roof:

This is steel framing structure and bracing take the shear force

X direction:

Bracing on south wall (Row A):

$A_B = 2L3\times2\times3/8 \Rightarrow A = 2\times1.73 = 3.46\,in^2,\ \alpha = 49.5°$

Bracing on north wall (Row F):

$A_B = 2L3\times2\times3/8 \Rightarrow A = 2\times1.73 = 3.46\,in^2,\ \alpha = 49.5°$

Equivalent Shear Area:

$A_e = (3.46\times2)\times\frac{E_s}{G_s}\cos^2\alpha\sin\alpha = (3.46\times2)\times2(1+.3)\cos^2 49.5°\sin 49.5° = 5.77\,in^2$

Y direction

Bracing on west wall:

$A_B = 2L3\times2\times3/8 \Rightarrow A = 2\times1.73 = 3.46\,in^2,\ \alpha = 54.5°$

Bracing on East wall

$A_B = 2L4\times3\times1/4 \Rightarrow A = 2\times1.69 = 3.38\,in^2,\ \alpha = 54.5°$

Equivalent Shear Area

$A_e = (3.46+3.38)\times2(1+.3)\cos^2 54.5°\sin 54.5° = 4.88\,in^2$

TURBINE BUILDING - SHEAR FACTOR OF THE MODAL

REF.

Consider the beam between Main floor and Roof floor as separate column

Then we have:

		I_x (in⁴)	I_y (in⁴)	J (in⁴)	A (in²)
W1 :	W12x40	310	44.1	.956	11.8
W2 :	W12x40	310	44.1	.956	11.8
W3 :	W12x40	310	44.1	.956	11.8
W4 :	W12x50	395	56.4	1.79	14.7
W5 :	W12x40	310	44.1	.956	11.8
W6 :	W12x40	310	44.1	.956	11.8
W7 :	W12x45	351	50	1.32	13.2
W8 :	W12x45	351	50	1.32	13.2
W9 :	W12x40	310	44.1	.956	11.8
W10 :	W14x87	967	350	3.68	25.6
W11 :	W14x87	967	350	3.68	25.6
W12 :	W14x87	967	350	3.68	25.6
W13 :	W14x87	967	350	3.68	25.6
W14 :	W12x40	310	44.1	.956	11.8
W15 :	W12x50	395	56.4	1.79	14.7
W16 :	W12x58	476	107	2.1	17.1
W17 :	W14x84	928	225	4.41	24.7
W18 :	W14x84	928	225	4.41	24.7
W19 :	W14x103	1170	420	6.02	30.3
W20 :	W12x87	740	241	5.10	25.6
	Total :	11772	3139.5	49.672	363.2

Then :

$4I_x$	$4I_y$	4J	A
47088	12558	198.7	363.2

NES

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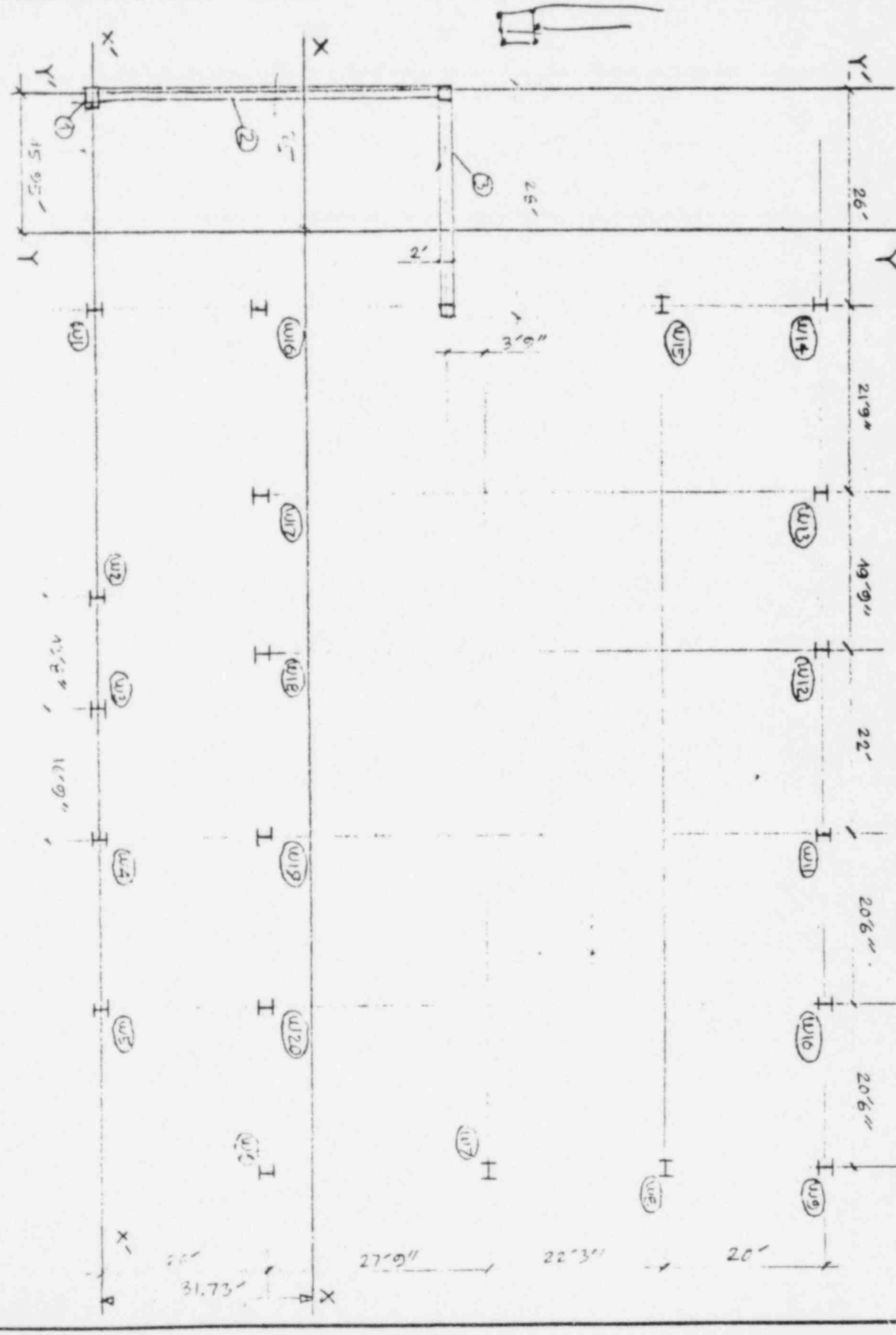
TURBINE BUILDING MOVEMENT — MAIN FLOOR CENTROID AND MOMENT INERTIA.

REF.



TURBINE BUILDING - ANALYSIS | REF.

BEAM 2 NODE 3

Axial & Bending stress:

From Output 36200M5.

Axial stress: $-6.17832\,E\text{-}2$ ksi (DL + SRSS EQ) (Compression) ✓

$-9.07792\,E\text{-}2$ ksi (DL − SRSS EQ). (Compression) ✓

Bending stress: $1.99589\,E\text{-}2$ (M_{x_2}) ✓

$1.82399\,E\text{-}2$ (M_{x_3}) ✓

SRSS bending $10^{-2}\sqrt{(1.99589^2 + 1.82399^2)} = 2.70380E\text{-}2$ ksi ✓

Since magnitude of bending stress < minimum magnitude of axial compression stress, no tension occur ✓

Max compression: $-9.07792\,E\text{-}2$ ksi $- 2.70380\,E\text{-}2$ ksi $= -.1178$ ksi (compression) < 2.975 ksi ✓ OK

CHECK SHEAR

Lateral LOAD from Output 56200M5

$F_{x_1} = 1062.7$ kips ✓ $F_{x_2} = 1034.6$ kips. ✓

Shear load F_{x_1} is taken by shear walls in x_1 direction and shear load F_{x_2} is taken by shear walls in x_2 direction.

From Mezzanine Floor Cross Section, shear walls area are:

$A_{x_1} = 53352\,in^2$ ✓, $A_{x_2} = 34380\,in^2$ ✓

$\tau_{x_1} = \frac{F_{x_1}}{A_{x_1}} = \frac{1062.7}{53352} = .01992$ ksi $= 19.9$ psi < 118 psi ✓ OK

$\tau_{x_2} = \frac{F_{x_2}}{A_{x_2}} = \frac{1034.6}{34380} = .03009$ ksi $= 30.09$ psi < 118 psi ✓ OK

TURBINE BUILDING – ANALYSIS | REF.

Allowable stress:

Maximum compression in concrete : $.85 f'_c = .85 \times 3500\ psi = 2975\ psi$ ✓

Allowable shear stress : $2\sqrt{f'_c} = 2\sqrt{3500} = 118\ psi$ (*) ✓

(*) Recommended Lateral Force Requirements and Commentary, 1975 edition.

TURBINE BUILDING - ANALYSIS. | REF.

BEAM 1 NODE 2

Axial & bending stress:

From Output S6200 MS.

Axial stress: $-.101688$ ksi (Output case 1) (Compression) ✓
$-.147862$ ksi (Output case 2) (Compression) ✓

Bending stress: $5.61337 E-2$ ksi (M_{x_2}) ✓
$4.15252 E-2$ ksi (M_{X3}) ✓

$$SRSS = 10^{-2}\sqrt{(5.61337^2 + 4.15252^2)} = 6.9824 E-2 \text{ ksi.}$$ ✓

No tension! ✓

Max compression: $-.1479$ ksi $- .0698$ ksi $= .2177$ ksi < 2.975 ksi ✓ OK

CHECK SHEAR.

Lateral load from Output S6200 MS

$F_{x_1} = 1607.8$ K ✓ $F_{x_2} = 1538.4$ K ✓

From Ground Floor Cross Section, shear wall areas are: (page 45 calculation)

$A_{x_1} = 42624 \text{ in}^2$ ✓ $A_{x_2} = 27936 \text{ in}^2$. ✓

$$\tau_{x_1} = \frac{F_{x_1}}{A_{x_1}} = \frac{1607.8}{42624} = .03772 \text{ ksi} = 37.72 \text{ psi} < 118 \text{ psi}$$ ✓ OK

$$\tau_{x_2} = \frac{F_{x2}}{A_{x2}} = \frac{1538.4}{84529} = .0551 \text{ ksi} = 55.1 \text{ psi} < 118 \text{ psi}.$$ ✓ OK

TURBINE BUILDING - ANALYSIS | REF.

DEAD LOAD + LIVE LOAD.

From Output S620020

BEAM 1 NODE 2

- Axial stress (Compression) : .19367 ksi ✓

- Shear stress : Very small, can be neglected. ✓

Criteria 1.4D + 1.7L : A value of 1.7 (D+L) would be conservative and satisfied 1.4D + 1.7L (Since we don't have separate Dead and Live Load)

1.7 (D+L) = 1.7 × .19367 = .3292 ksi < 2.975 ksi OK ✓

BEAM 2 NODE 3

- Axial stress (Compression) .10579 ksi

1.7 × .10579 = .1798 ksi ✓ < 2.975 ksi OK ✓

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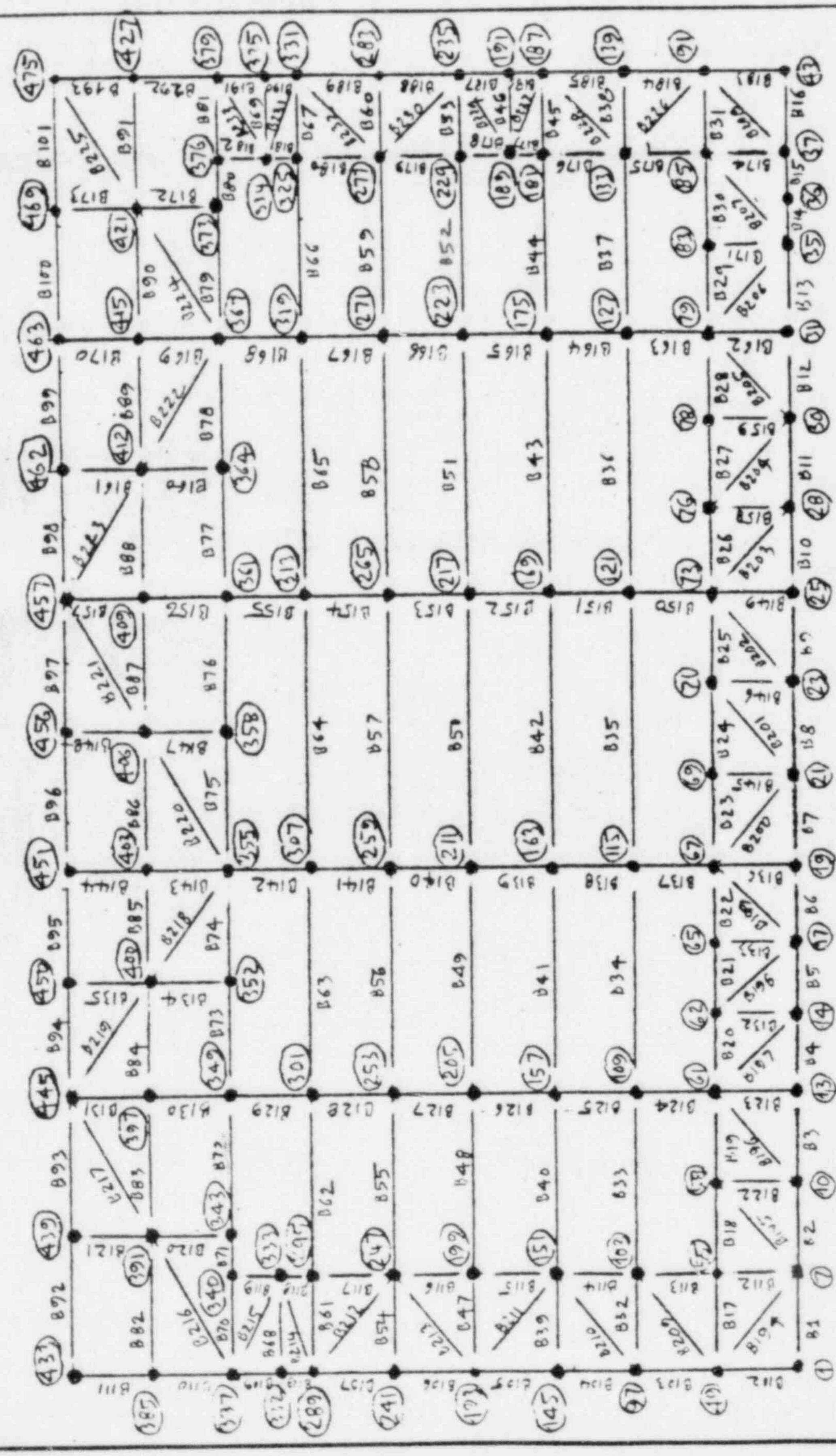
	REF.



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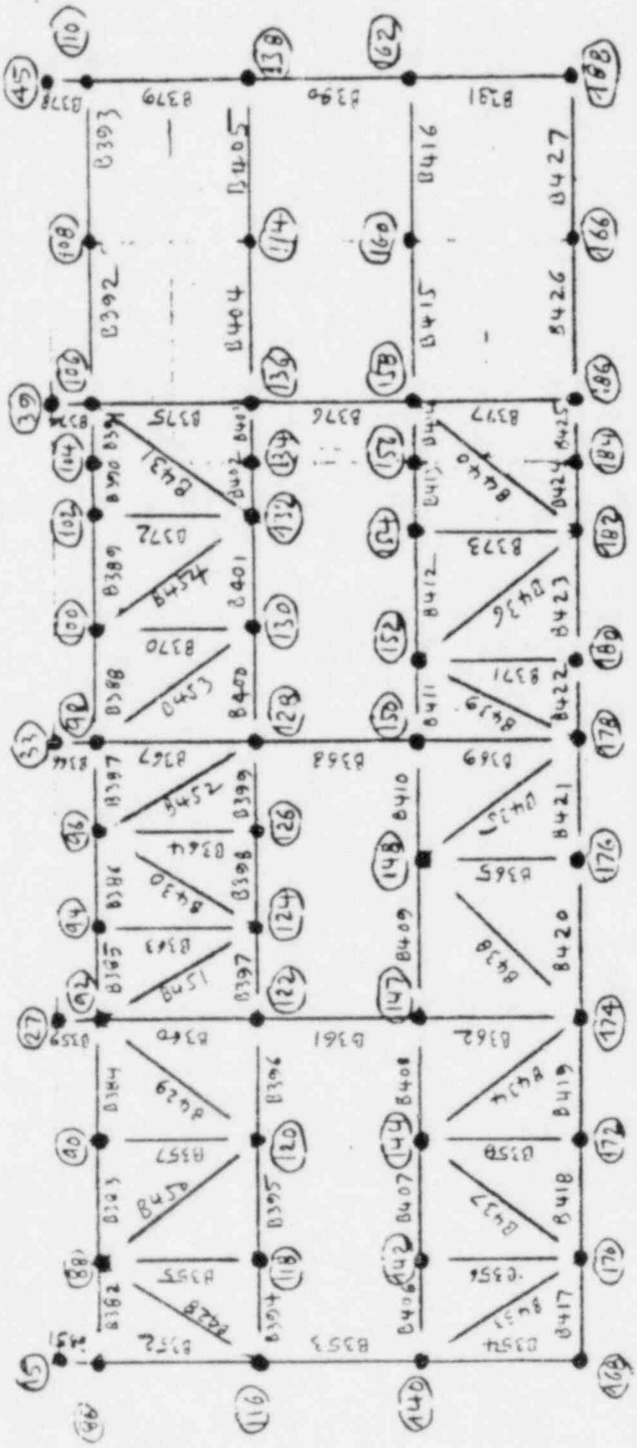
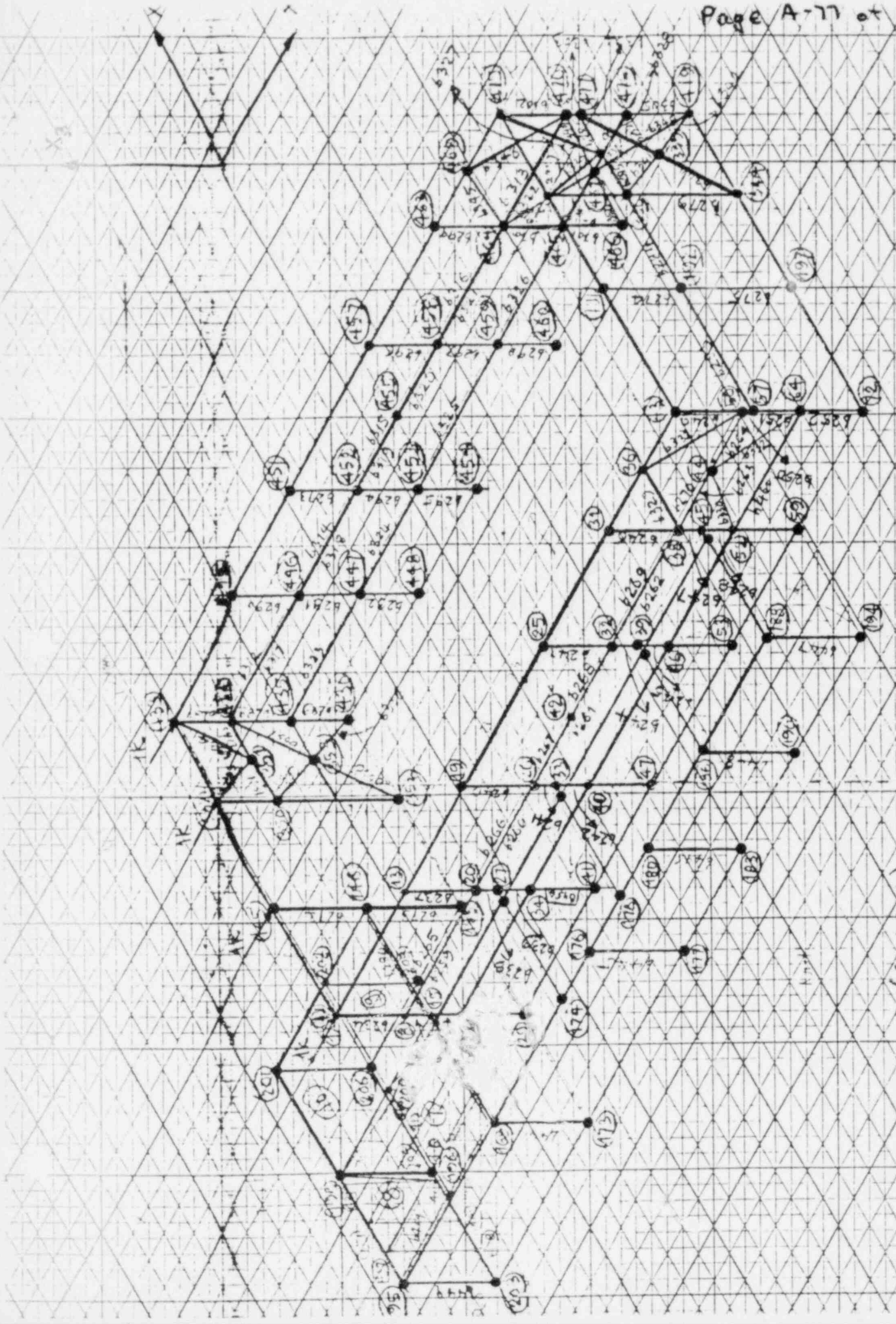
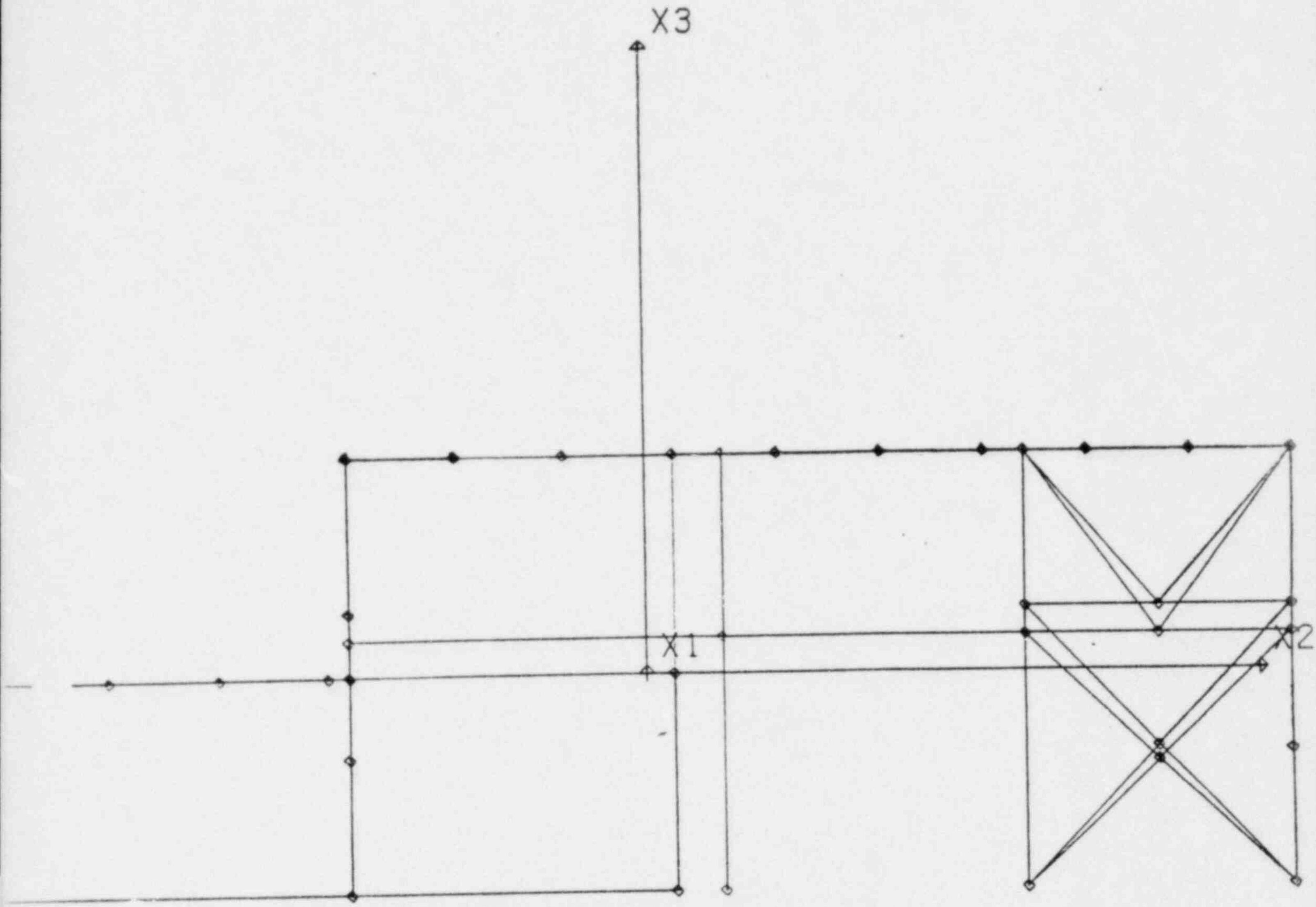
	REF.





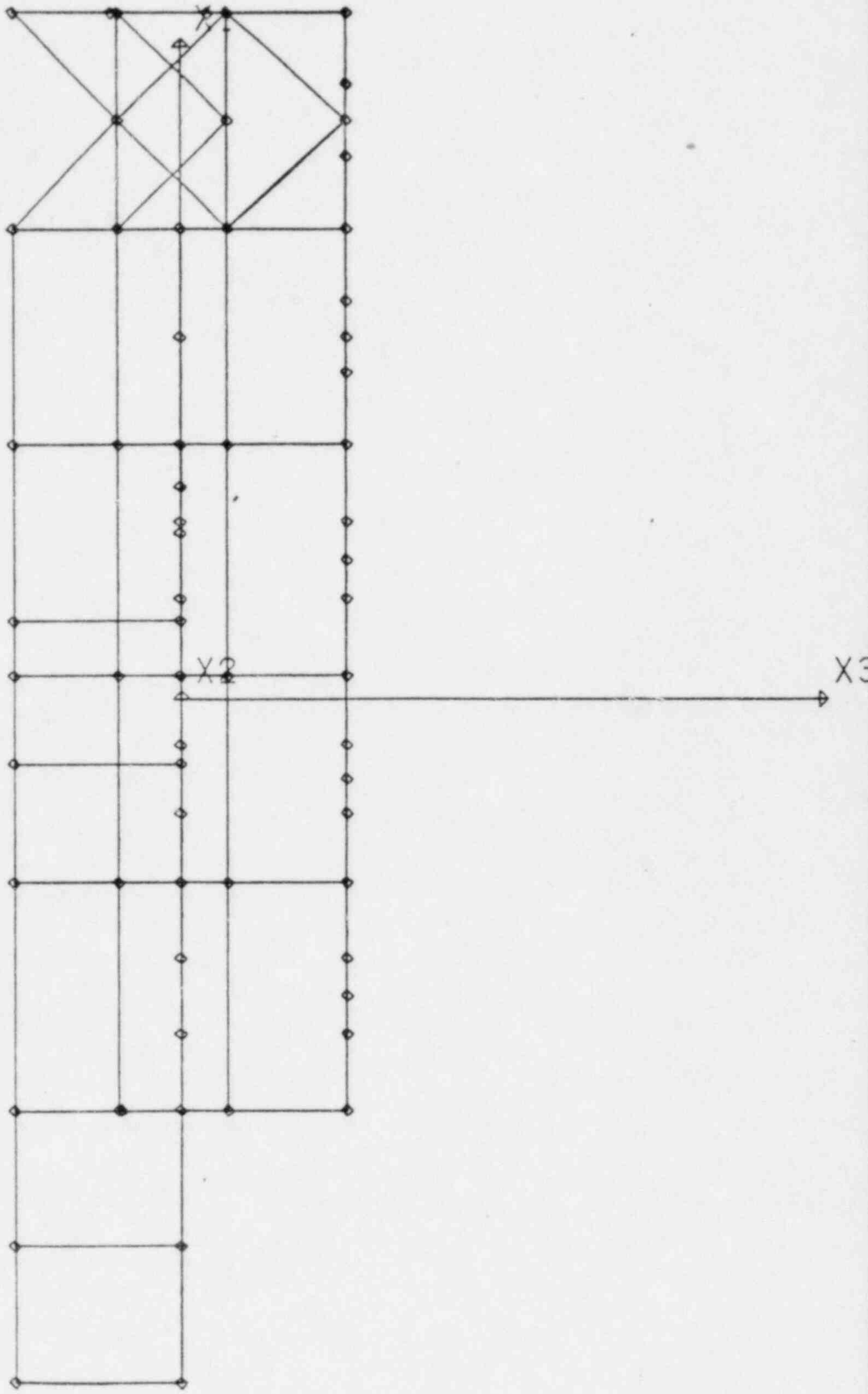
VG MODAL (UPPER PART) (STATIC)

TURBINE BUILDING GEOMETRY - LOOKING EAST



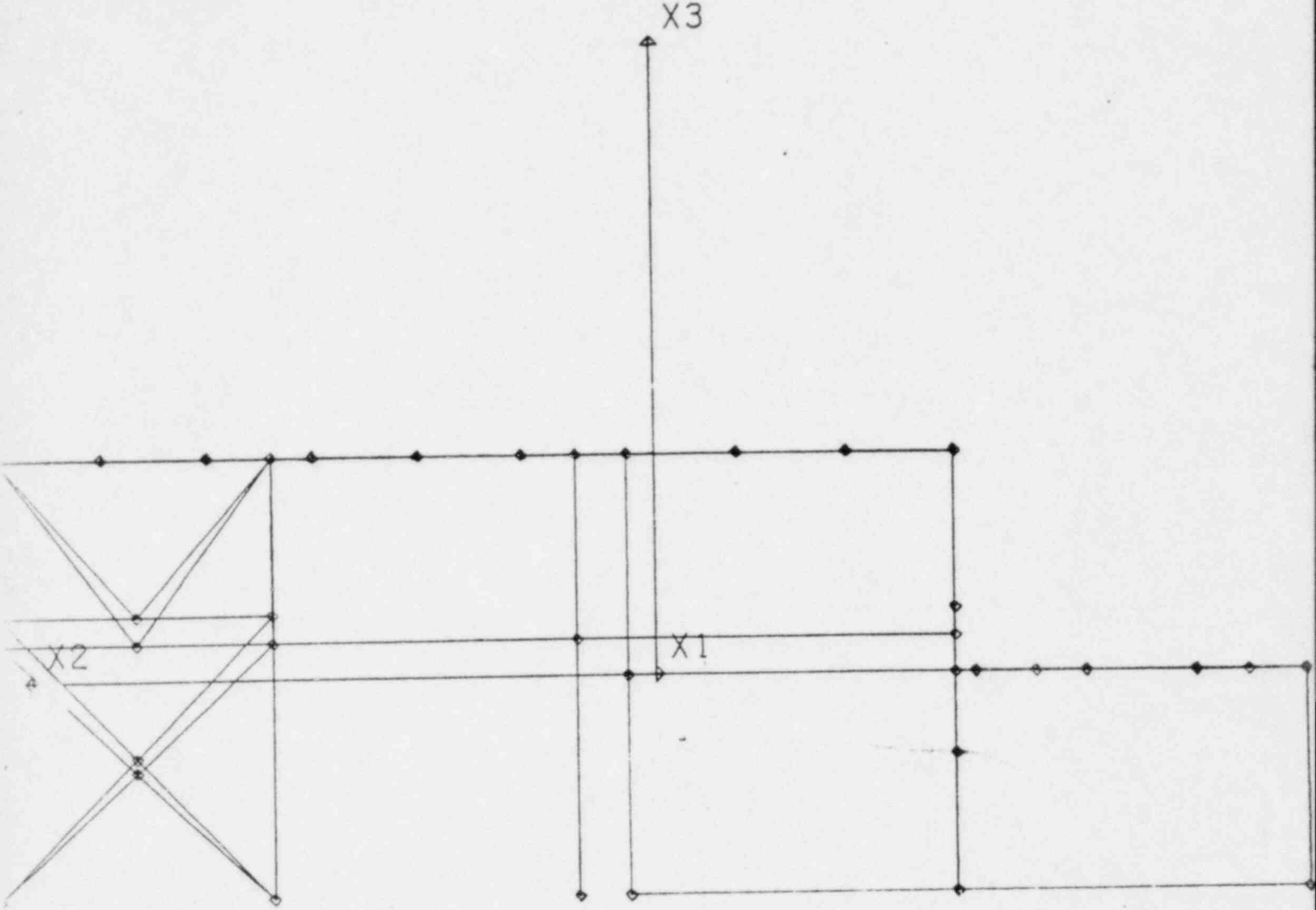
STARDYNE FINITE ELEMENT MODEL PROJECTION ON X2-X3 PLANE CASE NO. 1

TURBINE BUILDING GEOMETRY - LOOKING NORTH



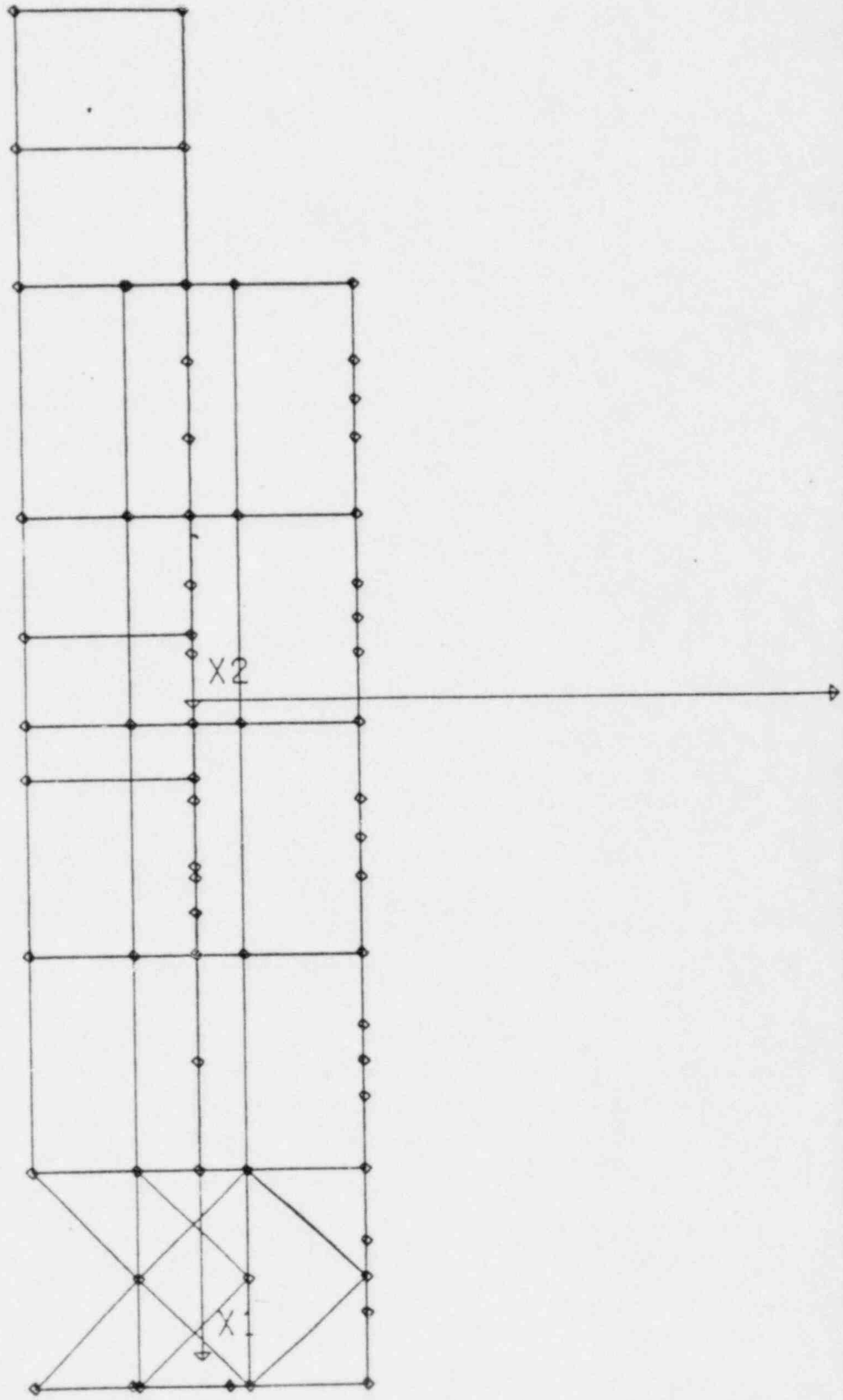
STARDYNE FINITE ELEMENT MODEL PROJECTION ON X3-X1 PLANE CASE NO. 2

TURBINE BUILDING GEOMETRY - LOCKING WEST



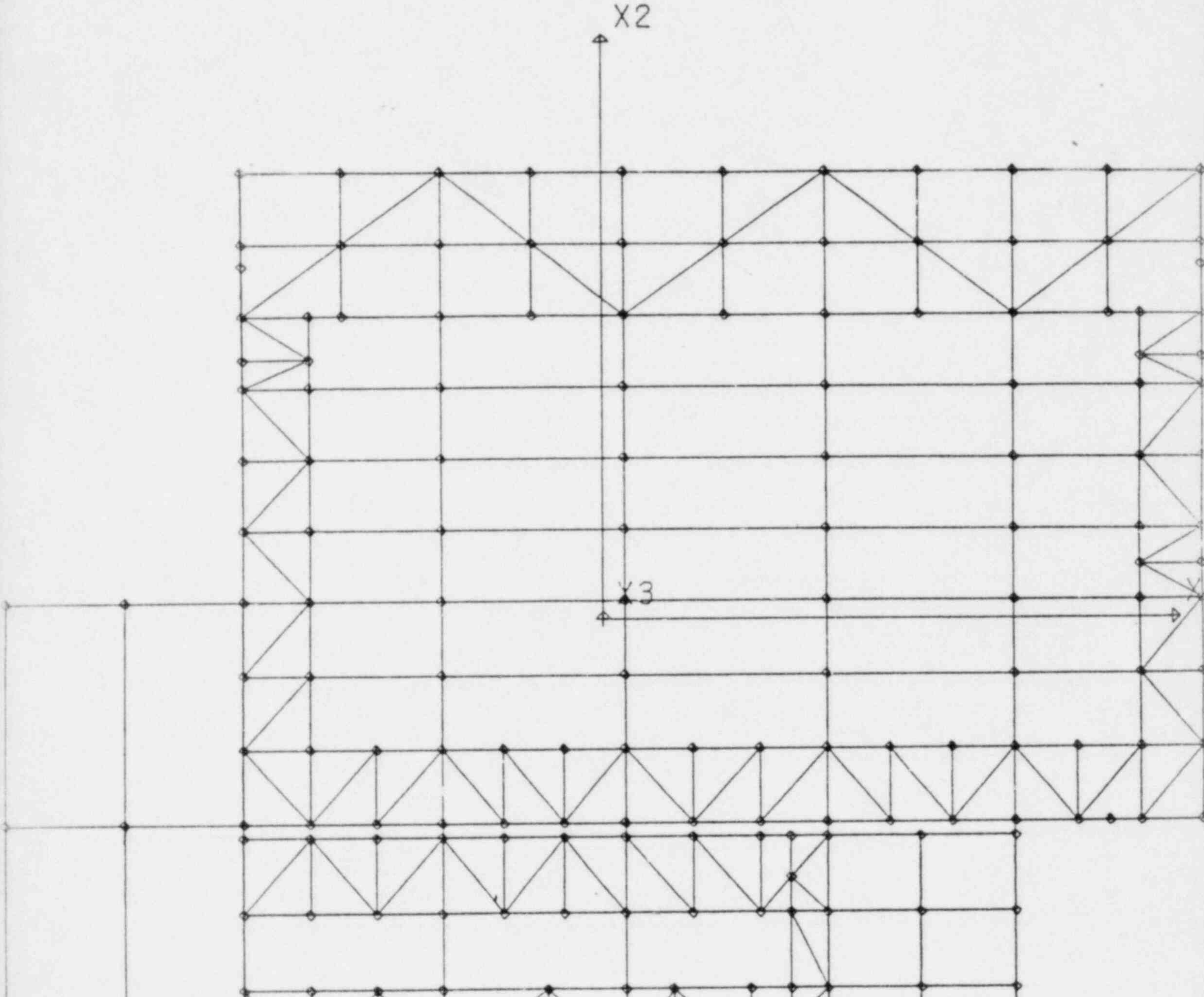
STARDYNE FINITE ELEMENT MODEL PROJECTION ON X2-X3 PLANE CASE NO. 3

TURBINE BUILDING GEOMETRY - LOOKING SOUTH



STARDYNE FINITE ELEMENT MODEL PROJECTION ON X3-X1 PLANE CASE NO. 4

TURBINE BUILDING GEOMETRY - TOP VIEW



REF.

TURBINE BUILDING - STATIC MODAL

NODAL COORDINATES TABLE

NODE	$X(x_1)$ - in	$Y(x_2)$ - in	$Z(x_3)$ - in
1	312	312	720
7	399	312	720
10	486	312	720
13	573	312	720
14	652	312	720
17	731	312	720
19	810	312	720
21	898	312	720
23	986	312	720
25	1074	312	720
28	1156	312	720
30	1238	312	720
32	1320	312	720
35	1402	312	720
36	1443	312	720
37	1484	312	720
43	1566	312	720
49	312	408	720
55	399	408	720
56	486	408	720
61	573	408	720
62	652	408	720
65	731	408	720
67	810	408	720
69	898	408	720
71	986	408	720
73	1074	408	720
76	1156	408	720
78	1238	408	720
79	1320	408	720
83	1402	408	720
85	1484	408	720
91	1566	408	720

REF.

TURBINE BUILDING – STATIC MODAL

NODAL COORDINATES TABLE

NODE	X(X1) – in	Y(X2) – in	Z(X3) – in	NODE	X(X1) – in	Y(X2) – in	Z(X3) – in
97	312	504	720	289	312	876	720
103	399	504	720	295	399	876	720
109	573	″	″	301	573	″	″
115	810	″	″	307	810	″	″
121	1074	″	″	313	1074	″	″
127	1320	″	″	319	1320	″	″
133	1484	″	″	325	1484	″	″
139	1566	″	″	331	1566	″	″
145	312	600	720	332	312	912	720
151	399	600	720	333	399	912	720
157	573	″	″	334	1484	″	″
163	810	″	″	335	1566	″	″
169	1074	″	″	337	312	968	720
175	1320	″	″	340	399	968	720
181	1484	″	″	343	442.5	″	″
187	1566	″	″	349	573	″	″
189	1484	645	720	352	691.5	″	″
191	1566	645	″	355	810	″	″
193	312	692	720	358	942	″	″
199	399	692	720	361	1074	″	″
205	573	″	″	364	1197	″	″
211	810	″	″	367	1320	″	″
217	1074	″	″	373	1443	″	″
223	1320	″	″	376	1484	″	″
229	1484	″	″	379	1566	″	″
235	1566	″	″	385	312	1060	720
241	312	764	720	391	442.5	1060	720
247	399	764	720	397	573	″	″
253	573	″	″	400	691.5	″	″
259	810	″	″	403	810	″	″
265	1074	″	″	406	942	″	″
271	1320	″	″	409	1074	″	″
277	1484	″	″	412	1197	″	″
283	1566	″	″	415	1320	″	″
				421	1443	″	″
				427	1566	″	″

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NUCLEAR ENERGY SERVICES

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TURBINE BUILDING — STATIC MODAL

NODAL COORDINATES TABLE

NODE	X(X1) - in	Y(X2) - in	Z(X3) - in	NODE	X(X1) - in	Y(X2) - in	Z(X3) - in
433	312	1152	720	192	1566	645	559.5
439	442.5	1152	720	336	1566	912	559.5
445	573	″	″	338	″	1032	″
450	691.5	″	″	477	″	1152	″
451	810	″	″	339	1566	1152	447.75
456	942	″	″	197	1566	645	336
457	1074	″	″	344	″	912	″
462	1197	″	″	479	″	1152	″
463	1320	″	″	434	312	1152	583.75
469	1443	″	″	446	573	1152	583.75
475	1566	″	″	452	810	″	″
8	312	312	583.75	458	1074	″	″
20	573	312	583.75	464	1320	″	″
26	810	″	″	476	1566	″	″
32	1074	″	″	435	312	1152	456
38	1320	″	″	447	573	1152	456
50	1566	″	″	453	810	″	″
15	312	312	528	459	1074	″	″
27	573	312	528	465	1320	″	″
33	810	″	″	467	1443	″	″
39	1074	″	″	478	1566	″	″
45	1320	″	″	436	312	1152	336
57	1566	″	559.5	448	573	1152	336
22	312	312	456	454	810	″	″
34	573	312	456	460	1074	″	″
40	810	312	″	466	1320	″	″
46	1074	312	″	146	312	600	528
52	1320	312	″	155	312	600	336
64	1566	312	″	350	312	912	583.75
29	312	312	336	351	312	1032	583.75
41	573	312	336	353	312	1032	459.88
47	810	″	″	354	312	912	336
53	1074	″	″				
59	1320	″	″				
72	1566	″	″				
44	1443	312	583.75				

NES

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NODE	X(X_1)-in	Y(X_2)-in	Z(X_3)-in
86	312	244	528
88	399	244	528
90	486	〃	〃
92	573	〃	〃
94	652	〃	〃
96	731	〃	〃
98	810	〃	〃
100	898	〃	〃
102	986	〃	〃
104	1026	〃	〃
106	1074	〃	〃
108	1197	〃	〃
110	1320	〃	528
114	1197	196	528
116	312	196	〃
118	399	196	〃
120	486	〃	〃
122	573	〃	〃
124	652	〃	〃
126	731	〃	〃
128	810	〃	〃
130	898	〃	〃
132	986	〃	〃
134	1026	〃	〃
136	1074	〃	〃
138	1320	〃	〃
140	312	98	〃
142	399	〃	〃
144	486	〃	〃
147	573	〃	〃
148	709	〃	〃
150	810	〃	〃
152	873	〃	〃
154	973.5	〃	〃
156	1026	〃	〃
158	1074	〃	〃
160	1197	〃	〃
162	1320	〃	
166	1197	0	〃

NODE	X(X_1)-in	Y(X_2)-in	Z(X_3)-in
168	312	0	528
170	399	0	528
172	486	〃	〃
174	573	〃	〃
176	709	〃	〃
178	810	〃	〃
180	873	〃	〃
182	973.5	〃	〃
184	1026	〃	〃
186	1074	〃	〃
188	1320	〃	〃
195	0	0	528
196	156	0	528
198	0	312	〃
200	156	312	〃
201	0	~~600~~	〃
202	156	~~600~~	〃
203	0	0	336
173	312	0	〃
177	709	〃	〃
192	873	〃	〃
190	1074	〃	〃
194	1320	〃	〃
204	0	312	〃
206	0	600	〃
208	156	600	〃

TURBINE BUILDING – STATIC MODEL

REF.

Slab weight (3½" thickness) : .2228 $\times 10^{-3}$ kips/in², Insulating concrete (2" thickness) : .03125$\times 10^{-3}$ kips/in²

Live load 30lbs/ft², Slab weight (8" thickness) : .5092 $\times 10^{-3}$ kips/in²

NODE	Lumped area (in²)	Slab weight (kip)	Insulation weight (kip)	Live load (kip)	Framming weight (kip)	Total (kips)	Total for live load of [illegible]
1	2088	.465	.065	.435		.965	1.835
7	4176	.93	.13	.87		1.93	3.67
10	4176	.93	.13	.87		1.93	3.67
13	3984	.888	.124	.83		1.842	[illegible]
16	3792	.845	.118	.79		1.753	3.337
17	3792	.845	.118	.79		1.753	3.337
19	4008	.893	.125	.835		1.853	3.523
21	4224	.941	.132	.88		1.953	3.713
23	4224	.941	.132	.88		1.953	3.713
25	4080	.909	.128	.85		1.887	3.587
26	3936	.877	.123	.82		1.82	3.46
30	3936	.877	.123	.82		1.82	[illegible]
32	3936	.877	.123	.82		1.82	3.46
35	2624	.585	.082	.547		1.214	[illegible]
36	2624	.585	.082	.547		1.214	[illegible]
37	[illegible]	.585	.082	.547		1.214	[illegible]
43	1968	.438	.062	.41		.91	1.73
49	4176	.93	.13	.87		1.93	[illegible]
55	8352	1.861	.261	1.74		3.862	[illegible]
56	8352	1.861	.261	1.74		3.862	[illegible]
61	7968	1.775	.249	1.66		3.684	7.004
62	7584	1.69	.237	1.58		3.507	6.667
65	7584	1.69	.237	1.58		3.507	6.667
67	8016	1.786	.25	1.67		3.706	7.046
69	8448	1.882	.264	1.76		3.906	7.426
71	8448	1.882	.264	1.76		3.906	[illegible]
73	8160	1.818	.255	1.7		3.773	7.173
76	7872	1.754	.246	1.64		3.64	6.92
78	7872	1.754	.246	1.64		3.64	6.92
79	7872	1.754	.246	1.64		3.64	[illegible]
83	7872	1.754	.246	1.64		3.64	[illegible]
85	7872	1.754	.246	1.64		3.64	6.92
91	3936	.877	.123	.82		1.82	[illegible]
97	4176	.93	.13	.87		1.93	[illegible]
103	12528	2.791	.392	2.61		5.793	[illegible]
109	19728	4.395	.616	4.11		9.121	[illegible]
115	24048	5.358	.752	5.01		11.12	21.14
121	24480	5.454	.765	5.1		11.319	[illegible]
127	19680	4.385	.615	4.1		9.1	[illegible]

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TURBINE BUILDING — STATIC MODAL

NODAL WEIGHT TABLE

NODE	Lumped area (in²)	Slab weight (kip)	Insulation weight (kip)	Live load (kip)	Framming weight (kip)	Total (kip)	REF.
133	11808	2.631	.369	2.46		5.46	10.38
139	3936	.877	.123	.82		1.82	3.46
145	4089	.911	.128	.852		1.891	3.595
151	12267	2.733	.383	2.556		5.672	10.784
157	19317	4.304	.603	4.024		8.931	16.979
163	23547	5.246	.736	4.906		10.888	20.70
169	23970	5.34	.749	4.994		11.083	21.071
175	19270	4.293	.602	4.014		8.909	16.937
181	8671.5	1.932	.271	1.806		4.009	7.662
187	2890.5	.644	.09	.602		1.336	2.54
189	5658	1.26	.177	1.179		2.617	4.975
191	1886	.4202	.059	.393		.872	1.658
193	4002	.892	.125	.834		1.851	3.519
199	12006	2.675	.375	2.501		5.551	10.553
205	18906	4.212	.591	3.939		8.742	16.62
211	23046	5.135	.72	4.801		10.656	20.258
217	23460	5.227	.733	4.888		10.848	20.624
223	18860	4.202	.589	3.929		8.72	16.578
229	8548.5	1.905	.267	1.781		3.953	7.515
235	2849.5	.635	.089	.594		1.318	2.505
241	4002	.892	.125	.834		1.851	3.519
247	12006	2.675	.375	2.501		5.551	10.553
253	18906	4.212	.591	3.939		8.742	16.62
259	23046	5.135	.72	4.801		10.656	20.258
265	23460	5.227	.733	4.888		10.848	20.624
271	18860	4.202	.589	3.929		8.72	16.578
277	11316	2.521	.354	2.357		5.232	9.946
283	3772	.84	.118	.786		1.744	3.316
289	2784	.62	.087	.58		1.287	2.427
295	8352	1.861	.261	1.74		3.862	7.342
301	18906	4.212	.591	3.939		8.742	16.62
307	23046	5.135	.72	4.801		10.656	20.258
313	23460	5.227	.733	4.888		10.848	20.624
319	18860	4.202	.589	3.929		8.72	16.578
325	7872	1.754	.246	1.64		3.64	6.92
331	2624	.585	.082	.547		1.214	2.308
332	2001	.446	.062	.417		.925	1.759
333	6003	1.337	.188	1.25		2.775	5.275
334	5658	1.261	.177	1.179		2.617	4.975
335	1886	.42	.059	.393		.872	1.658

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TURBINE BUILDING — STATIC MODAL

NODAL WEIGHT TABLE

NODE	Lumped area (in²)	Slab weight (kip)	Insulation weight (kip)	Live load (kip)	Framming weight (kip)	Total (kip)	Total (Live load 40
337	3219 ✓	.717 ✓	.1 ✓	.671 ✓		1.488 ✓	2.83 ✓
340	4828.5 ✓	1.076 ✓	.151 ✓	1.006 ✓		2.233 ✓	[illegible] ✓
343	5829 ✓	1.299 ✓	.182 ✓	1.214 ✓		2.695 ✓	5.123 ✓
348	12454.5 ✓	2.775 ✓	.389 ✓	2.594 ✓		5.758 ✓	10.946 ✓
352	10902 ✓	2.429 ✓	.341 ✓	2.271 ✓		5.041 ✓	9.583 ✓
355	11523 ✓	2.567 ✓	.36 ✓	2.4 ✓		5.327 ✓	10.127 ✓
358	12144 ✓	2.706 ✓	.38 ✓	2.53 ✓		5.616 ✓	10.676 ✓
361	11730 ✓	2.613 ✓	.366 ✓	2.444 ✓		5.423 ✓	10.311 ✓
364	11316 ✓	2.521 ✓	.354 ✓	2.358 ✓		5.232 ✓	9.948 ✓
367	12259 ✓	2.731 ✓	.383 ✓	2.554 ✓		5.668 ✓	10.776 ✓
373	5494 ✓	1.224 ✓	.172 ✓	1.144 ✓		2.54 ✓	4.828 ✓
376	4551 ✓	1.014 ✓	.142 ✓	.948 ✓		2.104 ✓	4. ✓
379	3034 ✓	.676 ✓	.095 ✓	.632 ✓		1.403 ✓	2.667 ✓
385	6003 ✓	1.337 ✓	.188 ✓	1.251 ✓		2.776 ✓	5.278 ✓
391	12006 ✓	2.675 ✓	.375 ✓	2.502 ✓		5.552 ✓	10.556 ✓
397	11454 ✓	2.552 ✓	.358 ✓	2.386 ✓		5.296 ✓	10.068 ✓
400	10902 ✓	2.429 ✓	.341 ✓	2.271 ✓		5.041 ✓	9.583 ✓
403	11523 ✓	2.567 ✓	.36 ✓	2.4 ✓		5.327 ✓	[illegible] ✓
406	12144 ✓	2.706 ✓	.38 ✓	2.53 ✓		5.616 ✓	[illegible] ✓
409	11730 ✓	2.613 ✓	.366 ✓	2.444 ✓		5.423 ✓	10.311 ✓
412	11316 ✓	2.521 ✓	.354 ✓	[illegible] ✓		5.232 ✓	[illegible]
415	11316 ✓	2.521 ✓	.354 ✓	[illegible] ✓		5.232 ✓	[illegible]
421	11316 ✓	2.521 ✓	.354 ✓	2.353 ✓		5.232 ✓	[illegible]
427	5658 ✓	1.261 ✓	.177 ✓	1.179 ✓		2.617 ✓	4.975 ✓
433	3001.5 ✓	.669 ✓	.094 ✓	.625 ✓		1.388 ✓	2.638 ✓
439	6003 ✓	1.337 ✓	.188 ✓	1.251 ✓		2.776 ✓	5.278 ✓
445	5727 ✓	1.276 ✓	.179 ✓	1.193 ✓		2.648 ✓	5.034 ✓
450	5451 ✓	1.214 ✓	.17 ✓	1.135 ✓		2.519 ✓	4.789 ✓
451	5761.5 ✓	1.284 ✓	.18 ✓	1.2 ✓		2.664 ✓	[illegible] ✓
456	6072 ✓	1.353 ✓	.19 ✓	1.265 ✓		2.808 ✓	5.338 ✓
457	5865 ✓	1.307 ✓	.183 ✓	1.222 ✓		2.712 ✓	5.156 ✓
462	5658 ✓	1.261 ✓	.177 ✓	1.179 ✓		2.617 ✓	4.975 ✓
463	5658 ✓	1.261 ✓	.177 ✓	1.179 ✓		2.617 ✓	4.975 ✓
469	5658 ✓	1.261 ✓	.177 ✓	1.179 ✓		2.617 ✓	4.975 ✓
475	2829 ✓	.63 ✓	.088 ✓	.589 ✓		1.307 ✓	2.485 ✓

TURBINE BUILDING – STATIC MODAL

Water tank weight is 5.1 kips x10^{-3}/in^2 average. (5.1)

NODE	Lumped area (in²)	Slab weight (kip)	Insulation weight (kip)	Live load (kip)	Other load (kip)	Total (kip)	Total (Live load ...)
86	2131.5	.475	.067	.444		.986	
88	4263	.95	.133	.888		1.971	3.747
90	4263	.95	.133	.888		1.971	3.747
92	4067	.906	.127	.847		1.88	3.574
94	3871	.862	.121	.806		1.789	3.401
96	3871	.862	.121	.806		1.789	3.401
98	4091.5	.912	.128	.852		1.892	3.596
100	4312	.961	.135	.898		1.994	3.79
– 102	3136	.699	.098	.653		1.450	2.76
104	980	.218	.03	.204		.452	.860
– 106	5365.5	2.732		1.118	27.364	31.214	33.449
– 108	6027	3.069		1.255	30.737	35.061	37.573
– 110	3013.5	1.535		.627	15.368	17.531	18.787
– 114	12054	6.138		2.511	61.475	70.123	75.146
116	4263	.95	.133	.888		1.971	
118	8526	1.899	.266	1.776		3.941	7.493
120	8526	1.899	.266	1.776		3.941	7.493
122	8134	1.812	.254	1.694		3.76	7.145
124	7742	1.725	.242	1.613		3.58	6.806
126	7742	1.725	.242	1.613		3.58	6.806
128	8183	1.823	.256	1.705		3.784	7.194
130	8624	1.921	.27	1.797		3.988	7.582
132	6272	1.397	.196	1.306		2.899	5.512
134	1960	.436	.06	.408		.904	1.721
– 136	10,731	5.464		2.236	54.728	62.428	66.899
– 138	6027	3.069		1.255	30.737	35.061	37.574
140	4263	.95	.133	.888		1.971	
142	8526	1.9	.266	1.776		3.942	7.494
144	8526	1.9	.266	1.776		3.942	7.494
146	10927	2.434	.341	2.276		5.051	9.603
148	11613	2.587	.363	2.419		5.369	10.207
150	8036	1.79	.251	1.674		3.715	7.063
152	8011.5	1.785	.25	1.669		3.704	7.042
154	7497	1.670	.234	1.562		3.466	6.590
156	2572.5	.573	.08	.536		1.192	2.264
– 158	10,731	5.464		2.236	54.728	62.428	66,899

TURBINE BUILDING _ STATIC MODAL

NODE	Lumped Area (in²)	Slab weight (kip)	Insulation weight (kip)	Live load (kip)	Framming weight (kip)	Total	Total Live load 90%	REF.
160	12054 ✓	6.138 ✓		2.51 ✓	61.475 (Water tank) ✓	70.123 ✓	75.146 ✓	
162	6027 ✓	3.069 ✓		1.255 ✓	30.737 ✓✓	35.061 ✓	37.574 ✓	
166	6027 ✓	3.069 ✓		1.255 ✓	30.737 ✓	35.061 ✓	37.572 ✓	
168	2131.5 ✓	.475 ✓	.067 ✓	.444 ✓		.986 ✓		
170	4263 ✓	.95 ✓	.134 ✓	.888 ✓		1.972 ✓	3.748 ✓	
172	4263 ✓	.95 ✓	.134 ✓	.888 ✓		1.972 ✓	3.748 ✓	
174	5463.5 ✓	1.217 ✓	.171 ✓	1.138 ✓		2.526 ✓	4.802 ✓	
176	5806.5 ✓	1.294 ✓	.181 ✓	1.209 ✓		2.684 ✓	5.102 ✓	
178	4018 ✓	.895 ✓	.126 ✓	.837 ✓		1.858 ✓	3.532 ✓	
180	4005.75 ✓	.892 ✓	.125 ✓	.834 ✓		1.851 ✓	3.519	
182	3748.5 ✓	.835 ✓	.117 ✓	.781 ✓		1.733 ✓	3.295 ✓	
184	1286.25 ✓	.286 ✓	.038 ✓	.268 ✓		.594 ✓	1.129	
186	5365.5 ✓	2.732 ✓		1.118 ✓	27.364 ✓	31.214 ✓	33.449	
188	3013.5 ✓	1.535 ✓		.627 ✓	15.369 ✓✓	17.531 ✓	18.787 ✓	

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TURBINE BUILDING — STATIC MODAL

For control room:

let $a = \frac{312''}{2} \times \frac{192''}{2} = 14,976\ in^2$

$c = \frac{312''}{2} \times \frac{156''}{2} = 12,168\ in^2$

$c_1 = \frac{98}{2} \times \frac{156''}{2} = 3822\ in^2$

$c_2 = \frac{18}{2} \times \frac{156''}{2} = 702\ in^2$

$b = \frac{288''}{2} \times \frac{192''}{2} = 13,824\ in^2$

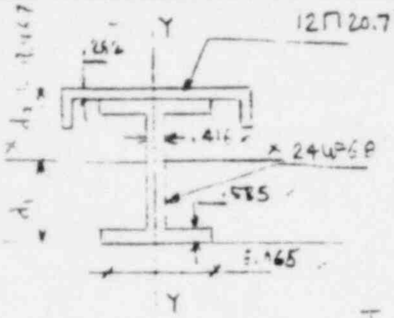
$d = \frac{288''}{2} \times \frac{156''}{2} = 11,232\ in^2$

Unit weight / in 2' thickness concrete : $\frac{2}{144} \times .15 = 2.083 \times 10^{-3}$ kip/in² ✓

NODE	Lumped area (in²)	Slab weight (kip)	Live load (kip)	Total (kip)	Total (Live load 90lb/ft²)
195	{3822 ✓ 4704 ✓	{7.961 ✓ 9.798 ✓	.8 ✓	} 18.559 ✓	20.159 ✓
196	7644 ✓	15.922 ✓	1.595 ✓	17.517 ✓	20.707 ✓
168	3822 ✓	7.961 ✓	.796 ✓	8.757 ✓	
198	{11934 ✓ 14688 ✓	24.859 ✓ {30.595 ✓	2.486 ✓	57.940 ✓	62.913 ✓
200	23868 ✓	49.717 ✓	4.973 ✓	54.689 ✓	64.634 ✓
15	11934 ✓	24.859 ✓	2.486 ✓	27.345 ✓	32.318 ✓
201	{11,232 ✓ 21,312 ✓	{23.396 ✓ 44.393 ✓	2.34 ✓	} 70.129 ✓	74.809 ✓
202	{22464 ✓ 14976 ✓	{46.792 ✓ 31.195 ✓	4.68 ✓ (No live load)	} 82.67 ✓	92.03 ✓
146	{11,232 ✓ 7,488 ✓	23.396 ✓ 15.598 ✓	2.34 ✓	} 41.334 ✓	46.014 ✓
140	7644 ✓	15.922 ✓	1.592 ✓	17.514 ✓	
116	7644 ✓	15.922 ✓	1.592 ✓	17.514 ✓	
86	4524 ✓	9.423 ✓	.942 ✓	10.365 ✓	

	CONTROL ROOM ROOF		OFFICE ROOF		Total ✓	Total (Live load 90lb/ft²)
86 :	10.365 ✓	+	.986 ✓	=	11.351 k	14.123 ✓
116 :	17.514 ✓	+	1.971 ✓		19.485 k ✓	24.445 ✓
140 :	17.514 ✓	+	1.971 ✓	=	19.485 k ✓	24.445 ✓
168 :	8.757 ✓	+	.986 ✓	=	9.743 k. ✓	12.223 ✓

TURBINE BUILDING – STATIC MODAL | REF.



$d_1 = \frac{\Sigma A d}{\Sigma A} = \frac{20 \times 23.71/2 + 6.09 \times (23.71 + .282 - .698)}{20 + 6.09}$

$d_1 = 14.525''$

$I_{xx} = I_c + I_I + A_c d_c^2 + A_I d_I^2 = 129 + 1820 + 6.09 \times 8.769^2 + 20 \times 2.67^2$

$I_{xx} = 2450\ in^4$

$I_{yy} = I_C + I_I = 129 + 70 = 199\ in^4$

* $SF_{xx} = \frac{.416 \times 23.71 + 2 \times 2.6 \times .436}{20 + 6.09} = .465$

* $SF_{yy} = \frac{2 \times 8.961 \times .582 + .282 \times 12}{20 + 6.09} = .531$

* SSF_{xx} : bending about YY axis

$SSF_{xx} = \frac{\tau}{\tau_{ave}}$

$\tau_{ave} = \frac{V}{A_T} = \frac{V}{20 + 6.09} = .03833\ V$

$\tau_{max} = \frac{VQ}{I_{yy} b} = V \frac{2 \times (8.961 - .416)/2 \times 4.48/2 + 5 \times .282 \times 3}{199 \times (.282 + 2 \times .582)} = .084158\ V$

* $SSF_{xx} = \frac{\tau_{max}}{\tau_{ave}} = \frac{.08416}{.03833} = 2.196$

* SSF_{yy} : bending about XX axis

$\tau_{max} = \frac{VQ}{I} = V \frac{(13.94) \times .4 ... + (8.961 \times .582 \times 14.234)}{2450 \times .416}$

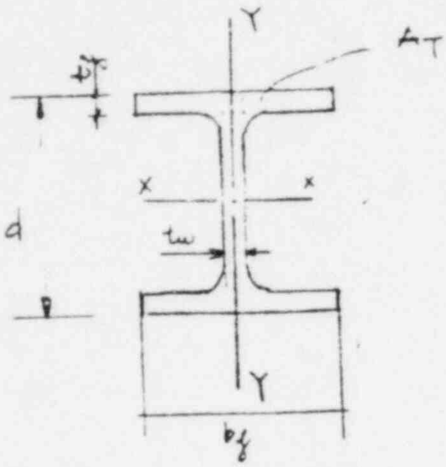
$= .11251\ V$

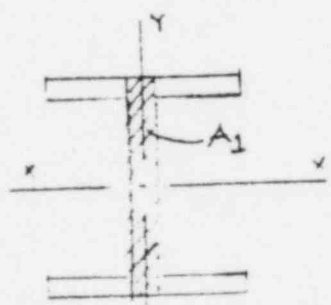
* $SSF_{yy} = \frac{\tau_{max}}{\tau_{ave}} = \frac{.11251}{.03833} = 2.935$

TURBINE BUILDING - STATIC MODEL

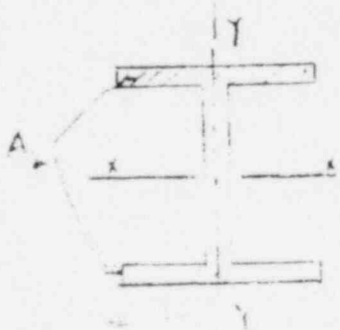
REF.

BEAM PROPERTY.





$SF_{xx} = \frac{A_1}{A_T}$ ✓ , $A_1 = d \times t_w$ ✓

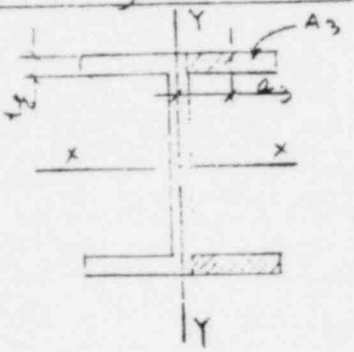


$SF_{YY} = \frac{A_2}{A_T}$ ✓, $A_2 = 2 b_f t_f$ ✓

TURBINE BUILDING – STATIC MODEL

REF.

SSFxx : bending about YY axis



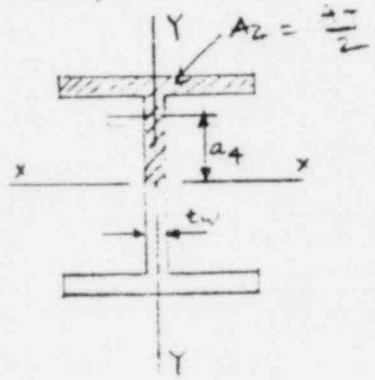
$$SSF_{xx} = \frac{\tau_{max}}{\tau_{avg.}}$$

$$\tau_{max} = \frac{VQ}{I_{yy} \times 2t_f} \quad \text{with } Q = 2A_3 a_3 \quad (a_3\text{: moment arm})$$

$$\tau_{avg} = \frac{V}{A_T} \qquad A_3 = \frac{b_f - t_w}{2} \times t_f \qquad a_3 = \frac{b_f + t_w}{4}$$

$$\Rightarrow SSF_{xx} = \frac{\tau_{max}}{\tau_{avg}} = \frac{A_T Q}{2 I_{yy} t_f} = \frac{A_T A_3 a_3}{I_{yy} t_f}$$

SSFyy : bending about XX axis



$$SSF_{yy} = \frac{\tau_{max}}{\tau_{avg}}$$

$$\tau_{max} = \frac{VQ}{I_{xx} t_w} \quad \text{with } Q = A_4 a_4$$

(a_4 : moment arm)

$$\tau_{ave} = \frac{V}{A_T} \qquad A_4 = \frac{A_T}{2}$$

a_4 given in AISC

$$\Rightarrow SSF_{yy} = \frac{A_T Q}{I_{xx} t_w} = \frac{A_T A_4 a_4}{I_{xx} t_w}$$

TURBINE BUILDING STATIC MODEL BEAM PROPERTY #32 | REF.

3x3x1/4 L BRACING

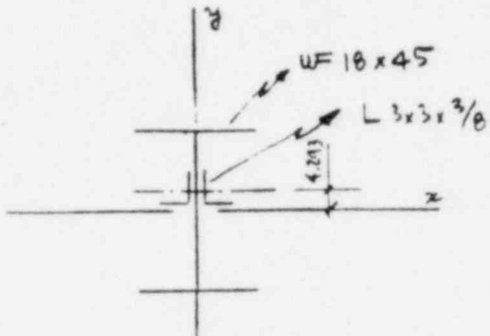
$A = 1.44 \text{ in}^2$

$I_{xx} = I_{yy} = 1.24 \text{ in}^4$

$H_2 = H_3 = 3''$

TURBINE BUILDING – ADDED BEAM PROPERTIES UNDER WATER TANK

REF.



Area of 2 L 3x3x3/8 = 4.22 in².

I_{xx} added to I beam: $Ad^2 = 4.22 \times 4.293^2 = 77 \text{ in}^4$

I_{yy} added to I beam: clearance between two L = 3/8"

r = 1.41

$I_{yy} = 8.22 \text{ in}^4$.

REF.

TURBINE BUILDING – STATIC MODAL

TABLE OF
SHEAR FACTOR, SHEAR STRESS FACTOR FOR BEAM ELEMENT

Beam type	A_T (in²)	I_{xx} (in⁴)	I_{yy} (in⁴)	d (in)	b_f (in)	t_f (in)	t_w (in)	A_1 (in²)	A_2 (in²)	A_3 (in²)	A_4 (in²)	a_3 (in)	a_4 (in)	SF_{xx}	SF_{yy}	SSF_{xx}	SSF_{yy}	
6WF15.5	4.56	30.1	3.23	6	5.995	.269	.235	1.41	3.22	.775	2.28	1.558	2.449	.309	.706	2.116	3.598	1
8B13	3.84	39.6	13	7.99	4	.255	.23	1.229	2.04	.98	1.92	1.058	2.995	.479	.531	2.8	4.624	2
8WF17	5.01	56.6	7.44	8	5.25	.308	.23	1.59	3.234	.773	2.305	1.37	3.165	.367	.646	[illegible]	3.051	3
12WF27	7.95	[illegible]	[illegible]	11.96	[illegible]	.4	.237	2.834	5.198	1.252	3.975	1.684	4.78	.352	.654	2.29	3.124	4
12WF40	11.8	310	44.1	11.94	8.	.516	.294	3.51	8.257	1.799	5.9	2.074	4.89	.297	.7	2.139	3.735	5
12WF45	13.2	351	50	12.06	8.042	.576	.336	4.052	9.264	2.219	6.6	2.094	4.9	.307	.702	2.13	3.62	6
12WF50	14.7	395	56.4	12.19	8.077	.641	.371	[illegible]	10.355	2.47	7.35	2.112	4.93	.308	.704	2.121	3.635	7
12WF53	15.6	425	96.1	12.06	10	.576	.345	4.16	11.52	2.791	7.8	2.586	5.01	.267	.739	2.027	4.148	8
12WF58	17.1	476	107	12.19	10.014	.641	.357	4.376	12.839	3.094	8.55	2.593	5.07	.256	.751	2	4.338	9
14B22	6.49	198	7	13.72	5	.335	.23	3.156	3.35	.797	3.245	1.308	5.1	.486	.516	2.892	2.358	10
14WF30	8.85	290	19.5	13.86	6.733	.383	.27	3.742	5.157	1.238	4.415	1.751	5.35	.424	.584	2.583	2.664	11
14WF34	10	340	23.3	14	6.75	.453	.287	4.015	6.616	1.464	5	1.759	5.46	.402	.612	2.44	2.798	12
14WF84	24.7	928	225	14.18	12.023	.778	.451	6.395	16.708	4.572	12.35	3.118	5.88	.259	.757	1.99	4.256	13
14WF87	25.6	967	350	14	14.5	.688	.42	5.88	19.952	4.844	12.8	3.73	5.92	.23	.779	1.921	4.776	14
14WF103	30.3	1170	420	14.25	14.575	.813	.495	7.054	23.199	5.724	15.15	3.768	5.98	.233	.792	1.914	4.74	15

TURBINE BUILDING - STATIC MODEL

Beam type	A_T (in²)	S_{xx} (in³)	S_{yy} (in³)	d (in)	b_f (in)	t_f (in)	t_w (in)	A_1 (in²)	A_2 (in²)	A_3 (in²)	A_4	a_3 (in)	a_4 (in)	SF_{xx}	SF_{yy}	[illegible]F_{xx}	SSF_{yy}	
16WF45	13.2	7?6	34.8	17.86	7.477	.499	[illegible]	5.983	7.462	1.782	6.6	1.953	6.77	.453	.565	2.645	2.494	16
30WF99	29.1	[illegible]	[illegible]	21.??	10.453	.67	.522	13.412	[illegible]	3.328	14.15	2.745	10.72	.532	.492	3.1	2.174	17
36WF170	50	[illegible]	[illegible]	[illegible]	[illegible]	1.1	[illegible]	24.589	26.45?	6.241	25	3.177	13.35	.492	.529	2.816	2.337	18
2∟4x?x½	3.38	6.64	5.67	H_3 4	H_2 6									.444	.572	2.907	2.325	19
2∟?x2x¼	2.??	2.17	1.889	3	4									.42	.63	3.434	2.209	20
24WF??	26.??	2450	199	23.99	12									.465	.529	3.931	2.809	21
?WF1??	31.?	[illegible]	[illegible]	29.?2	10.4?4	.76	.548	16.341	15.936	3.776	15.8	2.758	10.89	.514	.501	2.985	2.248	22
18WF?	14.7	[illegible]	40.2	18	7.5	.57	.358	6.444	6.55	2.035	7.35	1.964	6.87	.438	.582	2.564	2.585	23
[illegible]	57.2	12100	375	36.48	12.47	1.26	.77	28.01	30.535	7.149	29.6	3.222	13.43	.491	.534	2.788	2.358	24
36WF150	44.2	9030	270	35.84	11.972	.94	.625	22.4	22.507	5.333	22.1	3.149	13.14	.507	.509	2.925	2.274	25
30WF116	34.2	4930	[illegible]	30	10.5	.85	.564	16.92	17.85	4.223	17.1	2.766	11.07	.495	.522	2.866	2.328	26
21WF62	18.3	1330	57.5	20.99	8.24	.615	.4	8.3??	10.1?5	2.41	9.15	2.16	7.92	.459	.554	2.595	2.443	27
21WF55	16.2	1140	48.3	20.8	8.215	.522	.375	7.8	?.?76	2.046	8.1	2.148	7.76	.482	.529	2.82	2.382	28
2∟3x?x?	3.47	3.06	2.09	H_3 3	H_4 4													29

For beams 392, 393, 404, 405, 415, 416, 4?6, 4?7 (Underneath Water tank slab)

REF.

Add : A = 1.?? , I_{xx} = 7? , I_{yy} = 8.22 (Effect of 2 ∟3x3x3/8)

TURBINE BUILDING - STATIC MODAL.

REF.

bracings are made in :
- 2L 3x2x3/8 row 1, A and F, clearance 3/4" between two angles - Assumed
- 2L 4x3x1/4 row 10, clearance 3/8" between two angles.

From AISC code :

r = 1.07 in (2L 3x2x3/8) and r = 1.29 in (4x3x1/4)

ALLOWABLE BUCKLING STRESS TABLE FOR BRACINGS

BRACING NUMBER	Length (in)	r (in)	L/r	Allow. buckling stress (A.I.S.C. 1980)	Allow. SSE Earthq.
329 & 331	183.6 ✓	1.07	172	6.82 kpsi	10.91 ✓
330 & 332	177.3 ✓	1.07	166	7.04 kpsi	11.26 ✓
333 & 334	181.6 ✓	1.29	141	8.39 kpsi	13.42 ✓
335, 336, 337 & 338	172.4 ✓	1.29	134	8.94 kpsi	14.3
339 & 340	200	1.07	187	6.42 kpsi	10.27
341, 342, 343 & 344	164	1.07	153	7.64 kpsi	12.22
345 & 346	183.6	1.07	172	6.82 kpsi	10.91
347, 348, 349 & 350	174.6	1.07	163	7.16	11.46

TURBINE BUILDING – STATIC MODAL | REF.

STRESS CHECKING

Take beam 64 which caries an approximate area $= 22' \times \frac{22.25'}{3} = 163.167 ft^2$

Then

Slab weight : $163.167 \times 144 \times .2225 \times 10^{-3} = 5.235$ kips

Live load : $30 \times 163.167 \times 10^{-3} = 4.895$ kips

For length of beam 22', unit load is :

$$q = \frac{5.235 + 4.895}{22} = .46 \text{ kips/ft}$$

Beam 64 property ;

$A = 6.49 in^2$, $I_{xx} = 198 in^4$, $d = 13.72$ in, $I_{yy} = 7 in^4$, $b_f = 5$ in, $t_f = .335"$, $t_w = .23"$

* X_1 direction

Acceleration in this direction is .1665 G and it causes compression in beam 64.

$$\sigma_c = \frac{P}{A} = \frac{.1665 \times (5.235 + 4.895)}{6.49} = .29 \text{ kpsi}$$

* X_2 direction

Acceleration in this direction is .1803 G and braced length is 22/3

Then $$M_{max} = \frac{ql^2}{8} = \frac{.1806 \times .46 \times (22/3)^2}{8} = .558 \text{ k-ft} = 6.7 \text{ k-in}$$

Max. bending stress : $$\sigma_b = \frac{M b_f/2}{I_{yy}} = \frac{6.7 \times 5/2}{7} = 2.39 \text{ kpsi}$$

* X_3 direction (vertical) :

Acceleration in this direction is .2350 G and braced length is 22'

$$M = \frac{.2350 \times .46 \times 22^2}{8} = 6.540 \text{ k-ft} = 78.48 \text{ k-in}$$

Max bending stress : $$\sigma_b = \frac{M d/2}{I_{xx}} = \frac{71.234 \times 13.72/2}{198} = 2.72 \text{ kpsi}$$

SRSS of three stresses :

$$S = (.29^2 + 2.39^2 + 2.465^2)^{1/2} = 3.63 \text{ kpsi}$$

TURBINE BUILDING — STATIC MODAL | REF.

STRESS CHECKING

Take beam 64 which caries an approximate area = $22' \times \frac{22.25'}{3} = 163.167 ft^2$

Then

Slab weight : $163.167 \times 144 \times .2228 \times 10^{-3} = 5.235$ kips

Live load $30 \times 163.167 \times 10^{-3} = 4.895$ kips

For length of beam 22', unit load is :

$$q = \frac{5.235 + 4.695}{22} = .46 \text{ kips/ft}$$

Beam 64 property :

$A = 6.49 in^2$, $I_{xx} = 196 in^4$, $d = 13.72$ in, $I_{yy} = 7 in^2$, $b_f = 5$ in, $t_f = .335''$, $t_w = .23''$

* X_1 direction :

Acceleration in this direction is .1665 G and it causes compression in beam 64.

$$\sigma_c = \frac{P}{A} = \frac{.1665 \times (5.235 + 4.695)}{6.49} = .29 \text{ kpsi}$$

* X_2 direction :

Acceleration in this direction is .1603 G and braced length is 22/3

Then $M_{max} = \frac{ql^2}{8} = \frac{.1606 \times .46 \times (22/3)^2}{8} = .558 \text{ k-ft} = 6.7 \text{ k-in}$

Max bending stress : $\sigma_b = \frac{M b_f/2}{I_{yy}} = \frac{6.7 \times 5/2}{7} = 2.39$ kpsi

* X_3 direction (vertical) :

Acceleration in this direction is .2350 G and braced length is 22'

$$M = \frac{.2350 \times .46 \times 22^2}{8} = 6.540 \text{ k-ft} = 78.48 \text{ k-in}$$

Max bending stress : $\sigma_b = \frac{M d/2}{I_{xx}} = \frac{71.234 \times 13.72/2}{196} = 2.72$ kpsi

SRSS of three stresses :

$$S = (.29^2 + 2.39^2 + 2.468^2)^{1/2} = 3.63 \text{ kpsi}$$

TURBINE BUILDING — STATIC MODAL | REF.

STRESS CHECKING

* Dead load (X3 direction)

$$M = \frac{1. \times .46 \times 22^2}{8} = 27.83 \text{ k-ft} = 333.96 \text{ k-in}.$$

Max bending stress:

$$\sigma_b = \frac{333.96 \times 13.72/2}{198} = 11.57 \text{ kpsi}.$$

Dead load + SRSS ($x^2+y^2+z^2$) earthquake:

$$\sigma_T = 11.57 + 3.63 = 15.20 \text{ kpsi}$$

From AISC code:

$$\frac{b_f}{2t_f} = \frac{5}{2 \times .335} = 7.46 < \frac{65}{\sqrt{36}} = 10.83 \text{ (1.5.1.4.1-2 AISC) (OK)}$$

$$\frac{d}{t_w} = \frac{13.72}{.23} = 59.65 > \frac{257}{\sqrt{36}} = 42.83 \text{ (1.5.1.4.1-4 AISC) (Not OK)}$$

Then according to 1.5.1.4.4, AISC

$$F_b = .6 F_y = .6 \times 36 = 21.6 \text{ kpsi}$$

For SSE earthquake:

$$F_a = 1.6 F_b = 1.6 \times 21.6 = 34.56 \text{ kpsi}$$

Stress in beam 64   15.20 kpsi is O.K. comparing to allowable 34.56 kpsi

REF.

STRESS CHECKING

Beams on Top Roof and El. 684' are laterally supported and they are satisfied A.I.S.C. 1.5.1.4 (1980 code).

Bending Allowable stress :

$$F_b = .66 F_y = 23.76 \text{ kpsi} ✓$$

Increase 1.6 time for SSE earthquake

$$F_b = 1.6 \times 23.76 = 38.016 \text{ kpsi} ✓$$

TURBINE BUILDING - WATER TANK STABILITY	REF.

Water tank properties:

Diameter: 22′ ; Height: 23′ ; Capacity: 48,800 gallons of water

Total weight of tank shell: $W_s = 33.16k$ (steel), Total weight of tank roof plus portion of snow load (30 lb/ft²) = 19.16 kips, Total water weight = 408 k.

Water height in tank: 17.2′.

$$D/H = \frac{22}{17.2} = 1.28$$

From Fig 2-4 of Ref (1): For D/H = 1.28

$$k = .575$$

Then $T = kD^{1/2} = .575\sqrt{22} = 2.7$ second

From Fig 22 & 23 of Ref (1). For D/H = 1.28

$$\frac{X_1}{H} = .38 \Rightarrow X_1 = .38H = .38 \times 17.2 = 6.54'$$

$$\frac{X_2}{H} = .69 \Rightarrow X_2 = .69H = .69 \times 17.2 = 11.87'$$

$$\frac{W_1}{W_T} = .71 \Rightarrow W_1 = .71 \times W_T = .29 \times 408 = 289.68 \text{ kip}$$

$$\frac{W_2}{W_T} = .29 \Rightarrow W_2 = .29 \times W_T = .71 \times 408 = 118.32 \text{ kip}$$

$C_1 = .24$, $T = 2.7$ second $< 4.5s \Rightarrow C_2 = \frac{.3S}{T}$

We take $S = 1.5$, conservative for unknown Soil Profile

Then $C_2 = \frac{.3 \times 1.5}{2.7} = .167$

$$X_s = \frac{H_t}{2} = \frac{23'}{2} = 11.5'$$

Overturning moment: (Ref 1)

$$M = ZI(C_1 W_s X_s + C_1 W_r H_t + C_1 W_1 X_1 + C_2 W_2 X_2)$$

Instead of ZI, we apply g level of watertank = .186

$$M = .186(.24 \times 33.16 \times 11.5 + .24 \times 19.16 \times 23 + .24 \times 289.68 \times 6.54 + .167 \times 118.32 \times 11.87)$$

$M = 164.89$ kips-ft.

TURBINE BUILDING – WATER TANK STABILITY | REF.

Overturning moment will cause a force on perimeter of tank:

$$w = \frac{M}{\pi D^2/4} = \frac{164.89}{\pi \times 22^2/4} = .434 \text{ k/ft} ✓$$

Resistance to overturning moment by contents in tank.

$$w_L = 7.9\, t_b \sqrt{F_{by} G H} \leq 1.25 GHD.$$

t_b: thickness of bottom annular ring assumed 1/4" ✓

F_{by}: minimum specified yield strength = 8000 psi (Aluminum 6061, without Temper) (Ref. 2).

$$w_L = 7.9 \times 1/4" \sqrt{8000 \times 1 \times 17.2} = 733 \text{ lbs/ft} ✓$$

Or $w_L = 1.25 \times 17.2 \times 22 = 473$ lbs/ft ✓

$w = 434$ lbs/ft < 473 lbs/ft ✓ (O.K.)

This calculation is conservative because of:

1. For overturning moment, water tank is counted as steel made, results a bigger overturning moment.
2. For overturning resistant, water tank shell is counted as aluminum, results a lower resistant
3. Water tank shell weight is neglected from resistant calculation.
4. No restraint at the bottom of the tank.

Ref: 1. Basis of Seismic Design Provisions For Welded Steel Oil Storage Tanks
2. MARK'S STANDARD HANDBOOK FOR MECHANICAL ENGINEERS – 8 Edition (page 6-79)

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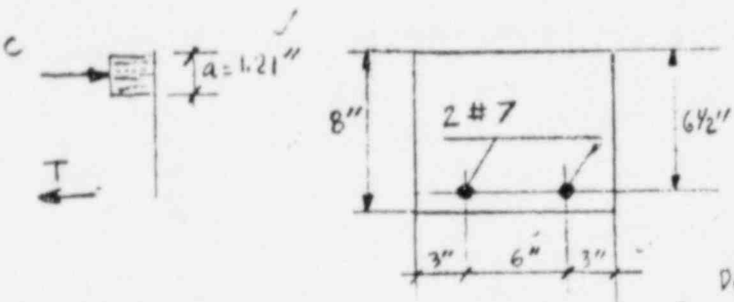
TURBINE BUILDING - WATER TANK SLAB CHECKING. | REF.

Assumed 8" thickness water tank slab is simply supported and main reinforced steel is #7 @ 6".

A 1' width slab cross section will have following dimension :



f'_c = 3.5 kpsi.

f_s = 36 kpsi. (ASTM 36) 5-1, 41-560

span : 98"

Live load (snow): 30 lb/ft

Dead load (water tank + slab weight): 807.7 lb/ft.

Moment caused by dead load : $M_D = \frac{P_D l^2}{8} = \frac{.8077 \times (8.167)^2}{8} = 6.734$ kips-ft = 80.81 kips-in

Moment caused by live load : $M_L = \frac{P_L l^2}{8} = \frac{.03 \times (8.167)^2}{8} = .25$ kips-ft = 3 kips-in

Required $M_u = 1.4 M_D + 1.7 M_L = 1.4 \times 80.81 + 1.7 \times 3 = 118.2$ kips-in

Required M_u for (Dead load + Live load) + .235 g Vertical Earthquake

$M_u = 118.2 + .235(80.81 + 3) = 137.89$ kips-in.

$A_s = 2 \times$ Area #7 $= 2 \times .6 = 1.2$ in².

$C = .85 f'_c b a = .85 \times 3.5 \times 12 \times a = 35.7a$ kips

$T = A_s f_s = 1.2 \times 36 = 43.2$ kips.

$T = C \Rightarrow a = \frac{43.2}{35.7} = 1.21$ in

$M_n = A_s f_s (d - \frac{a}{2}) = 1.2 \times 36 (6.5 - \frac{1.21}{2}) = 254.7$ kips-in

$M_u = \phi M_n = .9 \times 254.7 = 229.2$ kips-in > 137.89. kips-in. | OK

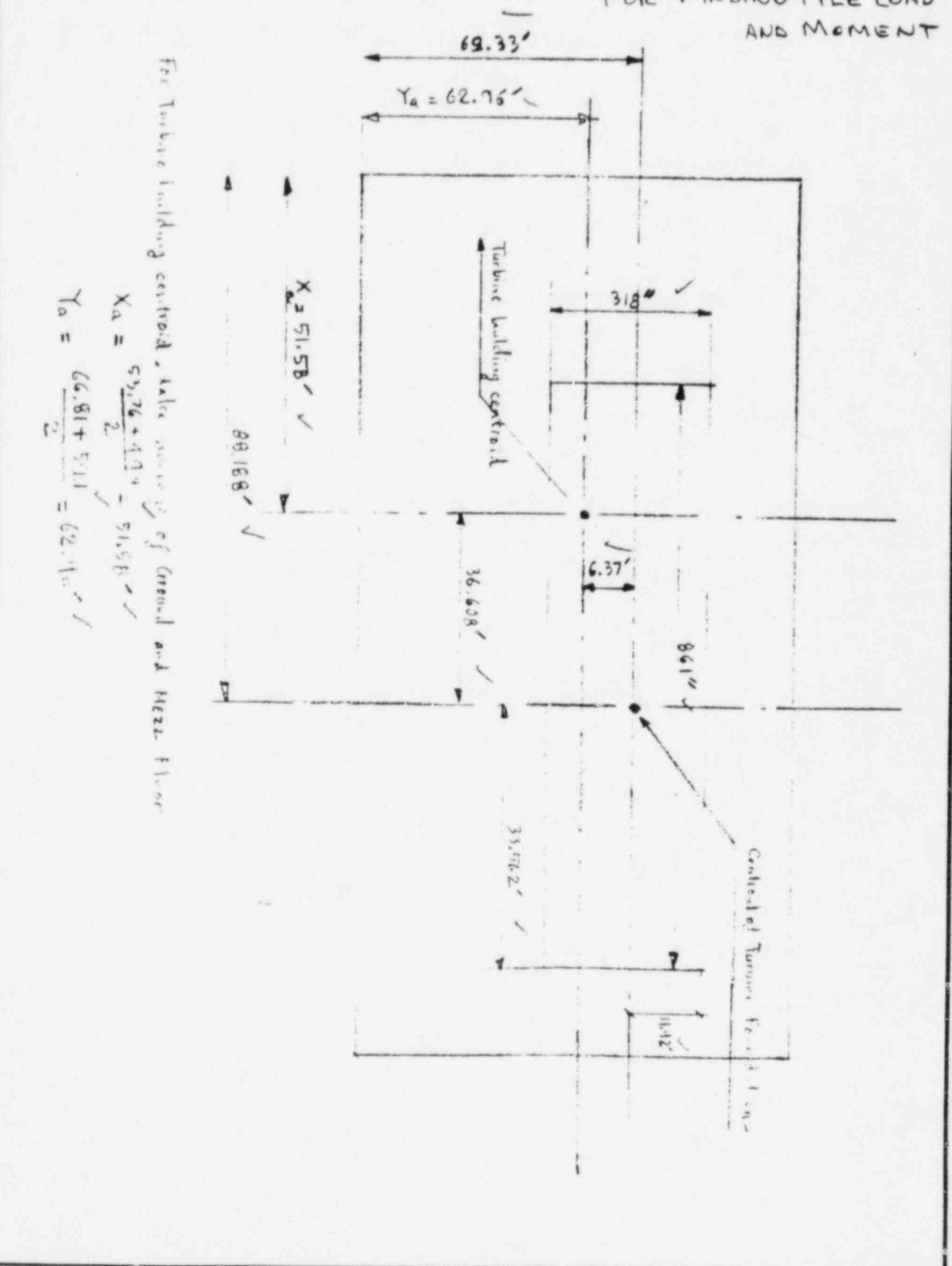
This calculation is conservative because we take $M_u = 1.4 M_D + 1.7 M_L +$ SSE intead using $M_u = M_D + M_L +$ SSE (STANDARD REVIEW PLAN) WHICH RESULTS a low M_u.

Ref: Reinforced Concrete Design - Third Edition.
CHU-KIA WANG - CHARLES G. SALMON.
SARGENT & LUNDY W1742

NES 105 (2/74)

Turbine Building & Turbine Foundation – Centroid Position. | REF.

FOR FINDING PILE LOAD AND MOMENT



NUCLEAR ENERGY SERVICES

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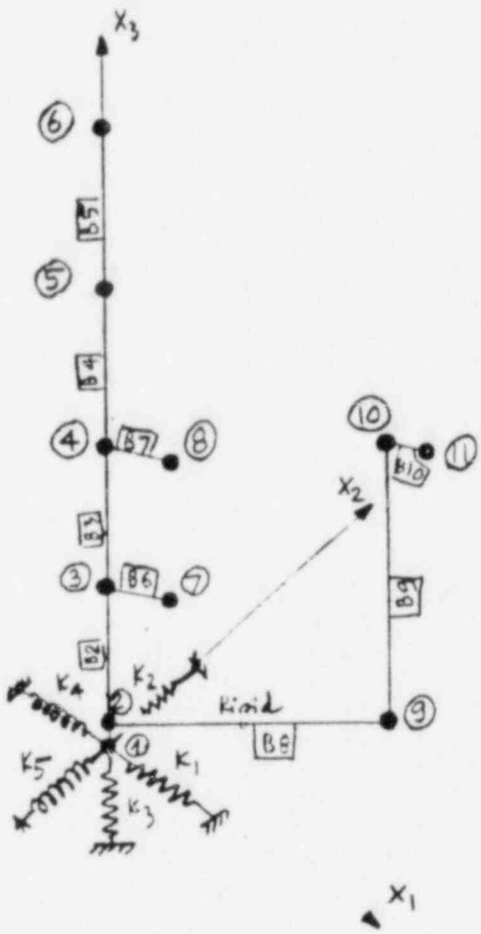
TURBINE BUILDING & TURBINE FOUNDATION MODEL	REF.



TURBINE BUILDING AND TURBINE FOUNDATION MODEL | REF.

NODAL COORDINATE TABLE

NODE	X1 (inch)	X2 (inch)	X3 (inch)
1	0	0	0 ✓
2	0	0	.1 ✓
3	0	0	168.1 ✓
4	0	0	336.1 ✓
5	0	0	528.1 ✓
6	0	0	720.1 ✓
7	78.3 ✓	57.6 ✓	168.1 ✓
8	78.3 ✓	57.6 ✓	336.1 ✓
9	439.3 ✓	76.4 ✓	.1 ✓
10	439.3 ✓	76.4 ✓	336.1 ✓
11	482.4 ✓	92.3 ✓	336.1 ✓

NUCLEAR ENERGY SERVICES

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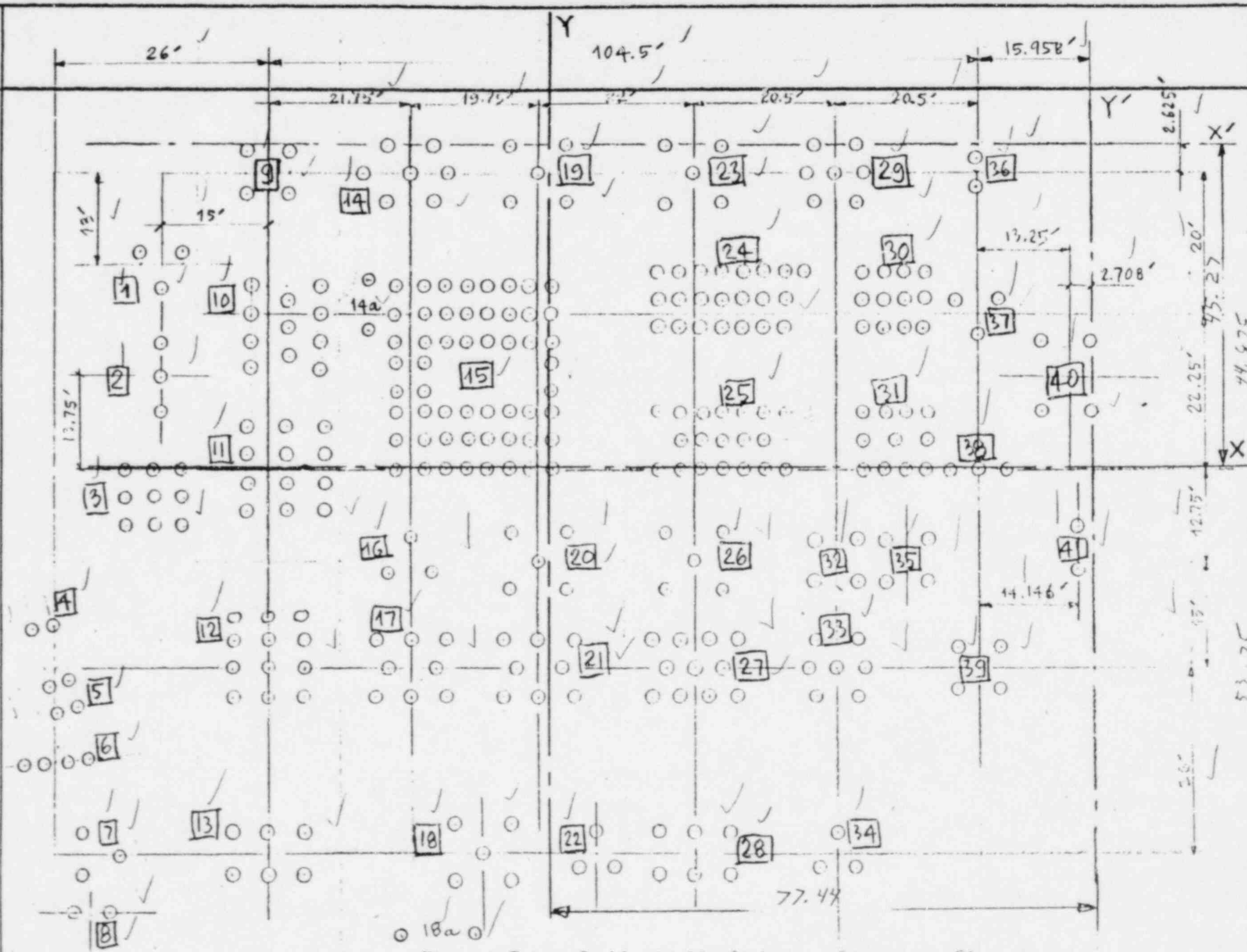
REF.



TURBINE BUILDING PILES PLAN - GENERAL DIMENSIONS

(FOR DETAILS, SEE DRAWING B3)

NES 105 (2/74)

TURBINE BUILDING - PILES CENTROID

Pile Group N°	A (unit)	X' (ft)	AX' (unit-ft)	Y' (ft)	AY' (unit-ft)	X	Y
1	3 ✓	135.458	406.374 ✓	15.625	46.875 ✓	-58.018 ✓	29.645 ✓
2	3 ✓	135.458	406.374	31.125	93.375 ✓	-58.018 ✓	14.145 ✓
3	9 ✓	137.208	1234.872 ✓	47.625	428.625 ✓	-59.768	-2.355 ✓
4	2 ✓	147.752	295.504 ✓	67.795 ✓	135.59 ✓	-70.312	-22.525 ✓
5	4 ✓	145.811 ✓	583.244 ✓	75.04 ✓	300.16 ✓	-68.371 ✓	-29.77 ✓
6	4 ✓	146.458	585.832 ✓	83.417 ✓	333.668 ✓	-69.018 ✓	-38.147 ✓
7	3 ✓	141.541	424.623 ✓	98.625	295.875 ✓	-64.101 ✓	-53.355 ✓
8	2 ✓	141.624	283.248 ✓	105.125 ✓	210.25 ✓	-64.184	-59.855 ✓
9	4 ✓	120.458 ✓	481.832 ✓	2.625 ✓	10.5 ✓	-43.018 ✓	42.645 ✓
10	11 ✓	119.458	1314.038 ✓	21.875 ✓	240.625 ✓	-42.018 ✓	23.395 ✓
11	12 ✓	119.458	1433.496 ✓	44.875	538.5 ✓	-42.018 ✓	.395 ✓
12	12 ✓	120.458	1445.496	72.625	871.5 ✓	-43.018 ✓	-27.355 ✓
13	6 ✓	120.458 ✓	722.748 ✓	98.625 ✓	591.75 ✓	-43.018 ✓	-53.355 ✓
14	7 ✓	98.708	690.956 ✓	2.625 ✓	18.375 ✓	-21.268 ✓	42.645 ✓
15	54 ✓	88.208	4763.232 ✓	30.625 ✓	1653.75 ✓	-10.768 ✓	14.645 ✓
16	3 ✓	98.708 ✓	296.124 ✓	57.625 ✓	172.875 ✓	-21.268 ✓	-12.355 ✓
17	8 ✓	98.708 ✓	789.664 ✓	72.625 ✓	581 ✓	-21.268 ✓	-27.355 ✓
18	5 ✓	87.375 ✓	436.875 ✓	98.625	493.125 ✓	-9.935 ✓	-53.355 ✓
19	5 ✓	78.958	394.79 ✓	2.625 ✓	13.125 ✓	-1.518 ✓	42.645 ✓
20	5 ✓	78.958	394.79 ✓	57.625 ✓	288.125 ✓	-1.518 ✓	-12.355 ✓
21	8 ✓	78.958	631.664 ✓	72.625 ✓	581 ✓	-1.518 ✓	-27.355 ✓
22	3 ✓	73.708 ✓	221.124 ✓	98.625 ✓	295.875 ✓	3.732 ✓	-53.355 ✓
23	5 ✓	56.958 ✓	284.79 ✓	2.625 ✓	13.125 ✓	20.482 ✓	42.645 ✓
24	22 ✓	53.208 ✓	1170.576 ✓	20.125 ✓	442.75 ✓	24.232 ✓	25.145 ✓
25	19 ✓	53.208	1010.952 ✓	41.125 ✓	781.375 ✓	24.232 ✓	4.145 ✓
26	5 ✓	56.958 ✓	284.79 ✓	57.625 ✓	288.125 ✓	20.482 ✓	-12.355 ✓
27	11 ✓	56.958 ✓	626.538 ✓	72.625 ✓	798.875 ✓	20.482 ✓	-27.355 ✓

NUCLEAR ENERGY SERVICES

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TURBINE BUILDING - PILES CENTROID

REF.

Pile Group N°	A (unit)	X' (ft)	AX' (unit-ft)	Y' (ft)	AY' (unit-ft)	X	Y
28	6 ✓	56.958 ✓	341.748 ✓	98.625 ✓	591.75 ✓	20.482 ✓	-53.355 ✓
29	7 ✓	36.458 ✓	255.206 ✓	2.625 ✓	18.375 ✓	40.982 ✓	42.645 ✓
30	12 ✓	28.208 ✓	338.496 ✓	20.125 ✓	241.5 ✓	49.232 ✓	25.145 ✓
31	11 ✓	28.208 ✓	310.288 ✓	41.125 ✓	452.375 ✓	49.232 ✓	4.145 ✓
32	4 ✓	36.458 ✓	145.832 ✓	57.625 ✓	230.5 ✓	40.982 ✓	-12.355 ✓
33	7 ✓	36.458 ✓	255.206 ✓	72.625 ✓	508.375 ✓	40.982 ✓	-27.355 ✓
34	3 ✓	36.458 ✓	109.374 ✓	98.625 ✓	295.875 ✓	40.982 ✓	-53.355 ✓
35	4 ✓	25.958 ✓	103.832 ✓	57.625 ✓	230.5 ✓	51.482 ✓	-12.355 ✓
36	2 ✓	15.958 ✓	31.916 ✓	2.625 ✓	5.25 ✓	61.482 ✓	42.645 ✓
37	3 ✓	15.958 ✓	47.874 ✓	22.625 ✓	67.875 ✓	61.482 ✓	22.645 ✓
38	3 ✓	15.958 ✓	47.874 ✓	44.875 ✓	134.625 ✓	61.482 ✓	.395 ✓
39	4 ✓	15.958 ✓	63.832 ✓	72.625 ✓	290.5 ✓	61.482 ✓	-27.355 ✓
40	4 ✓	2.708 ✓	10.832	30.625 ✓	122.5 ✓	74.732 ✓	14.645 ✓
41	2 ✓	1.812 ✓	3.624 ✓	55.625 ✓	111.25 ✓	75.628 ✓	-10.355 ✓
14a	2 ✓	107.958 ✓	215.916 ✓	19.5 ✓	39 ✓	-30.518 ✓	25.77 ✓
18a	2 ✓	93.416 ✓	186.832 ✓	109.833 ✓	219.666 ✓	-15.976 ✓	-64.563 ✓
Σ	311 ✓		24,083.228		14,078.709		

Centroid Coordinate

$$X = \frac{\Sigma AX'}{\Sigma A} = \frac{24,083.228}{311} = 77.44$$

$$Y = \frac{\Sigma AY'}{\Sigma A} = \frac{14,078.709}{311} = 45.27$$

TURBINE BUILDING - PILES CENTROID

Pile Group N°	N (number of piles)	X (ft)	NX² (unit-ft)	Y (ft)	NY² (unit-ft)	
1	3 ✓	-58.018 ✓	10098 ✓	29.645 ✓	2636 ✓	
2	3 ✓	-58.018 ✓	10098 ✓	14.145 ✓	600 ✓	
3	9 ✓	-59.768 ✓	32150 ✓	-2.355 ✓	50 ✓	
4	2 ✓	-70.312 ✓	9888 ✓	-22.525 ✓	1015 ✓	
5	4 ✓	-68.371 ✓	18698 ✓	-29.77 ✓	3545 ✓	
6	4 ✓	-69.018 ✓	19054 ✓	-38.147 ✓	5821 ✓	
7	3 ✓	-64.101 ✓	12327 ✓	-53.355 ✓	8540 ✓	
8	2	-64.184 ✓	8239 ✓	-59.855 ✓	7165 ✓	
9	4 ✓	-43.018 ✓	7402 ✓	42.645 ✓	7274 ✓	
10	11 ✓	-42.018 ✓	19421 ✓	23.395 ✓	6020 ✓	
11	12 ✓	-42.018 ✓	21186 ✓	.395 ✓	2 ✓	
12	12 ✓	-43.018 ✓	22206 ✓	-27.355 ✓	8980 ✓	
13	6 ✓	-43.018 ✓	11103 ✓	-53.355 ✓	17080 ✓	
14	7 ✓	-21.268 ✓	3166 ✓	42.645 ✓	12730 ✓	
15	54 ✓	-10.768 ✓	1261 ✓	14.645 ✓	11582 ✓	
16	3 ✓	-21.268 ✓	1357 ✓	-12.355 ✓	458 ✓	
17	8 ✓	-21.268 ✓	3619 ✓	-27.355 ✓	5986 ✓	
18	5	-9.935 ✓	494 ✓	-53.355 ✓	14234 ✓	
19	5 ✓	-1.518	12 ✓	42.645 ✓	9093 ✓	
20	5 ✓	-1.518 ✓	12 ✓	-12.355 ✓	763 ✓	
21	8 ✓	-1.518 ✓	18 ✓	-27.355 ✓	5986 ✓	
22	3 ✓	3.732 ✓	42 ✓	-53.355 ✓	8540 ✓	
23	5 ✓	20.482 ✓	2098 ✓	42.645 ✓	9093 ✓	
24	22 ✓	24.232 ✓	12918 ✓	25.145 ✓	13909 ✓	
25	19 ✓	24.232 ✓	11157 ✓	4.145 ✓	326 ✓	
26	5	20.482 ✓	2098 ✓	-12.355 ✓	763 ✓	
27	11	20.482 ✓	4615 ✓	-27.355 ✓	8231 ✓	

TURBINE BUILDING - PILES CENTROID.

Pile (group)	N (number of piles)	X (ft)	NX² (unit-ft)	Y (ft)	NY² (unit-ft)
28	6 ✓	20.482 ✓	2517 ✓	-53.355 ✓	17080 ✓
29	7 ✓	40.982 ✓	11757 ✓	42.645 ✓	12730 ✓
30	12 ✓	49.232 ✓	29085 ✓	25.145 ✓	7587 ✓
31	11 ✓	49.232 ✓	26662 ✓	4.145 ✓	189 ✓
32	4 ✓	40.982 ✓	6718 ✓	-12.355 ✓	610 ✓
33	7 ✓	40.982	11757 ✓	-27.355 ✓	5238 ✓
34	3 ✓	40.982	5038 ✓	-53.355 ✓	8540 ✓
35	4 ✓	51.482	10602 ✓	-12.355 ✓	610 ✓
36	2 ✓	61.482	7560 ✓	42.645 ✓	3637 ✓
37	3 ✓	61.482	11340 ✓	22.645 ✓	1538 ✓
38	3 ✓	61.482 ✓	11340 ✓	.395 ✓	1 ✓
39	4 ✓	61.482	15120 ✓	-27.355 ✓	2993 ✓
40	4 ✓	74.732	22339 ✓	14.645 ✓	858 ✓
41	2 ✓	75.628 ✓	11439 ✓	-10.355 ✓	214 ✓
14a	2 ✓	-30.518 ✓	1863 ✓	25.77 ✓	1328 ✓
18a	2 ✓	-15.976 ✓	510 ✓	-64.563 ✓	8337 ✓
			435,384 ✓		241912 ✓

TURBINE BUILDING — PILES LOAD.

REF.

From Calculation note book, we get estimated weights for Turbine building & Turbine Foundation:

- Top Roof (El. 700') : 726 kips ✓
- El. 694' Roof : 1381 kips ✓
- Main Floor (El. 668') : 5239 kips ✓
- Mezz Floor (El. 654') : 3202 kips. ✓
- Turbine + Foundation (El. 668'): 2695 kips ✓

Total 13243 kips ✓

Estimate ground floor weight = 15% above weight 1986 kips. ✓

Total DL = 15229 kips. ✓

From Output SE200MK, which model is combination of Turbine building & Turbine Foundation, we have:

FX3 = 2676 kips ✓, MX2 = 8.4 E5 kips-in ✓, MX1 = 6.756 E5 kips-in ✓

These loads is subjected by 311 piles (1' diameter). ✓

$$\text{Load on pile} = \frac{DL \pm FX3}{\text{Number of piles}} \pm \frac{MX1\, d_2}{\Sigma d_y^2} \pm \frac{MX2\, d_1}{\Sigma d_x^2}$$

in which:

DL = Dead load

FX3 = Vertical load caused by seismic

MX1 = Moment caused by seismic in X direction

MX2 = Bending Moment caused by seismic in Y direction

	REF.
TURBINE BUILDING – PILES LOAD	

d_1 : distance from piles centroid to interested pile in X direction

d_2 : " " " " " in Y direction

Σd_y^2 : Sum of the squares of the distances to each pile from the piles centroid in y direction

Σd_x^2 : Sum of the squares of the distances to each pile from the piles centroid in x direction

Then ;

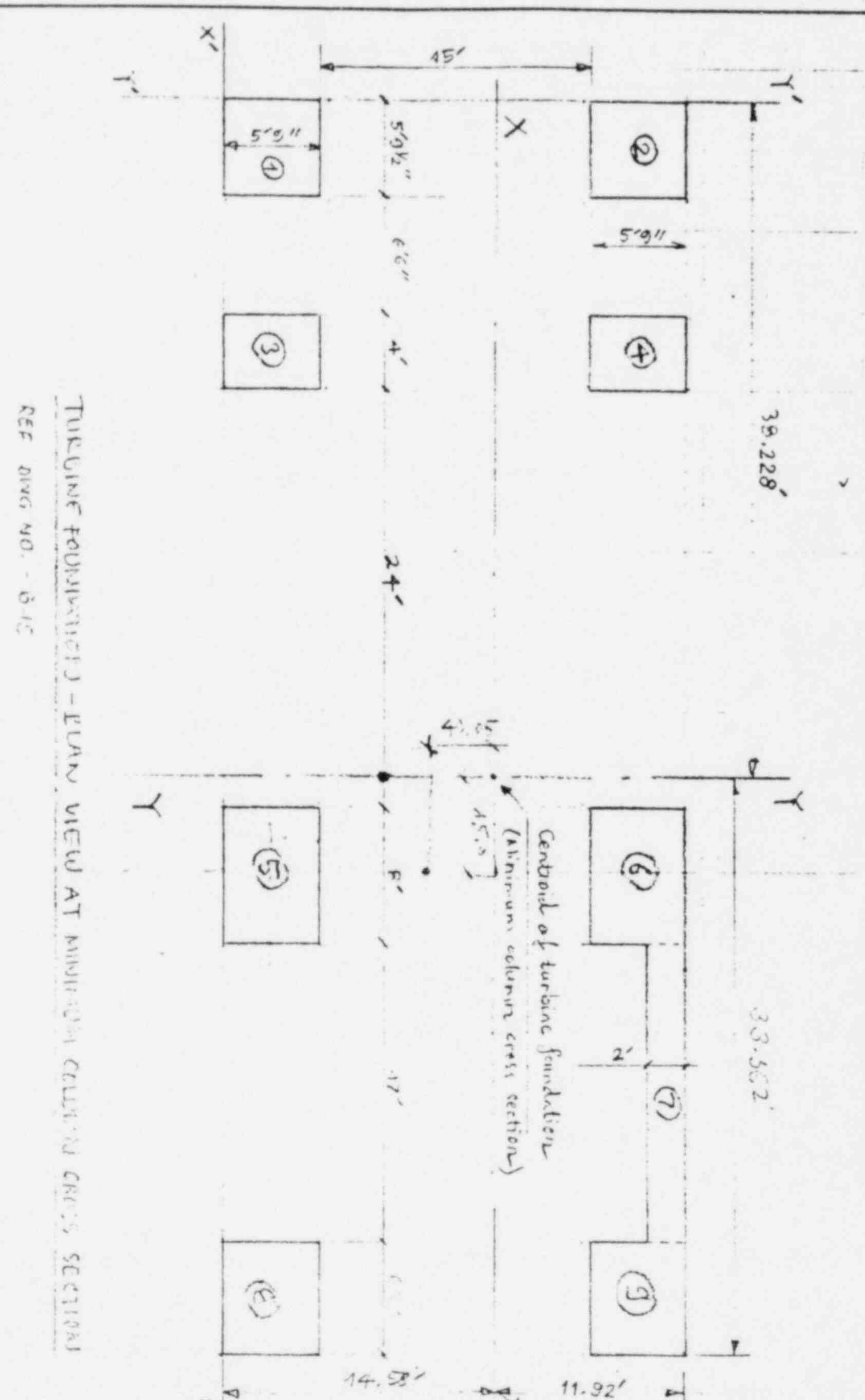
$$\text{Load on pile} = \frac{(15229 + 2676)}{311} \pm \frac{6.756 \times 10^5 \times 59.855}{12 \times 241912} \pm \frac{8.4 \times 10^5 \times 64.194}{12 \times 435384}$$

$$= -57.57 \pm 13.93 \pm 10.32 = -81.82 \text{ kip} < 100 \text{ kips OK}$$

The pile we interested above is belong to piles group 8, with $X = -64.194$, $Y = -59.855$ from piles centroid

Ref : FOUNDATION ENGINEERING, Second Edition page 393.

TURBINE BUILDING - TURBINE FOUNDATION CENTROID AND MOMENT INERTIA | REF.



TURBINE BUILDING - TURBINE FOUNDATION CENTROID AND MOMENT INERTIA | REF.

PART	Area A (ft^2)	x' (ft)	Ax' (ft^3)	y' (ft)	Ay' (ft^3)	
①	33.304	2.896	96.437	2.875	95.749	✓
②	33.304	2.896	96.437	23.625	786.807	✓
③	23	14.292	328.716	2.875	66.125	✓
④	23	14.292	328.716	23.625	543.375	✓
⑤	46	44.29	2037.34	2.875	132.25	✓
⑥	46	44.29	2037.34	23.625	1086.75	✓
⑦	34	56.79	1930.86	25.5	867.00	✓
⑧	37.375	68.54	2561.68	2.875	107.453	✓
⑨	37.375	68.54	2561.68	23.625	882.984	✓
Σ	313.35		11979.21		4568.493	✓

Centroid:

$$x = \frac{\Sigma Ax'}{\Sigma A} = \frac{11979.42}{313.35} = 38.228' ✓$$

$$y = \frac{\Sigma Ay'}{\Sigma A} = \frac{4568.493}{313.35} = 14.58' ✓$$

PART	Area A (ft^2)	d_x (ft)	d_y (ft)	Ad_x^2 (ft^4)	Ad_y^2 (ft^4)	I_x (self) (ft^4)	I_y (self) (ft^4)	
①	33.304	35.333	11.705	41577.4	4563	92	93	✓
②	33.304	35.333	9.045	41577.4	2725	92	93	✓
③	23	23.938	11.705	13180	3151	63	31	✓
④	23	23.938	9.045	13180	1882	63	31	✓
⑤	46	6.162	11.705	1746	6302	127	245	✓
⑥	46	6.162	9.045	1746	3763	127	245	✓
⑦	34	18.562	10.92	11714	4054	11	819	✓
⑧	37.375	30.312	11.705	34341	5121	103	132	✓
⑨	37.375	30.312	9.045	34341	3058	103	132	✓
Σ				193402	34619	781	1821	

TURBINE BUILDING 1 — TURBINE FOUNDATION CENTROID AND MOMENT INERTIA | REF.

Moment Inertia of turbine foundation versus X axis (through centroid)

$$I_{xx} = \Sigma A d_y^2 + \Sigma I_x = 34619 + 781 = 35{,}400.\ ft^4$$ ✓

Versus Y axis (through centroid)

$$I_{YY} = \Sigma A d_x^2 + \Sigma I_y = 193402 + 1821 = 195{,}223\ ft^4$$ ✓

Polar Moment Inertia

$$J = \Sigma A d_y^2 + A d_x^2 = 34{,}619 + 193{,}402 = 228021\ ft^4$$ ✓

TURBINE FOUNDATION — SPRING STIFFNESS OF SOIL | REF.

Foundation Spring stiffness

The stiffness of the Vertical, Lateral and Rocking Springs representing the shear and Vertical deformation of the soil beneath the foundation mat are obtained using the following equations. These equations are taken from Reference (5)

Vertical spring stiffness : $k_z = \frac{G}{1-\nu}\beta_z\sqrt{4cd}$

Lateral : $k_{x(\text{or } y)} = 4(1+\nu)G\beta_{x(\text{or } y)}\sqrt{cd}$

Rocking : $k_\psi = \frac{G}{1-\nu}\beta_\psi\, 8\, cd^2$

in which $\beta_z, \beta_x, \beta_y, \beta_\psi$ are functions of values of d/c (Reference 1, Figure 10.16, page 351)

The soil properties are taken from Reference (6). For the standard foundation spring, the soil properties correspond to averaged values for boring number 3.

G : Shear Modulus of Soil = 2.4×10^3 kips/ft²
(Tables 3.1 and 2.2 of Reference 2)

ν : Soil poisson Ratio = .24 (Calculated from data given in Table 3.1)

* For Horizontal X (X_1) direction :

$c = \frac{26.5'}{2}$, $d = \frac{71.79'}{2} \Rightarrow \frac{d}{c} = \frac{71.79}{26.5} = 2.7 \Rightarrow \beta_x = .94$

$K_x = k2 = 4(1+.24) \times 2.4 \times 10^3 \times .94\sqrt{\frac{71.79}{2} \times \frac{26.5}{2}} = 244.03 \times 10^3$ kips/ft

* Horizontal Y (X_2) direction

$c = \frac{71.79}{2}$, $d = \frac{26.5}{2} \Rightarrow \frac{d}{c} = \frac{26.5}{71.79} = .37 \Rightarrow \beta_y = 1$

$k_y = k3 = 4(1+.24) \times 2.4 \times 10^3 \times 1\sqrt{\frac{26.5}{2} \times \frac{71.79}{2}} = 259.61 \times 10^3$ kips/ft

TURBINE FOUNDATION – SPRING STIFFNESS OF SOIL | REF.

* For Rocking around X axis:

$$c = \frac{71.79}{2}, \; d = \frac{26.5}{2} \Rightarrow \frac{c}{d} = \frac{71.79}{26.5} = 2.7 \Rightarrow \beta\psi = .65$$

$$k\psi_x = K4 = \frac{2.4\times10^3}{1-.24} \times .65 \times 8 \times \frac{71.79}{2} \times \left(\frac{26.5}{2}\right)^2 = 103{,}482.45\times10^3 \text{ kips-ft/radian}$$

* For Rocking around Y axis

$$c = \frac{26.5}{2}, \; d = \frac{71.79}{2} \Rightarrow \frac{c}{d} = \frac{26.5}{71.79} = .37 \Rightarrow \beta\psi = .44$$

$$k\psi_y = K5 = \frac{2.4\times10^3}{1-.24} \times .44 \times 8 \times \frac{26.5}{2} \times \left(\frac{71.79}{2}\right)^2 = 189{,}768.49\times10^3 \text{ kips-ft/radian}$$

* For Vertical

$$\text{with } \frac{c}{d} = \frac{71.79}{26.5} = 2.7, \Rightarrow \beta_z = 2.28$$

$$kz = k1 = \frac{2.4\times10^3}{1-.24} \times 2.28 \sqrt{4 \times \frac{71.79}{2} \times \frac{26.5}{2}} = 314.06\times10^3 \text{ kips/ft}$$

Summarize.

$K_3 = 314.06\times10^3$ kips/ft $= 26.17\times10^3$ kips/in

$K_1 = 244.03\times10^3$ kips/ft $= 20.34\times10^3$ kips/in

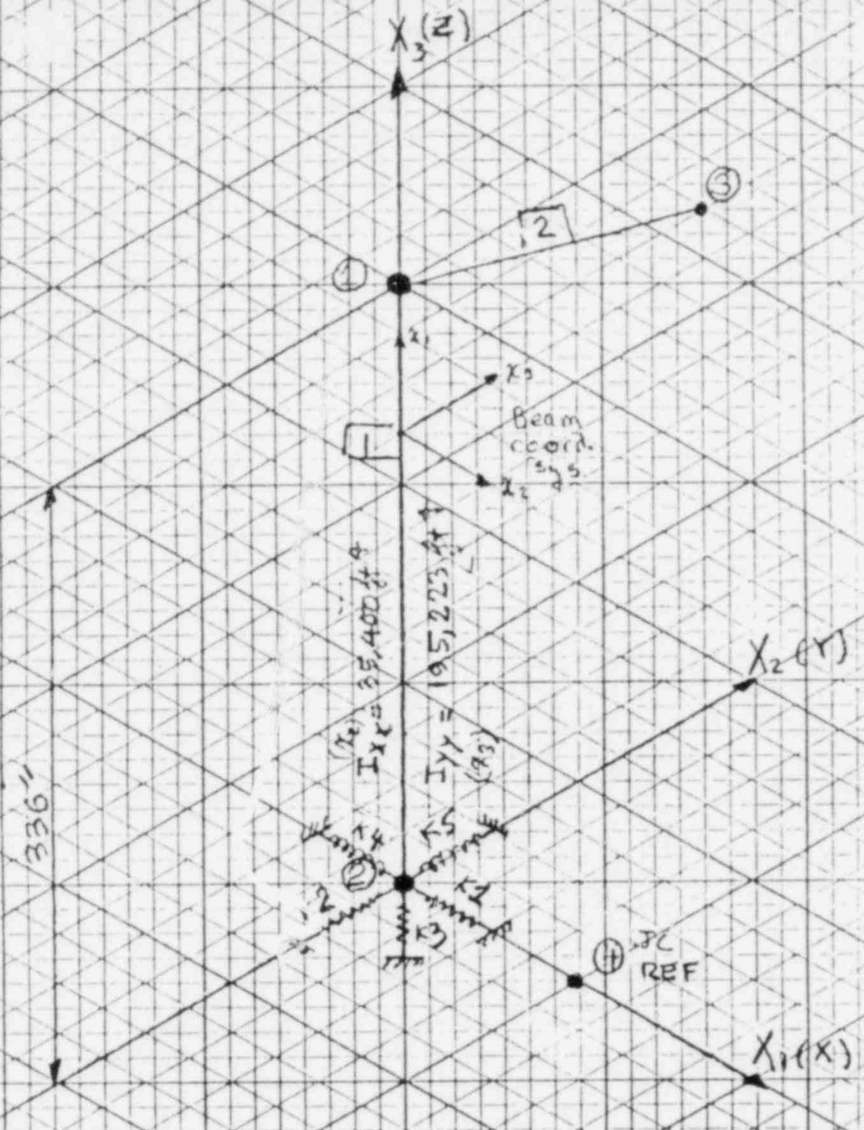
$K_2 = 259.61\times10^3$ kips/ft $= 21.63\times10^3$ kips/in

$K4 = 103{,}482.45\times10^3$ kips-ft/radian $= 1241.79\times10^6$ kips-in/radian

$K5 = 189{,}768.49\times10^3$ kips-ft/radian $= 2277.22\times10^6$ kips-in/radian

Reference

(1) Vibrations of Soils and Foundations, F.E. Richart, Jr., Prentice Hall 1970



TURBINE FOUNDATION MODAL

Prepaired by : NHAN CAU Date : 9/9/81

Checked by : ALAN ZOLLNER 12-31-81

TURBINE FOUNDATION — WEIGHT.

REF.

COLUMNS WEIGHT

Column height : 668 − 640 = 28′

COLUMNS TABLE

COLUMN NUMBER	CROSS SECTION AREA (ft^2)	HEIGHT (ft)	VOLUME (ft^3)	WEIGHT (kips)
1	33.3	28	932.4	139.86
2	33.3	28	932.4	139.86
3	23	28	644	96.6
4	23	28	644	96.6
5	46	28	1288	193.2
6	46	28	1288	193.2
8	37.375	28	1046.5	156.98
9	37.375	28	1046.5	156.98
			Total	1,173.28 kips. ✓

BEAMS WEIGHT (Reference Drawing B-15, B-16).

* Row B

(B4) − Beam 69″ x 151″, length 6.5′, Volume $\frac{69}{12} \times \frac{151}{12} \times 6.5 = 470.3\ ft^3$, Weight 470.3 x .15 = 70.545 kips ✓

(B5) − Beam 69″ x 60″, length 23.75′, Volume $\frac{69}{12} \times \frac{60}{12} \times 23.75 = 682.8\ ft^3$, Weight 682.8 x .15 = 102.42 kips ✓

(B6) − Beam 69″ x 83″, length 17′, Volume $\frac{69}{12} \times \frac{83}{12} \times 17 = 676.1\ ft^3$, Weight 676.1 x .15 = 101.415 kips ✓

* Row C : Same thing like row B, thus weights are
  - (C4) 70.545 kips
  - (C5) 102.42 kips
  - (C6) 101.415 kips

* Row 3

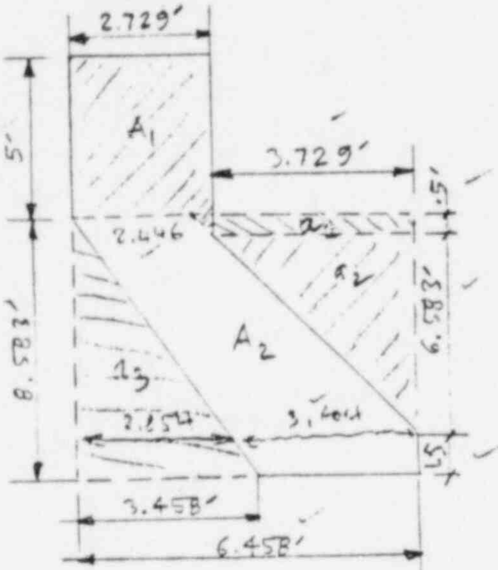
(3B) − Beam 7′1″ x 5′6″, length 15′, Volume $\frac{85}{12} \times \frac{66}{12} \times 15 = 584.38\ ft^3$, Weight 584.38 x .15 = 87.657 kips ✓

− Beam 5′10½″ x 5′6″, length 15′, Volume $\frac{70.5}{12} \times \frac{66}{12} \times 15 = 484.69\ ft^3$, Weight 484.69 x .15 = 72.7 kips ✓

* Row 5

REF.

TURBINE FOUNDATION - LUMPED WEIGHT



$a_3 + A_2 + a_1 + a_2 = A_3.$

Beam cross section

$A = A_1 + A_2 = A_1 + A_3 - (a_1 + a_2 + a_3)$

$A_1 = 2.729 \times 5 = 13.645\ ft^2$

$A_3 = 6.458 \times 8.583 = 55.429\ ft^2$

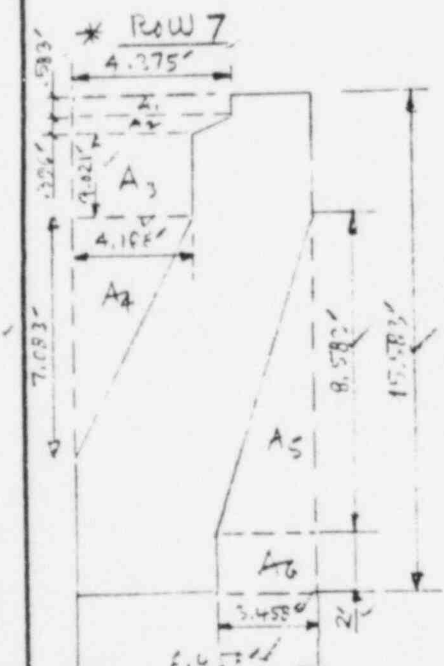
$a_1 = 3.729 \times .5 = 1.864\ ft^2$

$a_2 = \frac{1}{2} \times 3.729 \times 6.583 = 12.274\ ft^2$

$a_3 = \frac{1}{2} \times 8.583 \times 3.458 = 14.84\ ft^2$

$A = 13.645 + 55.429 - (1.864 + 12.274 + 14.84) = 40.096\ ft^2$

Volume: $40.096 \times 15 = 601.44\ ft^3$, Weight $= 601.44 \times .15 = 90.216$ kips.



A_e = A envelope

Beam cross section area $A = A_e - (A_1 + A_2 + A_3 + A_4 + A_5 + A_6)$

$A_e = 15.583 \times 6.458 = 100.635\ ft^2$

$A_1 = .583 \times 4.375 = 2.55\ ft^2$

$A_2 = \frac{(4.375 + 4.188)}{2} \times .396 = 1.695\ ft^2$

$A_3 = 4.021 \times 4.188 = 16.84\ ft^2$

$A_4 = \frac{1}{2}\ 7.083 \times 4.188 = 14.832\ ft^2$

$A_5 = \frac{1}{2}\ 8.583 \times 3.458 = 14.84\ ft^2$

$A_6 = 2 \times 3.458 = 6.916\ ft^2$

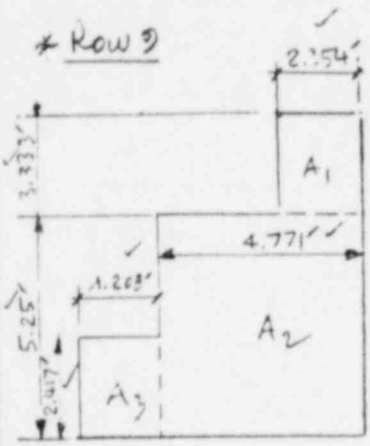
$A = 100.635 - (2.55 + 1.695 + 16.84 + 14.832 + 14.84 + 6.916)$

$= 42.962\ ft^2$

Volume $= 42.962 \times 15 = 644.43\ ft^3$, Weight $= 644.43 \times .15 = 96.664$ kips.

REF.

* Row 9



Beam Cross section Area $A = A_1 + A_2 + A_3$

$A_1 = 3.333 \times 2.354 = 7.846\ ft^2$

$A_2 = 4.771 \times 5.25 = 25.048\ ft^2$

$A_3 = 2.417 \times 1.208 = 2.92\ ft^2$

$A = 7.846 + 25.048 + 2.92 = 35.814\ ft^2$

Volume: $35.814 \times 15 = 537.21\ ft^3$, Weight $= 537.21 \times .15 = 80.582$ kips

Wall weight (Drawing L-18)

Wall 2'x17' height 21'2", Volume: $2 \times 17 \times 21.167 = 719.678\ ft^3$

Weight $719.678 \times .15 = 107.952$ kips.

LUMPED WEIGHT TABLE

PART	Mass lumped to El. 668' (kips)	Mass lumped to El. 640' (kips)(improved)
COLUMN	586.64	586.64
WALL	53.976	53.976
BEAM	1003.949	
TURBINE	1050.36	
Total	2694.92	

TURBINE FOUNDATION - NODAL COORDINATE

REF.

NODAL COORDINATE TABLE

NODE	X1	X2	X3
1	0	0.	336
2	136.75	0.	336
3	496.75	0.	336
4	685.5	0.	336
5	787.75	0.	336
6	0	249	336
7	136.75	249	336
8	496.75	249	336
9	685.5	249	336
10	787.75	249	336
11	0.	0.	0.
12	136.75	0.	0.
13	496.75	0.	0.
14	787.75	0.	0.
15	0.	249.	0.
16	136.75	249.	0.
17	496.75	249.	0.
18	685.5	249	0
19	787.75	249	0

TURBINE FOUNDATION — NODAL WEIGHT.	REF.

TURBINE WEIGHT:

According to Turbine Foundation structure and Position of TURBINE, we make following assumption:

2/5 TURBINE WEIGHT go to Foundation part Column row 7 — Column row 9

3/5 " " " " " " Column row 3 — Column row 5

Then we can construct Nodal weight table

Node	Beam Weight (kip)	Turbine weight (kip)	Total (Kip)
1	145.494 ✓	105.036 ✓	250.53 ✓
2	183.116 ✓	105.036 ✓	288.152 ✓
3	226.383 ✓	105.036 ✓	331.419 ✓
4	87.058 ✓	105.036 ✓	192.094 ✓
5	139.561 ✓	105.036 ✓	244.597 ✓
6	145.494 ✓	105.036 ✓	250.53 ✓
7	183.116 ✓	105.036 ✓	288.152 ✓
8.	226.383+19.05(wall 12') ✓	105.036 ✓	350.469 ✓
9	87.058 +26.988(wall) ✓	105.036 ✓	219.082 ✓
10	139.561+7.94(wall 5')	105.036 ✓	252.537 ✓

TURBINE FOUNDATION – BEAM PROPERTIES. | REF.

	BEAM	H_2 (in)	H_3 (in)	A (in²)	I_2 (in⁴)	I_3 (in⁴)	
BP1	1	69 ✓	151 ✓	10419 ✓	19.797E6 ✓	4.134E6 ✓	
2	2	69 ✓	60 ✓	4140 ✓	1.242E6 ✓	1.642E6 ✓	
3	3	69 ✓	83 ✓	5727 ✓	3.288E6 ✓	2.272E6 ✓	
3	4	69 ✓	83 ✓	5727 ✓	3.288E6 ✓	2.272E6 ✓	
1	5	69 ✓	151 ✓	10419 ✓	19.797E6 ✓	4.134E6 ✓	
2	6	69 ✓	60 ✓	4140 ✓	1.242E6 ✓	1.642E6 ✓	
3	7	69 ✓	83 ✓	5727 ✓	3.288E6 ✓	2.272E6 ✓	
3	8	69 ✓	83 ✓	5727 ✓	3.288E6 ✓	2.272E6 ✓	
4	9	71.7 ✓	103 ✓	5157 ✓	1.193E6 ✓	.985E6 ✓	Assume size 57.25 x 63 in I calculat[ed]
5	10	77.5 ✓	187 ✓	6186 ✓	14.549E6 ✓	.315E6 ✓	Assume size 27.25 x 187 in I calculat[ed]
6	11	77.5 ✓	163 ✓	5773 ✓	11.819E6 ✓	.477E6 ✓	Assume size 32.75 x 163 in I calcu[lated]
12	12	70.5 ✓	66 ✓	4653 ✓	1.689E6 ✓	1.927E6 ✓	
7	13	85 ✓	66 ✓	5610 ✓	2.036E6 ✓	3.379E6 ✓	
8	14	69.5 ✓	69 ✓	4795.5 ✓	1.903E6 ✓	1.93E6 ✓	
9	15	48 ✓	69 ✓	3312	1.314E6 ✓	.636E6 ✓	
10	16	96 ✓	69 ✓	6624 ✓	2.628E6 ✓	5.087E6 ✓	
11	17	78 ✓	69 ✓	5382 ✓	2.135E6	2.729E6 ✓	
8	18	69.5 ✓	69 ✓	4795.5 ✓	1.903E6	1.93E6 ✓	
9	19	48 ✓	69	3312	1.314E6 ✓	.636E6 ✓	
10	20	96 ✓	69 ✓	6624 ✓	2.629E6 ✓	5.087E6 ✓	
11	21	78 ✓	69 ✓	5382	2.135E6	2.729E6 ✓	

Since Turbine weight is not located on beam 9, 10, 11, the assumptions about smaller values their sizes in calculating moment Inertia I are conservative.

TURBINE FOUNDATION – STRESS ANALYSIS | REF.

DEAD LOAD + LIVE LOAD

* From Output SG200S3

Axial stress (compression) : .08946 ksi

Shear stress : Neglected (very small)

1.7(D+L) [instead of 1.4D+1.7L]

$1.7 \times .08946 = .15212$ ksi.

DEAD LOAD + LIVE LOAD + SEISMIC

* From Output SG280VT

Axial stress : -5.00256×10^{-2} ksi (Output case 1) (Compression)

-6.9761×10^{-2} ksi (Output case 2) (Compression)

Bending stress:

6.13511×10^{-2} ksi (axis 2) } (Output case 1)

1.26427×10^{-2} ksi (axis 3) } (Local axis)

1.17163 E-02 ksi (axis 2) } (output case 2)

2.17764 E-02 ksi (axis 3) }

Use output case 1 :

Total axial stress = $-5.00256 \times 10^{-2} \pm 10^{-2} (\sqrt{6.13511^2 + 1.26427^2})$

$= -5.00256 \times 10^{-2} \pm 6.32574 \times 10^{-2}$

Compression -11.3283×10^{-2} ksi (.1133 ksi) < 2.975 ksi OK.

Tension : 1.32318×10^{-2} ksi (.0132 ksi)

Modulus of rupture of concrete $= 7.5\sqrt{3500} = .444$ ksi

Tension = .0132 ksi << .444 ksi ⇒ No need to check reinforced

	REF.
CHECK SHEAR $\tau_{x_2} = 2.42509 \times 10^{-2}$ ksi (x_2 & x_3 are local axis) $\tau_{x_3} = 2.52556 \times 10^{-2}$ ksi $\tau_{x_2}, \tau_{x_3} <$ Allowable shear .118 ksi.	

TURBINE FOUNDATION - ANALYSIS. | REF.

NODE 2

Axial & Bending stress:

From Output S6200V5

Axial stress: $-6.9561\,E{-2}$ ksi (Compression) (DL - SRSS EQ)

$-5.00256\,E{-2}$ ksi (Compression) (DL + SRSS EQ)

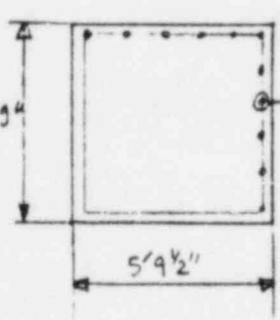
Bending stress: $6.19811\,E{-2}$ ksi (M_{x_2})

$2.17524\,E{-2}$ ksi (M_{x_3})

SRSS Bending: $\sqrt{6.19811^2 + 2.17524^2} \times 10^{-2} = 6.56873 \times 10^{-2}$ ksi

Max Compression: $(-6.9561 - 6.56873)\,E{-2} = -.13525$ ksi < 2.975 ksi OK

Max Tension: $(-5.00256 + 6.56873)\,E{-2} = 1.56617\,E{-2}$ ksi $< .26$ ksi. OK.



Steel area in colum

$20\#11 \Rightarrow A_s = 20 \times 1.56 = 31.2\ in^2$

Allowable tension stress:

$$\frac{(40) \times (31.2)}{69 \times 69.5} = .26\,ksi = 260\,psi$$

CHECK SHEAR: From Output S6200V5

$\tau_{x_1} = 2.42509\,E{-2}$ ksi $\tau_{x_2} = 2.52356\,E{-2}$ ksi

SRSS $= \sqrt{2.42509^2 + 2.52356^2}\ E{-2} = 3.504\ E{-2}$ ksi $= 35.04$ psi < 100.57 psi OK

APPENDIX B

COMPUTER DATA

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*USER SPECTRUM - LACBWR SSE ACCELERATION SPECTRA

*USER SUPPLIED ACCEL. SPECTRA CURVE.

FOR DIRECTION X1

1	FREQ =	.050000,	SPECTRA =	13.910400
2	FREQ =	.100000,	SPECTRA =	13.910400
3	FREQ =	.150000,	SPECTRA =	13.910400
4	FREQ =	.250000,	SPECTRA =	13.910400
5	FREQ =	.400000,	SPECTRA =	19.320000
6	FREQ =	.600000,	SPECTRA =	32.071200
7	FREQ =	.800000,	SPECTRA =	46.368000
8	FREQ =	1.000000,	SPECTRA =	53.709600
9	FREQ =	1.500000,	SPECTRA =	60.664800
10	FREQ =	2.000000,	SPECTRA =	64.142400
11	FREQ =	2.500000,	SPECTRA =	68.006400
12	FREQ =	3.000000,	SPECTRA =	69.165600
13	FREQ =	4.000000,	SPECTRA =	74.961600
14	FREQ =	5.000000,	SPECTRA =	71.484000
15	FREQ =	6.000000,	SPECTRA =	68.006400
16	FREQ =	8.000000,	SPECTRA =	64.142400
17	FREQ =	10.000000,	SPECTRA =	62.596800
18	FREQ =	15.000000,	SPECTRA =	50.232000
19	FREQ =	22.000000,	SPECTRA =	59.892000
20	FREQ =	25.000000,	SPECTRA =	42.504000
21	FREQ =	33.000000,	SPECTRA =	42.504000
22	FREQ =	50.000000,	SPECTRA =	42.504000

*USER SUPPLIED ACCEL. SPECTRA CURVE.

FOR DIRECTION X2

1	FREQ =	.050000,	SPECTRA =	13.910400
2	FREQ =	.100000,	SPECTRA =	13.910400
3	FREQ =	.150000,	SPECTRA =	13.910400
4	FREQ =	.250000,	SPECTRA =	13.910400
5	FREQ =	.400000,	SPECTRA =	19.320000
6	FREQ =	.600000,	SPECTRA =	32.071200
7	FREQ =	.800000,	SPECTRA =	46.368000
8	FREQ =	1.000000,	SPECTRA =	53.709600
9	FREQ =	1.500000,	SPECTRA =	60.664800
10	FREQ =	2.000000,	SPECTRA =	64.142400
11	FREQ =	2.500000,	SPECTRA =	68.006400
12	FREQ =	3.000000,	SPECTRA =	69.165600
13	FREQ =	4.000000,	SPECTRA =	74.961600
14	FREQ =	5.000000,	SPECTRA =	71.484000
15	FREQ =	6.000000,	SPECTRA =	68.006400
16	FREQ =	8.000000,	SPECTRA =	64.142400
17	FREQ =	10.000000,	SPECTRA =	62.596800
18	FREQ =	15.000000,	SPECTRA =	50.232000
19	FREQ =	22.000000,	SPECTRA =	59.892000
20	FREQ =	25.000000,	SPECTRA =	42.504000
21	FREQ =	33.000000,	SPECTRA =	42.504000
22	FREQ =	50.000000,	SPECTRA =	42.504000

*USER SUPPLIED ACCEL. SPECTRA CURVE.

FOR DIRECTION X3

1	FREQ =	.050000,	SPECTRA =	9.273600
2	FREQ =	.100000,	SPECTRA =	9.273600
3	FREQ =	.150000,	SPECTRA =	9.273600
4	FREQ =	.250000,	SPECTRA =	9.273600
5	FREQ =	.400000,	SPECTRA =	13.137600
6	FREQ =	.600000,	SPECTRA =	22.411200
7	FREQ =	.800000,	SPECTRA =	33.616800
8	FREQ =	1.000000,	SPECTRA =	39.799200
9	FREQ =	1.500000,	SPECTRA =	48.300000
10	FREQ =	2.000000,	SPECTRA =	54.096000
11	FREQ =	2.500000,	SPECTRA =	61.051200
12	FREQ =	3.000000,	SPECTRA =	65.688000
13	FREQ =	4.000000,	SPECTRA =	74.961600
14	FREQ =	5.000000,	SPECTRA =	71.484000
15	FREQ =	6.000000,	SPECTRA =	68.006400
16	FREQ =	8.000000,	SPECTRA =	64.142400
17	FREQ =	10.000000,	SPECTRA =	62.596800
18	FREQ =	15.000000,	SPECTRA =	50.232000
19	FREQ =	22.000000,	SPECTRA =	59.892000
20	FREQ =	25.000000,	SPECTRA =	42.504000
21	FREQ =	33.000000,	SPECTRA =	42.504000
22	FREQ =	50.000000,	SPECTRA =	42.504000

LACBWR TURBINE BUILDING DYNAMIC STRUCTURAL ANALYSIS

MODAL EXTRACTION DATA

MODE NO	EIGENVALUE (OMEGA**2)	NATURAL FREQUENCY	PERIOD	GENERALIZED WEIGHT	MAX TRANSLATION NODE-DOF	VALUE	--- MODAL WEIGHTS --- (GEN. WGT. * PARTICIPATION FACTORS**2) X1	X2	X3	
1	43.3705	1.048	.9541	1406.47	7-2	1.0000	.00000	2173.88080	.00599	12.0
2	53.3599	1.163	.8601	1407.09	7-1	1.0000	2187.61640	.00000	.00802	12.0
3	255.325	2.543	.3932	1500.59	7-2	1.0000	.00000	86.14454	.00022	12.0
4	314.170	2.821	.3545	1499.88	7-1	1.0000	90.84747	.00000	.00035	12.0
5	1684.55	6.532	.1531	7685.32	6-2	1.0000	7.89799	8041.68301	231.38536	12.0
6	1809.36	6.770	.1477	8142.11	6-1	1.0000	7831.22805	32.41937	478.79424	12.0
7	2028.74	7.169	.1395	6934.88	7-3	1.0000	399.18886	155.88797	9713.96120	12.0
8	11219.9	16.858	.0593	1744.48	7-3	1.0000	3.14046	3.31475	120.91719	12.0
9	45996.2	34.134	.0293	4035.12	1-2	1.0000	.01253	53.91037	.88007	10.3

THE FOLLOWING ARE APPROX. EIGENVALUES FOR WHICH MODES WERE NOT REQUESTED.

10	51408.7	36.086	9.9
11	65881.5	40.851	9.9
12	361992.	95.757	9.6

LANCZOS REDUCED MATRIX SIZE (DOF) = 12
APPROX. MAXIMUM EIGENVALUE(OMEGA**2)= .361992E+06

NOTE THE LAST COLUMN IN THE TABLE ABOVE IS RELATED TO EIGENVALUE ACCURACY BOUNDS.

NUCLEAR ENERGY SERVICES, INC.

DOCUMENT NO. 81A0078

(RSS = 6) DISPLACMT.

NODE	X1	X2	X3	X4	X5	X6
1	3.08134555E-02	2.77083983E-02	3.15505213E-02	1.96246213E-05	1.35072844E-05	0.
2	3.77271565E-02	3.75935795E-02	3.27014662E-02	2.12974438E-05	1.48662190E-05	8.00248345E-07
3	4.25814496E-02	4.46590282E-02	3.34241059E-02	2.18103777E-05	1.52227742E-05	1.16962187E-06
4	9.22783623E-01	1.09686498E+00	4.19405535E-02	2.18103779E-05	1.52227743E-05	1.16962187E-06
5	3.77468484E-02	3.76453914E-02	3.38398944E-02	2.12974438E-05	1.48662190E-05	8.00248345E-07
6	4.26100569E-02	4.47342515E-02	3.45976995E-02	2.18103777E-05	1.52227742E-05	1.16962187E-06
7	1.31424913E+00	1.56280982E+00	4.50214785E-02	2.18103779E-05	1.52227743E-05	1.16962187E-06

(RSS = 6) ACCEL.

NODE	X1	X2	X3	X4	X5	X6
1	1.43678578E-01	1.20749812E-01	1.62735104E-01	8.15658718E-05	5.75415962E-05	0.
2	1.75121346E-01	1.62288799E-01	1.68672624E-01	8.86347382E-05	6.32246090E-05	3.61401451E-06
3	1.96580362E-01	1.91002840E-01	1.72384763E-01	9.06003227E-05	6.45169515E-05	5.32879652E-06
4	1.31[illegible]5777E-01	1.27347501E-01	2.17392951E-01	9.06003227E-05	6.45169515E-05	5.32879652E-06
5	1.75217372E-01	1.62524599E-01	1.73733009E-01	8.86347382E-05	6.32246090E-05	3.61401451E-06
6	1.96720562E-01	1.91347326E-01	1.77612251E-01	9.06003227E-05	6.45169515E-05	5.32879652E-06
7	1.86554460E-01	1.80285895E-01	2.35024137E-01	9.06003227E-05	6.45169515E-05	5.32879652E-06

(RSS = 6) BEAM END LOADS (ELEMENT).

NO	NODES		AXIAL	V2	V3	M2	M3	TORSION
1	JA	1	1.9517E+03	1.5384E+03	1.6078E+03	4.5195E+05	4.4725E+05	1.5010E+05
	JB	2	1.9517E+03	1.5384E+03	1.6078E+03	2.5097E+05	2.2953E+06	1.5010E+05
2	JA	2	1.3962E+03	1.0346E+03	1.0627E+03	2.2422E+05	2.1453E+05	9.8443E+04
	JB	3	1.3962E+03	1.0346E+03	1.0627E+03	1.1081E+05	9.7231E+04	9.8443E+04
3	JA	3	4.7066E+02	2.9769E+02	3.0816E+02	8.4438E+04	8.1589E+04	5.6751E-04
	JB	4	4.7066E+02	2.9769E+02	3.0816E+02	2.6004E+04	2.5130E+04	5.6751E-04
4	JA	4	1.7063E+02	1.3089E+02	1.3544E+02	2.6004E+04	2.5130E+04	2.7512E-04
	JB	7	1.7063E+02	1.3089E+02	1.3544E+02	2.1485E-02	2.2366E-02	2.7512E-04

$\sigma_L = \sqrt{\chi_1^2 + \chi_2^2 + \chi_3^2}$

BEAM STRESSES

OUTPUT CASE 1

BEAM	NODE	AXIAL	* * * * SHEAR * * * * V2/A*K3	V3/A*K2	TORSION T*C/J	* * * * BENDING * * * * M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
*****	****	*************	************	*************	*************	*************	*************
1	1	1.73445E-01	3.49307E-02	1.21748E+00	0.	0.	0.
	7	1.73445E-01	3.49307E-02	1.21748E+00	0.	-5.11246E+00	2.98977E+00
2	7	1.16008E+00	4.69949E-02	-5.67236E-03	0.	-5.11246E+00	2.98977E+00
	10	1.16008E+00	4.69949E-02	-5.67236E-03	0.	-5.07401E+00	1.03672E+00
3	10	3.95788E+00	1.21228E-02	-7.48477E-01	0.	-5.07401E+00	1.03672E+00
	13	3.95788E+00	1.21228E-02	-7.48477E-01	0.	0.	0.
4	13	3.42732E+00	1.79068E-03	1.09772E+00	0.	0.	0.
	14	3.42732E+00	1.79068E-03	1.09772E+00	0.	-4.18569E+00	1.42657E-01
5	14	4.77304E+00	4.40510E-03	4.66352E-03	0.	-4.18569E+00	1.42657E-01
	17	4.77304E+00	4.40510E-03	4.66352E-03	0.	-4.20347E+00	4.82796E-01
6	17	7.07931E+00	5.21718E-03	-5.82853E-01	0.	-4.20347E+00	4.82796E-01
	19	7.07931E+00	5.21718E-03	-5.82853E-01	0.	0.	0.
7	19	6.79203E+00	4.47417E-03	1.22269E+00	0.	0.	0.
	21	6.79203E+00	4.47417E-03	1.22269E+00	0.	-5.19333E+00	3.93174E-01
8	21	7.61211E+00	4.04351E-03	-3.02592E-03	0.	-5.19333E+00	3.93174E-01
	23	7.61211E+00	4.04351E-03	-3.02592E-03	0.	-5.17258E+00	4.92451E-01
9	23	7.84918E+00	5.69295E-03	-7.54346E-01	0.	-5.17258E+00	4.92451E-01
	25	7.84918E+00	5.69295E-03	-7.54346E-01	0.	0.	0.
10	25	7.89054E+00	6.74156E-03	1.13792E+00	0.	0.	0.
	29	7.89054E+00	6.74156E-03	1.13792E+00	0.	-4.50376E+00	5.64294E-01
11	29	7.30513E+00	5.66843E-03	4.73578E-03	0.	-4.50376E+00	5.64294E-01
	30	7.30513E+00	5.66843E-03	4.73578E-03	0.	-4.52251E+00	1.07549E-01
12	30	5.37747E+00	1.33427E-03	-7.07802E-01	0.	-4.52251E+00	1.07549E-01
	31	5.37747E+00	1.33427E-03	-7.07802E-01	0.	0.	0.
13	31	4.80633E+00	1.30241E-02	8.22645E-02	0.	0.	0.
	35	4.80633E+00	1.30241E-02	8.22645E-02	0.	-3.41379E-01	6.17116E-01
14	35	5.88005E+00	7.72697E-02	-2.79244E-01	0.	-3.41379E-01	6.17116E-01
	36	5.88005E+00	7.72697E-02	-2.79244E-01	0.	9.66430E-01	1.16551E+00
15	36	1.44920E+00	1.54237E-01	4.48647E-01	0.	9.66430E-01	1.16551E+00
	37	1.44920E+00	1.54237E-01	4.48647E-01	0.	-3.39956E-01	4.71965E+00
16	37	3.31824E-02	1.00330E-01	-5.03026E-02	0.	-3.39955E-01	4.71965E+00
	43	3.31824E-02	1.00330E-01	-5.03024E-02	0.	0.	0.
17	43	3.83523E+00	3.99245E-02	2.27999E+00	0.	0.	0.
	55	3.83523E+00	3.99245E-02	2.27999E+00	0.	-9.57415E+00	3.41912E+00
18	55	3.90407E+00	5.20270E-02	-5.44731E-03	0.	-9.57415E+00	3.41912E+00
	59	3.90407E+00	5.20270E-02	-5.44731E-03	0.	-9.53723E+00	1.03258E+00
19	59	1.47559E+00	1.20743E-02	-1.40685E+00	0.	-9.53723E+00	1.03258E+00
	61	1.47559E+00	1.20743E-02	-1.40685E+00	0.	0.	0.
20	61	3.22956E+00	5.33880E-03	2.05367E+00	0.	0.	0.
	62	3.22956E+00	5.33880E-03	2.05367E+00	0.	-7.83078E+00	4.22173E-01
21	62	4.18864E+00	2.57831E-03	-2.88873E-03	0.	-7.83078E+00	4.22173E-01
	65	4.18864E+00	2.57831E-03	-2.88873E-03	0.	-7.81301E+00	3.33286E-01
22	65	4.22670E+00	4.25325E-03	-1.26722E+00	0.	-7.81301E+00	3.33286E-01
	67	4.22670E+00	4.25325E-03	-1.26722E+00	0.	0.	0.
23	67	5.12313E+00	4.53281E-03	2.27793E+00	0.	0.	0.
	69	5.12313E+00	4.53281E-03	2.27793E+00	0.	-9.67548E+00	3.95767E-01
24	69	5.16062E+00	2.14483E-03	4.88492E-03	0.	-9.67548E+00	3.95767E-01
	71	5.16062E+00	2.14483E-03	4.88492E-03	0.	-9.69622E+00	4.54814E-01
25	71	[illegible]	5.37356E-03	-1.41405E+00	0.	-9.69622E+00	4.54814E-01
	73	[illegible]	5.37356E-03	-1.41405E+00	0.	0.	0.
26	73	[illegible]	4.75275E-03	2.13005E+00	0.	0.	0.
	75	[illegible]	4.75275E-03	2.13005E+00	0.	-9.91047E+00	3.82555E-01

B E A M   S T R E S S E S

OUTPUT CASE 1

BEAM	NODE	AXIAL	* * * * SHEAR * * * * V2/A*K3	V3/A*K2	TORSION T*C/J	* * * * BENDING * * * * M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
27	75	3.39682E+00	3.29624E-03	-2.93352E-03	0.	-8.43047E+00	3.82666E-01
	73	3.39682E+00	3.29624E-03	-2.93352E-03	0.	-8.41173E+00	2.97196E-01
28	73	3.41365E+00	3.69712E-03	-1.31649E+00	0.	-8.41173E+00	2.97196E-01
	79	3.41365E+00	3.69712E-03	-1.31649E+00	0.	0.	0.
29	77	7.57687E-01	1.15905E-02	2.13897E+00	0.	0.	0.
	83	7.57687E-01	1.15905E-02	2.13897E+00	0.	-8.46577E+00	9.47041E-01
30	83	6.54089E-01	5.82355E-02	1.83896E-02	0.	-8.46577E+00	9.47041E-01
	85	5.54089E-01	5.82355E-02	1.83896E-02	0.	-8.53855E+00	3.68305E+00
31	85	4.12382E+00	4.56932E-02	-1.33634E+00	0.	-8.53855E+00	3.68305E+00
	91	4.12382E+00	4.56932E-02	-1.33634E+00	0.	0.	0.
32	97	1.91685E+00	2.77448E-02	2.27979E+00	0.	0.	0.
	103	1.91685E+00	2.77448E-02	2.27979E+00	0.	-9.57332E+00	2.37713E+00
33	103	6.83113E-01	1.38983E-02	-7.06089E-01	0.	-9.57332E+00	2.37713E+00
	109	6.83113E-01	1.38983E-02	-7.06089E-01	0.	0.	0.
34	109	1.34580E+00	0.	0.	0.	0.	0.
	115	1.34580E+00	0.	0.	0.	0.	0.
35	115	1.64124E+00	0.	0.	0.	0.	0.
	121	1.64124E+00	0.	0.	0.	0.	0.
36	121	1.29953E+00	0.	0.	0.	0.	0.
	127	1.29953E+00	0.	0.	0.	0.	0.
37	127	4.90931E-01	1.74064E-02	1.08389E+00	0.	0.	0.
	133	4.90931E-01	1.74064E-02	1.08389E+00	0.	-8.57984E+00	2.75257E+00
38	133	7.27404E-02	3.41505E-02	-1.34280E+00	0.	-8.57984E+00	2.75257E+00
	139	7.27407E-02	3.41505E-02	-1.34280E+00	0.	0.	0.
39	145	9.51432E-02	2.97767E-02	2.25005E+00	0.	0.	0.
	151	9.51432E-02	2.97767E-02	2.25005E+00	0.	-9.44844E+00	2.55295E+00
40	151	8.30437E-01	1.47263E-02	-5.96878E-01	0.	-9.44844E+00	2.55295E+00
	157	8.30437E-01	1.47263E-02	-5.96878E-01	0.	0.	0.
41	157	5.25763E-01	0.	0.	0.	0.	0.
	163	5.25763E-01	0.	0.	0.	0.	0.
42	163	3.22198E-01	0.	0.	0.	0.	0.
	169	3.22198E-01	0.	0.	0.	0.	0.
43	169	5.37476E-01	0.	0.	0.	0.	0.
	175	5.37476E-01	0.	0.	0.	0.	0.
44	175	8.98227E-01	1.84703E-02	7.95410E-01	0.	0.	0.
	181	8.98227E-01	1.84703E-02	7.95410E-01	0.	-6.29627E+00	2.91828E+00
45	181	9.92734E-01	3.52051E-02	-9.85407E-01	0.	-6.29627E+00	2.91828E+00
	187	9.92734E-01	3.52051E-02	-9.85407E-01	0.	0.	0.
46	189	1.03609E-01	0.	0.	0.	0.	0.
	191	1.03609E-01	0.	0.	0.	0.	0.
47	193	4.56023E-01	3.36164E-02	2.17285E+00	0.	0.	0.
	199	4.56023E-01	3.36164E-02	2.17285E+00	0.	-9.12425E+00	2.62552E+00
48	199	6.99635E-01	1.53506E-02	-5.72968E-01	0.	-9.12425E+00	2.62552E+00
	205	6.99635E-01	1.53506E-02	-5.72968E-01	0.	0.	0.
49	205	4.46675E-01	0.	0.	0.	0.	0.
	211	4.46675E-01	0.	0.	0.	0.	0.
50	211	2.07293E-01	0.	0.	0.	0.	0.
	217	2.07293E-01	0.	0.	0.	0.	0.
51	217	[illegible]	0.	0.	0.	0.	0.
	[illegible]	[illegible]	0.	0.	0.	0.	0.
[illegible]	[illegible]	6.24731E-01	[illegible]	7.84876E-01	0.	0.	0.
	[illegible]	[illegible]	[illegible]	7.84876E-01	0.	-5.21284E+00	[illegible]

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BEAM STRESSES

OUTPUT CASE 1

BEAM	NODE	AXIAL	**** SHEAR **** V2/A*K3	V3/A*K2	TORSION T*C/J	**** BENDING **** M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
*****	****	*************	*************	*************	*************	*************	*************
53	229	7.89230E-01	3.76108E-02	-9.72356E-01	0.	-6.21288E+00	3.03158E+00
	235	7.89230E-01	3.76108E-02	-9.72356E-01	0.	0.	0.
54	241	6.53858E-02	3.16527E-02	2.20425E+00	0.	0.	0.
	247	6.53858E-02	3.16527E-02	2.20425E+00	0.	-9.25612E+00	2.71420E+00
55	247	9.95102E-01	1.58690E-02	-6.82693E-01	0.	-9.25612E+00	2.71420E+00
	253	9.95102E-01	1.58690E-02	-6.82693E-01	0.	0.	0.
56	253	6.60041E-01	0.	0.	0.	0.	0.
	259	6.60041E-01	0.	0.	0.	0.	0.
57	259	3.73634E-01	0.	0.	0.	0.	0.
	265	3.73634E-01	0.	0.	0.	0.	0.
58	265	5.32679E-01	0.	0.	0.	0.	0.
	271	5.32679E-01	0.	0.	0.	0.	0.
59	271	1.01666E+00	1.98621E-02	1.04065E+00	0.	0.	0.
	277	1.01666E+00	1.98621E-02	1.04065E+00	0.	-8.23754E+00	3.13646E+00
60	277	5.76840E-02	3.89120E-02	-1.28923E+00	0.	-8.23754E+00	3.13646E+00
	283	5.76840E-02	3.89120E-02	-1.28923E+00	0.	0.	0.
61	289	1.21943E+00	3.22042E-02	2.20164E+00	0.	0.	0.
	295	1.21943E+00	3.22042E-02	2.20164E+00	0.	-9.24513E+00	2.75971E+00
62	295	1.21927E+00	1.61351E-02	-6.81883E-01	0.	-9.24513E+00	2.75971E+00
	301	1.21927E+00	1.61351E-02	-6.81883E-01	0.	0.	0.
63	301	1.67010E+00	0.	0.	0.	0.	0.
	307	1.67010E+00	0.	0.	0.	0.	0.
64	307	2.04300E+00	0.	0.	0.	0.	0.
	313	2.04300E+00	0.	0.	0.	0.	0.
65	313	1.78863E+00	0.	0.	0.	0.	0.
	319	1.78863E+00	0.	0.	0.	0.	0.
66	319	7.53872E-01	1.99425E-02	7.26023E-01	0.	0.	0.
	325	7.53872E-01	1.99425E-02	7.26023E-01	0.	-5.74702E+00	3.14989E+00
67	325	7.78362E-01	3.90786E-02	-8.99445E-01	0.	-5.74702E+00	3.14989E+00
	331	7.78362E-01	3.90786E-02	-8.99445E-01	0.	0.	0.
68	332	8.70405E-02	0.	0.	0.	0.	0.
	333	8.70405E-02	0.	0.	0.	0.	0.
69	334	7.81378E-02	0.	0.	0.	0.	0.
	335	7.81378E-02	0.	0.	0.	0.	0.
70	337	3.25677E+00	2.80085E-01	1.92958E+00	0.	0.	0.
	340	3.25677E+00	2.80085E-01	1.92958E+00	0.	-8.57027E+00	1.39573E+01
71	340	3.26973E+00	8.44014E-01	5.39693E-01	0.	-8.57027E+00	1.39573E+01
	343	3.26973E+00	8.44014E-01	5.39693E-01	0.	-9.99087E+00	7.13714E+00
72	343	3.28313E+00	9.53340E-02	-9.28914E-01	0.	-9.99087E+00	7.13714E+00
	349	3.28313E+00	9.53340E-02	-9.28914E-01	0.	0.	0.
73	349	3.11486E+00	2.08377E-02	1.45650E+00	0.	0.	0.
	352	3.11486E+00	2.08377E-02	1.45650E+00	0.	-8.81134E+00	1.41122E+00
74	352	3.15527E+00	2.07591E-02	-9.02207E-01	0.	-8.81134E+00	1.41122E+00
	355	3.15527E+00	2.07591E-02	-9.02207E-01	0.	0.	0.
75	355	6.78938E+00	1.19402E-02	1.61942E+00	0.	0.	0.
	358	6.78938E+00	1.19402E-02	1.61942E+00	0.	-1.09130E+01	9.24953E-01
76	358	6.79434E+00	1.22146E-02	-1.00312E+00	0.	-1.09130E+01	9.24953E-01
	361	6.79434E+00	1.22146E-02	-1.00312E+00	0.	0.	0.
77	361	7.13248E+00	1.31738E-02	1.51063E+00	0.	0.	0.
	364	7.13248E+00	1.31738E-02	1.51063E+00	0.	-9.48579E+00	9.20831E-01
78	364	7.14850E+00	1.30500E-02	-9.35732E-01	0.	-9.48579E+00	9.20831E-01
	367	7.14850E+00	1.30500E-02	-9.35732E-01	0.	0.	0.

B E A M   S T R E S S E S

OUTPUT CASE 1

BEAM	NODE	AXIAL	* * * * SHEAR * * * * V2/A*K3	V3/A*K2	TORSION T*C/J	* * * * BENDING * * * * M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
79	367	1.96764E+00	1.53828E-01	1.28429E+00	0.	0.	0.
	373	1.96764E+00	1.53828E-01	1.28429E+00	0.	-8.06455E+00	1.10635E+01
80	373	1.92689E+00	1.27309E+00	-4.55344E-01	0.	-8.06455E+00	1.10635E+01
	376	1.92689E+00	1.27309E+00	-4.55344E-01	0.	-6.52590E+00	1.85458E+01
81	376	1.89597E+00	3.94244E-01	-9.65628E-01	0.	-6.52590E+00	1.85458E+01
	379	1.89597E+00	3.94244E-01	-9.65628E-01	0.	0.	0.
82	385	1.36719E-01	0.	0.	0.	0.	0.
	391	1.36719E-01	0.	0.	0.	0.	0.
83	391	4.87528E-01	0.	0.	0.	0.	0.
	397	4.87528E-01	0.	0.	0.	0.	0.
84	397	3.98556E-01	0.	0.	0.	0.	0.
	400	3.98556E-01	0.	0.	0.	0.	0.
85	400	1.09518E+00	0.	0.	0.	0.	0.
	403	1.09518E+00	0.	0.	0.	0.	0.
86	403	1.15130E+00	0.	0.	0.	0.	0.
	405	1.15130E+00	0.	0.	0.	0.	0.
87	405	6.55655E-01	0.	0.	0.	0.	0.
	409	6.55655E-01	0.	0.	0.	0.	0.
88	409	4.23293E-01	0.	0.	0.	0.	0.
	412	4.23293E-01	0.	0.	0.	0.	0.
89	412	8.09787E-01	0.	0.	0.	0.	0.
	415	8.09787E-01	0.	0.	0.	0.	0.
90	415	9.06188E-01	0.	0.	0.	0.	0.
	421	9.06188E-01	0.	0.	0.	0.	0.
91	421	8.90941E-02	0.	0.	0.	0.	0.
	427	8.90941E-02	0.	0.	0.	0.	0.
92	433	4.24025E-02	5.95549E-03	-5.83685E-01	0.	0.	0.
	439	4.24025E-02	5.95549E-03	-5.83685E-01	0.	1.18711E+01	4.28896E-01
93	439	1.07256E-01	5.72896E-03	1.10373E+00	0.	1.18711E+01	4.28896E-01
	445	1.07256E-01	5.72896E-03	1.10373E+00	0.	0.	0.
94	445	8.56415E+00	2.06567E-02	-5.22203E-01	0.	0.	0.
	450	8.56415E+00	2.06567E-02	-5.22203E-01	0.	9.81010E+00	1.40916E+00
95	450	8.57294E+00	2.07288E-02	1.00447E+00	0.	9.81010E+00	1.40916E+00
	451	8.57294E+00	2.07288E-02	1.00447E+00	0.	0.	0.
96	451	8.50191E+00	1.23687E-02	-6.91365E-01	0.	0.	0.
	456	8.50191E+00	1.23687E-02	-5.91365E-01	0.	1.21424E+01	9.15524E-01
97	456	8.51574E+00	1.20901E-02	1.11612E+00	0.	1.21424E+01	9.15524E-01
	457	8.51574E+00	1.20901E-02	1.11612E+00	0.	0.	0.
98	457	6.27594E+00	1.33102E-02	-6.45403E-01	0.	0.	0.
	462	6.27594E+00	1.33102E-02	-6.45403E-01	0.	1.05623E+01	9.47568E-01
99	462	6.31654E+00	1.34289E-02	1.04192E+00	0.	1.05623E+01	9.47568E-01
	463	6.31654E+00	1.34289E-02	1.04192E+00	0.	0.	0.
100	463	6.38161E+00	1.22292E-02	1.81063E-02	0.	0.	0.
	469	6.38161E+00	1.22292E-02	1.81063E-02	0.	5.03287E-01	8.63080E-01
101	469	5.59849E+00	1.21890E-02	4.96471E-02	0.	5.03287E-01	8.60080E-01
	475	5.59849E+00	1.21890E-02	4.96471E-02	0.	0.	0.
102	1	3.04347E-01	4.70956E-02	-1.43594E+00	0.	0.	0.
	47	3.04349E-01	4.70956E-02	-1.43594E+00	0.	1.83413E+01	2.60136E+00
103	47	8.94393E-01	6.02562E-02	5.27506E-03	0.	1.83413E+01	2.60186E+00
	97	8.94393E-01	5.02562E-02	5.27506E-03	0.	1.82995E+01	7.33981E-01
104	97	2.25295E+00	1.33275E-02	2.31287E+00	0.	1.82995E+01	7.33981E-01
	145	2.25295E+00	1.33275E-02	2.31287E+00	0.	0.	0.

BEAM STRESSES

OUTPUT CASE 1

BEAM	NODE	AXIAL	**** SHEAR **** V2/A*K3	V3/A*K2	TORSION T*C/J	**** BENDING **** M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
*****	****	*************	*************	*************	*************	*************	*************
105	145	1.99802E+00	1.54421E-02	-1.41483E+00	0.	0.	0.
	193	1.99802E+00	1.54421E-02	-1.41483E+00	0.	1.77307E+01	7.38580E-01
106	193	2.50858E+00	9.58561E-03	-2.52617E-01	0.	1.77307E+01	7.38580E-01
	241	2.50858E+00	9.58561E-03	-2.52617E-01	0.	2.08965E+01	4.92859E-01
107	241	2.52228E+00	2.61573E-02	1.45983E+00	0.	2.08965E+01	4.92859E-01
	289	2.52228E+00	2.61573E-02	1.45983E+00	0.	9.56416E+00	1.07179E+00
108	289	2.56523E+00	5.75092E-02	3.14858E+00	0.	9.56416E+00	1.07179E+00
	332	2.56523E+00	5.75092E-02	3.14858E+00	0.	0.	0.
109	332	1.51618E+00	8.25027E-02	-1.50082E+00	0.	0.	0.
	337	1.51618E+00	8.25027E-02	-1.50082E+00	0.	1.11825E+01	2.63899E+00
110	337	3.38960E+00	4.71746E-02	1.85735E-01	0.	1.11825E+01	2.63899E+00
	385	3.38960E+00	4.71746E-02	1.85735E-01	0.	9.77417E+00	2.45832E-01
111	385	3.45269E+00	4.65784E-03	1.28907E+00	0.	9.77417E+00	2.45832E-01
	433	3.45269E+00	4.65784E-03	1.28907E+00	0.	0.	0.
112	7	6.60717E+00	0.	0.	0.	0.	0.
	55	6.60717E+00	0.	0.	0.	0.	0.
113	55	6.80376E+00	0.	0.	0.	0.	0.
	103	6.80376E+00	0.	0.	0.	0.	0.
114	103	4.70111E+00	0.	0.	0.	0.	0.
	151	4.70111E+00	0.	0.	0.	0.	0.
115	151	4.76224E+00	0.	0.	0.	0.	0.
	199	4.76224E+00	0.	0.	0.	0.	0.
116	199	4.90293E+00	0.	0.	0.	0.	0.
	247	4.90293E+00	0.	0.	0.	0.	0.
117	247	2.62039E+00	0.	0.	0.	0.	0.
	295	2.62039E+00	0.	0.	0.	0.	0.
118	295	2.74119E+00	4.45427E-02	1.03136E+00	0.	0.	0.
	333	2.74119E+00	4.45427E-02	1.03136E+00	0.	-3.51753E+00	9.17468E-01
119	333	8.32972E-01	2.82781E-02	-4.10695E-01	0.	-3.51753E+00	9.17468E-01
	340	8.32972E-01	2.82781E-02	-4.10695E-01	0.	0.	0.
120	343	5.15562E-01	1.58143E-02	1.70585E+00	0.	0.	0.
	391	5.15562E-01	1.58143E-02	1.70585E+00	0.	-1.48681E+01	8.56406E-01
121	391	1.22023E-01	1.60672E-02	-1.05666E+00	0.	-1.48681E+01	8.56406E-01
	439	1.22023E-01	1.60672E-02	-1.05666E+00	0.	0.	0.
122	10	4.42207E+00	0.	0.	0.	0.	0.
	58	4.42207E+00	0.	0.	0.	0.	0.
123	13	1.73410E-02	1.49236E-01	3.50620E+00	0.	3.50459E-13	3.11769E-12
	61	1.73410E-02	1.49236E-01	3.50620E+00	0.	-6.36837E+00	5.71533E+00
124	61	1.56375E-01	1.96747E-01	2.59427E+00	0.	-6.36837E+00	5.71533E+00
	109	1.56375E-01	1.96747E-01	2.59427E+00	0.	-1.10804E+01	1.85567E+00
125	109	1.17966E-01	3.98048E-02	1.69463E+00	0.	-1.10804E+01	1.85567E+00
	157	1.17966E-01	3.98048E-02	1.69463E+00	0.	-1.41584E+01	9.73071E-01
126	157	8.05626E-02	1.11630E-02	8.12051E-01	0.	-1.41584E+01	9.73071E-01
	205	8.05626E-02	1.11630E-02	8.12051E-01	0.	-1.55719E+01	1.14822E+00
127	205	4.44584E-02	1.16968E-02	-3.12974E-02	0.	-1.55719E+01	1.14822E+00
	253	4.44584E-02	1.16968E-02	-3.12974E-02	0.	-1.54839E+01	8.28516E-01
128	253	1.25715E-02	3.80575E-02	-5.66835E-01	0.	-1.54839E+01	8.28516E-01
	301	1.25715E-02	3.80575E-02	-5.66835E-01	0.	-1.38911E+01	1.52068E+00
129	301	2.73717E-02	1.14942E-01	-1.10227E+00	0.	-1.38911E+01	1.52068E+00
	349	2.73717E-02	1.14942E-01	-1.10227E+00	0.	-1.07936E+01	2.76134E+00
130	349	6.02651E-02	5.10711E-02	-1.77539E+00	0.	-1.07936E+01	2.76134E+00
	397	6.02651E-02	5.10711E-02	-1.77539E+00	0.	-5.80472E+00	1.75457E+00

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BEAM STRESSES

OUTPUT CASE 1

BEAM	NODE	AXIAL	**** SHEAR **** V2/A*K3	V3/A*K2	TORSION T*C/J	**** BENDING **** M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
*****	****	*************	*************	*************	*************	*************	*************
131	397	8.42644E-02	4.75413E-02	-2.06570E+00	0.	-5.80472E+00	1.75457E+00
	445	8.42644E-02	4.75413E-02	-2.06570E+00	0.	2.20288E-12	1.41557E-12
132	14	2.22664E+00	0.	0.	0.	0.	0.
	62	2.22664E+00	0.	0.	0.	0.	0.
133	17	1.45983E-01	0.	0.	0.	0.	0.
	65	1.45983E-01	0.	0.	0.	0.	0.
134	352	1.67677E-01	1.29113E-02	1.55367E+00	0.	0.	0.
	400	1.67677E-01	1.29113E-02	1.55367E+00	0.	-1.35417E+01	7.00540E-01
135	400	7.68061E-02	1.31430E-02	-9.62397E-01	0.	-1.35417E+01	7.00540E-01
	450	7.68061E-02	1.31430E-02	-9.62397E-01	0.	0.	0.
136	19	1.02168E-01	1.06662E-01	3.50991E+00	0.	2.52831E-12	9.09503E-13
	67	1.02168E-01	1.06662E-01	3.50991E+00	0.	-6.37511E+00	4.03709E+00
137	67	2.77668E-02	1.37124E-01	2.59612E+00	0.	-6.37511E+00	4.03709E+00
	115	2.77668E-02	1.37124E-01	2.59612E+00	0.	-1.10905E+01	1.24449E+00
138	115	6.11316E-02	1.55820E-02	1.69573E+00	0.	-1.10905E+01	1.24449E+00
	163	6.11316E-02	1.55820E-02	1.69573E+00	0.	-1.41705E+01	1.09693E+00
139	163	1.04234E-01	5.07022E-03	8.13459E-01	0.	-1.41705E+01	1.09693E+00
	211	1.04234E-01	5.07022E-03	8.13459E-01	0.	-1.55864E+01	1.06033E+00
140	211	1.48080E-01	6.40916E-03	-3.14075E-02	0.	-1.55864E+01	1.06033E+00
	259	1.48080E-01	6.40916E-03	-3.14075E-02	0.	-1.54982E+01	9.22938E-01
141	259	1.92443E-01	3.43675E-02	-5.66698E-01	0.	-1.54982E+01	9.22938E-01
	307	1.92443E-01	3.43675E-02	-5.66698E-01	0.	-1.39057E+01	1.52157E+00
142	307	2.37036E-01	1.12149E-01	-1.10199E+00	0.	-1.39057E+01	1.52157E+00
	355	2.37036E-01	1.12149E-01	-1.10199E+00	0.	-1.08091E+01	2.69048E+00
143	355	1.03698E-01	8.86135E-02	-1.77745E+00	0.	-1.08091E+01	2.69048E+00
	403	1.03698E-01	8.86135E-02	-1.77745E+00	0.	-5.81436E+00	9.06588E-01
144	403	7.91911E-02	2.45646E-02	-2.06913E+00	0.	-5.81436E+00	9.06588E-01
	451	7.91911E-02	2.45646E-02	-2.06913E+00	0.	2.29182E-18	1.59961E-12
145	21	1.62000E-01	0.	0.	0.	0.	0.
	69	1.62000E-01	0.	0.	0.	0.	0.
146	23	7.73929E-01	0.	0.	0.	0.	0.
	71	7.73929E-01	0.	0.	0.	0.	0.
147	358	2.02339E-01	4.40362E-03	1.72492E+00	0.	0.	0.
	406	2.02339E-01	4.40362E-03	1.72492E+00	0.	-1.50342E+01	2.50138E-01
148	406	1.00366E-01	4.69289E-03	-1.06847E+00	0.	-1.50342E+01	2.50138E-01
	456	1.00365E-01	4.69289E-03	-1.06847E+00	0.	0.	0.
149	25	2.95499E-01	1.08679E-01	3.56490E+00	0.	-8.13559E-13	6.62726E-13
	73	2.95499E-01	1.08679E-01	3.56490E+00	0.	-6.47500E+00	4.07241E+00
150	73	1.64977E-01	1.44233E-01	2.63537E+00	0.	-6.47500E+00	4.07241E+00
	121	1.64977E-01	1.44233E-01	2.63537E+00	0.	-1.12617E+01	1.49891E+00
151	121	2.11544E-01	2.66599E-02	1.72057E+00	0.	-1.12617E+01	1.49891E+00
	169	2.11544E-01	2.66599E-02	1.72057E+00	0.	-1.43868E+01	1.13043E+00
152	169	2.57540E-01	3.82382E-03	8.24151E-01	0.	-1.43868E+01	1.13043E+00
	217	2.57540E-01	3.82382E-03	8.24151E-01	0.	-1.58213E+01	1.02940E+00
153	217	3.02791E-01	3.27792E-03	-3.34138E-02	0.	-1.58213E+01	1.02940E+00
	265	3.02791E-01	3.27792E-03	-3.34138E-02	0.	-1.57274E+01	9.83317E-01
154	265	3.48157E-01	1.67880E-02	-5.77334E-01	0.	-1.57274E+01	9.88317E-01
	313	3.48157E-01	1.67880E-02	-5.77334E-01	0.	-1.41051E+01	1.13421E+00
155	313	3.93600E-01	1.03278E-01	-1.12126E+00	0.	-1.41051E+01	1.13421E+00
	361	3.93600E-01	1.03278E-01	-1.12126E+00	0.	-1.09543E+01	2.77607E+00
156	361	4.20561E-01	1.05310E-01	-1.80117E+00	0.	-1.09543E+01	2.77607E+00
	409	4.20561E-01	1.05310E-01	-1.80117E+00	0.	-5.89293E+00	1.17826E+00

B E A M S T R E S S E S

BEAM	NODE	AXIAL	* * * * SHEAR * * * * V2/A*K3	V3/A*K2	TORSION T*C/J	* * * * BENDING * * * * M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
157	407	4.45322E-01	3.24677E-02	-2.09709E+00	0.	-5.89293E+00	1.17826E+00
	457	4.45322E-01	3.24677E-02	-2.09709E+00	0.	2.80367E-12	2.02337E-13
158	28	2.04615E+00	0.	0.	0.	0.	0.
	76	2.04615E+00	0.	0.	0.	0.	0.
159	33	1.51236E-01	0.	0.	0.	0.	0.
	79	1.51236E-01	0.	0.	0.	0.	0.
160	364	1.86355E-01	9.88280E-03	1.61055E+00	0.	0.	0.
	412	1.86355E-01	9.88280E-03	1.61055E+00	0.	-1.40374E+01	5.39563E-01
161	412	9.18040E-02	1.01228E-02	-9.97630E-01	0.	-1.40374E+01	5.39563E-01
	462	9.18040E-02	1.01228E-02	-9.97630E-01	0.	0.	0.
162	31	2.34247E-01	1.57489E-01	3.41305E+00	0.	-2.81569E-12	1.76092E-12
	77	2.34247E-01	1.57489E-01	3.41305E+00	0.	-6.19918E+00	5.93837E+00
163	77	1.30624E-01	2.14415E-01	2.51199E+00	0.	-6.19918E+00	5.93837E+00
	127	1.30624E-01	2.14415E-01	2.51199E+00	0.	-1.07617E+01	2.34454E+00
164	127	1.15364E-01	5.94240E-02	1.62094E+00	0.	-1.07617E+01	2.34454E+00
	175	1.15364E-01	5.94240E-02	1.62094E+00	0.	-1.37059E+01	1.12084E+00
165	175	1.11797E-01	9.85110E-04	7.81620E-01	0.	-1.37059E+01	1.12084E+00
	223	1.11797E-01	9.85110E-04	7.81620E-01	0.	-1.50664E+01	1.08784E+00
166	223	1.20148E-01	1.85279E-02	-2.55513E-02	0.	-1.50664E+01	1.08784E+00
	271	1.20148E-01	1.85279E-02	-2.55513E-02	0.	-1.49945E+01	9.55781E-01
167	271	1.38039E-01	8.50558E-02	-5.55289E-01	0.	-1.49946E+01	9.55781E-01
	319	1.38039E-01	8.50558E-02	-5.55289E-01	0.	-1.34342E+01	3.00763E+00
168	319	1.62342E-01	2.54546E-01	-1.06039E+00	0.	-1.34342E+01	3.00763E+00
	367	1.62342E-01	2.54546E-01	-1.06039E+00	0.	-1.04545E+01	6.52066E+00
169	367	4.99426E-02	2.51424E-01	-1.71645E+00	0.	-1.04545E+01	6.52066E+00
	415	4.99426E-02	2.51424E-01	-1.71645E+00	0.	-5.63115E+00	2.96510E+00
170	415	2.57902E-02	8.03414E-02	-2.00393E+00	0.	-5.53115E+00	2.75510E+00
	463	2.57902E-02	8.03414E-02	-2.00393E+00	0.	4.20550E-12	7.68935E-13
171	35	1.12616E-01	0.	0.	0.	0.	0.
	83	1.12616E-01	0.	0.	0.	0.	0.
172	373	8.44390E-01	1.75198E-02	1.61055E+00	0.	0.	0.
	421	8.44390E-01	1.75198E-02	1.61055E+00	0.	-1.40374E+01	9.40198E-01
173	421	1.12512E-01	1.76392E-02	-9.97630E-01	0.	-1.40374E+01	9.40198E-01
	469	1.12512E-01	1.76392E-02	-9.97630E-01	0.	0.	0.
174	37	3.05480E+00	0.	0.	0.	0.	0.
	85	3.05480E+00	0.	0.	0.	0.	0.
175	85	8.68890E+00	0.	0.	0.	0.	0.
	133	8.68890E+00	0.	0.	0.	0.	0.
176	133	5.20292E+00	0.	0.	0.	0.	0.
	181	5.20292E+00	0.	0.	0.	0.	0.
177	181	5.34682E+00	0.	0.	0.	0.	0.
	137	5.34682E+00	0.	0.	0.	0.	0.
178	187	5.32154E+00	0.	0.	0.	0.	0.
	227	5.32154E+00	0.	0.	0.	0.	0.
179	229	5.43840E+00	0.	0.	0.	0.	0.
	277	5.43840E+00	0.	0.	0.	0.	0.
180	277	2.55730E+00	0.	0.	0.	0.	0.
	325	2.55730E+00	0.	0.	0.	0.	0.
181	325	2.65672E+00	0.	0.	0.	0.	0.
	334	2.65672E+00	0.	0.	0.	0.	0.
182	334	1.19111E+00	0.	0.	0.	0.	0.
	376	1.19111E+00	0.	0.	0.	0.	0.

B E A M   S T R E S S E S

OUTPUT CASE 1

BEAM	NODE	AXIAL	* * * * SHEAR * * * * V2/A*K3	V3/A*K2	TORSION T*C/J	* * * * BENDING * * * * M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
*****	****	*************	*************	*************	*************	*************	*************
183	43	4.40413E-02	5.60729E-02	2.28968E+00	0.	0.	0.
	91	4.40413E-02	5.60729E-02	2.28968E+00	0.	-1.14887E+01	2.73356E+00
184	91	1.54972E+00	7.47916E-02	4.29306E-01	0.	-1.14887E+01	2.73356E+00
	139	1.54972E+00	7.47916E-02	4.29306E-01	0.	-1.36428E+01	9.91096E-01
185	139	1.54505E+00	2.64169E-02	-8.74064E-01	0.	-1.36428E+01	9.91096E-01
	187	1.54505E+00	2.64169E-02	-8.74064E-01	0.	-6.56260E+00	8.62758E-01
186	187	3.16793E+00	3.70345E-02	-1.72836E+00	0.	-6.56260E+00	8.62758E-01
	191	3.16793E+00	3.70345E-02	-1.72836E+00	0.	0.	0.
187	191	3.58158E+00	3.01562E-02	2.53072E+00	0.	0.	0.
	235	3.58158E+00	3.01562E-02	2.53072E+00	0.	-5.07229E+00	8.07078E-01
188	235	3.90467E+00	9.96268E-03	9.19798E-01	0.	-5.07229E+00	8.07078E-01
	283	3.90467E+00	9.96268E-03	9.19798E-01	0.	-1.03924E+01	6.11099E-01
189	283	3.92061E+00	1.72968E-02	-7.25288E-01	0.	-1.03924E+01	6.11099E-01
	331	3.92061E+00	1.72968E-02	-7.25288E-01	0.	-4.89297E+00	6.99221E-01
190	331	4.18625E+00	3.38568E-02	-1.64912E+00	0.	-4.89297E+00	6.99221E-01
	335	4.18625E+00	3.38568E-02	-1.64912E+00	0.	0.	0.
191	335	2.14651E+00	9.11744E-02	2.06975E+00	0.	0.	0.
	379	2.14651E+00	9.11744E-02	2.06975E+00	0.	-5.91720E+00	3.01456E+00
192	379	1.34452E+00	7.25580E-02	-5.65823E-02	0.	-5.91720E+00	3.01456E+00
	427	1.34452E+00	7.25580E-02	-5.65823E-02	0.	-5.41235E+00	1.29427E+00
193	427	1.35934E+00	2.45228E-02	-7.13808E-01	0.	-5.41235E+00	1.29427E+00
	475	1.35934E+00	2.45228E-02	-7.13808E-01	0.	0.	0.
194	7	6.56075E+00	0.	0.	0.	0.	0.
	49	6.56075E+00	0.	0.	0.	0.	0.
195	7	1.95444E+01	0.	0.	0.	0.	0.
	53	1.95444E+01	0.	0.	0.	0.	0.
196	10	1.88173E+01	0.	0.	0.	0.	0.
	61	1.88173E+01	0.	0.	0.	0.	0.
197	14	9.46320E+00	0.	0.	0.	0.	0.
	61	9.46320E+00	0.	0.	0.	0.	0.
198	17	8.57314E+00	0.	0.	0.	0.	0.
	62	8.57314E+00	0.	0.	0.	0.	0.
199	17	7.69404E+00	0.	0.	0.	0.	0.
	67	7.69404E+00	0.	0.	0.	0.	0.
200	21	4.04146E+00	0.	0.	0.	0.	0.
	67	4.04146E+00	0.	0.	0.	0.	0.
201	21	3.45430E+00	0.	0.	0.	0.	0.
	71	3.45430E+00	0.	0.	0.	0.	0.
202	23	3.24380E+00	0.	0.	0.	0.	0.
	73	3.24380E+00	0.	0.	0.	0.	0.
203	23	8.44292E+00	0.	0.	0.	0.	0.
	73	8.44292E+00	0.	0.	0.	0.	0.
204	30	9.24425E+00	0.	0.	0.	0.	0.
	75	9.24425E+00	0.	0.	0.	0.	0.
205	30	9.91867E+00	0.	0.	0.	0.	0.
	77	9.91867E+00	0.	0.	0.	0.	0.
206	35	2.56456E+01	0.	0.	0.	0.	0.
	77	2.56456E+01	0.	0.	0.	0.	0.
207	35	2.57027E+01	0.	0.	0.	0.	0.
	35	2.57027E+01	0.	0.	0.	0.	0.
208	37	8.12533E+00	0.	0.	0.	0.	0.
	41	8.12533E+00	0.	0.	0.	0.	0.

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BEAM STRESSES

OUTPUT CASE 1

BEAM	NODE	AXIAL	* * * * SHEAR V2/A*K3	* * * * V3/A*K2	TORSION T*C/J	* * * * BENDING M2*C3/I2 (POINT C)	* * * * M3*C2/I3 (POINT B)
*****	****	*************	*************	*************	*************	*************	*************
209	49	8.98367E+00	0.	0.	0.	0.	0.
	103	8.98367E+00	0.	0.	0.	0.	0.
210	97	7.66561E+00	0.	0.	0.	0.	0.
	151	7.66561E+00	0.	0.	0.	0.	0.
211	151	3.39165E+00	0.	0.	0.	0.	0.
	193	3.39165E+00	0.	0.	0.	0.	0.
212	247	5.89029E+00	0.	0.	0.	0.	0.
	289	5.89029E+00	0.	0.	0.	0.	0.
213	193	1.12351E+00	0.	0.	0.	0.	0.
	247	1.12351E+00	0.	0.	0.	0.	0.
214	289	7.38063E+00	0.	0.	0.	0.	0.
	333	7.38063E+00	0.	0.	0.	0.	0.
215	333	8.36890E+00	0.	0.	0.	0.	0.
	337	8.36890E+00	0.	0.	0.	0.	0.
216	337	1.56865E+01	0.	0.	0.	0.	0.
	391	1.56865E+01	0.	0.	0.	0.	0.
217	391	1.61494E+01	0.	0.	0.	0.	0.
	445	1.61494E+01	0.	0.	0.	0.	0.
218	355	1.12746E+01	0.	0.	0.	0.	0.
	400	1.12746E+01	0.	0.	0.	0.	0.
219	403	1.23271E+01	0.	0.	0.	0.	0.
	445	1.23271E+01	0.	0.	0.	0.	0.
220	355	3.65147E+00	0.	0.	0.	0.	0.
	405	3.65147E+00	0.	0.	0.	0.	0.
221	405	2.98254E+00	0.	0.	0.	0.	0.
	457	2.98254E+00	0.	0.	0.	0.	0.
222	367	1.37858E+01	0.	0.	0.	0.	0.
	412	1.37858E+01	0.	0.	0.	0.	0.
223	412	1.26492E+01	0.	0.	0.	0.	0.
	457	1.26492E+01	0.	0.	0.	0.	0.
224	367	1.92616E+01	0.	0.	0.	0.	0.
	421	1.92616E+01	0.	0.	0.	0.	0.
225	421	1.81275E+01	0.	0.	0.	0.	0.
	475	1.81275E+01	0.	0.	0.	0.	0.
226	91	1.09274E+01	0.	0.	0.	0.	0.
	133	1.09274E+01	0.	0.	0.	0.	0.
227	187	3.15922E+00	0.	0.	0.	0.	0.
	199	3.15922E+00	0.	0.	0.	0.	0.
228	133	8.43713E+00	0.	0.	0.	0.	0.
	187	8.43713E+00	0.	0.	0.	0.	0.
229	189	2.78437E+00	0.	0.	0.	0.	0.
	235	2.78437E+00	0.	0.	0.	0.	0.
230	235	2.10897E+00	0.	0.	0.	0.	0.
	277	2.10897E+00	0.	0.	0.	0.	0.
231	331	7.16133E+00	0.	0.	0.	0.	0.
	334	7.16133E+00	0.	0.	0.	0.	0.
232	277	6.78932E+00	0.	0.	0.	0.	0.
	331	6.78932E+00	0.	0.	0.	0.	0.
233	134	8.08101E+00	0.	0.	0.	0.	0.
	179	8.08101E+00	0.	0.	0.	0.	0.
234	1	-4.55215E-01	2.27432E-01	2.85126E-01	0.	5.30046E+00	5.44576E+00
	5	-4.55215E-01	2.27432E-01	2.85126E-01	0.		

BEAM STRESSES

OUTPUT CASE 1

BEAM	NODE	AXIAL	**** SHEAR V2/A*K3	**** V3/A*K2	TORSION T*C/J	**** BENDING M2*C3/I2 (POINT C)	**** M3*C2/I3 (POINT B)
235	8	-5.32514E-01	2.24539E+00	3.21666E-01	0.	5.00046E+00	5.44576E+00
	15	-5.32514E-01	2.24539E+00	3.21666E-01	0.	7.26953E+00	1.64000E+01
236	15	-5.56427E+00	7.38532E-01	3.26819E-01	0.	2.57615E+00	9.79478E+00
	22	-5.56427E+00	7.38532E-01	3.26819E-01	0.	0.	0.
237	13	-1.78873E+00	1.00746E-01	1.03182E-01	0.	0.	0.
	20	-1.78873E+00	1.00746E-01	1.03182E-01	0.	8.37787E-01	2.01803E+00
238	20	-1.88414E+00	2.02440E-02	1.21812E-01	0.	8.37787E-01	2.01803E+00
	27	-1.88414E+00	2.02440E-02	1.21812E-01	0.	1.24413E+00	2.45776E+00
239	27	-2.45065E+00	2.22123E-01	1.82008E-01	0.	1.24413E+00	2.45776E+00
	34	-2.45065E+00	2.22123E-01	1.82008E-01	0.	0.	0.
240	19	-1.79132E+00	5.34611E-02	3.80015E-01	0.	0.	0.
	26	-1.79142E+00	5.34611E-02	3.80015E-01	0.	4.57800E+00	1.33063E+00
241	25	-2.58455E+00	1.99860E-01	4.77752E-02	0.	4.57800E+00	1.33063E+00
	31	-2.58455E+00	1.99860E-01	4.77752E-02	0.	4.64150E+00	3.07262E+00
242	33	-3.14822E+00	2.79499E-01	5.79021E-01	0.	4.64150E+00	3.07262E+00
	40	-3.14822E+00	2.79499E-01	5.79021E-01	0.	0.	0.
243	25	-1.48569E+00	9.26321E-02	9.20735E-01	0.	0.	0.
	32	-1.48559E+00	9.26321E-02	9.20735E-01	0.	1.20012E+01	1.28014E+00
244	32	-2.13656E+00	7.40036E-01	5.26171E-01	0.	1.20012E+01	1.28014E+00
	39	-2.13535E+00	7.40036E-01	5.26171E-01	0.	1.52913E+01	4.97142E+00
245	39	-5.89870E+00	5.35719E-01	2.15386E+00	0.	1.52913E+01	4.97142E+00
	46	-5.89870E+00	5.35719E-01	2.15386E+00	0.	0.	0.
246	31	-1.63011E+00	5.58972E-02	8.32569E-01	0.	0.	0.
	38	-1.63011E+00	5.58972E-02	8.32569E-01	0.	1.09431E+01	9.70878E-01
247	39	-1.10324E+00	6.46662E-01	7.88374E-01	0.	1.09431E+01	9.70874E-01
	45	-1.10324E+00	6.46662E-01	7.88374E-01	0.	1.51831E+01	4.35981E+00
248	45	-4.50973E+00	5.46493E-01	2.18596E+00	0.	1.51831E+01	4.35881E+00
	52	-4.50973E+00	5.46493E-01	2.18596E+00	0.	0.	0.
249	43	-5.96670E-01	1.27586E-02	5.14776E-02	0.	0.	0.
	50	-5.96670E-01	1.27586E-02	5.14776E-02	0.	9.27703E-01	2.26736E-01
250	50	1.35551E+00	-2.00951E-03	1.14422E-01	0.	9.27703E-01	2.26736E-01
	57	1.35551E+00	-2.00951E-03	1.14422E-01	0.	1.22880E+00	2.46350E-01
251	57	1.26995E+00	5.41121E-02	5.54196E-02	0.	1.22880E+00	2.46350E-01
	64	1.26995E+00	5.41121E-02	5.54196E-02	0.	5.07090E-01	1.61405E+00
252	64	1.00366E+00	3.74303E-02	2.83690E-02	0.	3.69009E-01	9.25856E-01
	72	1.00366E+00	3.74303E-02	2.83690E-02	0.	1.80024E-13	8.10592E-15
[illegible]	4	2.74167E-01	0.	0.	0.	0.	0.
	20	2.74157E-01	0.	0.	0.	0.	0.
[illegible]	20	2.41457E-01	0.	0.	0.	0.	0.
	26	2.41457E-01	0.	0.	0.	0.	0.
261	25	1.30946E-01	0.	0.	0.	0.	0.
	32	1.30946E-01	0.	0.	0.	0.	0.
262	32	2.74059E-01	0.	0.	0.	0.	0.
	39	2.74059E-01	0.	0.	0.	0.	0.
263	35	4.25047E+00	8.37705E-03	1.60911E-02	0.	0.	0.
	45	4.25047E+00	8.37705E-03	1.60911E-02	0.	8.74498E-01	8.27654E-01
264	44	[illegible]	5.59017E-02	1.60911E-02	0.	8.74498E-01	8.27654E-01
	50	[illegible]	5.59017E-02	1.60911E-02	0.	0.	0.
265	3	2.74157E-01	0.	0.	0.	0.	0.
	20	2.74157E-01	0.	0.	0.	0.	0.
[illegible]	[illegible]	2.41457E-01	0.	0.	0.	0.	0.
	[illegible]	2.41457E-01	0.	0.	0.	0.	0.

B E A M   S T R E S S E S

OUTPUT CASE 1

BEAM	NODE	AXIAL	* * * * SHEAR * * * * V2/A*K3	V3/A*K2	TORSION .T*C/J	* * * * BENDING * * * * M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
****	****	*************	*************	*************	*************	*************	*************
267	25	2.05882E-01	3.19391E+00	3.50234E-01	0.	0.	0.
	42	2.05882E-01	3.19391E+00	3.50234E-01	0.	1.65604E+01	-1.13665E-01
[illegible]	42	2.02204E-01	-1.97841E+00	3.50234E-01	0.	1.65604E+01	-1.13665E-01
	32	2.02204E-01	-1.97841E+00	3.50234E-01	0.	0.	0.
[illegible]	32	2.74058E-01	0.	0.	0.	0.	0.
	38	2.74058E-01	0.	0.	0.	0.	0.
270	38	2.35256E-01	0.	0.	0.	0.	0.
	50	2.35256E-01	0.	0.	0.	0.	0.
272	145	-1.33967E+00	0.	0.	0.	0.	0.
	146	-1.33967E+00	0.	0.	0.	0.	0.
274	191	-1.02524E+00	5.48793E-02	5.04709E-02	0.	0.	0.
	192	-1.02524E+00	5.48793E-02	5.04709E-02	0.	1.06422E+00	2.55339E+00
275	192	-1.13210E+00	3.93171E-02	4.49487E-02	0.	1.06422E+00	2.55339E+00
	197	-1.13210E+00	3.93171E-02	4.49487E-02	0.	5.11332E-13	2.65033E-13
276	332	1.16455E+00	1.09516E-02	2.70886E-02	0.	0.	0.
	350	1.16455E+00	1.09516E-02	2.70886E-02	0.	3.76651E-01	4.05352E-01
277	350	3.39237E+00	5.67339E-03	1.48974E-02	0.	3.76651E-01	4.05352E-01
	354	3.39237E+00	5.67339E-03	1.48974E-02	0.	2.25234E-13	1.04000E-14
278	335	2.73202E+00	1.38385E-02	3.13343E-02	0.	0.	.0.
	336	2.73202E+00	1.38385E-02	3.13343E-02	0.	5.32762E-01	6.21624E-01
279	336	5.51091E+00	9.53443E-03	2.25018E-02	0.	5.32762E-01	6.21624E-01
	344	5.51091E+00	9.53443E-03	2.25018E-02	0.	1.33225E-13	1.07958E-13
[illegible]	15	1.32910E-01	4.56717E-04	3.73435E-02	0.	-5.79926E-01	-8.33672E-16
	196	1.32910E-01	4.56717E-04	3.73435E-02	0.	1.38120E+00	1.46214E-01
281	350	1.71036E+00	1.02278E-02	2.10967E-02	0.	0.	0.
	351	1.71036E+00	1.02278E-02	2.10967E-02	0.	7.45945E-01	7.45755E-01
282	351	1.81144E+00	1.02278E-02	8.27842E-02	0.	7.45945E-01	7.45755E-01
	434	1.81144E+00	1.02278E-02	8.27842E-02	0.	0.	0.
283	57	6.84617E-02	0.	0.	0.	0.	0.
	172	6.84617E-02	0.	0.	0.	0.	0.
[illegible]	172	2.75234E-01	0.	0.	0.	0.	0.
	335	2.75234E-01	0.	0.	0.	0.	0.
285	335	2.23027E+00	1.04033E-02	4.77175E-02	0.	0.	0.
	334	2.23027E+00	1.04033E-02	4.77175E-02	0.	-1.30378E-01	7.10419E-01
[illegible]	334	2.24943E+00	9.73010E-03	-1.11399E-02	0.	-1.30378E-01	7.10419E-01
	477	2.24943E+00	9.73010E-03	-1.11399E-02	0.	0.	0.
287	433	2.21915E+00	4.67527E-02	3.50054E-02	0.	0.	0.
	434	2.21915E+00	4.67527E-02	3.50054E-02	0.	4.53514E-01	1.92114E+00
[illegible]	434	4.47370E+00	5.77252E-02	2.34071E-02	0.	4.53514E-01	1.92114E+00
	435	4.47370E+00	5.77252E-02	2.34071E-02	0.	5.50278E-02	5.12123E-01
[illegible]	435	4.41425E+00	1.43727E-02	5.15089E-03	0.	5.50278E-02	5.12123E-01
	435	4.41425E+00	1.43727E-02	5.15089E-03	0.	1.34645E-13	1.73344E-13
[illegible]	445	-1.73557E+00	2.17344E-01	3.57123E-02	0.	0.	0.
	445	-1.73557E+00	2.17344E-01	3.57123E-02	0.	4.59375E-01	3.27557E+00
[illegible]	445	-1.83511E+00	2.33131E-01	1.00167E-02	0.	4.59345E-01	3.27557E+00
	447	-1.83511E+00	2.33131E-01	1.00167E-02	0.	3.45951E-01	7.33127E-01
[illegible]	447	-1.49002E+00	5.53240E-02	2.98847E-02	0.	3.45951E-01	7.33127E-01
	449	-1.49002E+00	5.53240E-02	2.98847E-02	0.	4.20763E-13	1.72170E-13
[illegible]	451	-1.73572E+00	1.37737E-01	2.33019E-01	0.	0.	0.
	[illegible]	-1.73572E+00	1.37737E-01	2.33019E-01	0.	1.36276E+00	2.10740E+00
[illegible]	[illegible]	[illegible]	1.45970E-01	1.14501E-01	0.	1.36276E+00	2.10740E+00
	451	[illegible]	1.45970E-01	1.14501E-01	0.	1.50235E+00	6.10970E-01

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B E A M   S T R E S S E S

OUTPUT CASE 1

BEAM	NODE	AXIAL	* * * * SHEAR * * * * V2/A*K3	V3/A*K2	TORSION T*C/J	* * * * BENDING * * * * M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
*****	****	*************	*************	*************	*************	*************	*************
295	453	-2.55242E+00	4.58557E-02	1.38417E-01	0.	1.60235E+00	6.10970E-01
	454	-2.55242E+00	4.58557E-02	1.38417E-01	0.	2.10782E-13	7.67198E-14
296	457	-1.76383E+00	5.45631E-02	2.33444E-01	0.	0.	0.
	458	-1.76383E+00	5.45631E-02	2.33444E-01	0.	3.06834E+00	8.78681E-01
297	458	-2.53854E+00	9.20783E-02	1.18670E-01	0.	3.06834E+00	8.78681E-01
	459	-2.53854E+00	9.20783E-02	1.18670E-01	0.	1.60587E+00	5.61219E-01
298	459	-2.58266E+00	4.21216E-02	1.38722E-01	0.	1.60587E+00	5.61219E-01
	460	-2.58266E+00	4.21216E-02	1.38722E-01	0.	5.26962E-13	1.52057E-13
299	463	-1.60009E+00	1.47826E-02	3.77180E-02	0.	0.	0.
	464	-1.60009E+00	1.47826E-02	3.77180E-02	0.	4.95757E-01	2.98403E-01
300	464	4.62095E-01	8.75795E-02	1.00324E-02	0.	4.95757E-01	2.98403E-01
	465	4.62095E-01	8.75795E-02	1.00324E-02	0.	3.72120E-01	6.88133E-01
301	465	4.12674E-01	5.16471E-02	3.21453E-02	0.	3.72120E-01	6.88133E-01
	465	4.12674E-01	5.16471E-02	3.21453E-02	0.	1.97514E-14	3.02904E-13
302	475	3.78954E+00	6.75568E-03	5.20885E-02	0.	0.	0.
	476	3.78954E+00	6.75568E-03	5.20885E-02	0.	8.05465E-01	2.64373E-01
303	475	6.19128E+00	3.32102E-02	1.04994E-01	0.	8.05465E-01	2.64373E-01
	477	6.19128E+00	3.32102E-02	1.04994E-01	0.	1.08446E+00	3.67945E-01
304	477	8.27221E+00	2.82769E-02	5.97081E-02	0.	1.08446E+00	3.67945E-01
	478	8.27221E+00	2.82769E-02	5.97081E-02	0.	4.26436E-01	4.79265E-01
305	478	8.22856E+00	1.39374E-02	3.32666E-02	0.	4.26436E-01	4.79265E-01
	479	8.22856E+00	1.39374E-02	3.32666E-02	0.	3.63700E-14	1.73519E-14
312	434	1.78543E-02	0.	0.	0.	0.	0.
	445	1.78543E-02	0.	0.	0.	0.	0.
313	454	3.53264E-01	0.	0.	0.	0.	0.
	476	3.53264E-01	0.	0.	0.	0.	0.
314	446	9.66275E-02	0.	0.	0.	0.	0.
	452	9.66275E-02	0.	0.	0.	0.	0.
315	452	2.34950E-01	0.	0.	0.	0.	0.
	458	2.34950E-01	0.	0.	0.	0.	0.
316	458	3.68262E-01	0.	0.	0.	0.	0.
	464	3.68262E-01	0.	0.	0.	0.	0.
317	434	1.78543E-02	0.	0.	0.	0.	0.
	445	1.78543E-02	0.	0.	0.	0.	0.
318	445	9.66275E-02	0.	0.	0.	0.	0.
	452	9.66275E-02	0.	0.	0.	0.	0.
319	452	1.35857E-01	3.19391E+00	3.50234E-01	0.	0.	0.
	455	1.35857E-01	3.19391E+00	3.50234E-01	0.	1.65604E+01	-1.13665E-01
320	455	3.81325E-01	-1.97841E+00	3.50234E-01	0.	1.65604E+01	-1.13665E-01
	458	3.81325E-01	-1.97841E+00	3.50234E-01	0.	0.	0.
321	453	3.68262E-01	0.	0.	0.	0.	0.
	464	3.68262E-01	0.	0.	0.	0.	0.
322	464	3.53264E-01	0.	0.	0.	0.	0.
	475	3.53264E-01	0.	0.	0.	0.	0.
323	435	3.38220E-02	0.	0.	0.	0.	0.
	447	3.38220E-02	0.	0.	0.	0.	0.
324	447	2.65661E-01	0.	0.	0.	0.	0.
	453	2.65661E-01	0.	0.	0.	0.	0.
325	453	4.30710E-01	0.	0.	0.	0.	0.
	457	4.30710E-01	0.	0.	0.	0.	0.
326	454	5.36035E-01	0.	0.	0.	0.	0.
	465	5.36035E-01	0.	0.	0.	0.	0.

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OUTPUT CASE - 1

B E A M S T R E S S E S

BEAM	NODE	AXIAL	* * * * SHEAR * * * * V2/A*K3	V3/A*K2	TORSION T*C/J	* * * * BENDING * * * * M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
*****	****	*************	*************	*************	*************	*************	*************
127	465	6.41807E-01	3.03274E-03	2.21134E-02	0.	0.	0.
	467	6.41807E-01	3.03274E-03	2.21134E-02	0.	1.22928E+00	6.22700E-03
128	467	2.70340E-02	4.95816E-04	2.21134E-02	0.	1.22928E+00	6.22700E-03
	478	2.70340E-02	4.95816E-04	2.21134E-02	0.	0.	0.
129	36	1.01154E+01	0.	0.	0.	0.	0.
	39	1.01154E+01	0.	0.	0.	0.	0.
130	44	1.39670E+01	0.	0.	0.	0.	0.
	52	1.39670E+01	0.	0.	0.	0.	0.
131	35	1.01898E+01	0.	0.	0.	0.	0.
	50	1.01898E+01	0.	0.	0.	0.	0.
132	44	1.31016E+01	0.	0.	0.	0.	0.
	64	1.31016E+01	0.	0.	0.	0.	0.
133	332	1.41204E+01	0.	0.	0.	0.	0.
	351	1.41204E+01	0.	0.	0.	0.	0.
134	351	1.38858E+01	0.	0.	0.	0.	0.
	433	1.38858E+01	0.	0.	0.	0.	0.
135	350	1.32165E+01	0.	0.	0.	0.	0.
	353	1.32165E+01	0.	0.	0.	0.	0.
136	353	1.31618E+01	0.	0.	0.	0.	0.
	435	1.31618E+01	0.	0.	0.	0.	0.
137	434	1.27231E+01	0.	0.	0.	0.	0.
	353	1.27231E+01	0.	0.	0.	0.	0.
138	353	1.26685E+01	0.	0.	0.	0.	0.
	354	1.26685E+01	0.	0.	0.	0.	0.
139	335	1.81931E+01	0.	0.	0.	0.	0.
	338	1.81931E+01	0.	0.	0.	0.	0.
140	338	1.83147E+01	0.	0.	0.	0.	0.
	475	1.83147E+01	0.	0.	0.	0.	0.
141	335	1.53440E+01	0.	0.	0.	0.	0.
	337	1.53440E+01	0.	0.	0.	0.	0.
142	337	1.52873E+01	0.	0.	0.	0.	0.
	477	1.52873E+01	0.	0.	0.	0.	0.
143	477	1.51398E+01	0.	0.	0.	0.	0.
	333	1.51398E+01	0.	0.	0.	0.	0.
144	337	1.50830E+01	0.	0.	0.	0.	0.
	344	1.50830E+01	0.	0.	0.	0.	0.
145	464	1.09742E+01	0.	0.	0.	0.	0.
	469	1.09742E+01	0.	0.	0.	0.	0.
146	463	1.09532E+01	0.	0.	0.	0.	0.
	475	1.09532E+01	0.	0.	0.	0.	0.
147	464	1.42442E+01	0.	0.	0.	0.	0.
	467	1.42442E+01	0.	0.	0.	0.	0.
148	467	1.43929E+01	0.	0.	0.	0.	0.
	477	1.43929E+01	0.	0.	0.	0.	0.
149	475	1.30050E+01	0.	0.	0.	0.	0.
	467	1.30050E+01	0.	0.	0.	0.	0.
150	467	1.27559E+01	0.	0.	0.	0.	0.
	466	1.27559E+01	0.	0.	0.	0.	0.
151	15	1.50047E-01	1.11410E-02	-3.33381E-01	0.	0.	0.
	45	1.50047E-01	1.11410E-02	-3.33381E-01	0.	4.54915E-01	1.25177E-01
152	35	2.19535E-01	4.43866E-03	8.72972E-01	0.	1.35938E+00	1.25197E-01
	116	2.19535E-01	4.43866E-03	8.72972E-01	0.	-1.38463E+00	9.63864E-02

B E A M   S T R E S S E S

OUTPUT CASE 1

BEAM	NODE	AXIAL	* * * * SHEAR * * * * V2/A*K3	V3/A*K2	TORSION T*C/J	* * * * BENDING * * * * M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
*****	****	*************	*************	*************	*************	*************	*************
153	116	2.18006E-01	4.08862E-03	5.12675E-02	0.	-1.39128E+00	9.60864E-02
	140	2.18006E-01	4.08862E-03	5.12675E-02	0.	-1.52700E+00	1.43589E-01
154	140	1.38743E-01	2.93053E-03	-3.74507E-01	0.	-1.51859E+00	1.43589E-01
	168	1.38743E-01	2.93053E-03	-3.74507E-01	0.	-6.65755E-02	1.25511E-02
155	88	1.67593E-01	0.	0.	0.	0.	0.
	118	1.67593E-01	0.	0.	0.	0.	0.
156	142	1.69169E-01	0.	0.	0.	0.	0.
	170	1.69169E-01	0.	0.	0.	0.	0.
157	90	8.79687E-02	0.	0.	0.	0.	0.
	120	8.79687E-02	0.	0.	0.	0.	0.
158	144	8.82819E-02	0.	0.	0.	0.	0.
	172	8.82819E-02	0.	0.	0.	0.	0.
159	27	2.25166E-01	2.86273E-02	3.83557E+00	0.	-2.75147E+00	3.08391E+00
	92	2.25166E-01	2.86273E-02	3.83557E+00	0.	-2.75147E+00	3.08391E+00
160	92	2.99510E-01	1.32137E-01	2.42222E+00	0.	-1.22117E+01	2.74309E+00
	122	2.99510E-01	1.32137E-01	2.42222E+00	0.	-1.22117E+01	2.74309E+00
161	122	3.23254E-01	1.05304E-01	-1.44909E-01	0.	-1.12980E+01	3.43282E+00
	147	3.23254E-01	1.05304E-01	-1.44909E-01	0.	-1.12980E+01	3.43282E+00
162	147	3.65037E-01	6.93062E-02	-1.79188E+00	0.	-1.38803E-12	1.69054E-01
	174	3.65037E-01	6.93062E-02	-1.79188E+00	0.	0.	0.
163	94	8.24378E-02	0.	0.	0.	0.	0.
	124	8.24378E-02	0.	0.	0.	0.	0.
164	95	1.46588E-01	0.	0.	0.	0.	0.
	126	1.46588E-01	0.	0.	0.	0.	0.
165	148	1.40199E-01	0.	0.	0.	0.	0.
	176	1.40199E-01	0.	0.	0.	0.	0.
166	33	5.66102E-01	3.49557E-01	3.81583E+00	0.	-2.73731E+00	5.64584E+00
	93	5.66102E-01	3.49557E-01	3.81583E+00	0.	-2.73731E+00	5.64584E+00
167	93	4.19667E-01	2.02452E-01	2.40999E+00	0.	-1.21498E+01	4.11839E+00
	128	4.19667E-01	2.02452E-01	2.40999E+00	0.	-1.21498E+01	4.11839E+00
168	128	3.50027E-01	1.50180E-01	-1.45685E-01	0.	-1.12312E+01	4.35753E+00
	150	3.50027E-01	1.50180E-01	-1.45685E-01	0.	-1.12312E+01	4.35763E+00
169	150	3.14300E-01	8.38228E-02	-1.78128E+00	0.	0.	0.
	178	3.14300E-01	8.38228E-02	-1.78128E+00	0.	0.	0.
170	100	1.78921E+00	0.	0.	0.	0.	0.
	130	1.78921E+00	0.	0.	0.	0.	0.
171	152	9.44147E-02	0.	0.	0.	0.	0.
	180	9.44147E-02	0.	0.	0.	0.	0.
172	102	8.33403E-02	0.	0.	0.	0.	0.
	132	8.33403E-02	0.	0.	0.	0.	0.
173	154	1.79017E-01	0.	0.	0.	0.	0.
	182	1.79017E-01	0.	0.	0.	0.	0.
174	37	7.59544E-01	3.04429E-01	8.92715E+00	0.	-3.07838E+00	3.02490E+00
	105	7.59544E-01	3.04429E-01	8.92715E+00	0.	-3.07838E+00	3.02490E+00
175	106	7.10243E-01	1.38501E-01	5.75820E+00	0.	-1.38890E+01	4.47211E+00
	136	7.10243E-01	1.38501E-01	5.75820E+00	0.	-1.38890E+01	4.47211E+00
176	136	3.94624E-01	2.37666E-01	-3.37506E-01	0.	-1.28661E+01	5.34185E+00
	158	3.94624E-01	2.37666E-01	-3.37506E-01	0.	-1.28661E+01	5.34185E+00
177	158	1.61577E-01	1.39085E-01	-4.24499E+00	0.	-7.89700E-13	2.74957E-12
	186	1.61577E-01	1.39085E-01	-4.24499E+00	0.	0.	0.
178	43	4.74405E-01	3.83507E-01	-5.20147E+00	0.	4.53264E+00	2.15427E+00
	113	4.74405E-01	3.83507E-01	-5.20147E+00	0.		

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BEAM STRESSES — OUTPUT CASE 1

BEAM	NODE	AXIAL	**** SHEAR **** V2/A*K3	V3/A*K2	TORSION T*C/J	**** BENDING **** M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
*****	****	*************	*************	*************	*************	*************	*************
379	110	7.45357E-01	1.32246E-01	-3.35885E+00	0.	4.53264E+00	2.16427E+00
	138	7.45357E-01	1.32246E-01	-3.35885E+00	0.	2.04683E+01	4.7 286E+00
380	138	4.48015E-01	2.30246E-01	5.11827E-01	0.	2.04683E+01	4.73286E+00
	162	4.48016E-01	2.30246E-01	5.11827E-01	0.	1.89641E+01	4.46659E+00
381	162	1.50332E-01	1.05766E-01	6.45297E+00	0.	1.89641E+01	4.46659E+00
	188	1.50332E-01	1.05766E-01	6.45297E+00	0.	6.73661E-13	1.20710E-12
382	86	7.03380E+00	3.22581E-03	1.22753E+00	0.	0.	0.
	88	7.03380E+00	3.22581E-03	1.22753E+00	0.	-5.15464E+00	3.56348E-01
383	88	4.65688E+00	8.04510E-03	-5.08973E-03	0.	-5.15464E+00	3.56348E-01
	90	4.65688E+00	8.04510E-03	-5.08973E-03	0.	-5.11336E+00	3.39193E-01
384	90	4.60713E+00	3.96630E-03	-7.54281E-01	0.	-5.11336E+00	3.39193E-01
	92	4.60713E+00	3.96630E-03	-7.54281E-01	0.	0.	0.
385	92	3.15643E+00	4.45273E-03	1.11212E+00	0.	0.	0.
	94	3.15643E+00	4.45273E-03	1.11212E+00	0.	-4.24059E+00	3.21291E-01
386	94	3.10454E+00	1.03228E-02	1.25262E-02	0.	-4.24059E+00	3.21291E-01
	96	3.10454E+00	1.03228E-02	1.25262E-02	0.	-4.28835E+00	4.71773E-01
387	96	1.72242E+00	5.07524E-03	-5.96641E-01	0.	-4.28835E+00	4.71773E-01
	98	1.72242E+00	5.07524E-03	-5.96641E-01	0.	0.	0.
388	98	1.37764E+00	4.23875E-03	1.18330E+00	0.	0.	0.
	100	1.37764E+00	4.23875E-03	1.18330E+00	0.	-5.02605E+00	3.28822E-01
389	100	1.17675E+00	9.20041E-03	-3.88579E-02	0.	-5.02605E+00	3.28822E-01
	102	1.17675E+00	9.20041E-03	-3.88579E-02	0.	-4.75960E+00	4.55605E-01
390	102	1.15352E+00	2.34811E-02	-5.94994E-01	0.	-4.75960E+00	4.55605E-01
	104	1.15352E+00	2.34811E-02	-5.94994E-01	0.	-2.90510E+00	5.72247E-01
391	104	1.14615E+00	1.21283E-02	-7.76723E-01	0.	-2.90510E+00	5.72247E-01
	106	1.14615E+00	1.21283E-02	-7.76723E-01	0.	0.	0.
392	106	3.15047E-01	4.62684E-01	3.34813E+00	0.	0.	0.
	108	3.15047E-01	4.62684E-01	3.34813E+00	0.	-1.91549E+01	3.46263E+01
393	108	3.09627E-01	4.62684E-01	-2.07394E+00	0.	-1.91549E+01	3.46263E+01
	110	3.09627E-01	4.62684E-01	-2.07394E+00	0.	0.	0.
394	116	4.00496E+00	3.08754E-03	2.30184E+00	0.	0.	0.
	118	4.00495E+00	3.08754E-03	2.30184E+00	0.	-9.66591E+00	3.46682E-01
395	118	3.93844E+00	7.81334E-03	9.83114E-03	0.	-9.66591E+00	3.46682E-01
	120	3.93844E+00	7.81334E-03	9.83114E-03	0.	-9.70719E+00	3.24315E-01
396	120	3.23260E+00	3.79232E-03	-1.43193E+00	0.	-9.70719E+00	3.24315E-01
	122	3.23260E+00	3.79232E-03	-1.43193E+00	0.	0.	0.
397	122	3.11995E+00	4.26287E-03	2.09565E+00	0.	0.	0.
	124	3.11995E+00	4.26287E-03	2.09565E+00	0.	-7.99088E+00	3.01063E-01
398	124	3.47013E+00	1.02749E-02	-1.14040E-02	0.	-7.99088E+00	3.01063E-01
	126	3.47013E+00	1.02749E-02	-1.14040E-02	0.	-7.91980E+00	4.92047E-01
399	126	3.36218E+00	6.41755E-03	-1.30306E+00	0.	-7.91980E+00	4.92047E-01
	128	3.36218E+00	6.41755E-03	-1.30306E+00	0.	0.	0.
400	128	3.56421E+00	2.45532E-03	2.23901E+00	0.	0.	0.
	130	3.56421E+00	2.45532E-03	2.23901E+00	0.	-9.51015E+00	2.00363E-01
401	130	4.38131E+00	9.28845E-03	-6.46530E-02	0.	-9.51015E+00	2.00363E-01
	132	4.38131E+00	9.28845E-03	-6.46530E-02	0.	-9.06682E+00	5.75461E-01
402	132	6.44813E+00	4.16318E-02	-1.13909E+00	0.	-9.06682E+00	5.75461E-01
	134	6.44813E+00	4.16318E-02	-1.13909E+00	0.	-5.51645E+00	1.08372E+00
403	134	6.42241E+00	2.29685E-02	-1.47491E+00	0.	-5.51645E+00	1.08372E+00
	136	6.42241E+00	2.29685E-02	-1.47491E+00	0.	0.	0.
404	136	6.53172E-01	4.03384E-01	3.65476E+00	0.	0.	0.
	114	6.53172E-01	4.03384E-01	3.65476E+00	0.	-1.10121E+01	2.70114E+01

BEAM STRESSES

OUTPUT CASE 1

BEAM	NODE	AXIAL	**** SHEAR **** V2/A*K3	V3/A*K2	TORSION T*C/J	**** BENDING **** M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
405	114	3.21329E-01	4.03388E-01	-2.26388E+00	0.	-1.10121E+01	2.70114E+01
	139	3.21329E-01	4.03388E-01	-2.26388E+00	0.	0.	0.
406	140	7.31883E+00	5.30668E-03	2.30881E+00	0.	0.	0.
	142	7.31883E+00	5.30668E-03	2.30881E+00	0.	-9.69518E+00	5.09081E-01
407	142	7.24171E+00	7.50357E-03	1.62487E-02	0.	-9.69518E+00	5.09081E-01
	144	7.24171E+00	7.50357E-03	1.62487E-02	0.	-9.76341E+00	1.75207E-01
408	144	3.81534E+00	2.29432E-03	-1.44022E+00	0.	-9.76341E+00	1.96207E-01
	147	3.81534E+00	2.29432E-03	-1.44022E+00	0.	0.	0.
409	147	3.83050E+00	9.70932E-04	1.34973E+00	0.	0.	0.
	148	3.83050E+00	9.70932E-04	1.34973E+00	0.	-8.85999E+00	1.27210E-01
410	148	2.91000E+00	1.28132E-03	-1.12579E+00	0.	-8.85999E+00	1.27210E-01
	150	2.91000E+00	1.28132E-03	-1.12579E+00	0.	0.	0.
411	150	2.87668E+00	5.52689E-03	2.57557E+00	0.	0.	0.
	152	2.87668E+00	5.52689E-03	2.57557E+00	0.	-7.83180E+00	3.52179E-01
412	152	4.09771E+00	1.06971E-02	3.71536E-01	0.	-7.83180E+00	3.52179E-01
	154	4.09771E+00	1.06971E-02	3.71536E-01	0.	-9.63406E+00	7.13211E-01
413	154	3.99996E+00	4.67056E-02	-1.02108E+00	0.	-9.63406E+00	7.13211E-01
	156	3.99996E+00	4.67056E-02	-1.02108E+00	0.	-5.45695E+00	1.79737E+00
414	156	3.96583E+00	3.78818E-02	-1.45900E+00	0.	-5.45695E+00	1.79737E+00
	158	3.96583E+00	3.78818E-02	-1.45900E+00	0.	0.	0.
415	158	5.08542E-01	3.92094E-01	3.29361E+00	0.	0.	0.
	160	5.08542E-01	3.92094E-01	3.29361E+00	0.	-1.00726E+01	2.42532E+01
416	160	2.09135E-01	3.92094E-01	-2.04017E+00	0.	-1.00726E+01	2.42532E+01
	162	2.09135E-01	3.92094E-01	-2.04017E+00	0.	0.	0.
417	168	3.17305E+00	1.74480E-02	1.66923E+00	0.	0.	0.
	170	3.17305E+00	1.74480E-02	1.66923E+00	0.	-4.82007E+00	8.90845E-01
418	170	2.39532E+00	2.65153E-02	1.20068E+00	0.	-4.82007E+00	8.90845E-01
	172	2.39532E+00	2.65153E-02	1.20068E+00	0.	-8.28716E+00	3.90037E-01
419	172	2.37898E+00	1.46307E-02	7.48247E-01	0.	-8.28716E+00	3.90037E-01
	174	2.37898E+00	1.46307E-02	7.48247E-01	0.	-1.04478E+01	2.79788E-01
420	174	1.93059E+00	1.69971E-03	-1.43372E+00	0.	-1.04478E+01	1.21583E-01
	175	1.93059E+00	1.69971E-03	-1.43372E+00	0.	0.	0.
421	176	1.99561E+00	4.06072E-03	1.14698E+00	0.	0.	0.
	178	1.99561E+00	4.06072E-03	1.14698E+00	0.	-5.38829E+00	1.62010E-01
422	178	1.62831E+00	4.22655E-03	-1.13902E+00	0.	-5.38829E+00	1.62010E-01
	180	1.62831E+00	4.22655E-03	-1.13902E+00	0.	0.	0.
423	180	3.15727E+00	7.06617E-03	4.35189E-01	0.	0.	0.
	182	3.15727E+00	7.06617E-03	4.35189E-01	0.	-2.23283E+00	3.81366E-01
424	182	2.14307E+00	1.95902E-02	-1.92998E-01	0.	-2.23283E+00	3.81366E-01
	184	2.14307E+00	1.95902E-02	-1.92998E-01	0.	-1.39774E+00	5.97419E-01
425	184	2.12846E+00	2.16956E-02	-3.53321E-01	0.	-1.39774E+00	5.97419E-01
	186	2.12846E+00	2.16956E-02	-3.53321E-01	0.	0.	0.
426	186	5.43569E-01	3.78027E-01	3.05365E+00	0.	0.	0.
	166	5.43569E-01	3.78027E-01	3.05365E+00	0.	-1.43828E+01	2.89498E+01
427	166	2.32413E-01	3.78027E-01	-1.89153E+00	0.	-1.43828E+01	2.89498E+01
	139	2.32413E-01	3.78027E-01	-1.89153E+00	0.	0.	0.
428	88	7.80169E+00	0.	0.	0.	0.	0.
	115	7.80169E+00	0.	0.	0.	0.	0.
429	92	5.74212E+00	0.	0.	0.	0.	0.
	120	5.74212E+00	0.	0.	0.	0.	0.
430	95	5.03549E+00	0.	0.	0.	0.	0.
	124	5.03549E+00	0.	0.	0.	0.	0.

B E A M   S T R E S S E S   OUTPUT CASE 1

BEAM	NODE	AXIAL	* * * * SHEAR * * * * V2/A*K3	V3/A*K2	TORSION T*C/J	* * * * BENDING * * * * M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
*****	****	*************	*************	*************	*************	*************	*************
431	106	6.57566E+00	0.	0.	0.	0.	0.
	132	6.57566E+00	0.	0.	0.	0.	0.
433	140	8.72954E+00	0.	0.	0.	0.	0.
	170	8.72954E+00	0.	0.	0.	0.	0.
434	144	7.39114E+00	0.	0.	0.	0.	0.
	174	7.39114E+00	0.	0.	0.	0.	0.
[illegible]	148	3.28382E+00	0.	0.	0.	0.	0.
	179	3.28382E+00	0.	0.	0.	0.	0.
436	152	4.73733E+00	0.	0.	0.	0.	0.
	182	4.73733E+00	0.	0.	0.	0.	0.
437	144	6.55636E+00	0.	0.	0.	0.	0.
	170	6.55636E+00	0.	0.	0.	0.	0.
438	148	4.36043E+00	0.	0.	0.	0.	0.
	174	4.36043E+00	0.	0.	0.	0.	0.
439	152	4.28883E+00	0.	0.	0.	0.	0.
	178	4.28883E+00	0.	0.	0.	0.	0.
440	154	3.99293E+00	0.	0.	0.	0.	0.
	182	3.99293E+00	0.	0.	0.	0.	0.
442	164	4.53537E-01	6.46042E-04	-5.08225E-02	0.	-2.39761E-02	6.50883E-02
	196	4.53537E-01	6.46042E-04	-5.08225E-02	0.	1.97203E+00	3.06865E-02
443	196	2.22241E-01	1.61676E-03	2.01631E-01	0.	1.79177E+00	3.06855E-02
	175	2.22241E-01	1.61676E-03	2.01631E-01	0.	7.67448E-01	3.79962E-02
444	163	-3.72767E+00	3.03763E-02	3.95302E-02	0.	0.	0.
	173	-3.72767E+00	3.03763E-02	3.95302E-02	0.	1.25293E+00	1.05374E+00
445	175	-1.45919E+00	5.42034E-16	4.03885E-17	0.	0.	0.
	177	-1.45919E+00	5.42034E-16	4.03885E-17	0.	2.75478E-15	2.74874E-14
446	183	-8.76934E-01	1.68261E-15	1.58027E-14	0.	0.	0.
	133	-8.76934E-01	1.68261E-15	1.58027E-14	0.	3.48595E-13	7.15557E-14
447	188	-7.49879E+00	9.72168E-15	7.47645E-14	0.	0.	0.
	194	-7.49879E+00	9.72168E-15	7.47645E-14	0.	1.54727E-12	3.93132E-13
448	186	-8.64664E+00	2.51263E-15	6.15880E-14	0.	0.	0.
	190	-8.64664E+00	2.51263E-15	5.15880E-14	0.	1.24109E-12	1.03686E-13
449	195	-1.34354E-02	9.55690E-04	1.33715E-03	0.	5.01731E-02	6.20327E-02
	203	-1.34354E-02	9.55690E-04	1.33715E-03	0.	8.34110E-03	1.46940E-01
450	88	8.43158E+00	0.	0.	0.	0.	0.
	120	8.43158E+00	0.	0.	0.	0.	0.
451	92	7.15447E+00	0.	0.	0.	0.	0.
	124	7.15447E+00	0.	0.	0.	0.	0.
452	96	3.37749E+00	0.	0.	0.	0.	0.
	128	3.37749E+00	0.	0.	0.	0.	0.
453	94	5.69223E+00	0.	0.	0.	0.	0.
	130	5.69223E+00	0.	0.	0.	0.	0.
454	100	5.20353E+00	0.	0.	0.	0.	0.
	132	5.20353E+00	0.	0.	0.	0.	0.
455	22	-5.73037E-02	-2.43902E-04	5.76876E-03	0.	6.64117E-03	2.03543E-15
	27	-5.73037E-02	-2.43902E-04	5.76876E-03	0.	2.74945E-01	9.23768E-03
456	34	-1.29188E-02	1.70562E-05	4.59969E-03	0.	5.58883E-03	-7.47000E-17
	41	-1.29188E-02	1.70562E-05	4.59969E-03	0.	1.09948E-01	1.15638E-03
457	40	-2.15026E-02	1.26140E-04	1.46487E-02	0.	2.15740E-03	-9.01749E-17
	47	-2.15026E-02	1.26140E-04	1.46487E-02	0.	2.72543E-01	2.92500E-05
458	45	-5.31038E-02	1.11773E-04	4.17745E-02	0.	5.99659E-03	-2.02772E-17
	53	-5.31038E-02	1.11773E-04	4.17745E-02	0.	7.70100E-01	4.27019E-14

BEAM STRESSES

OUTPUT CASE 1

BEAM	NODE	AXIAL	SHEAR V2/A*K3	SHEAR V3/A*K2	TORSION T*C/J	BENDING M2*C3/I2 (POINT C)	BENDING M3*C2/I3 (POINT B)
459	52	-5.69615E-02	2.10817E-03	5.56072E-02	0.	4.43829E-02	1.14812E-15
	59	-5.69615E-02	2.10817E-03	5.56072E-02	0.	9.45759E-01	2.70776E-02
460	52	4.34169E+00	0.	0.	0.	0.	0.
	64	4.34169E+00	0.	0.	0.	0.	0.

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BEAM STRESSES

OUTPUT CASE 2

BEAM	NODE	AXIAL	SHEAR V2/A*K3	SHEAR V3/A*K2	TORSION T*C/J	BENDING M2*C3/I2 (POINT C)	BENDING M3*C2/I3 (POINT B)
1	1	-1.67175E-01	-3.49603E-02	7.54149E-01	0.	0.	0.
	7	-1.67175E-01	-3.49603E-02	7.54149E-01	0.	-8.25346E+00	-2.98724E+00
2	7	-1.20806E+00	-4.70080E-02	-9.15734E-03	0.	-8.25346E+00	-2.98724E+00
	10	-1.20806E+00	-4.70080E-02	-9.15734E-03	0.	-8.19138E+00	-1.03308E+00
3	10	-4.02501E+00	-1.20802E-02	-1.20833E+00	0.	-8.19138E+00	-1.03308E+00
	13	-4.02501E+00	-1.20802E-02	-1.20833E+00	0.	0.	0.
4	13	-3.49330E+00	-1.83706E-03	5.79964E-01	0.	0.	0.
	14	-3.49330E+00	-1.83706E-03	5.79964E-01	0.	-5.75729E+00	-1.37055E-01
5	14	-4.83734E+00	-4.39824E-03	2.88874E-03	0.	-5.75729E+00	-1.37055E-01
	17	-4.83734E+00	-4.39824E-03	2.88874E-03	0.	-6.78600E+00	-4.77727E-01
6	17	-7.14035E+00	-6.17766E-03	-1.10238E+00	0.	-6.78600E+00	-4.77727E-01
	19	-7.14035E+00	-6.17766E-03	-1.10238E+00	0.	0.	0.
7	19	-6.85918E+00	-4.54550E-03	7.57372E-01	0.	0.	0.
	21	-6.85918E+00	-4.54550E-03	7.57372E-01	0.	-8.38400E+00	-3.88755E-01
8	21	-7.66377E+00	-4.01467E-03	-4.88498E-03	0.	-8.38400E+00	-3.88755E-01
	23	-7.66377E+00	-4.01467E-03	-4.88498E-03	0.	-8.35050E+00	-4.90506E-01
9	23	-7.89313E+00	-5.67047E-03	-1.21780E+00	0.	-8.35050E+00	-4.90506E-01
	25	-7.89313E+00	-5.67047E-03	-1.21780E+00	0.	0.	0.
10	25	-7.93825E+00	-7.00082E-03	7.04868E-01	0.	0.	0.
	28	-7.93825E+00	-7.00082E-03	7.04868E-01	0.	-7.27078E+00	-5.57517E-01
11	28	-7.32681E+00	-5.57793E-03	2.93350E-03	0.	-7.27078E+00	-5.57517E-01
	30	-7.32681E+00	-5.57793E-03	2.93350E-03	0.	-7.30104E+00	-1.10067E-01
12	30	-6.34714E+00	-1.36553E-03	-1.14266E+00	0.	-7.30104E+00	-1.10067E-01
	31	-6.34714E+00	-1.36553E-03	-1.14266E+00	0.	0.	0.
13	31	-4.79095E+00	-1.31611E-02	5.05134E-02	0.	0.	0.
	35	-4.79095E+00	-1.31611E-02	5.05134E-02	0.	-5.55960E-01	-6.12669E-01
14	35	-5.79726E+00	-7.55726E-02	-4.49323E-01	0.	-5.55960E-01	-6.12669E-01
	36	-5.79726E+00	-7.55726E-02	-4.49323E-01	0.	5.94750E-01	-1.19899E+00
15	36	-1.40164E+00	-1.52542E-01	2.77825E-01	0.	5.94750E-01	-1.19899E+00
	37	-1.40164E+00	-1.52542E-01	2.77825E-01	0.	-5.53682E-01	-4.77304E+00
16	37	-3.02623E-02	-1.01890E-01	-8.19275E-02	0.	-5.53682E-01	-4.77304E+00
	43	-3.02623E-02	-1.01890E-01	-8.19275E-02	0.	0.	0.
17	49	-3.81776E+00	-3.99809E-02	1.41230E+00	0.	0.	0.
	55	-3.81776E+00	-3.99809E-02	1.41230E+00	0.	-1.54563E+01	-3.41430E+00
18	55	-3.88657E+00	-5.19659E-02	-8.79402E-03	0.	-1.54563E+01	-3.41430E+00
	58	-3.88657E+00	-5.19659E-02	-8.79402E-03	0.	-1.53967E+01	-1.03298E+00
19	58	-1.83895E+00	-1.20790E-02	-2.27119E+00	0.	-1.53967E+01	-1.03298E+00
	61	-1.83895E+00	-1.20790E-02	-2.27119E+00	0.	0.	0.
20	61	-3.17131E+00	-5.43678E-03	1.27211E+00	0.	0.	0.
	62	-3.17131E+00	-5.43678E-03	1.27211E+00	0.	-1.26419E+01	-4.18468E-01
21	62	-4.13205E+00	-2.57496E-03	-4.66350E-03	0.	-1.26419E+01	-4.18468E-01
	65	-4.13205E+00	-2.57496E-03	-4.66350E-03	0.	-1.26132E+01	-3.25821E-01
22	65	-4.17011E+00	-4.20862E-03	-2.04900E+00	0.	-1.26132E+01	-3.25821E-01
	67	-4.17011E+00	-4.20862E-03	-2.04900E+00	0.	0.	0.
23	67	-5.06403E+00	-4.57524E-03	1.41103E+00	0.	0.	0.
	69	-5.06403E+00	-4.57524E-03	1.41103E+00	0.	-1.56199E+01	-3.92096E-01
24	69	-5.10152E+00	-2.34463E-03	3.02588E-03	0.	-1.56199E+01	-3.92096E-01
	71	-5.10152E+00	-2.34463E-03	3.02588E-03	0.	-1.56534E+01	-4.61161E-01
25	71	-5.18064E+00	-5.33123E-03	-2.28282E+00	0.	-1.56534E+01	-4.61161E-01
	73	-5.18064E+00	-5.33123E-03	-2.28282E+00	0.	0.	0.
26	73	-4.58742E+00	-4.74743E-03	1.31942E+00	0.	0.	0.
	75	-4.58742E+00	-4.74743E-03	1.31942E+00	0.	-1.36100E+01	-3.82930E-01

BEAM STRESSES

OUTPUT CASE 2

BEAM	NODE	AXIAL	**** SHEAR **** V2/A*K3	V3/A*K2	TORSION T*C/J	**** BENDING **** M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
*****	****	*************	*************	*************	*************	*************	*************
						-1.36100E+01	-3.82930E-01
27	76	-3.38451E+00	-3.31247E-03	-4.73581E-03	0.	-1.35797E+01	-2.96152E-01
	78	-3.38451E+00	-3.31247E-03	-4.73581E-03	0.	-1.35797E+01	-2.96152E-01
28	78	-3.40134E+00	-3.67416E-03	-2.12531E+00	0.	0.	0.
	79	-3.40134E+00	-3.67416E-03	-2.12531E+00	0.	0.	0.
29	79	-7.94167E-01	-1.17493E-02	1.32495E+00	0.	-1.36670E+01	-9.34241E-01
	83	-7.94167E-01	-1.17493E-02	1.32495E+00	0.	-1.36670E+01	-9.34241E-01
30	83	-6.90570E-01	-5.72521E-02	1.13911E-02	0.	-1.37845E+01	-3.74952E+00
	85	-6.90570E-01	-5.72521E-02	1.13911E-02	0.	-1.37845E+01	-3.74952E+00
31	85	-4.20556E+00	-4.65178E-02	-2.15735E+00	0.	0.	0.
	91	-4.20556E+00	-4.65178E-02	-2.15735E+00	0.	0.	0.
32	97	-1.91108E+00	-2.77965E-02	1.41218E+00	0.	-1.54550E+01	-2.37271E+00
	103	-1.91108E+00	-2.77965E-02	1.41218E+00	0.	-1.54550E+01	-2.37271E+00
33	103	-6.59686E-01	-1.38724E-02	-1.13989E+00	0.	0.	0.
	109	-6.59686E-01	-1.38724E-02	-1.13989E+00	0.	0.	0.
34	109	-1.32228E+00	0.	0.	0.	0.	0.
	115	-1.32228E+00	0.	0.	0.	0.	0.
35	115	-1.62330E+00	0.	0.	0.	0.	0.
	121	-1.62330E+00	0.	0.	0.	0.	0.
36	121	-1.29400E+00	0.	0.	0.	0.	0.
	127	-1.29400E+00	0.	0.	0.	0.	0.
37	127	-5.00628E-01	-1.70753E-02	5.71400E-01	0.	-1.38511E+01	-2.80606E+00
	133	-5.00628E-01	-1.70753E-02	5.71400E-01	0.	-1.38511E+01	-2.80606E+00
38	133	-7.19610E-02	-3.48129E-02	-2.16779E+00	0.	0.	0.
	139	-7.19610E-02	-3.48129E-02	-2.16779E+00	0.	0.	0.
39	145	-8.52733E-02	-2.98525E-02	1.39376E+00	0.	-1.52534E+01	-2.54647E+00
	151	-8.52733E-02	-2.98525E-02	1.39376E+00	0.	-1.52534E+01	-2.54647E+00
40	151	-8.21342E-01	-1.48883E-02	-1.12503E+00	0.	0.	0.
	157	-8.21342E-01	-1.48883E-02	-1.12503E+00	0.	0.	0.
41	157	-5.18996E-01	0.	0.	0.	0.	0.
	163	-5.18996E-01	0.	0.	0.	0.	0.
42	163	-3.16031E-01	0.	0.	0.	0.	0.
	169	-3.16031E-01	0.	0.	0.	0.	0.
43	169	-5.30248E-01	0.	0.	0.	0.	0.
	175	-5.30248E-01	0.	0.	0.	0.	0.
44	175	-8.88855E-01	-1.81026E-02	4.92703E-01	0.	-1.01645E+01	-2.97756E+00
	181	-8.88855E-01	-1.81026E-02	4.92703E-01	0.	-1.01645E+01	-2.97756E+00
45	181	-9.83362E-01	-3.69406E-02	-1.59082E+00	0.	0.	0.
	187	-9.83362E-01	-3.69406E-02	-1.59082E+00	0.	0.	0.
46	189	-1.03370E-01	0.	0.	0.	0.	0.
	191	-1.03370E-01	0.	0.	0.	0.	0.
47	193	-8.54903E-01	-3.07011E-02	1.34594E+00	0.	-1.47300E+01	-2.61832E+00
	199	-8.54903E-01	-3.07011E-02	1.34594E+00	0.	-1.47300E+01	-2.61832E+00
48	199	-6.98518E-01	-1.53084E-02	-1.08643E+00	0.	0.	0.
	205	-6.98518E-01	-1.53084E-02	-1.08643E+00	0.	0.	0.
49	205	-4.44337E-01	0.	0.	0.	0.	0.
	211	-4.44337E-01	0.	0.	0.	0.	0.
50	211	-2.04071E-01	0.	0.	0.	0.	0.
	217	-2.04071E-01	0.	0.	0.	0.	0.
51	217	-3.90917E-01	0.	0.	0.	0.	0.
	223	-3.90917E-01	0.	0.	0.	0.	0.
52	223	-6.69792E-01	-1.98054E-02	4.86178E-01	0.	-1.00300E+01	-3.09470E+00
	229	-6.69792E-01	-1.98054E-02	4.86178E-01	0.		

BEAM STRESSES

BEAM	NODE	AXIAL	* * * * SHEAR * * * * V2/A*K3	V3/A*K2	TORSION T*C/J	* * * * BENDING * * * * M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
						-1.00300E+01	-3.09470E+00
53	229	-7.84422E-01	-3.83938E-02	-1.56975E+00	0.	0.	0.
	235	-7.84422E-01	-3.83938E-02	-1.56975E+00	0.	0.	0.
54	241	-6.52477E-02	-3.17380E-02	1.36539E+00	0.	-1.49429E+01	-2.73691E+00
	247	-6.52477E-02	-3.17380E-02	1.36539E+00	0.	-1.49429E+01	-2.73691E+00
55	247	-9.98867E-01	-1.58264E-02	-1.10213E+00	0.	0.	0.
	253	-9.98867E-01	-1.58264E-02	-1.10213E+00	0.	0.	0.
56	253	-6.63331E-01	0.	0.	0.	0.	0.
	259	-6.63331E-01	0.	0.	0.	0.	0.
57	259	-3.76508E-01	0.	0.	0.	0.	0.
	265	-3.76508E-01	0.	0.	0.	0.	0.
58	265	-5.35900E-01	0.	0.	0.	0.	0.
	271	-5.35900E-01	0.	0.	0.	0.	0.
59	271	-1.02334E+00	-1.94560E-02	6.44615E-01	0.	-1.32985E+01	-3.20193E+00
	277	-1.02334E+00	-1.94560E-02	6.44615E-01	0.	-1.32985E+01	-3.20193E+00
60	277	-5.76226E-02	-3.97242E-02	-2.08130E+00	0.	0.	0.
	283	-5.76226E-02	-3.97242E-02	-2.08130E+00	0.	0.	0.
61	289	-1.24621E+00	-3.22702E-02	1.36377E+00	0.	-1.49251E+01	-2.75407E+00
	295	-1.24621E+00	-3.22702E-02	1.36377E+00	0.	-1.49251E+01	-2.75407E+00
62	295	-1.24619E+00	-1.61021E-02	-1.10082E+00	0.	0.	0.
	301	-1.24619E+00	-1.61021E-02	-1.10082E+00	0.	0.	0.
63	301	-1.69542E+00	0.	0.	0.	0.	0.
	307	-1.69542E+00	0.	0.	0.	0.	0.
64	307	-2.06461E+00	0.	0.	0.	0.	0.
	313	-2.06461E+00	0.	0.	0.	0.	0.
65	313	-1.80197E+00	0.	0.	0.	0.	0.
	319	-1.80197E+00	0.	0.	0.	0.	0.
66	319	-7.50307E-01	-1.95393E-02	4.49723E-01	0.	-9.27787E+00	-3.21489E+00
	325	-7.50307E-01	-1.95393E-02	4.49723E-01	0.	-9.27787E+00	-3.21489E+00
67	325	-7.74797E-01	-3.98850E-02	-1.45205E+00	0.	0.	0.
	331	-7.74797E-01	-3.98850E-02	-1.45205E+00	0.	0.	0.
68	332	-8.61122E-02	0.	0.	0.	0.	0.
	333	-8.61122E-02	0.	0.	0.	0.	0.
69	334	-7.99416E-02	0.	0.	0.	0.	0.
	335	-7.99416E-02	0.	0.	0.	0.	0.
70	337	-3.30970E+00	-2.79651E-01	1.19525E+00	0.	-1.38357E+01	-1.39789E+01
	340	-3.30970E+00	-2.79651E-01	1.19525E+00	0.	-1.38357E+01	-1.39789E+01
71	340	-3.32273E+00	-8.46171E-01	3.96247E-01	0.	-1.51291E+01	-7.10495E+00
	343	-3.32273E+00	-8.46171E-01	3.96247E-01	0.	-1.61291E+01	-7.10495E+00
72	343	-3.33608E+00	-9.49041E-02	-1.49962E+00	0.	0.	0.
	349	-3.33608E+00	-9.49041E-02	-1.49962E+00	0.	0.	0.
73	349	-3.17106E+00	-2.07591E-02	9.02207E-01	0.	-1.42248E+01	-1.41656E+00
	352	-3.17106E+00	-2.07591E-02	9.02207E-01	0.	-1.42248E+01	-1.41656E+00
74	352	-3.21143E+00	-2.08377E-02	-1.45650E+00	0.	0.	0.
	355	-3.21143E+00	-2.08377E-02	-1.45650E+00	0.	0.	0.
75	355	-6.84458E+00	-1.22146E-02	1.00312E+00	0.	-1.76177E+01	-9.04172E-01
	358	-6.84458E+00	-1.22146E-02	1.00312E+00	0.	-1.76177E+01	-9.04172E-01
76	358	-6.84948E+00	-1.19402E-02	-1.61942E+00	0.	0.	0.
	361	-6.84948E+00	-1.19402E-02	-1.61942E+00	0.	0.	0.
77	361	-7.19824E+00	-1.30500E-02	9.35732E-01	0.	-1.53137E+01	-9.27557E-01
	364	-7.19824E+00	-1.30500E-02	9.35732E-01	0.	-1.53137E+01	-9.27557E-01
78	364	-7.21422E+00	-1.31734E-02	-1.51063E+00	0.	0.	0.
	367	-7.21422E+00	-1.31734E-02	-1.51063E+00	0.		

B E A M   S T R E S S E S

OUTPUT CASE 2

BEAM	NODE	AXIAL	**** SHEAR **** V2/A*K3	V3/A*K2	TORSION T*C/J	**** BENDING **** M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
*****	****	*************	*************	*************	*************	*************	*************
79	367	-1.95299E+00	-1.56791E-01	7.95534E-01	0.	0.	0.
	373	-1.95299E+00	-1.56791E-01	7.95534E-01	0.	-1.30192E+01	-1.08544E+01
80	373	-1.91221E+00	-1.24861E+00	-7.35098E-01	0.	-1.30192E+01	-1.08544E+01
	376	-1.91221E+00	-1.24861E+00	-7.35098E-01	0.	-1.05353E+01	-1.89124E+01
81	376	-1.88130E+00	-4.02038E-01	-1.55889E+00	0.	-1.05353E+01	-1.89124E+01
	379	-1.88130E+00	-4.02038E-01	-1.55889E+00	0.	0.	0.
82	385	-1.37137E-01	0.	0.	0.	0.	0.
	391	-1.37137E-01	0.	0.	0.	0.	0.
83	391	-4.91884E-01	0.	0.	0.	0.	0.
	397	-4.91884E-01	0.	0.	0.	0.	0.
84	397	-4.01559E-01	0.	0.	0.	0.	0.
	400	-4.01559E-01	0.	0.	0.	0.	0.
85	400	-1.09872E+00	0.	0.	0.	0.	0.
	403	-1.09872E+00	0.	0.	0.	0.	0.
86	403	-1.15071E+00	0.	0.	0.	0.	0.
	406	-1.15071E+00	0.	0.	0.	0.	0.
87	406	-6.56685E-01	0.	0.	0.	0.	0.
	409	-6.56685E-01	0.	0.	0.	0.	0.
88	409	-4.16319E-01	0.	0.	0.	0.	0.
	412	-4.16319E-01	0.	0.	0.	0.	0.
89	412	-8.03577E-01	0.	0.	0.	0.	0.
	415	-8.03577E-01	0.	0.	0.	0.	0.
90	415	-8.76048E-01	0.	0.	0.	0.	0.
	421	-8.75048E-01	0.	0.	0.	0.	0.
91	421	-9.08136E-02	0.	0.	0.	0.	0.
	427	-9.08136E-02	0.	0.	0.	0.	0.
92	433	-4.22318E-02	-5.72896E-03	-1.10373E+00	0.	0.	0.
	439	-4.22318E-02	-5.72896E-03	-1.10373E+00	0.	7.35332E+00	-4.45855E-01
93	439	-1.07038E-01	-5.95549E-03	5.83685E-01	0.	7.35332E+00	-4.45855E-01
	445	-1.07033E-01	-5.95549E-03	5.83685E-01	0.	0.	0.
94	445	-8.48600E+00	-2.07288E-02	-1.00447E+00	0.	0.	0.
	450	-8.48600E+00	-2.07288E-02	-1.00447E+00	0.	6.07670E+00	-1.40425E+00
95	450	-8.49475E+00	-2.06567E-02	5.22203E-01	0.	6.07670E+00	-1.40425E+00
	451	-8.49475E+00	-2.06567E-02	5.22203E-01	0.	0.	0.
96	451	-8.42158E+00	-1.20901E-02	-1.11612E+00	0.	0.	0.
	456	-8.42158E+00	-1.20901E-02	-1.11612E+00	0.	7.52139E+00	-9.35619E-01
97	456	-8.43536E+00	-1.23687E-02	5.91365E-01	0.	7.52139E+00	-9.35619E-01
	457	-8.43536E+00	-1.23687E-02	5.91365E-01	0.	0.	0.
98	457	-6.27147E+00	-1.34289E-02	-1.04192E+00	0.	0.	0.
	462	-6.27147E+00	-1.34289E-02	-1.04192E+00	0.	5.54264E+00	-9.39194E-01
99	462	-6.31202E+00	-1.33102E-02	6.45403E-01	0.	5.54264E+00	-9.39194E-01
	463	-6.31202E+00	-1.33102E-02	6.45403E-01	0.	0.	0.
100	463	-6.37493E+00	-1.21890E-02	-4.96471E-02	0.	0.	0.
	469	-6.37493E+00	-1.21890E-02	-4.96471E-02	0.	-1.83549E-01	-8.[illegible]
101	469	-5.57341E+00	-1.22292E-02	-1.81063E-02	0.	-1.83549E-01	-8.[illegible]
	475	-5.57341E+00	-1.22292E-02	-1.81063E-02	0.	0.	0.
102	1	-2.55845E-01	-4.72440E-02	-2.31815E+00	0.	0.	0.
	49	-2.55845E-01	-4.72440E-02	-2.31815E+00	0.	1.13612E+01	-2.57358E+00
103	49	-8.88681E-01	-5.02922E-02	3.26755E-03	0.	1.13612E+01	-2.57358E+00
	97	-8.88681E-01	-5.02922E-02	3.26755E-03	0.	1.13353E+01	-7.23825E-01
104	97	-2.24267E+00	-1.31431E-02	1.43267E+00	0.	1.13353E+01	-7.23825E-01
	145	-2.24267E+00	-1.31431E-02	1.43267E+00	0.	0.	0.

OUTPUT CASE 2

BEAM STRESSES

BEAM	NODE	AXIAL	**** SHEAR **** V2/A*K3	V3/A*K2	TORSION T*C/J	**** BENDING **** M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
*****	****	*************	*************	*************	*************	*************	*************
						0.	0.
105	145	-1.98897E+00	-1.55074E-02	-2.28406E+00	0.	1.09830E+01	-7.35468E-01
	193	-1.98897E+00	-1.55074E-02	-2.28406E+00	0.	1.09830E+01	-7.35468E-01
106	193	-2.47842E+00	-9.48858E-03	-4.07819E-01	0.	1.29440E+01	-4.94368E-01
	241	-2.47842E+00	-9.48858E-03	-4.07819E-01	0.	1.29440E+01	-4.94368E-01
107	241	-2.49215E+00	-2.58094E-02	9.04267E-01	0.	5.92436E+00	-1.08987E+00
	289	-2.49215E+00	-2.58094E-02	9.04267E-01	0.	5.92436E+00	-1.08987E+00
108	289	-2.53065E+00	-5.84793E-02	1.95034E+00	0.	0.	0.
	332	-2.53065E+00	-5.84793E-02	1.95034E+00	0.	0.	0.
109	332	-1.50557E+00	-8.21456E-02	-2.42289E+00	0.	5.92680E+00	-2.65046E+00
	337	-1.50557E+00	-8.21456E-02	-2.42289E+00	0.	6.92682E+00	-2.65046E+00
110	337	-3.43095E+00	-4.70413E-02	1.15051E-01	0.	6.35445E+00	-2.64340E-01
	385	-3.43095E+00	-4.70413E-02	1.15051E-01	0.	6.35445E+00	-2.64340E-01
111	385	-3.49404E+00	-5.00852E-03	7.98490E-01	0.	0.	0.
	433	-3.49404E+00	-5.00852E-03	7.98490E-01	0.	0.	0.
112	7	-6.58441E+00	0.	0.	0.	0.	0.
	55	-6.58441E+00	0.	0.	0.	0.	0.
113	55	-6.78094E+00	0.	0.	0.	0.	0.
	103	-6.78094E+00	0.	0.	0.	0.	0.
114	103	-4.65300E+00	0.	0.	0.	0.	0.
	151	-4.65300E+00	0.	0.	0.	0.	0.
115	151	-4.74253E+00	0.	0.	0.	0.	0.
	199	-4.74253E+00	0.	0.	0.	0.	0.
116	199	-4.88315E+00	0.	0.	0.	0.	0.
	247	-4.88315E+00	0.	0.	0.	0.	0.
117	247	-2.63877E+00	0.	0.	0.	0.	0.
	295	-2.63877E+00	0.	0.	0.	0.	0.
118	295	-2.75951E+00	-4.39882E-02	6.38859E-01	0.	-5.67862E+00	-9.29033E-01
	333	-2.75951E+00	-4.39882E-02	6.38859E-01	0.	-5.67862E+00	-9.29033E-01
119	333	-8.31258E-01	-2.86346E-02	-6.63017E-01	0.	0.	0.
	343	-8.31258E-01	-2.86346E-02	-6.63017E-01	0.	0.	0.
120	343	-5.13851E-01	-1.60672E-02	1.05666E+00	0.	-2.40027E+01	-8.42927E-01
	391	-5.13851E-01	-1.60672E-02	1.05666E+00	0.	-2.40027E+01	-8.42927E-01
121	391	-1.22322E-01	-1.58143E-02	-1.70585E+00	0.	0.	0.
	439	-1.22322E-01	-1.58143E-02	-1.70585E+00	0.	0.	0.
122	10	-4.45212E+00	0.	0.	0.	0.	0.
	58	-4.45212E+00	0.	0.	0.	-2.50329E-13	-3.13687E-12
123	13	-2.69302E-02	-1.48408E-01	2.17186E+00	0.	-1.02810E+01	-5.74720E+00
	61	-2.69302E-02	-1.48408E-01	2.17186E+00	0.	-1.02810E+01	-5.74720E+00
124	61	-1.62957E-01	-1.97172E-01	1.60698E+00	0.	-1.78880E+01	-1.87121E+00
	109	-1.62957E-01	-1.97172E-01	1.60698E+00	0.	-1.78880E+01	-1.87121E+00
125	109	-1.24549E-01	-4.02568E-02	1.04971E+00	0.	-2.28570E+01	-9.71202E-01
	157	-1.24547E-01	-4.02568E-02	1.04971E+00	0.	-2.28570E+01	-9.71202E-01
126	157	-8.71481E-02	-1.09694E-02	5.03011E-01	0.	-2.51389E+01	-1.15350E+00
	205	-8.71481E-02	-1.09694E-02	5.03011E-01	0.	-2.51389E+01	-1.15350E+00
127	205	-5.10462E-02	-1.18799E-02	-5.05259E-02	0.	-2.49969E+01	-8.27037E-01
	253	-5.10462E-02	-1.18799E-02	-5.05259E-02	0.	-2.49969E+01	-8.27037E-01
128	253	-1.91615E-02	-3.83849E-02	-7.15087E-01	0.	-2.24255E+01	-1.50712E+00
	301	-1.71615E-02	-3.83844E-02	-7.15087E-01	0.	-2.24255E+01	-1.50712E+00
129	301	-3.39636E-02	-1.15633E-01	-1.77748E+00	0.	-1.74250E+01	-2.72228E+00
	349	-3.39635E-02	-1.15633E-01	-1.77748E+00	0.	-1.74250E+01	-2.72228E+00
130	349	-6.68804E-02	-5.34205E-02	-2.86615E+00	0.	-3.37102E+00	-1.73753E+00
	397	-6.68805E-02	-5.34205E-02	-2.86615E+00	0.		

BEAM STRESSES

OUTPUT CASE 2

BEAM	NODE	AXIAL	**** SHEAR **** V2/A*K3	V3/A*K2	TORSION T*C/J	**** BENDING **** M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
131	397	-9.08796E-02	-4.71336E-02	-3.33482E+00	0.	-9.37102E+00	-1.73953E+00
	445	-9.08796E-02	-4.71336E-02	-3.33482E+00	0.	1.00131E-12	-1.44941E-12
132	14	-2.22952E+00	0.	0.	0.	0.	0.
	62	-2.22952E+00	0.	0.	0.	0.	0.
133	17	-1.46008E-01	0.	0.	0.	0.	0.
	65	-1.46008E-01	0.	0.	0.	0.	0.
134	352	-1.67781E-01	-1.31430E-02	9.62397E-01	0.	0.	0.
	400	-1.67781E-01	-1.31430E-02	9.62397E-01	0.	-2.18614E+01	-6.88191E-01
135	400	-7.67107E-02	-1.29113E-02	-1.55367E+00	0.	-2.18614E+01	-6.88191E-01
	450	-7.67107E-02	-1.29113E-02	-1.55367E+00	0.	0.	0.
136	19	-1.06757E-01	-1.04830E-01	2.17416E+00	0.	1.67720E-12	-9.18296E-13
	67	-1.06757E-01	-1.04830E-01	2.17416E+00	0.	-1.32918E+01	-4.10763E+00
137	67	-3.15156E-02	-1.38901E-01	1.60812E+00	0.	-1.32918E+01	-4.10763E+00
	115	-3.15156E-02	-1.38901E-01	1.60812E+00	0.	-1.79043E+01	-1.24658E+00
138	115	-6.48804E-02	-1.56660E-02	1.05039E+00	0.	-1.79043E+01	-1.24658E+00
	163	-6.48804E-02	-1.56660E-02	1.05039E+00	0.	-2.28765E+01	-1.09578E+00
139	163	-1.07983E-01	-5.91148E-03	5.03883E-01	0.	-2.28765E+01	-1.09578E+00
	211	-1.07983E-01	-5.91148E-03	5.03883E-01	0.	-2.51624E+01	-1.05504E+00
140	211	-1.51829E-01	-6.50333E-03	-5.07037E-02	0.	-2.51624E+01	-1.05504E+00
	259	-1.51829E-01	-6.50333E-03	-5.07037E-02	0.	-2.50199E+01	-9.24171E-01
141	259	-1.96192E-01	-3.45879E-02	-9.14866E-01	0.	-2.50199E+01	-9.24171E-01
	307	-1.96192E-01	-3.45879E-02	-9.14866E-01	0.	-2.24491E+01	-1.51467E+00
142	307	-2.40785E-01	-1.13615E-01	-1.77903E+00	0.	-2.24491E+01	-1.51467E+00
	355	-2.40785E-01	-1.13615E-01	-1.77903E+00	0.	-1.74499E+01	-2.62946E+00
143	355	-1.03684E-01	-8.74170E-02	-2.86947E+00	0.	-1.74499E+01	-2.62946E+00
	403	-1.03684E-01	-8.74170E-02	-2.86947E+00	0.	-9.38657E+00	-8.97735E-01
144	403	-7.91774E-02	-2.41080E-02	-3.34036E+00	0.	-9.38657E+00	-8.97735E-01
	451	-7.91774E-02	-2.41080E-02	-3.34036E+00	0.	-2.29182E-18	-1.51092E-12
145	21	-1.62025E-01	0.	0.	0.	0.	0.
	69	-1.62025E-01	0.	0.	0.	0.	0.
146	23	-7.61966E-01	0.	0.	0.	0.	0.
	71	-7.61966E-01	0.	0.	0.	0.	0.
147	358	-2.01976E-01	-4.69289E-03	1.06847E+00	0.	0.	0.
	405	-2.01976E-01	-4.69289E-03	1.06847E+00	0.	-2.42710E+01	-2.34720E-01
148	406	-1.00735E-01	-4.40362E-03	-1.72492E+00	0.	-2.42710E+01	-2.34720E-01
	456	-1.00735E-01	-4.40362E-03	-1.72492E+00	0.	0.	0.
149	25	-3.04255E-01	-1.05747E-01	2.20822E+00	0.	-1.78785E-12	-6.67522E-13
	73	-3.04255E-01	-1.05747E-01	2.20822E+00	0.	-1.04531E+01	-4.18534E+00
150	73	-1.70870E-01	-1.47569E-01	1.63244E+00	0.	-1.04531E+01	-4.18534E+00
	121	-1.70870E-01	-1.47569E-01	1.63244E+00	0.	-1.81805E+01	-1.48337E+00
151	121	-2.17436E-01	-2.62323E-02	1.06578E+00	0.	-1.81805E+01	-1.48337E+00
	169	-2.17436E-01	-2.62323E-02	1.06578E+00	0.	-2.32257E+01	-1.13136E+00
152	169	-2.63433E-01	-1.71806E-03	5.10507E-01	0.	-2.32257E+01	-1.13136E+00
	217	-2.63433E-01	-1.71806E-03	5.10507E-01	0.	-2.55416E+01	-1.03423E+00
153	217	-3.08843E-01	-3.34383E-03	-5.39425E-02	0.	-2.55416E+01	-1.03423E+00
	265	-3.08843E-01	-3.34383E-03	-5.39425E-02	0.	-2.53900E+01	-9.70528E-01
154	265	-3.54047E-01	-1.67536E-02	-7.32036E-01	0.	-2.53900E+01	-9.70528E-01
	313	-3.54047E-01	-1.67536E-02	-7.32036E-01	0.	-2.27709E+01	-1.13769E+00
155	313	-3.79472E-01	-1.35755E-01	-1.81013E+00	0.	-2.27709E+01	-1.13769E+00
	361	-3.79472E-01	-1.35755E-01	-1.81013E+00	0.	-1.76844E+01	-2.54813E+00
156	361	-4.26463E-01	-1.03401E-01	-2.90777E+00	0.	-1.76844E+01	-2.54813E+00
	409	-4.26463E-01	-1.03401E-01	-2.90777E+00	0.	-9.51342E+00	-1.18030E+00

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BEAM STRESSES

OUTPUT CASE 2

BEAM	NODE	AXIAL	**** SHEAR **** V2/A*K3	V3/A*K2	TORSION T*C/J	**** BENDING **** M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
*****	****	*************	*************	*************	*************	*************	*************
157	409	-4.51224E-01	-3.19946E-02	-3.38550E+00	0.	-9.51342E+00	-1.18080E+00
	457	-4.51224E-01	-3.19946E-02	-3.38550E+00	0.	4.30525E-13	-2.52697E-13
158	28	-2.08945E+00	0.	0.	0.	0.	0.
	76	-2.08945E+00	0.	0.	0.	0.	0.
159	30	-1.51254E-01	0.	0.	0.	0.	0.
	78	-1.51254E-01	0.	0.	0.	0.	0.
160	364	-1.86519E-01	-1.01228E-02	9.97630E-01	0.	0.	0.
	412	-1.86519E-01	-1.01228E-02	9.97630E-01	0.	-2.26617E+01	-5.26768E-01
161	412	-9.16470E-02	-9.88280E-03	-1.61055E+00	0.	-2.26617E+01	-5.26768E-01
	462	-9.16470E-02	-9.88280E-03	-1.61055E+00	0.	0.	0.
162	31	-2.34254E-01	-1.54200E-01	2.11415E+00	0.	-4.39374E-12	-1.78037E-12
	79	-2.34254E-01	-1.54200E-01	2.11415E+00	0.	-1.00078E+01	-6.05503E+00
163	79	-1.27534E-01	-2.18318E-01	1.55601E+00	0.	-1.00078E+01	-6.05503E+00
	127	-1.27534E-01	-2.18318E-01	1.55601E+00	0.	-1.73735E+01	-2.32088E+00
164	127	-1.12255E-01	-5.47089E-02	1.00407E+00	0.	-1.73735E+01	-2.32088E+00
	175	-1.12255E-01	-5.47089E-02	1.00407E+00	0.	-2.21265E+01	-1.12472E+00
165	175	-1.08669E-01	-9.21358E-04	4.84162E-01	0.	-2.21265E+01	-1.12472E+00
	223	-1.08669E-01	-9.21358E-04	4.84162E-01	0.	-2.43229E+01	-1.03411E+00
166	223	-1.16998E-01	-1.87768E-02	-4.12495E-02	0.	-2.43229E+01	-1.03411E+00
	271	-1.16998E-01	-1.87768E-02	-4.12495E-02	0.	-2.42070E+01	-9.52867E-01
167	271	-1.34867E-01	-8.42566E-02	-8.96447E-01	0.	-2.42070E+01	-9.52867E-01
	319	-1.34867E-01	-8.42566E-02	-8.96447E-01	0.	-2.16879E+01	-3.03421E+00
168	319	-1.59147E-01	-2.58873E-01	-1.71188E+00	0.	-2.16879E+01	-3.03421E+00
	367	-1.59147E-01	-2.58873E-01	-1.71188E+00	0.	-1.68775E+01	-6.38757E+00
169	367	-4.99478E-02	-2.47473E-01	-2.77100E+00	0.	-1.68775E+01	-6.38757E+00
	415	-4.99478E-02	-2.47473E-01	-2.77100E+00	0.	-9.09081E+00	-2.97781E+00
170	415	-2.57954E-02	-8.06858E-02	-3.23511E+00	0.	-9.09081E+00	-2.97781E+00
	463	-2.57954E-02	-8.06858E-02	-3.23511E+00	0.	2.20288E-12	-7.73001E-13
171	35	-1.13305E-01	0.	0.	0.	0.	0.
	83	-1.13305E-01	0.	0.	0.	0.	0.
172	373	-4.26237E-01	-1.76392E-02	9.97630E-01	0.	0.	0.
	421	-4.26237E-01	-1.76392E-02	9.97630E-01	0.	-2.26617E+01	-9.33831E-01
173	421	-1.12565E-01	-1.75198E-02	-1.61055E+00	0.	-2.26617E+01	-9.33831E-01
	469	-1.12565E-01	-1.75198E-02	-1.61055E+00	0.	0.	0.
174	37	-3.14906E+00	0.	0.	0.	0.	0.
	85	-3.14905E+00	0.	0.	0.	0.	0.
175	85	-8.85278E+00	0.	0.	0.	0.	0.
	133	-8.85274E+00	0.	0.	0.	0.	0.
176	133	-5.29153E+00	0.	0.	0.	0.	0.
	181	-5.29153E+00	0.	0.	0.	0.	0.
177	181	-5.43603E+00	0.	0.	0.	0.	0.
	189	-5.43603E+00	0.	0.	0.	0.	0.
178	189	-5.38042E+00	0.	0.	0.	0.	0.
	229	-5.38042E+00	0.	0.	0.	0.	0.
179	229	-5.49812E+00	0.	0.	0.	0.	0.
	277	-5.49812E+00	0.	0.	0.	0.	0.
180	277	-2.56174E+00	0.	0.	0.	0.	0.
	325	-2.56174E+00	0.	0.	0.	0.	0.
181	325	-2.66197E+00	0.	0.	0.	0.	0.
	334	-2.66197E+00	0.	0.	0.	0.	0.
182	334	-1.16976E+00	0.	0.	0.	0.	0.
	376	-1.16975E+00	0.	0.	0.	0.	0.

BEAM STRESSES OUTPUT CASE 2

BEAM	NODE	AXIAL	SHEAR V2/A*K3	SHEAR V3/A*K2	TORSION T*C/J	BENDING M2*C3/I2 (POINT C)	BENDING M3*C2/I3 (POINT B)
183	43	-4.47725E-02	-5.50031E-02	1.41831E+00	0.	0.	0.
	91	-4.47725E-02	-5.50031E-02	1.41831E+00	0.	-1.85471E+01	-2.78672E+00
184	91	-1.51909E+00	-7.59810E-02	2.65926E-01	0.	-1.85471E+01	-2.78672E+00
	139	-1.51909E+00	-7.59810E-02	2.65926E-01	0.	-2.20246E+01	-9.85149E-01
185	139	-1.51426E+00	-2.61902E-02	-1.41107E+00	0.	-2.20246E+01	-9.85149E-01
	187	-1.51426E+00	-2.61902E-02	-1.41107E+00	0.	-1.05945E+01	-8.68076E-01
186	187	-3.16724E+00	-3.72628E-02	-2.79023E+00	0.	-1.05945E+01	-8.68076E-01
	191	-3.16724E+00	-3.72628E-02	-2.79023E+00	0.	0.	0.
187	191	-3.58228E+00	-2.99331E-02	1.56761E+00	0.	0.	0.
	235	-3.58228E+00	-2.99331E-02	1.56761E+00	0.	-9.80298E+00	-8.13093E-01
188	235	-3.92697E+00	-1.00925E-02	5.69753E-01	0.	-9.80298E+00	-8.13093E-01
	283	-3.92697E+00	-1.00925E-02	5.69753E-01	0.	-1.67772E+01	-6.10264E-01
189	283	-3.94268E+00	-1.73063E-02	-1.17089E+00	0.	-1.67772E+01	-6.10264E-01
	331	-3.94268E+00	-1.73063E-02	-1.17089E+00	0.	-7.89911E+00	-6.97885E-01
190	331	-4.23287E+00	-3.37921E-02	-2.66231E+00	0.	-7.89911E+00	-6.97885E-01
	335	-4.23287E+00	-3.37921E-02	-2.66231E+00	0.	0.	0.
191	335	-2.19072E+00	-9.38361E-02	1.28207E+00	0.	0.	0.
	379	-2.19072E+00	-9.38361E-02	1.28207E+00	0.	-9.55261E+00	-2.92905E+00
192	379	-1.39469E+00	-7.07519E-02	-1.07489E-01	0.	-9.55261E+00	-2.92905E+00
	427	-1.39469E+00	-7.07519E-02	-1.07489E-01	0.	-8.73759E+00	-1.30408E+00
193	427	-1.40951E+00	-2.47088E-02	-1.15236E+00	0.	-8.73759E+00	-1.30408E+00
	475	-1.40951E+00	-2.47088E-02	-1.15236E+00	0.	0.	0.
194	7	-6.70320E+00	0.	0.	0.	0.	0.
	43	-6.70320E+00	0.	0.	0.	0.	0.
195	7	-1.94158E+01	0.	0.	0.	0.	0.
	58	-1.94158E+01	0.	0.	0.	0.	0.
196	10	-1.86888E+01	0.	0.	0.	0.	0.
	61	-1.86888E+01	0.	0.	0.	0.	0.
197	14	-9.45126E+00	0.	0.	0.	0.	0.
	61	-9.45126E+00	0.	0.	0.	0.	0.
198	17	-8.56147E+00	0.	0.	0.	0.	0.
	62	-8.56147E+00	0.	0.	0.	0.	0.
199	17	-7.70553E+00	0.	0.	0.	0.	0.
	67	-7.70553E+00	0.	0.	0.	0.	0.
200	21	-3.98964E+00	0.	0.	0.	0.	0.
	67	-3.98964E+00	0.	0.	0.	0.	0.
201	21	-3.50580E+00	0.	0.	0.	0.	0.
	71	-3.50580E+00	0.	0.	0.	0.	0.
202	23	-3.29521E+00	0.	0.	0.	0.	0.
	73	-3.29521E+00	0.	0.	0.	0.	0.
203	29	-8.26211E+00	0.	0.	0.	0.	0.
	73	-8.26211E+00	0.	0.	0.	0.	0.
204	33	-9.06337E+00	0.	0.	0.	0.	0.
	75	-9.06337E+00	0.	0.	0.	0.	0.
205	30	-1.00993E+01	0.	0.	0.	0.	0.
	77	-1.00993E+01	0.	0.	0.	0.	0.
206	35	-2.53232E+01	0.	0.	0.	0.	0.
	79	-2.53232E+01	0.	0.	0.	0.	0.
207	35	-2.60167E+01	0.	0.	0.	0.	0.
	85	-2.60167E+01	0.	0.	0.	0.	0.
208	37	-7.87033E+00	0.	0.	0.	0.	0.
	81	-7.87033E+00	0.	0.	0.	0.	0.

B E A M   S T R E S S E S

OUTPUT CASE 2

BEAM	NODE	AXIAL	• • • • SHEAR • • • • V2/A*K3	V3/A*K2	TORSION T*C/J	• • • • BENDING • • • • M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
*****	****	*************	*************	*************	*************	*************	*************
209	49	-8.91195E+00	0.	0.	0.	0.	0.
	103	-8.91195E+00	0.	0.	0.	0.	0.
210	97	-7.68855E+00	0.	0.	0.	0.	0.
	151	-7.68855E+00	0.	0.	0.	0.	0.
211	151	-3.33260E+00	0.	0.	0.	0.	0.
	193	-3.33260E+00	0.	0.	0.	0.	0.
212	247	-5.84265E+00	0.	0.	0.	0.	0.
	289	-5.84265E+00	0.	0.	0.	0.	0.
213	193	-1.18664E+00	0.	0.	0.	0.	0.
	247	-1.18664E+00	0.	0.	0.	0.	0.
214	289	-7.33917E+00	0.	0.	0.	0.	0.
	333	-7.33917E+00	0.	0.	0.	0.	0.
215	333	-8.41754E+00	0.	0.	0.	0.	0.
	337	-8.41754E+00	0.	0.	0.	0.	0.
216	337	-1.54824E+01	0.	0.	0.	0.	0.
	391	-1.54824E+01	0.	0.	0.	0.	0.
217	391	-1.59401E+01	0.	0.	0.	0.	0.
	445	-1.59401E+01	0.	0.	0.	0.	0.
218	355	-1.13110E+01	0.	0.	0.	0.	0.
	400	-1.13110E+01	0.	0.	0.	0.	0.
219	400	-1.23640E+01	0.	0.	0.	0.	0.
	445	-1.23640E+01	0.	0.	0.	0.	0.
220	355	-3.71015E+00	0.	0.	0.	0.	0.
	406	-3.71015E+00	0.	0.	0.	0.	0.
221	405	-3.03933E+00	0.	0.	0.	0.	0.
	457	-3.03933E+00	0.	0.	0.	0.	0.
222	367	-1.35848E+01	0.	0.	0.	0.	0.
	412	-1.35848E+01	0.	0.	0.	0.	0.
223	412	-1.24490E+01	0.	0.	0.	0.	0.
	457	-1.24490E+01	0.	0.	0.	0.	0.
224	367	-1.93882E+01	0.	0.	0.	0.	0.
	421	-1.93882E+01	0.	0.	0.	0.	0.
225	421	-1.82090E+01	0.	0.	0.	0.	0.
	475	-1.82090E+01	0.	0.	0.	0.	0.
226	91	-1.08444E+01	0.	0.	0.	0.	0.
	133	-1.08444E+01	0.	0.	0.	0.	0.
227	187	-3.09510E+00	0.	0.	0.	0.	0.
	189	-3.09510E+00	0.	0.	0.	0.	0.
228	133	-4.56408E+00	0.	0.	0.	0.	0.
	187	-4.56408E+00	0.	0.	0.	0.	0.
229	193	-2.84992E+00	0.	0.	0.	0.	0.
	235	-2.84992E+00	0.	0.	0.	0.	0.
230	235	-2.04395E+00	0.	0.	0.	0.	0.
	277	-2.04395E+00	0.	0.	0.	0.	0.
231	331	-7.10452E+00	0.	0.	0.	0.	0.
	334	-7.10452E+00	0.	0.	0.	0.	0.
232	277	-6.88195E+00	0.	0.	0.	0.	0.
	331	-6.88195E+00	0.	0.	0.	0.	0.
233	334	-4.13941E+00	0.	0.	0.	0.	0.
	376	-4.13941E+00	0.	0.	0.	0.	0.
234	1	-7.34872E-01	-2.16985E-01	-3.35228E-01	0.	0.	0.
	8	-7.34872E-01	-2.16985E-01	-3.35228E-01	0.	-4.25311E+00	-5.73776E+00

OUTPUT CASE 2

B E A M   S T R E S S E S

BEAM	NODE	AXIAL	**** SHEAR **** V2/A*K3	V3/A*K2	TORSION T*C/J	**** BENDING **** M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
*****	****	*************	*************	*************	*************	*************	*************
235	8	-8.59678E-01	-2.06630E+00	-3.71768E-01	0.	-4.25311E+00	-5.70796E+00
	15	-8.59678E-01	-2.06630E+00	-3.71768E-01	0.	-6.21637E+00	-1.85013E+01
236	15	-9.17445E+00	-2.28240E-01	-9.82140E-01	0.	-7.74174E+00	-3.02703E+00
	22	-9.17445E+00	-2.28240E-01	-9.82140E-01	0.	0.	0.
237	13	-2.88769E+00	-9.63780E-02	-6.47671E-02	0.	0.	0.
	20	-2.88769E+00	-9.63780E-02	-6.47671E-02	0.	-1.33470E+00	-2.10949E+00
238	20	-3.04172E+00	-1.88600E-01	-8.33966E-02	0.	-1.33470E+00	-2.10949E+00
	27	-3.04172E+00	-1.88600E-01	-8.33966E-02	0.	-1.94437E+00	-1.10681E+00
239	27	-3.95629E+00	-1.00029E-01	-2.84448E-01	0.	-1.94437E+00	-1.10681E+00
	34	-3.95629E+00	-1.00029E-01	-2.84448E-01	0.	0.	0.
240	19	-2.89268E+00	-6.35486E-02	-3.61644E-01	0.	0.	0.
	26	-2.89268E+00	-6.35486E-02	-3.61644E-01	0.	-4.91564E+00	-1.32879E+00
241	26	-4.17244E+00	-3.34198E-01	-2.94040E-02	0.	-4.91564E+00	-1.32879E+00
	33	-4.17244E+00	-3.34198E-01	-2.94040E-02	0.	-4.97637E+00	-1.93983E+00
242	33	-5.08242E+00	-1.75314E-01	-7.28011E-01	0.	-4.97637E+00	-1.93983E+00
	40	-5.08242E+00	-1.75314E-01	-7.28011E-01	0.	0.	0.
243	25	-2.39847E+00	-8.65408E-02	-8.93295E-01	0.	0.	0.
	32	-2.39847E+00	-8.65408E-02	-8.93295E-01	0.	-1.23725E+01	-1.36867E+00
244	32	-3.44970E+00	-1.01242E+00	-5.98531E-01	0.	-1.23725E+01	-1.36867E+00
	39	-3.44970E+00	-1.01242E+00	-5.98531E-01	0.	-1.58145E+01	-3.41320E+00
245	39	-9.52274E+00	-4.37149E-01	-2.22757E+00	0.	-1.58145E+01	-3.41320E+00
	45	-9.52274E+00	-4.37149E-01	-2.22757E+00	0.	0.	0.
246	31	-2.63161E+00	-6.41775E-02	-8.32570E-01	0.	0.	0.
	38	-2.63161E+00	-6.41775E-02	-8.32570E-01	0.	-1.09431E+01	-9.95894E-01
247	38	-3.55030E+00	-8.62044E-01	-7.88374E-01	0.	-1.09431E+01	-9.95894E-01
	45	-3.55030E+00	-8.62044E-01	-7.88374E-01	0.	-1.51831E+01	-3.06161E+00
248	45	-8.21587E+00	-3.82976E-01	-2.18596E+00	0.	-1.51831E+01	-3.06161E+00
	52	-8.21587E+00	-3.82976E-01	-2.18596E+00	0.	0.	0.
249	43	-9.63256E-01	-5.80726E-03	-6.37395E-02	0.	0.	0.
	50	-9.63256E-01	-5.80726E-03	-6.37395E-02	0.	-8.94782E-01	-4.98143E-01
250	50	-3.46211E+00	-9.12846E-03	-1.16683E-01	0.	-8.94782E-01	-4.98143E-01
	57	-3.46211E+00	-9.12846E-03	-1.16683E-01	0.	-1.19002E+00	-4.40358E-01
251	57	-3.55219E+00	-6.92500E-02	-5.37953E-02	0.	-1.19002E+00	-4.40358E-01
	64	-3.55219E+00	-6.92500E-02	-5.37953E-02	0.	-4.86269E-01	-1.47772E+00
252	64	-4.99737E+00	-3.63998E-02	-2.72041E-02	0.	-3.53858E-01	-8.47654E-01
	72	-4.99737E+00	-3.63998E-02	-2.72041E-02	0.	-1.78878E-13	-4.40903E-15
259	5	-2.54637E-01	0.	0.	0.	0.	0.
	20	-2.54637E-01	0.	0.	0.	0.	0.
260	20	-2.51171E-01	0.	0.	0.	0.	0.
	26	-2.51171E-01	0.	0.	0.	0.	0.
261	25	-1.63389E-01	0.	0.	0.	0.	0.
	32	-1.63399E-01	0.	0.	0.	0.	0.
262	32	-3.58775E-01	0.	0.	0.	0.	0.
	38	-3.58775E-01	0.	0.	0.	0.	0.
263	39	-4.43601E+00	-6.59017E-02	-1.60911E-02	0.	0.	0.
	44	-4.43601E+00	-6.59017E-02	-1.60911E-02	0.	-9.94498E-01	-1.05208E-01
264	44	-3.78126E+00	-8.37706E-03	-1.60911E-02	0.	-8.94498E-01	-1.05208E-01
	50	-3.78126E+00	-8.37706E-03	-1.60911E-02	0.	0.	0.
265	3	-2.54637E-01	0.	0.	0.	0.	0.
	20	-2.54637E-01	0.	0.	0.	0.	0.
266	20	-2.51171E-01	0.	0.	0.	0.	0.
	26	-2.51171E-01	0.	0.	0.	0.	0.

B E A M   S T R E S S E S   OUTPUT CASE 2

BEAM	NODE	AXIAL	* * * * SHEAR V2/A*K3	* * * * V3/A*K2	TORSION T*C/J	* * * * BENDING M2*C3/I2 (POINT C)	* * * * M3*C2/I3 (POINT B)
267	26	-2.38323E-01	1.97841E+00	-3.50234E-01	0.	0.	0.
	42	-2.38323E-01	1.97841E+00	-3.50234E-01	0.	-1.65604E+01	-1.83498E-01
268	42	-2.34645E-01	-3.19391E+00	-3.50234E-01	0.	-1.65604E+01	-1.83498E-01
	32	-2.34645E-01	-3.19391E+00	-3.50234E-01	0.	0.	0.
269	32	-3.58775E-01	0.	0.	0.	0.	0.
	38	-3.58775E-01	0.	0.	0.	0.	0.
270	38	-1.89402E-01	0.	0.	0.	0.	0.
	50	-1.89402E-01	0.	0.	0.	0.	0.
272	145	-2.16273E+00	0.	0.	0.	0.	0.
	146	-2.16273E+00	0.	0.	0.	0.	0.
274	191	-1.65512E+00	-5.47499E-02	-5.25922E-02	0.	0.	0.
	192	-1.65512E+00	-5.47499E-02	-5.25922E-02	0.	-1.02816E+00	-2.56944E+00
275	192	-1.82764E+00	-3.94100E-02	-4.34254E-02	0.	-1.02816E+00	-2.56944E+00
	197	-1.82764E+00	-3.94100E-02	-4.34254E-02	0.	-5.16312E-13	-2.64612E-13
276	332	-3.72633E+00	-1.03162E-02	-2.70886E-02	0.	0.	0.
	353	-3.72633E+00	-1.03162E-02	-2.70886E-02	0.	-3.96651E-01	-4.30319E-01
277	353	-5.97133E+00	-5.02283E-03	-1.48974E-02	0.	-3.96651E-01	-4.30319E-01
	354	-5.97133E+00	-5.02283E-03	-1.48974E-02	0.	-2.26115E-13	-5.90305E-15
278	335	-4.94874E+00	-1.32769E-02	-3.13343E-02	0.	0.	0.
	336	-4.94874E+00	-1.32769E-02	-3.13343E-02	0.	-5.32762E-01	-6.47916E-01
279	336	-7.80717E+00	-9.93770E-03	-2.25018E-02	0.	-5.32762E-01	-6.47916E-01
	344	-7.80717E+00	-9.93770E-03	-2.25018E-02	0.	-1.27395E-13	-1.10427E-13
280	15	-1.43275E-01	-9.24726E-04	-2.81187E-01	0.	-1.52558E+00	-5.57787E-15
	145	-1.43275E-01	-9.24726E-04	-2.81187E-01	0.	-1.14550E+00	-7.22145E-02
281	350	-1.77013E+00	-1.02278E-02	-8.27842E-02	0.	0.	0.
	351	-1.77013E+00	-1.02278E-02	-8.27842E-02	0.	-1.90095E-01	-7.46755E-01
282	351	-1.67911E+00	-1.02278E-02	-2.10967E-02	0.	-1.90095E-01	-7.46755E-01
	434	-1.67911E+00	-1.02278E-02	-2.10967E-02	0.	0.	0.
283	57	-6.72292E-02	0.	0.	0.	0.	0.
	192	-6.72292E-02	0.	0.	0.	0.	0.
284	192	-2.69697E-01	0.	0.	0.	0.	0.
	336	-2.69697E-01	0.	0.	0.	0.	0.
285	336	-2.09582E+00	-9.73010E-03	1.11399E-02	0.	0.	0.
	338	-2.09582E+00	-9.73010E-03	1.11399E-02	0.	-4.29968E-01	-7.88776E-01
286	338	-2.15271E+00	-1.08033E-02	-4.77175E-02	0.	-4.29968E-01	-7.88776E-01
	477	-2.15271E+00	-1.08033E-02	-4.77175E-02	0.	0.	0.
287	433	-3.72377E+00	-4.66438E-02	-3.11595E-02	0.	0.	0.
	434	-3.72377E+00	-4.66438E-02	-3.11595E-02	0.	-5.09505E-01	-1.82540E+00
288	434	-6.56167E+00	-5.07826E-02	-3.05227E-02	0.	-5.09505E-01	-1.82540E+00
	435	-6.56167E+00	-5.07826E-02	-3.05227E-02	0.	-9.31475E-02	-4.04497E-01
289	435	-6.62234E+00	-1.17631E-02	-7.26652E-03	0.	-9.31475E-02	-4.04497E-01
	436	-6.62234E+00	-1.17631E-02	-7.26652E-03	0.	-1.01500E-13	-1.79774E-13
290	445	-2.80207E+00	-2.17847E-01	-3.57123E-02	0.	0.	0.
	446	-2.80207E+00	-2.17847E-01	-3.57123E-02	0.	-4.59395E-01	-3.28777E+00
291	446	-2.36450E+00	-2.64914E-01	-1.00167E-02	0.	-4.59395E-01	-3.28777E+00
	447	-2.36450E+00	-2.64914E-01	-1.00167E-02	0.	-3.45951E-01	-9.27898E-01
292	447	-3.03505E+00	-5.76423E-02	-2.98847E-02	0.	-3.45951E-01	-9.27898E-01
	449	-3.03505E+00	-5.76423E-02	-2.98847E-02	0.	-4.21989E-13	-1.85052E-13
293	451	-2.80123E+00	-1.33437E-01	-2.33019E-01	0.	0.	0.
	452	-2.80123E+00	-1.33437E-01	-2.33019E-01	0.	-3.06276E+00	-2.03357E+00
294	452	-4.04735E+00	-1.69577E-01	-1.18503E-01	0.	-3.06276E+00	-2.03357E+00
	453	-4.04735E+00	-1.69577E-01	-1.18503E-01	0.	-1.50235E+00	-6.13025E-01

B E A M S T R E S S E S

BEAM	NODE	AXIAL	* * * * SHEAR * * * * V2/A*K3	V3/A*K2	TORSION T*C/J	* * * * BENDING * * * * M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
*****	****	*************	*************	*************	*************	*************	*************
295	453	-4.12058E+00	-5.13959E-02	-1.38417E-01	0.	-1.60235E+00	-8.19025E-01
	454	-4.12058E+00	-5.13959E-02	-1.38417E-01	0.	-2.10576E-13	-7.40704E-14
296	457	-2.84749E+00	-5.80830E-02	-2.33444E-01	0.	0.	0.
	458	-2.84749E+00	-5.80830E-02	-2.33444E-01	0.	-3.06834E+00	-8.25432E-01
297	459	-4.09816E+00	-7.20317E-02	-1.18670E-01	0.	-3.06834E+00	-8.25432E-01
	459	-4.09816E+00	-7.20317E-02	-1.18670E-01	0.	-1.60587E+00	-7.92316E-01
298	457	-4.16939E+00	-5.94664E-02	-1.38722E-01	0.	-1.60587E+00	-7.92316E-01
	460	-4.16939E+00	-5.94664E-02	-1.38722E-01	0.	-5.26763E-13	-1.51174E-13
299	463	-2.58321E+00	-1.97252E-02	-3.77180E-02	0.	0.	0.
	464	-2.58321E+00	-1.97252E-02	-3.77180E-02	0.	-4.95757E-01	-2.23631E-01
100	464	-5.00321E+00	-6.38506E-02	-1.00324E-02	0.	-4.95757E-01	-2.23631E-01
	465	-5.00321E+00	-6.38506E-02	-1.00324E-02	0.	-3.72120E-01	-9.49938E-01
101	465	-5.05705E+00	-7.12965E-02	-3.21453E-02	0.	-3.72120E-01	-9.49938E-01
	465	-5.05705E+00	-7.12965E-02	-3.21453E-02	0.	-1.97514E-14	-2.99951E-13
102	475	-4.74972E+00	-6.77122E-03	-5.53409E-02	0.	0.	0.
	476	-4.74972E+00	-6.77122E-03	-5.53409E-02	0.	-7.58127E-01	-2.63766E-01
103	476	-7.68062E+00	-2.98736E-02	-1.08247E-01	0.	-7.58127E-01	-2.63766E-01
	477	-7.68062E+00	-2.98736E-02	-1.08247E-01	0.	-1.02870E+00	-3.90524E-01
104	477	-9.75879E+00	-2.49404E-02	-5.73725E-02	0.	-1.02870E+00	-3.90524E-01
	478	-9.75879E+00	-2.49404E-02	-5.73725E-02	0.	-3.96496E-01	-6.00802E-01
105	478	-9.80290E+00	-1.74718E-02	-3.09310E-02	0.	-3.96495E-01	-6.00802E-01
	479	-9.80290E+00	-1.74718E-02	-3.09310E-02	0.	-3.52698E-14	-2.19298E-14
112	434	-1.81481E-02	0.	0.	0.	0.	0.
	446	-1.81481E-02	0.	0.	0.	0.	0.
113	464	-1.09552E-01	0.	0.	0.	0.	0.
	475	-1.09552E-01	0.	0.	0.	0.	0.
114	445	-9.92470E-02	0.	0.	0.	0.	0.
	452	-9.92470E-02	0.	0.	0.	0.	0.
115	452	-2.40421E-01	0.	0.	0.	0.	0.
	458	-2.40421E-01	0.	0.	0.	0.	0.
116	458	-3.77444E-01	0.	0.	0.	0.	0.
	464	-3.77444E-01	0.	0.	0.	0.	0.
117	434	-1.81481E-02	0.	0.	0.	0.	0.
	446	-1.81481E-02	0.	0.	0.	0.	0.
118	445	-9.92470E-02	0.	0.	0.	0.	0.
	452	-9.92470E-02	0.	0.	0.	0.	0.
119	452	-1.41328E-01	1.97841E+00	-3.50234E-01	0.	-1.65604E+01	-1.83498E-01
	455	-1.41328E-01	1.97841E+00	-3.50234E-01	0.	-1.55604E+01	-1.83498E-01
120	455	-3.86795E-01	-3.19391E+00	-3.50234E-01	0.	0.	0.
	458	-3.86795E-01	-3.19391E+00	-3.50234E-01	0.	0.	0.
121	459	-3.77444E-01	0.	0.	0.	0.	0.
	464	-3.77444E-01	0.	0.	0.	0.	0.
122	464	-1.09552E-01	0.	0.	0.	0.	0.
	476	-1.09552E-01	0.	0.	0.	0.	0.
123	435	-3.13636E-02	0.	0.	0.	0.	0.
	447	-3.13636E-02	0.	0.	0.	0.	0.
124	447	-2.43727E-01	0.	0.	0.	0.	0.
	453	-2.43727E-01	0.	0.	0.	0.	0.
125	453	-3.87434E-01	0.	0.	0.	0.	0.
	457	-3.87434E-01	0.	0.	0.	0.	0.
126	457	-4.67348E-01	0.	0.	0.	0.	0.
	467	-4.67348E-01	0.	0.	0.	0.	0.

B E A M   S T R E S S E S   OUTPUT CASE 2

BEAM	NODE	AXIAL	**** SHEAR **** V2/A*K3	V3/A*K2	TORSION T*C/J	**** BENDING **** M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
*****	****	************	************	************	************	************	************
127	465	-5.43874E-01	-4.95816E-04	-2.21134E-02	0.	0.	0.
	467	-5.43874E-01	-4.95816E-04	-2.21134E-02	0.	-1.22928E+00	-3.80884E-02
128	467	-2.97645E-02	-3.03274E-03	-2.21134E-02	0.	-1.22928E+00	-3.80884E-02
	478	-2.97645E-02	-3.03274E-03	-2.21134E-02	0.	0.	0.
129	36	-1.17352E+01	0.	0.	0.	0.	0.
	38	-1.17352E+01	0.	0.	0.	0.	0.
130	44	-1.34636E+01	0.	0.	0.	0.	0.
	52	-1.34636E+01	0.	0.	0.	0.	0.
131	36	-1.16768E+01	0.	0.	0.	0.	0.
	50	-1.16768E+01	0.	0.	0.	0.	0.
132	44	-1.41269E+01	0.	0.	0.	0.	0.
	64	-1.41269E+01	0.	0.	0.	0.	0.
133	332	-1.40087E+01	0.	0.	0.	0.	0.
	351	-1.40087E+01	0.	0.	0.	0.	0.
134	351	-1.37125E+01	0.	0.	0.	0.	0.
	433	-1.37125E+01	0.	0.	0.	0.	0.
135	350	-1.42524E+01	0.	0.	0.	0.	0.
	353	-1.42524E+01	0.	0.	0.	0.	0.
136	353	-1.43340E+01	0.	0.	0.	0.	0.
	436	-1.43340E+01	0.	0.	0.	0.	0.
137	434	-1.37162E+01	0.	0.	0.	0.	0.
	353	-1.37162E+01	0.	0.	0.	0.	0.
138	353	-1.37979E+01	0.	0.	0.	0.	0.
	354	-1.37979E+01	0.	0.	0.	0.	0.
139	335	-1.82043E+01	0.	0.	0.	0.	0.
	338	-1.82043E+01	0.	0.	0.	0.	0.
140	338	-1.80133E+01	0.	0.	0.	0.	0.
	475	-1.80133E+01	0.	0.	0.	0.	0.
141	336	-1.62466E+01	0.	0.	0.	0.	0.
	337	-1.62466E+01	0.	0.	0.	0.	0.
142	339	-1.63264E+01	0.	0.	0.	0.	0.
	479	-1.63264E+01	0.	0.	0.	0.	0.
143	477	-1.58174E+01	0.	0.	0.	0.	0.
	339	-1.58174E+01	0.	0.	0.	0.	0.
144	339	-1.58973E+01	0.	0.	0.	0.	0.
	344	-1.58973E+01	0.	0.	0.	0.	0.
145	464	-1.32242E+01	0.	0.	0.	0.	0.
	469	-1.32242E+01	0.	0.	0.	0.	0.
146	469	-1.32731E+01	0.	0.	0.	0.	0.
	476	-1.32731E+01	0.	0.	0.	0.	0.
147	464	-1.57110E+01	0.	0.	0.	0.	0.
	467	-1.57110E+01	0.	0.	0.	0.	0.
148	467	-1.59877E+01	0.	0.	0.	0.	0.
	479	-1.59877E+01	0.	0.	0.	0.	0.
149	476	-1.42064E+01	0.	0.	0.	0.	0.
	467	-1.42064E+01	0.	0.	0.	0.	0.
150	467	-1.44195E+01	0.	0.	0.	0.	0.
	455	-1.44195E+01	0.	0.	0.	0.	0.
151	15	-1.41053E-01	-1.27762E-02	-5.39067E-01	0.	0.	0.
	46	-1.41053E-01	-1.27762E-02	-5.39067E-01	0.	2.37314E-01	-1.09173E-01
152	45	-1.19255E-01	-1.83957E-03	5.22400E-01	0.	5.86088E-01	-1.09173E-01
	116	-1.19255E-01	-1.83957E-03	5.22400E-01	0.	-2.37779E+00	-1.12022E-01

BEAM STRESSES — OUTPUT CASE 2

BEAM	NODE	AXIAL	SHEAR V2/A*K3	SHEAR V3/A*K2	TORSION T*C/J	BENDING M2*C3/I2 (POINT C)	BENDING M3*C2/I3 (POINT B)
153	116	-1.95972E-01	-4.78131E-03	1.47197E-02	0.	-2.61036E+00	-1.12022E-01
	140	-1.95972E-01	-4.78131E-03	1.47197E-02	0.	-2.73038E+00	-1.22570E-01
154	140	-1.18910E-01	-2.53217E-03	-5.90994E-01	0.	-2.81580E+00	-1.22570E-01
	168	-1.18910E-01	-2.53217E-03	-5.90994E-01	0.	-1.38380E-01	-1.27843E-02
155	88	-1.66102E-01	0.	0.	0.	0.	0.
	118	-1.66102E-01	0.	0.	0.	0.	0.
156	142	-1.69877E-01	0.	0.	0.	0.	0.
	170	-1.69877E-01	0.	0.	0.	0.	0.
157	90	-8.68244E-02	0.	0.	0.	0.	0.
	120	-8.68244E-02	0.	0.	0.	0.	0.
158	144	-8.93275E-02	0.	0.	0.	0.	0.
	172	-8.93275E-02	0.	0.	0.	0.	0.
159	27	-3.44698E-01	-3.22974E-01	2.37588E+00	0.	0.	0.
	92	-3.44698E-01	-3.22974E-01	2.37588E+00	0.	-4.44191E+00	-2.73346E-01
160	92	-3.92745E-01	-5.56513E-02	1.50041E+00	0.	-4.44191E+00	-2.73346E-01
	122	-3.92745E-01	-5.56513E-02	1.50041E+00	0.	-1.97143E+01	-3.90873E+00
161	122	-4.16661E-01	-1.41217E-01	-2.33938E-01	0.	-1.97143E+01	-3.90873E+00
	147	-4.16661E-01	-1.41217E-01	-2.33938E-01	0.	-1.82393E+01	-2.78349E+00
162	147	-4.58426E-01	-5.60747E-02	-2.89278E+00	0.	-1.82393E+01	-2.73349E+00
	174	-4.58426E-01	-5.60747E-02	-2.89278E+00	0.	-2.53119E-12	-2.07590E-01
163	94	-8.21889E-02	0.	0.	0.	0.	0.
	124	-8.21889E-02	0.	0.	0.	0.	0.
164	96	-1.46695E-01	0.	0.	0.	0.	0.
	126	-1.46695E-01	0.	0.	0.	0.	0.
165	148	-1.36687E-01	0.	0.	0.	0.	0.
	176	-1.36687E-01	0.	0.	0.	0.	0.
166	33	-6.23265E-01	-5.91281E-01	2.36365E+00	0.	0.	0.
	98	-6.23265E-01	-5.91281E-01	2.36365E+00	0.	-4.41905E+00	-3.33774E+00
167	98	-5.67831E-01	-1.37526E-01	1.49283E+00	0.	-4.41905E+00	-3.33774E+00
	128	-5.67831E-01	-1.37526E-01	1.49283E+00	0.	-1.76143E+01	-5.18557E+00
168	128	-4.02870E-01	-1.83548E-01	-2.35192E-01	0.	-1.76143E+01	-5.18557E+00
	150	-4.02870E-01	-1.83548E-01	-2.35192E-01	0.	-1.81314E+01	-3.69015E+00
169	150	-3.67118E-01	-7.09834E-02	-2.87566E+00	0.	-1.81314E+01	-3.69015E+00
	178	-3.67118E-01	-7.09834E-02	-2.87566E+00	0.	0.	0.
170	100	-2.08212E+00	0.	0.	0.	0.	0.
	130	-2.08212E+00	0.	0.	0.	0.	0.
171	152	-9.05928E-02	0.	0.	0.	0.	0.
	180	-9.05928E-02	0.	0.	0.	0.	0.
172	102	-8.34423E-02	0.	0.	0.	0.	0.
	132	-8.34423E-02	0.	0.	0.	0.	0.
173	154	-1.78691E-01	0.	0.	0.	0.	0.
	182	-1.78691E-01	0.	0.	0.	0.	0.
174	39	-7.87577E-01	-4.28798E-01	5.52977E+00	0.	0.	0.
	106	-7.87577E-01	-4.28798E-01	5.52977E+00	0.	-4.96967E+00	-2.14755E+00
175	106	-7.14892E-01	-1.50333E-01	3.56682E+00	0.	-4.96967E+00	-2.14755E+00
	136	-7.14892E-01	-1.50333E-01	3.56682E+00	0.	-2.24221E+01	-5.06070E+00
176	136	-3.99290E-01	-2.69461E-01	-5.44862E-01	0.	-2.24221E+01	-5.06070E+00
	158	-3.99290E-01	-2.69461E-01	-5.44862E-01	0.	-2.07707E+01	-4.70925E+00
177	158	-1.61670E-01	-1.22614E-01	-5.85302E+00	0.	-2.07707E+01	-4.70925E+00
	188	-1.61670E-01	-1.22614E-01	-5.85302E+00	0.	-1.31617E-12	-1.69809E-12
178	45	-8.74405E-01	-2.77019E-01	-8.39715E+00	0.	0.	0.
	110	-8.74405E-01	-2.77019E-01	-8.39715E+00	0.	2.80767E+00	-2.77475E+00

B E A M   S T R E S S E S

OUTPUT CASE 2

BEAM	NODE	AXIAL	* * * * SHEAR * * * * V2/A*K3	V3/A*K2	TORSION T*C/J	* * * * BENDING * * * * M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
*****	****	*************	*************	*************	*************	*************	*************
179	110	-7.45357E-01	-1.63418E-01	-5.42246E+00	0.	2.80767E+00	-2.97475E+00
	138	-7.45357E-01	-1.63418E-01	-5.42246E+00	0.	1.26787E+01	-4.22691E+00
180	138	-4.48016E-01	-2.04350E-01	3.17043E-01	0.	1.26787E+01	-4.22691E+00
	162	-4.48016E-01	-2.04350E-01	3.17043E-01	0.	1.17470E+01	-5.05425E+00
181	162	-1.50332E-01	-1.19681E-01	3.99718E+00	0.	1.17470E+01	-5.05425E+00
	188	-1.50332E-01	-1.19681E-01	3.99718E+00	0.	2.30442E-13	-9.71116E-13
182	85	-6.83151E+00	-4.16689E-03	7.60371E-01	0.	0.	0.
	88	-6.83151E+00	-4.16689E-03	7.60371E-01	0.	-8.32155E+00	-2.75868E-01
183	88	-4.94255E+00	-6.62667E-03	-9.83113E-03	0.	-8.32155E+00	-2.75868E-01
	90	-4.94255E+00	-6.62667E-03	-9.83113E-03	0.	-8.25490E+00	-3.80016E-01
184	90	-4.89277E+00	-4.44365E-03	-1.21770E+00	0.	-8.25490E+00	-3.80016E-01
	92	-4.89277E+00	-4.44365E-03	-1.21770E+00	0.	0.	0.
185	92	-3.53550E+00	-4.13741E-03	6.88882E-01	0.	0.	0.
	94	-3.53550E+00	-4.13741E-03	6.88882E-01	0.	-6.84591E+00	-3.45777E-01
186	94	-3.48361E+00	-1.04199E-02	7.75914E-03	0.	-6.84591E+00	-3.45777E-01
	95	-3.48361E+00	-1.04199E-02	7.75914E-03	0.	-6.92302E+00	-4.88722E-01
187	95	-2.44976E+00	-6.29350E-03	-1.12464E+00	0.	-6.92302E+00	-4.88722E-01
	98	-2.44976E+00	-6.29350E-03	-1.12464E+00	0.	0.	0.
188	98	-2.02113E+00	-3.80133E-03	7.32977E-01	0.	0.	0.
	100	-2.02113E+00	-3.80133E-03	7.32977E-01	0.	-8.11395E+00	-3.66660E-01
189	100	-2.00533E+00	-9.50360E-03	-5.27314E-02	0.	-8.11395E+00	-3.66650E-01
	102	-2.00513E+00	-9.50360E-03	-5.27314E-02	0.	-7.68380E+00	-4.57216E-01
190	102	-1.98208E+00	-2.36153E-02	-9.60546E-01	0.	-7.68380E+00	-4.57216E-01
	104	-1.98209E+00	-2.36153E-02	-9.60546E-01	0.	-4.68993E+00	-5.79581E-01
191	104	-1.97472E+00	-1.22625E-02	-1.25393E+00	0.	-4.68993E+00	-5.78581E-01
	106	-1.97472E+00	-1.22625E-02	-1.25393E+00	0.	0.	0.
192	106	-4.66592E-01	-4.62684E-01	2.07394E+00	0.	0.	0.
	108	-4.66592E-01	-4.62684E-01	2.07394E+00	0.	-3.09233E+01	-3.46253E+01
193	109	-4.61172E-01	-4.62684E-01	-3.34813E+00	0.	-3.09233E+01	-3.46263E+01
	110	-4.51172E-01	-4.62684E-01	-3.34813E+00	0.	0.	0.
194	114	-4.95364E+00	-4.05386E-03	1.42584E+00	0.	0.	0.
	118	-4.95364E+00	-4.05386E-03	1.42584E+00	0.	-1.56044E+01	-2.64043E-01
195	118	-4.88713E+00	-5.31012E-03	5.08973E-03	0.	-1.56044E+01	-2.64043E-01
	120	-4.88713E+00	-5.31012E-03	5.08973E-03	0.	-1.56711E+01	-3.70230E-01
196	120	-3.69366E+00	-4.32922E-03	-2.31167E+00	0.	-1.56711E+01	-3.70230E-01
	122	-3.69365E+00	-4.32922E-03	-2.31167E+00	0.	0.	0.
197	122	-3.67862E+00	-3.87693E-03	1.29812E+00	0.	0.	0.
	124	-3.67862E+00	-3.87693E-03	1.29812E+00	0.	-1.29003E+01	-3.31034E-01
198	124	-3.58073E+00	-1.03799E-02	-1.84103E-02	0.	-1.29003E+01	-3.31034E-01
	126	-3.58093E+00	-1.03799E-02	-1.84103E-02	0.	-1.27855E+01	-5.13761E-01
199	126	-3.57298E+00	-5.70076E-03	-2.10364E+00	0.	-1.27856E+01	-5.13761E-01
	128	-3.57298E+00	-5.70076E-03	-2.10364E+00	0.	0.	0.
200	128	-3.68695E+00	-2.31629E-03	1.38692E+00	0.	0.	0.
	130	-3.68695E+00	-2.31629E-03	1.38692E+00	0.	-1.53530E+01	-2.12389E-01
201	130	-4.31921E+00	-7.35634E-03	-1.04374E-01	0.	-1.53530E+01	-2.12389E-01
	132	-4.31921E+00	-7.35634E-03	-1.04374E-01	0.	-1.46373E+01	-6.07556E-01
202	132	-6.01571E+00	-4.20027E-02	-1.83893E+00	0.	-1.46373E+01	-6.07556E-01
	134	-6.01571E+00	-4.20027E-02	-1.83893E+00	0.	-8.70564E+00	-1.10123E+00
203	134	-5.98997E+00	-2.33396E-02	-2.38106E+00	0.	-8.70564E+00	-1.10123E+00
	135	-5.98997E+00	-2.33396E-02	-2.38106E+00	0.	0.	0.
204	136	-5.22360E-01	-4.33344E-01	2.26388E+00	0.	0.	0.
	114	-5.22360E-01	-4.33344E-01	2.26388E+00	0.	-1.77777E+01	-2.73114E+01

nes NUCLEAR ENERGY SERVICES, INC.

BEAM STRESSES

OUTPUT CASE 2

BEAM	NODE	AXIAL	**** SHEAR **** V2/A*K3	V3/A*K2	TORSION T*C/J	**** BENDING **** M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
405	114	-2.90517E-01	-4.03388E-01	-3.65476E+00	0.	-1.77777E+01	-2.70114E+01
	138	-2.90517E-01	-4.03388E-01	-3.65476E+00	0.	0.	0.
406	140	-6.54187E+00	-5.95285E-03	1.43015E+00	0.	0.	0.
	142	-6.54187E+00	-5.95285E-03	1.43015E+00	0.	-1.56517E+01	-4.53822E-01
407	142	-6.46475E+00	-6.97666E-03	1.00650E-02	0.	-1.56517E+01	-4.53822E-01
	144	-6.46475E+00	-6.97666E-03	1.00650E-02	0.	-1.57618E+01	-1.86009E-01
408	144	-3.69665E+00	-2.17506E-03	-2.32506E+00	0.	-1.57618E+01	-1.86009E-01
	147	-3.69665E+00	-2.17506E-03	-2.32506E+00	0.	0.	0.
409	147	-3.66962E+00	-9.51570E-04	8.36066E-01	0.	0.	0.
	148	-3.66962E+00	-9.51570E-04	8.36066E-01	0.	-1.43034E+01	-1.29799E-01
410	148	-3.13775E+00	-1.30739E-03	-1.81745E+00	0.	-1.43034E+01	-1.29799E-01
	150	-3.13775E+00	-1.30739E-03	-1.81745E+00	0.	0.	0.
411	150	-3.06395E+00	-5.68695E-03	1.59539E+00	0.	0.	0.
	152	-3.06395E+00	-5.68695E-03	1.59539E+00	0.	-1.26435E+01	-3.42267E-01
412	152	-4.35484E+00	-1.03752E-02	2.30141E-01	0.	-1.26435E+01	-3.42267E-01
	154	-4.35484E+00	-1.03752E-02	2.30141E-01	0.	-1.55530E+01	-7.35098E-01
413	154	-4.25709E+00	-4.69271E-02	-1.64842E+00	0.	-1.55530E+01	-7.35098E-01
	156	-4.25709E+00	-4.69271E-02	-1.64842E+00	0.	-8.80959E+00	-1.79783E+00
414	156	-4.22296E+00	-3.81034E-02	-2.35538E+00	0.	-8.80959E+00	-1.79783E+00
	158	-4.22296E+00	-3.81034E-02	-2.35538E+00	0.	0.	0.
415	158	-5.28693E-01	-3.92094E-01	2.04017E+00	0.	0.	0.
	160	-5.28693E-01	-3.92094E-01	2.04017E+00	0.	-1.62609E+01	-2.42532E+01
416	160	-2.29287E-01	-3.92094E-01	-3.29361E+00	0.	-1.62609E+01	-2.42532E+01
	162	-2.29287E-01	-3.92094E-01	-3.29361E+00	0.	0.	0.
417	168	-3.65751E+00	-1.94682E-02	1.03398E+00	0.	0.	0.
	170	-3.65751E+00	-1.94682E-02	1.03398E+00	0.	-7.78142E+00	-7.98407E-01
418	170	-2.64515E+00	-2.48566E-02	7.43744E-01	0.	-7.78142E+00	-7.98407E-01
	172	-2.64515E+00	-2.48566E-02	7.43744E-01	0.	-1.33786E+01	-3.73499E-01
419	172	-2.62881E+00	-1.36215E-02	4.63489E-01	0.	-1.33786E+01	-3.73499E-01
	174	-2.62881E+00	-1.36215E-02	4.63489E-01	0.	-1.68667E+01	-3.07429E-01
420	174	-1.98806E+00	-2.52777E-03	-2.31456E+00	0.	-1.68667E+01	-1.83815E-01
	176	-1.98806E+00	-2.52777E-03	-2.31456E+00	0.	0.	0.
421	176	-2.05606E+00	-2.63637E-03	7.10479E-01	0.	0.	0.
	178	-2.05606E+00	-2.63637E-03	7.10479E-01	0.	-8.59874E+00	-2.49540E-01
422	178	-1.62125E+00	-5.51005E-03	-1.83881E+00	0.	-8.59874E+00	-2.49540E-01
	180	-1.62125E+00	-5.51005E-03	-1.83881E+00	0.	0.	0.
423	180	-3.14335E+00	-5.61471E-03	2.69570E-01	0.	0.	0.
	182	-3.14335E+00	-5.61471E-03	2.69570E-01	0.	-3.60463E+00	-4.07395E-01
424	182	-2.06719E+00	-2.00416E-02	-3.11572E-01	0.	-3.60463E+00	-4.07395E-01
	184	-2.06719E+00	-2.00416E-02	-3.11572E-01	0.	-2.25649E+00	-6.07850E-01
425	184	-2.05259E+00	-2.21471E-02	-5.70394E-01	0.	-2.25649E+00	-6.07850E-01
	186	-2.05259E+00	-2.21471E-02	-5.70394E-01	0.	0.	0.
426	186	-5.30311E-01	-3.78027E-01	1.89153E+00	0.	0.	0.
	166	-5.30311E-01	-3.78027E-01	1.89153E+00	0.	-2.32192E+01	-2.87478E+01
427	166	-2.19154E-01	-3.78027E-01	-3.05365E+00	0.	-2.32192E+01	-2.87478E+01
	188	-2.19154E-01	-3.78027E-01	-3.05365E+00	0.	0.	0.
428	99	-9.46417E+00	0.	0.	0.	0.	0.
	116	-9.46417E+00	0.	0.	0.	0.	0.
429	92	-7.40233E+00	0.	0.	0.	0.	0.
	120	-7.40233E+00	0.	0.	0.	0.	0.
430	95	-6.28605E+00	0.	0.	0.	0.	0.
	124	-6.28605E+00	0.	0.	0.	0.	0.

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BEAM STRESSES

OUTPUT CASE 2

BEAM	NODE	AXIAL	**** SHEAR **** V2/A*K3	V3/A*K2	TORSION T*C/J	**** BENDING **** M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
431	106	-7.42527E+00	0.	0.	0.	0.	0.
	132	-7.42527E+00	0.	0.	0.	0.	0.
433	140	-7.36233E+00	0.	0.	0.	0.	0.
	170	-7.36233E+00	0.	0.	0.	0.	0.
434	144	-6.03761E+00	0.	0.	0.	0.	0.
	174	-6.03761E+00	0.	0.	0.	0.	0.
435	148	-2.66003E+00	0.	0.	0.	0.	0.
	178	-2.66003E+00	0.	0.	0.	0.	0.
436	152	-4.57813E+00	0.	0.	0.	0.	0.
	142	-4.57813E+00	0.	0.	0.	0.	0.
437	144	-7.90654E+00	0.	0.	0.	0.	0.
	170	-7.70653E+00	0.	0.	0.	0.	0.
438	149	-5.11448E+00	0.	0.	0.	0.	0.
	174	-5.11443E+00	0.	0.	0.	0.	0.
439	152	-4.43033E+00	0.	0.	0.	0.	0.
	174	-4.43033E+00	0.	0.	0.	0.	0.
440	153	-4.15444E+00	0.	0.	0.	0.	0.
	132	-4.15444E+00	0.	0.	0.	0.	0.
442	164	-5.21437E-01	-8.57131E-04	-1.60269E-01	0.	-3.36270E-02	-5.37010E-02
	136	-5.21437E-01	-8.57131E-04	-1.60269E-01	0.	6.29385E-01	-1.12347E-02
443	175	-1.77602E-01	-5.42531E-04	5.75729E-02	0.	5.14906E-01	-1.12347E-02
	175	-1.77602E-01	-5.42531E-04	5.75729E-02	0.	-1.72194E+00	-1.14681E-01
444	164	-6.33177E+00	-1.71522E-02	-5.10888E-02	0.	0.	0.
	173	-6.33197E+00	-1.71522E-02	-5.10888E-02	0.	-5.10764E-01	-1.57128E+00
445	176	-2.35553E+00	-4.71751E-16	-1.20851E-16	0.	0.	0.
	177	-2.35557E+00	-4.71751E-16	-1.20851E-16	0.	-1.65459E-15	-3.25433E-14
446	183	-1.41571E+00	-1.43148E-15	-1.52797E-14	0.	0.	0.
	133	-1.41571E+00	-1.43148E-15	-1.52797E-14	0.	-3.59347E-13	-8.75012E-14
447	180	-1.21057E+01	-7.26177E-15	-7.45834E-14	0.	0.	0.
	174	-1.21057E+01	-7.26177E-15	-7.45834E-14	0.	-1.55105E-12	-5.27753E-13
448	136	-1.39570E+01	-1.73866E-15	-5.15239E-14	0.	0.	0.
	140	-1.39570E+01	-1.73366E-15	-5.15237E-14	0.	-1.24285E-12	-1.32061E-13
449	175	-3.59664E-02	-1.06263E-03	-4.59144E-04	0.	-1.79051E-02	-1.15614E-01
	203	-3.59664E-02	-1.06263E-03	-4.59144E-04	0.	-2.50220E-02	-1.74123E-01
450	93	-6.78143E+00	0.	0.	0.	0.	0.
	129	-6.78143E+00	0.	0.	0.	0.	0.
451	92	-5.70552E+00	0.	0.	0.	0.	0.
	124	-5.70552E+00	0.	0.	0.	0.	0.
452	95	-7.62054E+00	0.	0.	0.	0.	0.
	123	-7.62054E+00	0.	0.	0.	0.	0.
453	[illegible]	-4.93716E+00	0.	0.	0.	0.	0.
	133	-4.93716E+00	0.	0.	0.	0.	0.
454	133	-4.44314E+00	0.	0.	0.	0.	0.
	137	-4.44314E+00	0.	0.	0.	0.	0.
455	22	[illegible]	-4.51344E-04	-1.63020E-02	0.	-1.48852E-02	4.77392E-16
	23	[illegible]	-4.51344E-04	-1.63020E-02	0.	-1.13709E-01	4.97304E-03
456	14	[illegible]	-5.73184E-05	-5.44519E-03	0.	-1.19155E-02	-1.49886E-16
	41	[illegible]	-5.73184E-05	-5.44519E-03	0.	-7.54207E-02	-3.41125E-04
457	43	[illegible]	[illegible]	-1.54764E-02	0.	-2.35742E-03	-1.74720E-16
	47	[illegible]	[illegible]	-1.54764E-02	0.	-2.54274E-01	-2.52279E-03
458	45	[illegible]	-2.14513E-05	-4.29250E-02	0.	-5.79329E-03	-6.74421E-17
	[illegible]	[illegible]	-2.14513E-05	-4.29250E-02	0.	-7.54446E-01	-2.71519E-03

B E A M   S T R E S S E S

OUTPUT CASE 2

BEAM	NODE	AXIAL	**** SHEAR **** V2/A*K3	V3/A*K2	TORSION T*C/J	**** BENDING **** M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
459	52	-1.15409E-01	-1.35388E-03	-5.57007E-02	0.	-4.44756E-02	-9.72673E-16
	59	-1.15807E-01	-1.35388E-03	-5.57007E-02	0.	-9.44189E-01	-4.21635E-02
461	52	-4.02531E+00	0.	0.	0.	0.	0.
	54	-4.02531E+00	0.	0.	0.	0.	0.

MODAL EXTRACTION DATA

MODE NO.	EIGENVALUE (OMEGA**2)	NATURAL FREQUENCY	PERIOD	GENERALIZED WEIGHT	MAX TRANSLATION NODE-DOF	VALUE	--- MODAL WEIGHTS --- (GEN. WGT. * PARTICIPATION FACTORS**2) X1	X2	X3	
1	922.359	4.834	.2069	2728.73	3-2	1.0000	.07742	2661.69433	33.22971	12.0
2	1293.45	5.732	.1745	2698.19	3-1	1.0000	2691.81800	.22291	2.95948	12.0
3	3514.65	9.435	.1060	2731.68	3-3	1.0000	3.10487	33.08430	2658.81325	12.0

LANCZOS REDUCED MATRIX SIZE (DOF) = 3
APPROX. MAXIMUM EIGENVALUE(OMEGA**2)= .351465E+04

*NOTE** THE LAST COLUMN IN THE TABLE ABOVE IS RELATED TO EIGENVALUE ACCURACY BOUNDS.

(RSS = 6) DISPLACMT.

NODE	X1	X2	X3	X4	X5	X6
1	5.366083 17E-02	7.75986373E-02	1.77965430E-02	1.48724720E-04	7.31988754E-05	1.09438974E-06
2	2.36449404E-02	2.31833396E-02	1.68225724E-02	1.36984963E-04	7.12030977E-05	0.
3	5.37047822E-02	7.76048710E-02	1.98809373E-02	1.48724720E-04	7.31988754E-05	1.09438974E-06

(RSS 6) ACCEL.

NODE	X1	X2	X3	X4	X5	X6
1	1.78308850E-01	1.86053679E-01	1.60569235E-01	3.56268372E-04	2.43261595E-04	3.52466117E-06
2	7.97819648E-02	5.87618187E-02	1.51782491E-01	3.27444936E-04	2.36606827E-04	0.
3	1.78454918E-01	1.86068803E-01	1.63357676E-01	3.56268072E-04	2.43261595E-04	3.52466117E-06

(RSS = 6) BEAM END LOADS (ELEMENT).

NO	NODES		AXIAL	V2	V3	M2	M3	TORSION
1	JA	1	4.4025E+02	4.8094E+02	5.0146E+02	1.8953E+04	7.0300E+03	2.2187E+04
	JB	2	4.4025E+02	4.8094E+02	5.0146E+02	1.7011E+05	1.6179E+05	2.2187E+04

BEAM STRESSES — OUTPUT CASE 1

DL+ (1Z²+1Y²+1X²)

BEAM	NODE	AXIAL	**** SHEAR **** V2/A*K3	V3/A*K2	TORSION T*C/J	**** BENDING **** M2*C3/I2 (POINT C)	M3*C2/I3 (POINT B)
*****	****	*************	*************	*************	*************	*************	*************
1	1	2.00664E-03	1.57575E-03	2.47565E-03	0.	5.85937E-03	1.77940E-02
	2	2.00664E-03	1.57575E-03	2.47565E-03	0.	2.38307E-03	5.45966E-03
2	2	1.11228E-02	5.94296E-03	2.91354E-03	0.	2.61706E-02	5.00424E-02
	3	1.11228E-02	5.94296E-03	2.91354E-03	0.	7.55538E-02	6.82375E-02
3	3	3.87072E-05	4.66228E-03	3.19049E-02	0.	1.57872E-01	2.13503E-02
	4	3.87072E-05	4.66228E-03	3.19049E-02	0.	-7.56433E-02	2.47082E-02
4	4	1.08874E-03	6.61994E-03	-1.78169E-02	0.	-7.56433E-02	2.03774E-02
	5	1.08874E-03	6.61994E-03	-1.78169E-02	0.	1.35160E-01	2.24542E-02
5	6	5.28417E-03	1.61131E-03	5.32031E-04	0.	2.88681E-03	1.71407E-02
	7	5.28417E-03	1.61131E-03	5.32031E-04	0.	1.89916E-03	4.55232E-03
6	7	2.70603E-02	5.48654E-03	3.24205E-03	0.	3.14652E-02	4.57241E-02
	8	2.70603E-02	5.48654E-03	3.24205E-03	0.	3.53516E-02	7.33193E-02
7	8	1.40806E-02	3.98218E-03	1.539[illegible]9E-03	0.	1.99758E-02	1.67594E-02
	9	1.40806E-02	3.98218E-03	1.53929E-03	0.	2.43138E-02	2.98424E-02
8	9	4.41041E-03	5.73096E-03	8.82349E-03	0.	2.43138E-02	1.85462E-02
	10	4.41041E-03	5.73096E-03	8.82349E-03	0.	1.82523E-02	1.61212E-02
9	1	8.20882E-06	7.12251E-03	9.23901E-03	0.	7.30283E-02	6.19631E-02
	6	8.20882E-06	7.12251E-03	9.23901E-03	0.	7.26818E-02	5.95883E-02
10	2	2.73318E-05	7.47355E-03	1.40296E-02	0.	1.16443E-01	7.75405E-02
	7	2.73318E-05	7.47355E-03	1.40296E-02	0.	1.13367E-01	8.14993E-02
11	3	3.52248E-04	8.48987E-03	1.70732E-02	0.	1.27824E-01	4.38428E-02
	8	3.52248E-04	8.48987E-03	1.70732E-02	0.	1.34646E-01	4.81981E-02
12	4	8.35407E-04	4.32505E-03	2.11701E-03	0.	9.35739E-16	3.02544E-02
	9	8.35407E-04	4.32505E-03	2.11701E-03	0.	4.89761E-02	3.25680E-02
13	5	6.01150E-04	3.26928E-03	1.92231E-02	0.	1.46245E-01	1.86045E-02
	10	6.01150E-04	3.25928E-03	1.92231E-02	0.	1.47681E-01	1.97990E-02
14	1	-4.01563E-02	2.52324E-03	1.44620E-02	0.	1.73436E-02	6.14943E-02
	11	-4.01563E-02	2.52324E-03	1.44620E-02	0.	8.69993E-02	6.68939E-02
15	2	-4.30646E-02	3.86912E-03	1.69800E-02	0.	9.52935E-03	1.16090E-01
	12	-4.30646E-02	3.86912E-03	1.69800E-02	0.	5.08905E-02	1.10274E-01
16	3	-4.64685E-02	2.27553E-02	1.55702E-02	0.	1.21849E-01	1.34734E-01
	13	-4.64685E-02	2.27553E-02	1.55702E-02	0.	1.68092E-01	1.30521E-01
17	5	-4.93043E-02	9.60359E-03	1.80952E-02	0.	1.52992E-01	5.17384E-02
	14	-4.93043E-02	9.60359E-03	1.80952E-02	0.	2.36834E-01	1.53616E-01
18	5	-4.02226E-02	1.35042E-03	1.44616E-02	0.	1.73434E-02	3.27413E-02
	15	-4.02226E-02	1.35042E-03	1.44616E-02	0.	8.69980E-02	3.71022E-02
19	7	-4.32325E-02	1.92628E-03	1.73882E-02	0.	9.78884E-03	5.71829E-02
	16	-4.32325E-02	1.92628E-03	1.73882E-02	0.	4.97356E-02	6.37921E-02
20	8	-1.88686E-02	7.04370E-03	1.53615E-02	0.	1.14240E-01	3.27135E-02
	17	-1.88685E-02	7.04370E-03	1.53615E-02	0.	1.62350E-01	6.64074E-02
21	10	-7.65436E-03	3.97608E-03	1.86933E-02	0.	1.61051E-01	2.06662E-02
	19	-7.65436E-03	3.97608E-03	1.86933E-02	0.	2.08123E-01	5.42134E-02

B E A M   S T R E S S E S   OUTPUT CASE 2

BEAM	NODE	AXIAL	SHEAR V2/A*K3	SHEAR V3/A*K2	TORSION T*C/J	BENDING M2*C3/I2 (POINT C)	BENDING M3*C2/I3 (POINT B)
1	1	-2.00449E-03	-1.60526E-03	-1.76033E-03	0.	-5.42196E-03	-1.71407E-02
	2	-2.00449E-03	-1.60526E-03	-1.76033E-03	0.	-4.69170E-03	-4.53136E-03
2	2	-1.11462E-02	-5.50290E-03	-4.80584E-03	0.	-3.88379E-02	-4.57866E-02
	3	-1.11462E-02	-5.50290E-03	-4.80584E-03	0.	-4.31843E-02	-7.30920E-02
3	3	-5.25967E-03	-4.26474E-03	3.51446E-03	0.	-4.51396E-02	-1.83739E-02
	4	-5.25967E-03	-4.26474E-03	3.51446E-03	0.	-1.40764E-01	-3.11627E-02
4	4	-6.18984E-03	-6.80087E-03	-4.64595E-02	0.	-1.40764E-01	-2.06563E-02
	5	-6.18984E-03	-6.80087E-03	-4.64595E-02	0.	-4.56949E-02	-2.16973E-02
5	6	-5.39454E-03	-1.57917E-03	-1.20743E-03	0.	-3.27286E-03	-1.77942E-02
	7	-5.39454E-03	-1.57917E-03	-1.20743E-03	0.	5.90814E-04	-5.50533E-03
6	7	-2.76919E-02	-5.93992E-03	-2.28698E-03	0.	-1.90814E-02	-5.03478E-02
	8	-2.76919E-02	-5.93992E-03	-2.28698E-03	0.	-4.56984E-02	-6.77568E-02
7	8	-9.17088E-03	-4.44907E-03	-5.21559E-03	0.	-3.41150E-02	-2.04279E-02
	9	-9.17088E-03	-4.44907E-03	-5.21559E-03	0.	4.87332E-03	-2.83070E-02
8	9	9.33949E-05	-4.59024E-03	6.53187E-04	0.	4.87332E-03	-1.58924E-02
	10	9.33949E-05	-4.59024E-03	6.53187E-04	0.	-3.41649E-02	-1.99983E-02
9	1	-5.77130E-06	-6.86096E-03	-9.19527E-03	0.	-7.26828E-02	-5.95881E-02
	6	-5.77130E-06	-6.86096E-03	-9.19527E-03	0.	-7.30278E-02	-6.19640E-02
10	2	-3.65252E-05	-7.85613E-03	-1.36584E-02	0.	-1.13362E-01	-8.15036E-02
	7	-3.65252E-05	-7.85613E-03	-1.36584E-02	0.	-1.16449E-01	-7.75244E-02
11	3	-3.06089E-04	-9.27730E-03	-1.77472E-02	0.	-1.33173E-01	-4.83554E-02
	8	-3.06089E-04	-9.27730E-03	-1.77472E-02	0.	-1.29824E-01	-4.42412E-02
12	4	-1.31007E-03	-4.54635E-03	-3.26262E-03	0.	-2.28712E-16	-3.15705E-02
	9	-1.31007E-03	-4.54635E-03	-3.26262E-03	0.	-3.17789E-02	-3.08574E-02
13	5	-4.81324E-04	-3.22360E-03	-1.99506E-02	0.	-1.53456E-01	-1.79773E-02
	10	-4.81324E-04	-3.22360E-03	-1.99506E-02	0.	-1.43911E-01	-1.97071E-02
14	1	-5.91597E-02	-2.70182E-03	-1.45249E-02	0.	-1.74260E-02	-6.64553E-02
	11	-5.91597E-02	-2.70182E-03	-1.45249E-02	0.	-8.66291E-02	-6.30407E-02
15	2	-6.31200E-02	-3.62914E-03	-1.73863E-02	0.	-9.78828E-03	-1.08060E-01
	12	-6.31200E-02	-3.62914E-03	-1.73863E-02	0.	-4.97313E-02	-1.15683E-01
16	3	-8.29081E-02	-1.47711E-02	-1.55728E-02	0.	-1.16955E-01	-6.38488E-02
	13	-8.29081E-02	-1.47711E-02	-1.55728E-02	0.	-1.63150E-01	-1.64670E-01
17	5	-8.57939E-02	-1.77933E-02	-1.81003E-02	0.	-1.45802E-01	-1.53036E-01
	14	-8.57939E-02	-1.77933E-02	-1.81003E-02	0.	-1.99543E-01	-1.13815E-01
18	6	-5.90802E-02	-1.50383E-03	-1.45247E-02	0.	-1.74259E-02	-3.71198E-02
	15	-5.90802E-02	-1.50383E-03	-1.45247E-02	0.	-8.56266E-02	-3.39090E-02
19	7	-6.33641E-02	-2.13141E-03	-1.69813E-02	0.	-9.52974E-03	-6.42376E-02
	16	-6.33641E-02	-2.13141E-03	-1.69813E-02	0.	-5.08766E-02	-5.87053E-02
20	8	-6.86256E-02	-8.03069E-03	-1.54205E-02	0.	-1.19901E-01	-3.92420E-02
	17	-6.86256E-02	-8.03069E-03	-1.54205E-02	0.	-1.66932E-01	-5.77517E-02
21	10	-6.47692E-02	-5.38874E-03	-1.83256E-02	0.	-1.48896E-01	-3.85834E-02
	19	-6.47692E-02	-5.38874E-03	-1.83256E-02	0.	-2.03131E-01	-4.78922E-02