FINAL REPORT

SPACE SHUTTLE MAIN ENGINE STRUCTURAL ANALYSIS AND DATA REDUCTION/EVALUATION

VOLUME 7: HIGH PRESSURE FUEL TURBO-PUMP THIRD STAGE IMPELLER ANALYSIS

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FOREWORD

This volume of the Final Report summarizes the analysis used to assess the structural life of the SSME High Pressure Fuel Turbo-Pump (HPFTP) Third Stage Impeller. A cyclic symmetrical section of the Third Stage Impeller was modeled with finite elements using DIAL. A three-phase analysis concluded that the impeller operates very near the upper limits of its capabilities at Full Power Level (FPL). This analysis was performed by Kirby V. Pool under Contract NAS8-37282.

In addition, the following individuals contributed greatly to the analysis and the report:

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1. INTRODUCTION AND OVERVIEW

The SSME High Pressure Fuel Turbo-Pump (HPFTP) is a three-stage turbine pump which pressurizes liquid hydrogen from an inlet pressure of 178 psi (nominally) to an outlet pressure of over 6000 psi. At Full Power Level (FPL) the impeller/turbine shaft rotates at over 37,000 rpm and the entire unit produces approximately 77,000 horsepower. Clearly, a turbine or impeller failure at this speed and power level could be catastrophic.

On one occasion in particular, an SSME ground test was prematurely terminated due to excessive vibration of an HPFTP (Refs. 1 and 2). Post-test investigation revealed the existence of a high cycle fatigue crack in the shroud of the First Stage Impeller. The crack apparently initiated at a sharp corner (the part was not properly manufactured) at the juncture of the vane and shroud of the impeller rim. As a result of this failure, Rocketdyne performed a structural dynamic test and analysis program which is documented in Reference 3. The conclusion of the Rocketdyne report was that "the stresses calculated in the analysis were not sufficient to cause a failure." This inability of analysis to predict the failure prompted further interest in the problem and eventually led to this current study.

The purpose of this analysis was to assess the structural life of the HPFTP Third Stage Impeller. Although the centrifugal loading will be the same for all three impellers (since they rotate on the same shaft and are very similar in size and shape), the Third Stage Impeller is of particular interest because it has the largest pressure loading. Because of this, it also has the largest amplitude forcing function of the three impellers.

This analysis was performed in three phases, all using the DIAL finite element code (Ref. 4). The first phase was a static stress analysis to determine the mean (non-varying) stress and static margin of safety for the part.

The loads involved were steady state pressure and centrifugal force due to spinning. The second phase of the analysis was a modal survey to determine the vibrational modes and natural frequencies of the impeller. The third phase was a dynamic response analysis to determine the alternating component of the stress due to time varying pressure impulses at the outlet (diffuser) side of the impeller.

The results of the three phases of the analysis show that the Third Stage Impeller operates very near the upper limits of its capability at FPL loading. The static loading alone creates stresses in some areas of the shroud which exceed the yield point of the material (Ti-5Al-2.5Sn ELI). Additional cyclic loading due to the dynamic force could lead to a significant reduction in the life of this part. The cyclic stresses determined in the dynamic response phase of this study are based on an assumption regarding the magnitude of the forcing function. Further studies should be done to better quantify the dynamic loading of the Third Stage Impeller.

2. FINITE ELEMENT MODEL DESCRIPTION

Figure 1 is a plot of the DIAL finite element model of one-sixth of the HPFTP Third Stage Impeller. Figure 2 is a color light source shaded plot of the model from a different perspective. This model was used for each of the three phases of the analysis discussed earlier. Table 1 identifies the components of the model and provides a breakdown of the number of nodes and elements in each component. In brief, the model contains a total of 1,168 parabolic (ZIB-20) elements, 7,068 nodes and 21,161 degrees of freedom (DOF). It should be noted that no attempt was made to model the fillets at the intersection of the vanes and the hub and shroud.

Table 1 NODE AND ELEMENT STATISTICS FOR HPFTP THIRD STAGE IMPELLER 3-D MODEL

Component	Drawing Number	Nodes	Elements
Impeller Hub	RS007556 (Sheets 8 to 13)	2481	408 solids
Impeller Shroud	RS007556 (Sheets 8 to 13)	2850	453 solids
Blades	RS007556 (Sheets 12,13)	385	82 solids
Hub Center	RS007556 (Sheets 8 to 13)	1352	225 solids
Constraint Elems for Symmetry BC's	----	----	1374 constraints
	TOTALS	7068 (21,161 DOF)	1168 solids 1374 cons

3. CYCLIC SYMMETRY BOUNDARY CONDITIONS

In order to provide a high level of detail and still maintain a workable size model, it was necessary to take advantage of the natural symmetry of the problem. Because of the complex nature of the geometry and the dynamic loading, it was necessary to use "cyclic symmetry" boundary conditions to achieve this.

This cyclic symmetric structure is one that comprises several identical segments attached together in a repetitive fashion. It is possible to take advantage of this repetitive nature and obtain an exact solution for the complete part by modeling only one segment and applying the appropriate boundary conditions. For the case of the HPFTP Third Stage Impeller, one 60° segment finite element model and four sets of boundary conditions were necessary to completely and accurately model the behavior of the full Impeller. For the purposes of this discussion, the common names given to these boundary conditions (as found in the literature) are the symmetric-symmetric, first degenerate, second degenerate, and antisymmetric-antisymmetric boundary conditions.

The primary benefit of cyclic symmetry is that the method allows the transformation of the full model into several smaller uncoupled models which are analyzed separately. This has two advantages. The first is that the number of degrees of freedom is smaller per symmetric component model and the bandwidth (average column height) is also greatly reduced. It is not uncommon for this reduction to result in an order of magnitude reduction in the computer cost of the analysis. The second advantage is that, for a particular loading, the results (displacements, stresses, etc.) have to be evaluated for only one physical segment since the one segment typifies the other segments. This can also result in computer analysis savings and most importantly a significant reduction in computer resources (disk space, I/O, etc.).

Had cyclic symmetry not been used in this analysis, the resulting model would have been approximately 120,000 DOF and could not have been analyzed with current computer resources. The three 40,000 DOF models, however, were manageable. (A more detailed description of the application of cyclic symmetry boundary conditions appears in Ref. 5).

4. EXTERNAL LOADING AND BOUNDARY CONDITIONS

The loading and boundary conditions were different for each phase of the analysis, and each will be addressed separately.

4.1 STATIC ANALYSIS

Because of the symmetry of the loading, the static analysis (with pressure and centrifugal forces) excited only the symmetric modes. The boundary conditions, therefore, reduced to the symmetric-symmetric case in which the displacements of the left edge of the model are tied directly to those of the right edge.

The loading for the static analysis was obtained from Gene Teal of LMSC's Huntsville Engineering Center (HEC) on 22 July 1988 (refer to Appendixes A and B). The FPL loads used were as follows:

Load Case 1 - An angular velocity of 37,342 rpm (3910.4 rps).

Load Case 2 - Distributed load on hub and on shroud (Figures 3 and 4).

Load Case 3 - 6000 psi pressure on top of shroud from the labyrinth seals to the Impeller rim and 4500 psi in the vicinity of the labyrinth seals (Figure 5).

- 5000 psi pressure on bottom of hub (Figure 6).

Load Case 4 - 100% torque (10971.2 ft-lb) to input shaft.

- 66.7% torque to output shaft (Figure 7).

Load Case 5 - Pressure on vanes to counteract remaining 33.3% torque (Figure 8).

4.2 MODAL ANALYSIS

The modal analysis involved a separate solution for each of the possible (symmetric, first degenerate, second degenerate and antisymmetric) boundary conditions. The only external boundary condition applied was to fix one end of the hub in the axial direction.

Modal Truncation (MT) vectors (to be discussed in more detail later) were added to the modal set to exactly represent the dynamic pressure loading that was applied in the dynamic response analysis.

In a separate modal analysis, loads due to spinning were applied to create a pre-stress in the impeller. This was done (using the symmetric-symmetric boundary condition only) to investigate the "spin stiffening" effect due to the high angular velocity (37,342 rpm).

4.3 DYNAMIC RESPONSE ANALYSIS

The loading used for the dynamic transient analysis was obtained from a Rocketdyne report (Ref. 3) on the HPFTP First Stage Impeller. This loading consisted of pressure impulses due to the impingement of fluid from the 15 inlet vane guides on the inlet side of the impeller vanes and the 13 diffuser vane guides on the outlet side of the impeller vanes. The pressure pulse was assumed to be triangular in shape and the magnitudes of the pulses were assumed to be the same for all vane guide positions (both on the inlet and outlet side of the impeller). It was discovered late in this analysis that there are only 13 inlet vane guides for the Third Stage Impeller. Since most of the concern in the past has been about the outer edges of the impeller, it was decided that attention would be focused in this region and the contribution to the stresses due to the inlet vane guides could be neglected (for a first estimate). Figure 9 shows the diffuser vane guide spatial loading used for the dynamic response analysis. Note that the pressure pulse loading varies with time so that the vanes shown in Figure 9 will not all experience the peak loading at the same time.

The magnitude of the pressure pulse has been the subject of much conjecture. The Rocketdyne report (Ref. 3, Figure 2-25) shows a peak delta pressure of 300 psi at the outer tip of the full vane, trailing off to some lower value at an unspecified distance inside the impeller rim. A NASA report (Ref. 1) presents pressure pulse magnitudes ranging from 215 psi to 633 psi at the rim of the impeller (depending on the gap width between the diffuser vanes

and the impeller rim), decreasing linearly to zero at 1.0 inch inside the impeller rim. This represents a total force per blade (assuming a blade width of 0.55 inch as in the drawings) of ~ 60 to ~ 175 lb. The value chosen for the peak pressure in this analysis was 100 psi over the outer two elements of the blades for a total force per blade of 44 lb. The pressure pulse was triangular in form with a rise time of 16.7% of the period. The results of this linear analysis can be scaled to any level of blade loading. For a different shape of pulse loading or a different spatial position on the vanes, the results of this analysis could also be scaled by the ratio of the loading impulse in one loading cycle as long as the new loading is not too different from the present analysis.

For a more detailed description of the time phasing of the loading, including damping and the transformation into cyclic symmetry components, refer to Appendixes C and D.

5. FINITE ELEMENT ANALYSIS RESULTS

5.1 STATIC STRUCTURAL ANALYSIS

Figure 10 is a deflected plot for the spin loading only. Figure 11 shows the deflected shape for the combined spin, pressure, and torque loading.

Figures 12 and 13 show the effective stress contours (in the hub and the shroud, respectively) due to the spin loading only. Note the regions of high stress in the vicinity of the vane-to-hub and vane-to-shroud intersections. These stresses are very close to yield for the material (147 ksi vs Sy = 154 ksi). One obvious reason for the high stresses is the stress concentration at the sharp corner. The presence of a fillet in the real part will certainly lower the stresses, but the extent can be determined only by additional analysis.

Figures 14 and 15 show the effective stress contours due to combined spin, pressure, and torque loading. The stress for this loading is well above ultimate (183 ksi vs Su = 163 ksi) in the vane/shroud intersection areas. This stress value is not accurate since it was computed assuming linear elastic material response. Figure 16 shows that the maximum effective strain for this linear analysis is 1.06%. The ultimate elongation for the material, according to the Rocketdyne Materials manual (Ref. 6), is on the order of 15%. The yielding in the vane fillet is extremely localized in the high stress concentration area of the fillet region. In reality (or in a nonlinear analysis), any yielding will allow the load to redistribute and therefore keep the plastic strain low and the margin of safety for the static load condition fairly high. It is likely, however, that the stresses in the vane fillet at FPL loading are near the yield point. This directly affects the fatigue life of the HPFTP Third Stage Impeller.

The color contour plots shown in Figures 17 and 18 show the areas of concern very clearly.

5.2 DYNAMIC MODAL ANALYSIS

All modes to 50,000 Hz were extracted from each of the symmetrical component models. Additionally, MT vectors were added to the symmetric-symmetric/antisymmetric-antisymmetric double model and to each of the degenerate component models to assure that any load not accounted for in the extracted modes would be included in the final analysis. The MT vectors were from a unit pressure field applied to the end of the full vane, the end of the first partial vane, and to the ends of each of the two second partial vanes. Therefore there were four MT vectors per half-model. The eight MT vectors for each of the degenerate models are the results of four loads on the cosine model vanes and four loads on the sine model vanes. The applied dynamic load can be exactly reproduced in the physical domain from the retained modes in the analysis (plus the MT vectors) and would exactly solve any of these loads statically.

The modal analysis results are shown in Tables 2 through 5, immediately following the text. There were 245 modes for the symmetric-symmetric and antisymmetric-antisymmetric combined model, 112 modes for the first degenerate model and 106 modes for the second degenerate model, for a total of 463 modes that were used in the dynamic response analysis.

The mass modal participation factors and the load participation factors (for the unit pressure loads used to create the MT vectors, load cases 27 through 34) are listed in Appendix E.

The lowest symmetric mode (at 1823 Hz) was not mentioned at all in the Rocketdyne report (Ref. 3) which was obtained prior to the beginning of this analysis. By animating this mode on a Megatek terminal, it was determined that this was a torsional (twisting shaft) mode. After close scrutiny of the

Rocketdyne STARDYNE model of the First Stage Impeller it became apparent that the shaft portion of the hub was not included in that model. This precluded Rocketdyne's discovery of any torsional mode.

Figures 19 to 22 are representative displacement contour plots for the lowest modes for each of the four boundary conditions (symmetric, first degenerate, second degenerate, and antisymmetric).

Figures 23 through 26 are some representative deflected modal shape plots. (Note: all displacements are relative, not absolute).

One additional run was made to ascertain the magnitude of any spin stiffening effect that might alter the actual natural frequencies when the impeller is operating. Table 6 can be compared with Table 2 (both are for the symmetric boundary condition case) to see that there is, at most, about a 5% increase in the natural frequency due to the effect of spinning at 37,342 rpm. The effect of fluid mass was not considered.

5.3 DYNAMIC RESPONSE ANALYSIS

5.3.1 Solution Method

Since the solution method is entirely a time domain method, there is no need to transform the time portion into the frequency domain and none of the problems of inadequate representation of the time domain loading in the frequency domain components. This time domain solution method with the MT vectors results in a complete representation of the applied dynamic loading. That is to say, the loading has not been truncated spatially nor in a time varying manner.

A complete derivation of the periodic time domain solution procedure is given in Reference 7. Essentially, the solution method consists of three steps. The first is to solve for the modal response over one period of the loading assuming zero initial conditions (displacement and velocity) at the

beginning of the period of loading. The second step is to solve for the initial displacement and velocity that, when added to the results of the first step, will result in the same displacement and velocity at the beginning of the analysis period as the displacement and velocity at the end of the loading period. The third step is to add the response to the initial displacement and velocity over the portion of loading to the response of the first step to give the final response of the structure.

The solution method is very efficient in the modal domain since the response at the end of the period of loading due to an initial displacement/ velocity can be written explicitly (within a scalar that is to be solved) for each mode. Each mode is solved for separately, and, after all the periodic responses are determined, the modal results can be transformed to any physical quantities desired (as in any other modal time history analysis).

The computer solution time required for this method is slightly larger than the effort required for a modal time history response over one period of the loading, and a little less than the effort required for a modal time history solution over two periods of the loading. This effort should be compared against the procedure of running the modal time history analysis until the solution has become periodic (the Rocketdyne analysis required from 1000 to 2400 loading periods of response time).

A FORTRAN program, Periodic Response Analysis (PRA) (refer to Appendixes F and G), was written to do the periodic solution automatically. The input to the program consists of the modal eigenvalues, modal damping, modal generalized loads, and number of output time steps. The output of PRA is the periodic generalized response for each mode over the period of the loading. Only a VAX double precision version of PRA was written, since the run times for PRA for all the modes retained were only on the order of 10 seconds for each cyclic symmetry model.

5.3.2 Analysis Procedure and Results

A transient, dynamic analysis involves a great deal more complexity in that the final solution must take into account the contributions of each vibrational mode (resulting from each type of cyclic symmetry boundary condition). Because of the complexity, it was decided that a small disk model would be run, using cyclic-symmetry boundary conditions, to work out the procedure for both the analysis and the post-processing. As a result of working with the small model, a method was developed to combine the contributions of each cyclic symmetry component into a single data base from which the physical quantities of displacements and stresses could be obtained for post-processing purposes. Additionally, a method was developed by Dr. John Dickens which solved the steady state solution for a periodic loading (the PRA code, discussed above).

Essentially the analysis process was completed in two steps. First, a periodic response analysis was done using the PRA code and the required inputs from the DIAL code modal analysis to determine the steady state response of the impeller due to the applied forcing function. This is done for each of the four cyclic symmetry models. Next, these modal or generalized displacements from each of the four cyclic symmetry models are combined, using the principles of cyclic symmetry, into physical displacements on a one-sixth impeller model. The data base for this model contains the physical displacements for each of the six identical segments as a function of time. From this data base the stresses and strains at any location and at any time can be obtained.

The location and timing of the worst case were determined by examination of the summary tables for each of the 73 time steps in the analysis. It was determined that the worst case effective stress in the impeller occurs near the impeller rim at the intersection of the full blade and the hub. Figure 27 is a highly magnified deflected plot of the first segment of the impeller at the worst case timing for the load. The dot on this figure represents the location of the highest stress found near the impeller rim. Figures 28 and 29 are graphs of the effective stress at that dot (node 2093) for segments 1 and 2, respectively.

It was sufficient that the displacements/stresses were evaluated only in the first physical segment since the results should be the same in all other physical segments except for a shift in time (of one-sixth cycle of the loading). However, to confirm the analysis procedure, the second physical segment displacements/stresses were also evaluated. Comparison of Figures 28 and 29 shows identical results except for the expected time phase of 0.02 second (12 time steps = 72/6). As can be seen from these figures, the maximum alternating stress for the loading used is only about 1500 psi. Figure 30, an effective stress contour plot of the inside surface of the hub, confirms this. Figure 31 shows that the maximum effective stress in the shroud is 1320 psi, and it also occurs at the impeller rim. Figures 32a and 32b are color contour plots of the effective stress which clearly show the areas of the highest stress.

It should be noted again that these stress numbers are based on an assumed peak pressure pulse magnitude of 100 psi. A higher peak would produce a proportionately higher stress. It should also be noted that the results presented here apply only to one particular pump speed (FPL loading - 37,342 rpm). The phasing of the forcing function would be different for different pump speeds and the results may be worse or better, depending on the excitability of any particular mode of vibration. It turns out that 37,342 rpm translates into a forcing frequency of 8091 Hz (with 13 diffuser vanes), which is very close to the fifth symmetric-symmetric mode which occurs at 8093 Hz (see Table 2). Comparison of the mode shape plot for this mode (Figure 23) with the deflected plot shown in Figure 27 shows some similarities. The large relative deflection of the labyrinth seal teeth is not realistic, as they will be restrained somewhat by their sealing action.

Other frequencies which could be examined in the future are pointed out in Table 7. Whereas all periods of loading should be examined, the worst possible periods of loading would probably occur at or near the pump speeds that are close to the frequencies listed in Table 7.

6. CONCLUSIONS AND RECOMMENDATIONS

The results of this analysis show that the HPFTP Third Stage Impeller is loaded to very near its ultimate capability. Static loading (centrifugal forces and pressures) tends to focus the high stresses in the hub and shroud inboard areas, towards the axis of rotation (as would be expected from the physics of the problem). Dynamic loading due to the interaction of the rotating vanes and the stationary diffuser vanes tends to stress the outer rim of the impeller (as is also expected). The combination of static and dynamic stresses suggests that fatigue is less and less important as one moves inboard from the rim. This may explain why impellers do not fail by fatigue on a more regular basis, given the high stresses in the interior of the impeller.

Dynamic loading due to the interaction of the rotating impeller vanes with the inlet guide vanes was not considered in this analysis because a previous analysis (Ref. 3) showed that the stresses produced were quite small. If the stresses are not small, this could lead to fatigue life problems in the interior regions of the impeller (where the static margin is low).

Although this analysis has been very rigorous, there are a few deficiencies which need to be addressed.

1. The largest source of error in this analysis is the uncertainty in the dynamic forcing function. There has been no definitive forcing function established to date (or at least none that has been identified as such).

2. This analysis is valid for FPL conditions. At different pump speeds, other modes may be excited which may give higher alternating stresses (albeit lower static stresses). It would be possible to run the analysis at other frequencies (Table 7) without a great effort.

3. Some improvements can be made to the model to include fillets at the vane intersections and some sensitivities could be examined with regard to the hub boundary conditions, but it is not likely that the results will change significantly.

4. This analysis, which predicts a near zero margin of safety in the shroud near the interior of the impeller, still does not predict the type of failure seen in the one First Stage Impeller during a ground test. The static stresses at the rim of the impeller are low (less than 60 ksi - see Figures 15 and 18) and the alternating stress required to fail it would need to be tens of times higher than predicted to propagate a crack at the impeller rim.

7. REFERENCES

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3. "SSME HPFTP First Stage Impeller Dynamic Analysis and Model Test Results," Rocketdyne Internal Letter No. 6128-0102, R.J. Szabo et al., to F. Nitz, 28 April 1986.

4. "DIAL Finite Element Analysis System User's Manual," LMSC Document.

5. "The Application of Cyclic Symmetry for Economic Solutions of Static and Dynamic Finite Element Models," Rocketdyne Internal Memo from J. Dickens (currently an LMSC employee).

6. Rocketdyne Materials Properties Manual, Section 5002 (Ti-5Al-2.5Sn ELI).

7. "Numerical Methods for Dynamic Substructure Analysis," J. Dickens, Ph.D. Dissertation, University of California, Berkeley, 1980.

8. "Structural Audit Review - HPFTP Third Stage Impeller," by M. Sasaki et al., 20 June 1986.

9. "HPFTP First Stage Impeller Analysis," LMSC-HEC TR F042560-II, Sections 2.4 (Model Description) and 3.2 (Crack Investigation).

Table 2 EIGENVALUE SUMMARY TABLE - SYMMETRIC-SYMMETRIC BOUNDARY CONDITIONS

Mode No.	Seq. No.	Frequency Hertz	Eigenvalue (Rad/sec)**2	Generalized Mass	Max Component Deg. of Freedom
1	1	0.18226E+04	0.13115E+09	0.23655E-02	Node 5068 UX
2	2	0.22494E+04	0.19976E+09	0.18720E-02	166 UZ
3	3	0.50758E+04	0.10171E+10	0.23574E-02	1339 UZ
4	4	0.78944E+04	0.24604E+10	0.40676E-03	1751 UZ
5	5	0.80931E+04	0.25857E+10	0.37524E-03	1181 UZ
6	6	0.88315E+04	0.30792E+10	0.71296E-03	3768 UZ
7	7	0.99319E+04	0.38942E+10	0.99351E-03	690 UZ
8	8	0.11834E+05	0.55291E+10	0.66701E-04	3531 UX
9	9	0.13953E+05	0.76854E+10	0.23804E-02	5626 UY
10	10	0.14220E+05	0.79829E+10	0.29924E-03	1504 UZ
11	11	0.14453E+05	0.82467E+10	0.22122E-03	2027 UZ
12	12	0.14870E+05	0.87292E+10	0.33261E-03	394 UZ
13	13	0.15549E+05	0.95447E+10	0.10115E-03	3199 UX
14	14	0.16447E+05	0.10680E+11	0.28039E-03	753 UZ
15	15	0.16983E+05	0.11387E+11	0.25415E-03	5139 UX
16	16	0.18092E+05	0.12922E+11	0.14907E-03	1799 UZ
17	17	0.18377E+05	0.13333E+11	0.72536E-04	4006 UX
18	18	0.18966E+05	0.14201E+11	0.14036E-03	2744 UX
19	19	0.19982E+05	0.15764E+11	0.18956E-03	4345 UZ
20	20	0.20119E+05	0.15980E+11	0.67996E-04	3272 UZ
21	21	0.20229E+05	0.16155E+11	0.94755E-04	4536 UZ
22	22	0.21074E+05	0.17533E+11	0.11093E-03	3350 UZ
23	23	0.21386E+05	0.18055E+11	0.62843E-04	3349 UZ
24	24	0.21441E+05	0.18149E+11	0.45748E-04	2750 UZ
25	25	0.21771E+05	0.18712E+11	0.12807E-03	4014 UZ
26	26	0.21850E+05	0.18847E+11	0.21134E-03	2918 UZ
27	27	0.22123E+05	0.19321E+11	0.21542E-03	4346 UZ
28	28	0.22460E+05	0.19914E+11	0.24089E-03	4338 UZ
29	29	0.23537E+05	0.21871E+11	0.10817E-03	2739 UZ
30	30	0.23852E+05	0.22459E+11	0.37487E-03	4338 UZ
31	31	0.24154E+05	0.23032E+11	0.30043E-03	4145 UZ
32	32	0.25214E+05	0.25098E+11	0.96523E-04	4014 UZ
33	33	0.25885E+05	0.26451E+11	0.45215E-03	751 UZ
34	34	0.25971E+05	0.26629E+11	0.87812E-04	4608 UZ
35	35	0.26163E+05	0.27023E+11	0.16159E-03	4608 UZ
36	36	0.26461E+05	0.27642E+11	0.57532E-04	2748 UZ
37	37	0.26999E+05	0.28778E+11	0.11725E-03	3350 UZ
38	38	0.27822E+05	0.30560E+11	0.74359E-04	2750 UZ
39	39	0.27865E+05	0.30654E+11	0.11669E-03	3936 UZ
40	40	0.28066E+05	0.31097E+11	0.77802E-04	3350 UZ

Table 2 EIGENVALUE SUMMARY TABLE - SYMMETRIC-SYMMETRIC BOUNDARY CONDITIONS (Continued)

Mode No.	Seq. No.	Frequency Hertz	Eigenvalue (Rad/sec)**2	Generalized Mass	Max Component Deg. of Freedom
41	41	0.28567E+05	0.32218E+11	0.18561E-03	3071 UZ
42	42	0.28656E+05	0.32419E+11	0.16681E-03	5438 UX
43	43	0.29614E+05	0.34621E+11	0.53925E-04	5438 UX
44	44	0.29799E+05	0.35056E+11	0.11152E-03	5626 UZ
45	45	0.29958E+05	0.35432E+11	0.23633E-03	5366 UX
46	46	0.30215E+05	0.36042E+11	0.12351E-03	5525 UX
47	47	0.30719E+05	0.37253E+11	0.32290E-03	2752 UZ
48	48	0.30935E+05	0.37781E+11	0.76169E-04	5626 UZ
49	49	0.31166E+05	0.38347E+11	0.16213E-03	5626 UZ
50	50	0.31338E+05	0.38770E+11	0.18374E-03	5438 UX
51	51	0.31997E+05	0.40418E+11	0.44262E-04	5357 UX
52	52	0.32150E+05	0.40805E+11	0.47969E-04	5438 UX
53	53	0.32374E+05	0.41376E+11	0.87426E-04	5438 UX
54	54	0.33012E+05	0.43024E+11	0.88612E-04	5357 UX
55	55	0.33131E+05	0.43333E+11	0.15511E-03	6930 UX
56	56	0.33286E+05	0.43740E+11	0.13445E-03	4010 UZ
57	57	0.33608E+05	0.44591E+11	0.94948E-04	5525 UX
58	58	0.33966E+05	0.45545E+11	0.17546E-03	4001 UZ
59	59	0.34008E+05	0.45659E+11	0.11914E-03	5453 UX
60	60	0.34288E+05	0.46413E+11	0.10149E-03	5357 UX
61	61	0.34697E+05	0.47528E+11	0.93722E-04	5296 UZ
62	62	0.35018E+05	0.48410E+11	0.83637E-04	3598 UZ
63	63	0.35527E+05	0.49828E+11	0.95728E-04	5525 UX
64	64	0.35831E+05	0.50686E+11	0.11573E-03	6966 UX
65	65	0.35988E+05	0.51130E+11	0.17170E-03	3348 UZ
66	66	0.36500E+05	0.52596E+11	0.17378E-03	2748 UZ
67	67	0.36650E+05	0.53027E+11	0.14258E-03	4612 UZ
68	68	0.36900E+05	0.53755E+11	0.11895E-03	5626 UZ
69	69	0.37619E+05	0.55870E+11	0.42554E-04	3184 UZ
70	70	0.37646E+05	0.55948E+11	0.76522E-04	3184 UZ
71	71	0.38141E+05	0.57432E+11	0.10098E-03	5044 UZ
72	72	0.38506E+05	0.58535E+11	0.46188E-04	5357 UX
73	73	0.38929E+05	0.59829E+11	0.10200E-03	5357 UX
74	74	0.39229E+05	0.60755E+11	0.17664E-03	5453 UX
75	75	0.39321E+05	0.61039E+11	0.35294E-04	5044 UZ
76	76	0.39532E+05	0.61697E+11	0.20368E-04	5525 UX
77	77	0.39648E+05	0.62060E+11	0.94315E-04	5525 UX
78	78	0.39859E+05	0.62719E+11	0.61475E-04	5525 UX
79	79	0.40294E+05	0.64097E+11	0.58306E-04	3603 UZ
80	80	0.40682E+05	0.65337E+11	0.11646E-03	2739 UZ

Table 2 EIGENVALUE SUMMARY TABLE - SYMMETRIC-SYMMETRIC BOUNDARY CONDITIONS (Concluded)

Mode No.	Seq. No.	Frequency Hertz	Eigenvalue (Rad/sec)**2	Generalized Mass	Max Component Deg. of Freedom
81	81	0.40948E+05	0.66194E+11	0.12629E-03	5525 UX
82	82	0.40979E+05	0.66294E+11	0.12687E-03	2739 UZ
83	83	0.41199E+05	0.67010E+11	0.73769E-04	5357 UX
84	84	0.41341E+05	0.67473E+11	0.19728E-03	3516 UZ
85	85	0.41847E+05	0.69135E+11	0.13804E-03	5525 UX
86	86	0.42225E+05	0.70389E+11	0.12362E-03	5357 UX
87	87	0.42443E+05	0.71118E+11	0.26662E-04	5357 UX
88	88	0.42588E+05	0.71603E+11	0.11306E-03	5357 UX
89	89	0.42874E+05	0.72567E+11	0.69895E-04	5357 UX
90	90	0.43153E+05	0.73517E+11	0.66326E-04	5534 UX
91	91	0.43192E+05	0.73649E+11	0.31830E-04	2739 UZ
92	92	0.43415E+05	0.74411E+11	0.34940E-04	5366 UX
93	93	0.43651E+05	0.75222E+11	0.22249E-04	5525 UX
94	94	0.43822E+05	0.75814E+11	0.38260E-04	3516 UZ
95	95	0.43929E+05	0.76183E+11	0.13207E-03	5647 UX
96	96	0.44361E+05	0.77690E+11	0.11987E-03	2724 UZ
97	97	0.44493E+05	0.78154E+11	0.37984E-04	4860 UZ
98	98	0.44796E+05	0.79222E+11	0.16290E-03	4180 UZ
99	99	0.45006E+05	0.79963E+11	0.12760E-03	4432 UZ
100	100	0.45138E+05	0.80435E+11	0.10196E-03	1143 UX
101	101	0.45250E+05	0.80833E+11	0.41388E-04	3782 UZ
102	102	0.45420E+05	0.81444E+11	0.76791E-04	4778 UZ
103	103	0.45703E+05	0.82461E+11	0.83173E-04	2003 UX
104	104	0.46012E+05	0.83580E+11	0.10448E-03	5453 UX
105	105	0.46235E+05	0.84393E+11	0.65654E-04	5296 UZ
106	106	0.46365E+05	0.84869E+11	0.42200E-04	4180 UZ
107	107	0.46585E+05	0.85676E+11	0.70959E-04	5534 UX
108	108	0.46696E+05	0.86083E+11	0.32912E-04	3768 UZ
109	109	0.46830E+05	0.86579E+11	0.50468E-04	5534 UX
110	110	0.47124E+05	0.87670E+11	0.30983E-04	5366 UX
111	111	0.47516E+05	0.89134E+11	0.88321E-04	5647 UX
112	112	0.47820E+05	0.90276E+11	0.90826E-05	5366 UX
113	113	0.48126E+05	0.91438E+11	0.27678E-04	4599 UZ
114	114	0.48413E+05	0.92529E+11	0.42714E-04	5453 UX
115	115	0.48828E+05	0.94125E+11	0.15451E-04	5453 UX
116	116	0.49073E+05	0.95068E+11	0.23261E-04	4594 UZ
117	117	0.49386E+05	0.96286E+11	0.28385E-04	5004 UZ
118	118	0.49443E+05	0.96509E+11	0.10837E-04	5366 UX
119	119	0.49797E+05	0.97895E+11	0.14835E-04	5453 UX
120	120	0.63480E+05	0.15908E+12	0.38099E-04	5360 UX
121	121	0.65905E+05	0.17147E+12	0.41610E-04	5528 UX
122	122	0.67667E+05	0.18076E+12	0.40134E-04	5453 UX
123	123	0.69764E+05	0.19214E+12	0.74007E-04	5366 UX

Table 3 EIGENVALUE SUMMARY TABLE - FIRST DEGENERATE BOUNDARY CONDITIONS

Mode No.	Seq. No.	Frequency Hertz	Eigenvalue (Rad/sec)**2	Generalized Mass	Max Component Deg. of Freedom
1	1	0.21088E+04	0.17556E+09	0.16134E-02	Node 8248 UZ
2	2	0.21088E+04	0.17556E+09	0.16134E-02	1180 UZ
3	3	0.42067E+04	0.69864E+09	0.61548E-02	12220 UY
4	4	0.42067E+04	0.69864E+09	0.61548E-02	5152 UY
5	5	0.67035E+04	0.17740E+10	0.75562E-03	1505 UZ
6	6	0.67035E+04	0.17740E+10	0.75562E-03	8573 UZ
7	7	0.77456E+04	0.23685E+10	0.15060E-02	2317 UZ
8	8	0.77456E+04	0.23685E+10	0.15060E-02	9385 UZ
9	9	0.91158E+04	0.32806E+10	0.14893E-02	10671 UZ
10	10	0.91158E+04	0.32806E+10	0.14893E-02	3603 UZ
11	11	0.92778E+04	0.33982E+10	0.57041E-03	9095 UZ
12	12	0.92778E+04	0.33982E+10	0.57041E-03	2027 UZ
13	13	0.10498E+05	0.43510E+10	0.45472E-03	3531 UX
14	14	0.10498E+05	0.43510E+10	0.45472E-03	10599 UX
15	15	0.11646E+05	0.53548E+10	0.94544E-04	3531 UX
16	16	0.11646E+05	0.53548E+10	0.94544E-04	10599 UX
17	17	0.13167E+05	0.68445E+10	0.77789E-03	8929 UZ
18	18	0.13167E+05	0.68445E+10	0.77789E-03	1861 UZ
19	19	0.13715E+05	0.74256E+10	0.75172E-03	1341 UZ
20	20	0.13715E+05	0.74256E+10	0.75172E-03	8409 UZ
21	21	0.13966E+05	0.77002E+10	0.26428E-03	8573 UZ
22	22	0.13966E+05	0.77002E+10	0.26428E-03	1505 UZ
23	23	0.15804E+05	0.98600E+10	0.11319E-03	3322 UZ
24	24	0.15804E+05	0.98600E+10	0.11319E-03	10390 UZ
25	25	0.17349E+05	0.11882E+11	0.58935E-03	4006 UX
26	26	0.17349E+05	0.11882E+11	0.58935E-03	11074 UX
27	27	0.17723E+05	0.12401E+11	0,11086E-02	4536 UZ
28	28	0.17723E+05	0.12401E+11	0.11086E-02	11604 UZ
29	29	0.17944E+05	0.12712E+11	0.37410E-03	12206 UX
30	30	0.17944E+05	0.12712E+11	0.37410E-03	5138 UX
31	31	0.18361E+05	0.13309E+11	0.15633E-03	11081 UZ
32	32	0.18361E+05	0.13309E+11	0.15633E-03	4013 UZ
33	33	0.18688E+05	0.13788E+11	0.29600E-03	12205 UX
34	34	0.18688E+05	0.13788E+11	0.29600E-03	5137 UX
35	35	0.19046E+05	0.14322E+11	0.62169E-03	3797 UX
36	36	0.19046E+05	0.14322E+11	0.62169E-03	10865 UX
37	37	0.19612E+05	0.15184E+11	0.34660E-03	4006 UX
38	38	0.19612E+05	0.15184E+11	0.34660E-03	11074 UX
39	39	0.19948E+05	0.15709E+11	0.28366E-03	11410 UZ
40	40	0.19948E+05	0.15709E+11	0.28366E-03	4342 UZ

Table 3 EIGENVALUE SUMMARY TABLE - FIRST DEGENERATE BOUNDARY CONDITIONS (Continued)

Mode No.	Seq. No.	Frequency Hertz	Eigenvalue (Rad/sec)**2	Generalized Mass	Max Component Deg. of Freedom
41	41	0.20414E+05	0.16452E+11	0.61657E-04	11604 UZ
42	42	0.20414E+05	0.16452E+11	0.61657E-04	4536 UZ
43	43	0.20804E+05	0.17087E+11	0.46441E-04	10418 UZ
44	44	0.20804E+05	0.17087E+11	0.46441E-04	3350 UZ
45	45	0.21137E+05	0.17638E+11	0.16867E-03	11082 UZ
46	46	0.21137E+05	0.17638E+11	0.16867E-03	4014 UZ
47	47	0.21403E+05	0.18085E+11	0.52716E-04	2750 UZ
48	48	0.21403E+05	0.18085E+11	0.52716E-04	9818 UZ
49	49	0.22129E+05	0.19332E+11	0.20852E-03	3350 UZ
50	50	0.22129E+05	0.19332E+11	0.20852E-03	10418 UZ
51	51	0.22658E+05	0.20267E+11	0.33407E-03	11074 UX
52	52	0.22658E+05	0.20267E+11	0.33407E-03	4006 UX
53	53	0.22967E+05	0.20824E+11	0.28867E-03	3797 UX
54	54	0.22967E+05	0.20824E+11	0.28867E-03	10865 UX
55	55	0.23156E+05	0.21168E+11	0.30185E-03	12378 UZ
56	56	0.23156E+05	0.21168E+11	0.30185E-03	5310 UZ
57	57	0.23571E+05	0.21933E+11	0.89045E-03	2748 UZ
58	58	0.23571E+05	0.21933E+11	0.89045E-03	9816 UZ
59	59	0.24230E+05	0.23178E+11	0.18683E-03	2734 UZ
60	60	0.24230E+05	0.23178E+11	0.18683E-03	9802 UZ
61	61	0.24698E+05	0.24081E+11	0.19938E-03	10340 UZ
62	62	0.24698E+05	0.24081E+11	0.19938E-03	3272 UZ
63	63	0.24912E+05	0.24501E+11	0.16011E-03	11082 UZ
64	64	0.24912E+05	0.24501E+11	0.16011E-03	4014 UZ
65	65	0.26014E+05	0.26717E+11	0.11403E-03	11604 UZ
66	66	0.26014E+05	0.26717E+11	0.11403E-03	4536 UZ
67	67	0.26229E+05	0.27160E+11	0.62791E-04	10418 UZ
68	68	0.26229E+05	0.27160E+11	0.62791E-04	3350 UZ
69	69	0.26370E+05	0.27451E+11	0.35421E-03	10418 UZ
70	70	0.26370E+05	0.27451E+11	0.35421E-03	3350 UZ
71	71	0.26738E+05	0.28224E+11	0.17451E-03	10340 UZ
72	72	0.26738E+05	0.28224E+11	0.17451E-03	3272 UZ
73	73	0.27155E+05	0.29111E+11	0.42658E-03	9743 UZ
74	74	0.27155E+05	0.29111E+11	0.42658E-03	2675 UZ
75	75	0.27737E+05	0.30372E+11	0.13612E-03	5626 UZ
76	76	0.27737E+05	0.30372E+11	0.13612E-03	12694 UZ
77	77	0.28018E+05	0.30991E+11	0.38798E-03	4012 UZ
78	78	0.28018E+05	0.30991E+11	0.38798E-03	11080 UZ
79	79	0.28237E+05	0.31478E+11	0.28213E-03	12506 UX
80	80	0.28237E+05	0.31478E+11	0.28213E-03	5438 UX

Table 3 EIGENVALUE SUMMARY TABLE - FIRST DEGENERATE BOUNDARY CONDITIONS (Concluded)

Mode No.	Seq. No.	Frequency Hertz	Eigenvalue (Rad/sec)**2	Generalized Mass	Max Component Deg. of Freedom
81	81	0.28829E+05	0.32810E+11	0.28798E-03	12204 UX
82	82	0.28829E+05	0.32810E+11	0.28798E-03	5136 UX
83	83	0.29133E+05	0.33506E+11	0.12946E-03	12694 UZ
84	84	0.29133E+05	0.33506E+11	0.12946E-03	5626 UZ
85	85	0.29428E+05	0.34189E+11	0.22950E-03	11676 UZ
86	86	0.29428E+05	0.34189E+11	0.22950E-03	4608 UZ
87	87	0.29762E+05	0.34969E+11	0.44882E-03	11082 UZ
88	88	0.29762E+05	0.34969E+11	0.44882E-03	4014 UZ
89	89	0.29995E+05	0.35518E+11	0.14462E-03	12506 UX
90	90	0.29995E+05	0.35518E+11	0.14462E-03	5438 UX
91	91	0.30107E+05	0.35785E+11	0.23542E-03	11082 UZ
92	92	0.30107E+05	0.35785E+11	0.23542E-03	4014 UZ
93	93	0.30493E+05	0.36708E+11	0.21538E-03	5626 UZ
94	94	0.30493E+05	0.36708E+11	0.21538E-03	12694 UZ
95	95	0.30862E+05	0.37601E+11	0.13503E-03	12694 UZ
96	96	0.30862E+05	0.37601E+11	0.13503E-03	5626 UZ
97	97	0.31099E+05	0.38183E+11	0.85267E-04	12506 UX
98	98	0.31099E+05	0.38183E+11	0.85266E-04	5438 UX
99	99	0.31272E+05	0.38607E+11	0.22345E-03	3516 UZ
100	100	0.31272E+05	0.38607E+11	0.22345E-03	10584 UZ
101	101	0.31825E+05	0.39986E+11	0.11375E-03	5438 UX
102	102	0.31825E+05	0.39986E+11	0.11376E-03	12506 UX
103	103	0.31971E+05	0.40354E+11	0.74614E-04	5525 UX
104	104	0.31971E+05	0.40354E+11	0.74605E-04	12593 UX
105	105	0.43041E+05	0.73133E+11	0.54749E-04	5366 UX
106	106	0.43041E+05	0.73134E+11	0.54751E-04	12434 UX
107	107	0.44806E+05	0.79256E+11	0.71311E-04	12696 UX
108	108	0.44806E+05	0.79256E+11	0.71318E-04	5628 UX
109	109	0.45789E+05	0.82771E+11	0.27983E-04	12521 UX
110	110	0.45789E+05	0.82771E+11	0.27977E-04	5453 UX
111	111	0.47749E+05	0.90009E+11	0.40885E-04	12434 UX
112	112	0.47749E+05	0.90010E+11	0.40889E-04	5366 UX

[redacted]

Table 4 EIGENVALUE SUMMARY TABLE - SECOND DEGENERATE BOUNDARY CONDITIONS

Mode No.	Seq. No.	Frequency Hertz	Eigenvalue (Rad/sec)**2	Generalized Mass	Max Component Deg. of Freedom
1	1	0.26821E+04	0.28400E+09	0.14242E-02	Node 640 UZ
2	2	0.26821E+04	0.28400E+09	0.14242E-02	7708 UZ
3	3	0.53898E+04	0.11468E+10	0.93958E-03	8931 UZ
4	4	0.53898E+04	0.11468E+10	0.93958E-03	1863 UZ
5	5	0.76347E+04	0.23012E+10	0.16728E-02	10599 UX
6	6	0.76347E+04	0.23012E+10	0.16728E-02	3531 UX
7	7	0.97547E+04	0.37565E+10	0.43556E-03	10410 UX
8	8	0.97547E+04	0.37565E+10	0.43556E-03	3342 UX
9	9	0.10519E+05	0.43682E+10	0.43760E-03	9095 UZ
10	10	0.10519E+05	0.43682E+10	0.43760E-03	2027 UZ
11	11	0.11037E+05	0.48088E+10	0.12470E-03	3342 UX
12	12	0.11037E+05	0.48088E+10	0.12470E-03	10410 UX
13	13	0.11920E+05	0.56093E+10	0.80870E-03	396 UZ
14	14	0.11920E+05	0.56093E+10	0.80870E-03	7464 UZ
15	15	0.12083E+05	0.57639E+10	0.90705E-03	3199 UX
16	16	0.12083E+05	0.57639E+10	0.90705E-03	10267 UX
17	17	0.12993E+05	0.66651E+10	0.31966E-03	395 UZ
18	18	0.12993E+05	0.66651E+10	0.31966E-03	7463 UZ
19	19	0.13376E+05	0.70635E+10	0.13673E-02	3199 UX
20	20	0.13376E+05	0.70635E+10	0.13673E-02	10267 UX
21	21	0.14957E+05	0.88319E+10	0.24981E-03	10390 UZ
22	22	0.14957E+05	0.88319E+10	0.24981E-03	3322 UZ
23	23	0.15395E+05	0.93570E+10	0.78289E-03	233 UZ
24	24	0.15395E+05	0.93570E+10	0.78289E-03	7301 UZ
25	25	0.16340E+05	0.10541E+11	0.17920E-03	3608 UX
26	26	0.16340E+05	0.10541E+11	0.17920E-03	10676 UX
27	27	0.17880E+05	0.12621E+11	0.23140E-03	2933 UX
28	28	0.17880E+05	0.12621E+11	0.23140E-03	10001 UX
29	29	0.18686E+05	0.13784E+11	0.14137E-03	11004 UZ
30	30	0.18686E+05	0.13784E+11	0.14137E-03	3936 UZ
31	31	0.18777E+05	0.13919E+11	0.12827E-03	10418 UZ
32	32	0.18777E+05	0.13919E+11	0.12827E-03	3350 UZ
33	33	0.19240E+05	0.14615E+11	0.45894E-03	232 UZ
34	34	0.19240E+05	0.14615E+11	0.45894E-03	7300 UZ
35	35	0.19747E+05	0.15394E+11	0.42431E-03	4012 UZ
36	36	0.19747E+05	0.15394E+11	0.42431E-03	11080 UZ
37	37	0.20485E+05	0.16567E+11	0.95820E-04	11676 UZ
38	38	0.20485E+05	0.16567E+11	0.95820E-04	4608 UZ
39	39	0.20701E+05	0.16918E+11	0.85273E-04	2750 UZ
40	40	0.20701E+05	0.16918E+11	0.85273E-04	9818 UZ

Table 4 EIGENVALUE SUMMARY TABLE - SECOND DEGENERATE BOUNDARY CONDITIONS (Continued)

Mode No.	Seq. No.	Frequency Hertz	Eigenvalue (Rad/sec)**2	Generalized Mass	Max Component Deg. of Freedom
41	41	0.20938E+05	0.17307E+11	0.88255E-04	3936 UZ
42	42	0.20938E+05	0.17307E+11	0.88255E-04	11004 UZ
43	43	0.21108E+05	0.17589E+11	0.25379E-03	11411 UZ
44	44	0.21108E+05	0.17589E+11	0.25379E-03	4343 UZ
45	45	0.21565E+05	0.18359E+11	0.32459E-03	10148 UZ
46	46	0.21565E+05	0.18359E+11	0.32459E-03	3080 UZ
47	47	0.22014E+05	0.19131E+11	0.31792E-03	4338 UZ
48	48	0.22014E+05	0.19131E+11	0.31792E-03	11406 UZ
49	49	0.22546E+05	0.20067E+11	0.20094E-03	2918 UZ
50	50	0.22546E+05	0.20067E+11	0.20094E-03	9986 UZ
51	51	0.23063E+05	0.20999E+11	0.11366E-03	3798 UX
52	52	0.23063E+05	0.20999E+11	0.11366E-03	10866 UX
53	53	0.23566E+05	0.21925E+11	0.11538E-03	4536 UZ
54	54	0.23566E+05	0.21925E+11	0.11538E-03	11604 UZ
55	55	0.24017E+05	0.22771E+11	0.29182E-03	2752 UZ
56	56	0.24017E+05	0.22771E+11	0.29182E-03	9820 UZ
57	57	0.24611E+05	0.23912E+11	0.10915E-03	3350 UZ
58	58	0.24611E+05	0.23912E+11	0.10915E-03	10418 UZ
59	59	0.24779E+05	0.24239E+11	0.10536E-03	11004 UZ
60	60	0.24779E+05	0.24239E+11	0.10536E-03	3936 UZ
61	61	0.25125E+05	0.24922E+11	0.10426E-03	10418 UZ
62	62	0.25125E+05	0.24922E+11	0.10426E-03	3350 UZ
63	63	0.25531E+05	0.25734E+11	0.57633E-04	2750 UZ
64	64	0.25531E+05	0.25734E+11	0.57633E-04	9818 UZ
65	65	0.26049E+05	0.26789E+11	0.35336E-03	3348 UZ
66	66	0.26049E+05	0.26789E+11	0.35336E-03	10416 UZ
67	67	0.26532E+05	0.27791E+11	0.14668E-03	5626 UZ
68	68	0.26532E+05	0.27791E+11	0.14668E-03	12694 UZ
69	69	0.27513E+05	0.29883E+11	0.31081E-03	12204 UX
70	70	0.27513E+05	0.29883E+11	0.31081E-03	5136 UX
71	71	0.27952E+05	0.30845E+11	0.25271E-03	5438 UX
72	72	0.27952E+05	0.30845E+11	0.25271E-03	12506 UX
73	73	0.28010E+05	0.30974E+11	0.27584E-03	5438 UX
74	74	0.28010E+05	0.30974E+11	0.27584E-03	12506 UX
75	75	0.28347E+05	0.31722E+11	0.40349E-03	3000 UZ
76	76	0.28347E+05	0.31722E+11	0.40349E-03	10068 UZ
77	77	0.28833E+05	0.32819E+11	0.18525E-03	8930 UZ
78	78	0.28833E+05	0.32819E+11	0.18525E-03	1862 UZ
79	79	0.29172E+05	0.33596E+11	0.25161E-03	3348 UZ
80	80	0.29172E+05	0.33596E+11	0.25161E-03	10416 UZ

Table 4 EIGENVALUE SUMMARY TABLE - SECOND DEGENERATE BOUNDARY CONDITIONS (Concluded)

Mode No.	Seq. No.	Frequency Hertz	Eigenvalue (Rad/sec)**2	Generalized Mass	Max Component Deg. of Freedom
81	81	0.29448E+05	0.34235E+11	0.16100E-03	5438 UX
82	82	0.29448E+05	0.34235E+11	0.16100E-03	12506 UX
83	83	0.29657E+05	0.34723E+11	0.23382E-03	231 UZ
84	84	0.29657E+05	0.34723E+11	0.23382E-03	7299 UZ
85	85	0.29862E+05	0.35204E+11	0.16441E-03	5357 UX
86	86	0.29862E+05	0.35204E+11	0.16441E-03	12425 UX
87	87	0.30204E+05	0.36016E+11	0.31797E-03	9986 UZ
88	88	0.30204E+05	0.36016E+11	0.31797E-03	2918 UZ
89	89	0.30872E+05	0.37626E+11	0.15012E-03	2749 UZ
90	90	0.30872E+05	0.37626E+11	0.15012E-03	9817 UZ
91	91	0.31022E+05	0.37992E+11	0.17736E-03	11933 UZ
92	92	0.31022E+05	0.37992E+11	0.17734E-03	4865 UZ
93	93	0.31129E+05	0.38255E+11	0.87263E-04	5438 UX
94	94	0.31129E+05	0.38255E+11	0.87263E-04	12506 UX
95	95	0.31572E+05	0.39352E+11	0.96413E-04	5525 UX
96	96	0.31572E+05	0.39352E+11	0.96412E-04	12593 UX
97	97	0.31928E+05	0.40243E+11	0.21365E-03	5438 UX
98	98	0.31928E+05	0.40243E+11	0.21373E-03	12506 UX
99	99	0.44206E+05	0.77147E+11	0.52939E-04	12602 UX
100	100	0.44206E+05	0.77147E+11	0.52937E-04	5534 UX
101	101	0.45811E+05	0.82850E+11	0.63014E-04	12434 UX
102	102	0.45811E+05	0.82851E+11	0.63016E-04	5366 UX
103	103	0.46366E+05	0.84872E+11	0.37867E-04	5453 UX
104	104	0.46366E+05	0.84873E+11	0.37866E-04	12521 UX
105	105	0.47784E+05	0.90141E+11	0.50646E-04	12434 UX
106	106	0.47784E+05	0.90141E+11	0.50644E-04	5366 UX

Table 5 EIGENVALUE SUMMARY TABLE - ANTISYMMETRIC-ANTISYMMETRIC BOUNDARY CONDITIONS

Mode No.	Seq. No.	Frequency Hertz	Eigenvalue (Rad/sec)**2	Generalized Mass	Max Component Deg. of Freedom
1	1	0.39458E+04	0.61464E+09	0.58723E-03	8345 UZ
2	2	0.41008E+04	0.66389E+09	0.57382E-03	7235 UZ
3	3	0.97279E+04	0.37359E+10	0.20327E-03	10599 UX
4	4	0.99459E+04	0.39052E+10	0.97860E-03	10212 UZ
5	5	0.10640E+05	0.44690E+10	0.10869E-03	10410 UX
6	6	0.11784E+05	0.54824E+10	0.20615E-03	7821 UZ
7	7	0.11827E+05	0.55225E+10	0.18295E-03	7463 UZ
8	8	0.12576E+05	0.62436E+10	0.53503E-03	10666 UZ
9	9	0.12852E+05	0.65213E+10	0.20125E-03	10400 UZ
10	10	0.14375E+05	0.81577E+10	0.22320E-03	10599 UX
11	11	0.14930E+05	0.87998E+10	0.51431E-03	11933 UZ
12	12	0.16796E+05	0.11137E+11	0.53078E-03	10410 UX
13	13	0.16987E+05	0.11392E+11	0.68191E-03	10676 UX
14	14	0.17838E+05	0.12562E+11	0.30326E-03	10267 UX
15	15	0.18397E+05	0.13361E+11	0.42890E-03	10676 UX
16	16	0.18512E+05	0.13530E+11	0.45330E-03	10340 UZ
17	17	0.18967E+05	0.14203E+11	0.48067E-04	11604 UZ
18	18	0.19086E+05	0.14382E+11	0.59100E-04	10418 UZ
19	19	0.20441E+05	0.16496E+11	0.17814E-03	11414 UZ
20	20	0.20894E+05	0.17235E+11	0.15621E-03	10144 UZ
21	21	0.21118E+05	0.17607E+11	0.28471E-03	8249 UZ
22	22	0.21282E+05	0.17881E+11	0.16938E-03	10152 UZ
23	23	0.21874E+05	0.18889E+11	0.13372E-03	11410 UZ
24	24	0.22485E+05	0.19960E+11	0.71432E-04	10865 UX
25	25	0.23457E+05	0.21722E+11	0.36807E-04	11082 UZ
26	26	0.23479E+05	0.21763E+11	0.36138E-04	9818 UZ
27	27	0.24614E+05	0.23917E+11	0.46213E-04	11604 UZ
28	28	0.24705E+05	0.24096E+11	0.48929E-04	10418 UZ
29	29	0.24973E+05	0.24621E+11	0.10710E-03	12694 UZ
30	30	0.25412E+05	0.25493E+11	0.64398E-04	9818 UZ
31	31	0.25846E+05	0.26373E+11	0.13621E-03	10865 UX
32	32	0.26270E+05	0.27244E+11	0.29711E-03	10212 UZ
33	33	0.26737E+05	0.28222E+11	0.12729E-03	11082 UZ
34	34	0.26787E+05	0.28327E+11	0.37062E-03	12506 UX
35	35	0.27352E+05	0.29534E+11	0.10999E-03	9986 UZ
36	36	0.27974E+05	0.30893E+11	0.55532E-03	10671 UZ
37	37	0.28168E+05	0.31325E+11	0.33603E-03	12593 UX
38	38	0.28635E+05	0.32372E+11	0.15107E-03	12506 UX
39	39	0.28948E+05	0.33081E+11	0.27357E-03	11248 UZ
40	40	0.29516E+05	0.34393E+11	0.92719E-04	12694 UZ

Table 5 EIGENVALUE SUMMARY TABLE - ANTISYMMETRIC-ANTISYMMETRIC BOUNDARY CONDITIONS (Continued)

Mode No.	Seq. No.	Frequency Hertz	Eigenvalue (Rad/sec)**2	Generalized Mass	Max Component Deg. of Freedom
41	41	0.30042E+05	0.35629E+11	0.10940E-03	12593 UX
42	42	0.30206E+05	0.36019E+11	0.35431E-03	8408 UZ
43	43	0.30751E+05	0.37332E+11	0.13219E-03	10666 UZ
44	44	0.31018E+05	0.37982E+11	0.39344E-04	12506 UX
45	45	0.31219E+05	0.38477E+11	0.64976E-04	11933 UZ
46	46	0.31453E+05	0.39056E+11	0.13406E-03	12425 UX
47	47	0.31666E+05	0.39588E+11	0.25325E-03	12593 UX
48	48	0.31860E+05	0.40072E+11	0.89416E-04	11082 UZ
49	49	0.32268E+05	0.41105E+11	0.22791E-03	10584 UZ
50	50	0.32327E+05	0.41257E+11	0.18897E-03	12506 UX
51	51	0.32632E+05	0.42038E+11	0.18830E-03	10666 UZ
52	52	0.32996E+05	0.42983E+11	0.15255E-03	12593 UX
53	53	0.33407E+05	0.44059E+11	0.61279E-04	12593 UX
54	54	0.33595E+05	0.44557E+11	0.30441E-04	12425 UX
55	55	0.33848E+05	0.45230E+11	0.12868E-03	11933 UZ
56	56	0.34018E+05	0.45686E+11	0.84628E-04	12378 UZ
57	57	0.34559E+05	0.47150E+11	0.99870E-04	11676 UZ
58	58	0.35008E+05	0.48384E+11	0.65417E-04	10416 UZ
59	59	0.35130E+05	0.48721E+11	0.27515E-03	11074 UX
60	60	0.35553E+05	0.49900E+11	0.20880E-03	12199 UZ
61	61	0.36084E+05	0.51402E+11	0.26864E-03	12694 UZ
62	62	0.36322E+05	0.52082E+11	0.97727E-04	10252 UZ
63	63	0.36592E+05	0.52861E+11	0.48780E-04	10405 UZ
64	64	0.36987E+05	0.54007E+11	0.14326E-03	12593 UX
65	65	0.37329E+05	0.55011E+11	0.42045E-04	10405 UZ
66	66	0.37714E+05	0.56153E+11	0.16131E-03	12593 UX
67	67	0.37919E+05	0.56763E+11	0.15409E-03	11514 UZ
68	68	0.38111E+05	0.57339E+11	0.89933E-04	12425 UX
69	69	0.38214E+05	0.57652E+11	0.28224E-03	12434 UX
70	70	0.38456E+05	0.58382E+11	0.58318E-04	11667 UZ
71	71	0.39003E+05	0.60057E+11	0.10054E-03	12204 UX
72	72	0.39212E+05	0.60701E+11	0.83075E-04	12434 UX
73	73	0.39446E+05	0.61429E+11	0.63603E-04	10584 UZ
74	74	0.39753E+05	0.62386E+11	0.37125E-04	12593 UX
75	75	0.40009E+05	0.63193E+11	0.26641E-04	12425 UX
76	76	0.40276E+05	0.64041E+11	0.18806E-04	12593 UX
77	77	0.40416E+05	0.64485E+11	0.83200E-04	12434 UX
78	78	0.40576E+05	0.64999E+11	0.48774E-04	12425 UX
79	79	0.40680E+05	0.65332E+11	0.41614E-04	12199 UZ
80	80	0.41291E+05	0.67309E+11	0.17851E-04	12425 UX

Table 5 EIGENVALUE SUMMARY TABLE -- ANTISYMMETRIC-ANTISYMMETRIC BOUNDARY CONDITIONS (Concluded)

Mode No.	Seq. No.	Frequency Hertz	Eigenvalue (Rad/sec)**2	Generalized Mass	Max Component Deg. of Freedom
81	81	0.41356E+05	0.67521E+11	0.61422E-04	9807 UZ
82	82	0.41635E+05	0.68434E+11	0.38567E-04	10405 UZ
83	83	0.42285E+05	0.70587E+11	0.60762E-04	11667 UZ
84	84	0.42435E+05	0.71091E+11	0.40220E-04	12434 UX
85	85	0.43050E+05	0.73165E+11	0.69469E-04	11248 UZ
86	86	0.43260E+05	0.73881E+11	0.33787E-04	12593 UX
87	87	0.43683E+05	0.75333E+11	0.84909E-04	12602 UX
88	88	0.44081E+05	0.76713E+11	0.99970E-04	12521 UX
89	89	0.44427E+05	0.77919E+11	0.82695E-04	12602 UX
90	90	0.44705E+05	0.78899E+11	0.55472E-04	12521 UX
91	91	0.44713E+05	0.78929E+11	0.13467E-03	13898 UX
92	92	0.44839E+05	0.79374E+11	0.24738E-04	12593 UX
93	93	0.44972E+05	0.79845E+11	0.86692E-04	12194 UZ
94	94	0.45079E+05	0.80225E+11	0.45104E-04	12425 UX
95	95	0.45373E+05	0.81275E+11	0.46547E-04	12715 UY
96	96	0.45492E+05	0.81700E+11	0.98490E-04	12521 UX
97	97	0.45684E+05	0.82392E+11	0.25966E-04	12425 UX
98	98	0.45926E+05	0.83269E+11	0.34538E-04	13995 UX
99	99	0.45991E+05	0.83502E+11	0.22108E-04	12593 UX
100	100	0.46113E+05	0.83949E+11	0.55428E-04	13300 UX
101	101	0.46321E+05	0.84706E+11	0.18300E-04	10850 UZ
102	102	0.46449E+05	0.85175E+11	0.16114E-04	12434 UX
103	103	0.46545E+05	0.85529E+11	0.24565E-04	12194 UZ
104	104	0.46864E+05	0.86704E+11	0.19765E-04	11832 UZ
105	105	0.47247E+05	0.88125E+11	0.48711E-04	12434 UX
106	106	0.47477E+05	0.88988E+11	0.24344E-04	12521 UX
107	107	0.47597E+05	0.89438E+11	0.18360E-03	11335 UZ
108	108	0.47886E+05	0.90528E+11	0.55186E-04	10068 UZ
109	109	0.48000E+05	0.90957E+11	0.39781E-04	12521 UX
110	110	0.48156E+05	0.91552E+11	0.32736E-04	11933 UZ
111	111	0.48383E+05	0.92414E+11	0.77723E-04	12434 UX
112	112	0.48627E+05	0.93352E+11	0.21434E-04	11514 UZ
113	113	0.48654E+05	0.93454E+11	0.83209E-04	12602 UX
114	114	0.48972E+05	0.94680E+11	0.45442E-04	10656 UZ
115	115	0.49338E+05	0.96101E+11	0.43418E-04	12434 UX
116	116	0.49510E+05	0.96772E+11	0.33842E-04	12602 UX
117	117	0.49778E+05	0.97823E+11	0.24032E-04	12434 UX
118	118	0.49947E+05	0.98486E+11	0.23669E-04	12521 UX
119	119	0.65862E+05	0.17125E+12	0.60923E-04	12403 UX
120	120	0.67509E+05	0.17992E+12	0.55034E-04	12719 UX
121	121	0.68783E+05	0.18678E+12	0.28177E-04	12509 UX
122	122	0.69770E+05	0.19218E+12	0.30797E-04	12602 UX

Table 6 EIGENVALUE SUMMARY TABLE - SYMMETRIC-SYMMETRIC BOUNDARY CONDITIONS WITH SPIN LOADING

Mode No.	Seq. No.	Frequency Hertz	Eigenvalue (Rad/sec)**2	Generalized Mass	Max Component Deg. of Freedom
1	1	0.19261E+04	0.14646E+09	0.23704E-02	Node 5068 UX
2	2	0.23002E+04	0.20888E+09	0.19367E-02	166 UZ
3	3	0.51527E+04	0.10482E+10	0.23030E-02	1339 UZ
4	4	0.81635E+04	0.26310E+10	0.40100E-03	1751 UZ
5	5	0.83532E+04	0.27547E+10	0.37095E-03	1181 UZ
6	6	0.89285E+04	0.31472E+10	0.72698E-03	3768 UZ
7	7	0.10059E+05	0.39943E+10	0.99653E-03	690 UZ
8	8	0.12009E+05	0.56939E+10	0.66132E-04	3531 UX
9	9	0.14016E+05	0.77553E+10	0.24323E-02	5626 UY
10	10	0.14356E+05	0.81361E+10	0.63608E-03	1340 UZ
11	11	0.14789E+05	0.86349E+10	0.19488E-03	917 UZ
12	12	0.15170E+05	0.90848E+10	0.31747E-03	394 UZ
13	13	0.15736E+05	0.97759E+10	0.10483E-03	3199 UX
14	14	0.16728E+05	0.11047E+11	0.27595E-03	753 UZ
15	15	0.17192E+05	0.11668E+11	0.24996E-03	5139 UX
16	16	0.18463E+05	0.13457E+11	0.14703E-03	1799 UZ
17	17	0.18599E+05	0.13656E+11	0.81184E-04	3797 UX
18	18	0.19176E+05	0.14516E+11	0.11111E-03	2744 UX
19	19	0.20184E+05	0.16084E+11	0.26307E-03	4346 UZ
20	20	0.20422E+05	0.16465E+11	0.11927E-03	3272 UZ
21	21	0.20540E+05	0.16656E+11	0.44844E-04	4536 UZ
22	22	0.21262E+05	0.17847E+11	0.27800E-03	3350 UZ
23	23	0.21643E+05	0.18493E+11	0.45818E-04	3350 UZ
24	24	0.21765E+05	0.18702E+11	0.43813E-04	2750 UZ
25	25	0.22019E+05	0.19141E+11	0.15988E-03	2739 UZ
26	26	0.22103E+05	0.19286E+11	0.10779E-03	3081 UZ
27	27	0.22288E+05	0.19611E+11	0.26284E-03	4346 UZ
28	28	0.22694E+05	0.20332E+11	0.24374E-03	4338 UZ
29	29	0.23729E+05	0.22229E+11	0.12147E-03	2739 UZ
30	30	0.24044E+05	0.22823E+11	0.27652E-03	4338 UZ
31	31	0.24371E+05	0.23449E+11	0.30563E-03	4145 UZ
32	32	0.25520E+05	0.25711E+11	0.93843E-04	4014 UZ
33	33	0.26116E+05	0.26926E+11	0.43203E-03	751 UZ
34	34	0.26215E+05	0.27130E+11	0.10797E-03	4608 UZ
35	35	0.26438E+05	0.27595E+11	0.17020E-03	4608 UZ
36	36	0.26701E+05	0.28147E+11	0.56694E-04	2748 UZ
37	37	0.27225E+05	0.29262E+11	0.90582E-04	3350 UZ
38	38	0.28123E+05	0.31224E+11	0.14275E-03	5626 UZ
39	39	0.28176E+05	0.31341E+11	0.78579E-04	4014 UZ
40	40	0.28425E+05	0.31898E+11	0.74204E-04	3350 UZ
41	41	0.28805E+05	0.32755E+11	0.19013E-03	3071 UZ
42	42	0.28898E+05	0.32968E+11	0.13177E-03	5438 UX
43	43	0.29865E+05	0.35212E+11	0.57792E-04	5438 UX
44	44	0.30039E+05	0.35623E+11	0.11978E-03	5626 UZ
45	45	0.30113E+05	0.35798E+11	0.20995E-03	5366 UX
46	46	0.30483E+05	0.36683E+11	0.88942E-04	5525 UX
47	47	0.30863E+05	0.37605E+11	0.26916E-03	2752 UZ
48	48	0.31123E+05	0.38242E+11	0.68396E-04	5626 UZ
49	49	0.31313E+05	0.38708E+11	0.14362E-03	5626 UZ

Table 7 SUGGESTED FREQUENCIES FOR FURTHER EXAMINATIONS

Power Level	RPM	1st Harmonic of Forcing Freq	Natural Frequencies of Interest(*) (Hz) Sym-Sym	1st Degen	2nd Degen	Anti-Anti
RPL	35128	7611 Hz	-	(7,8) 7746	(5,6) 7635	-
104%	36106	7823	(4) 7894	-	-	-
FPL	37342	8091	(5) 8093	-	-	-

* Mode numbers are in parentheses.

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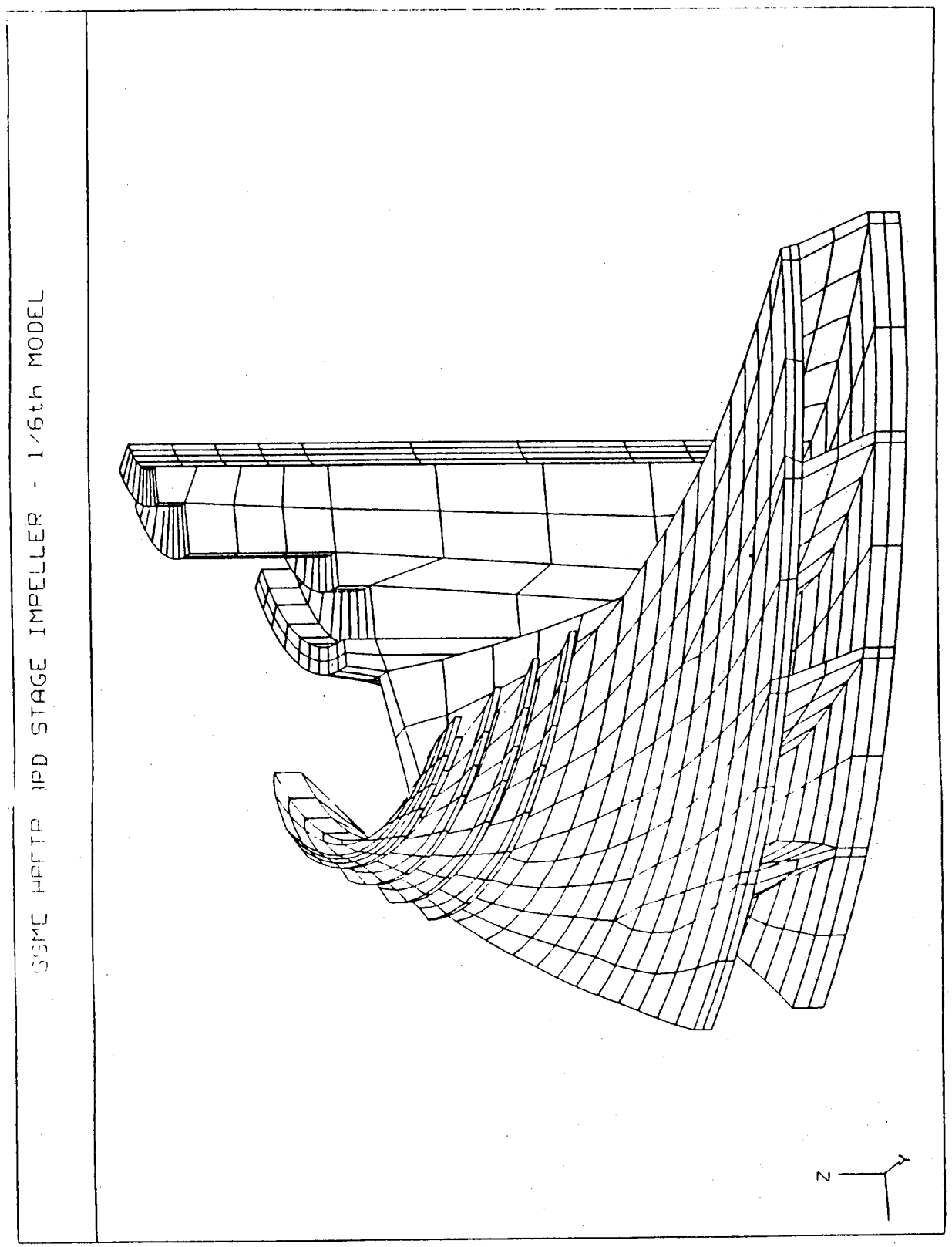

Figure 1 SSME HPFTP Third Stage Impeller - DIAL Finite Element Model

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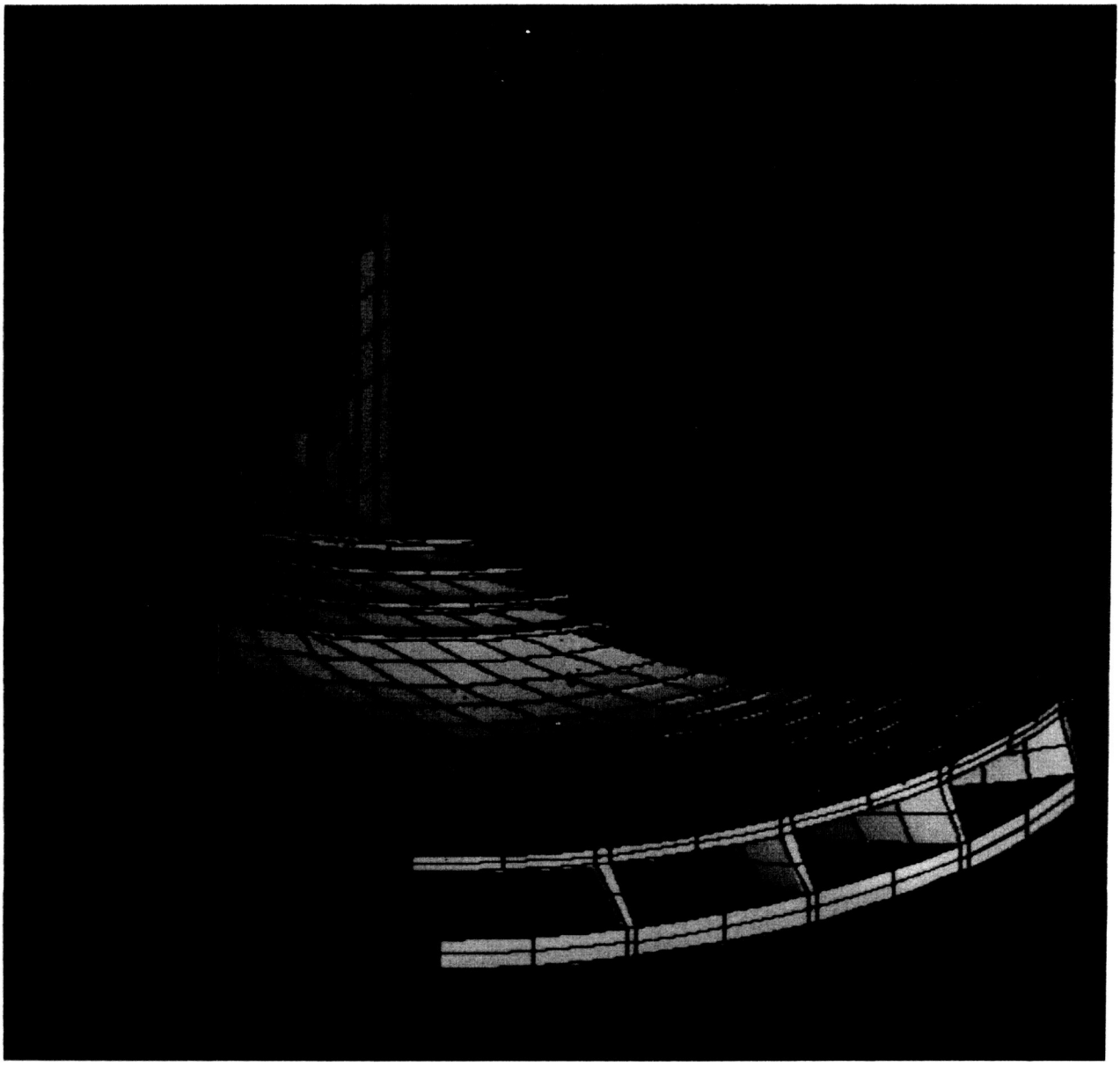

Figure 2 SSME HPFTP Third Stage Impeller - Light Source Shading Plot

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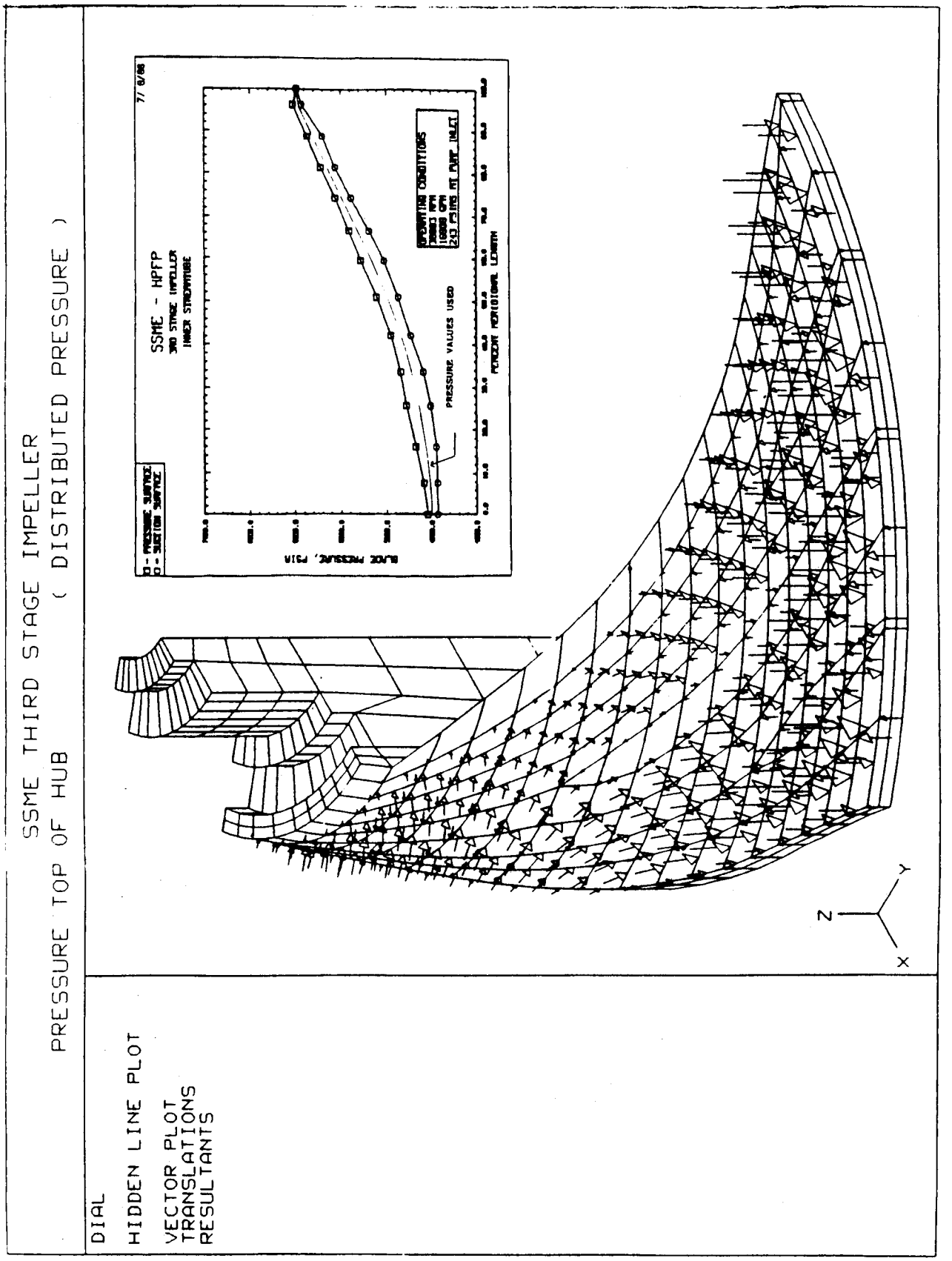

Figure 3 HPFTP Third Stage Impeller - Distributed Pressure Loading- Hub

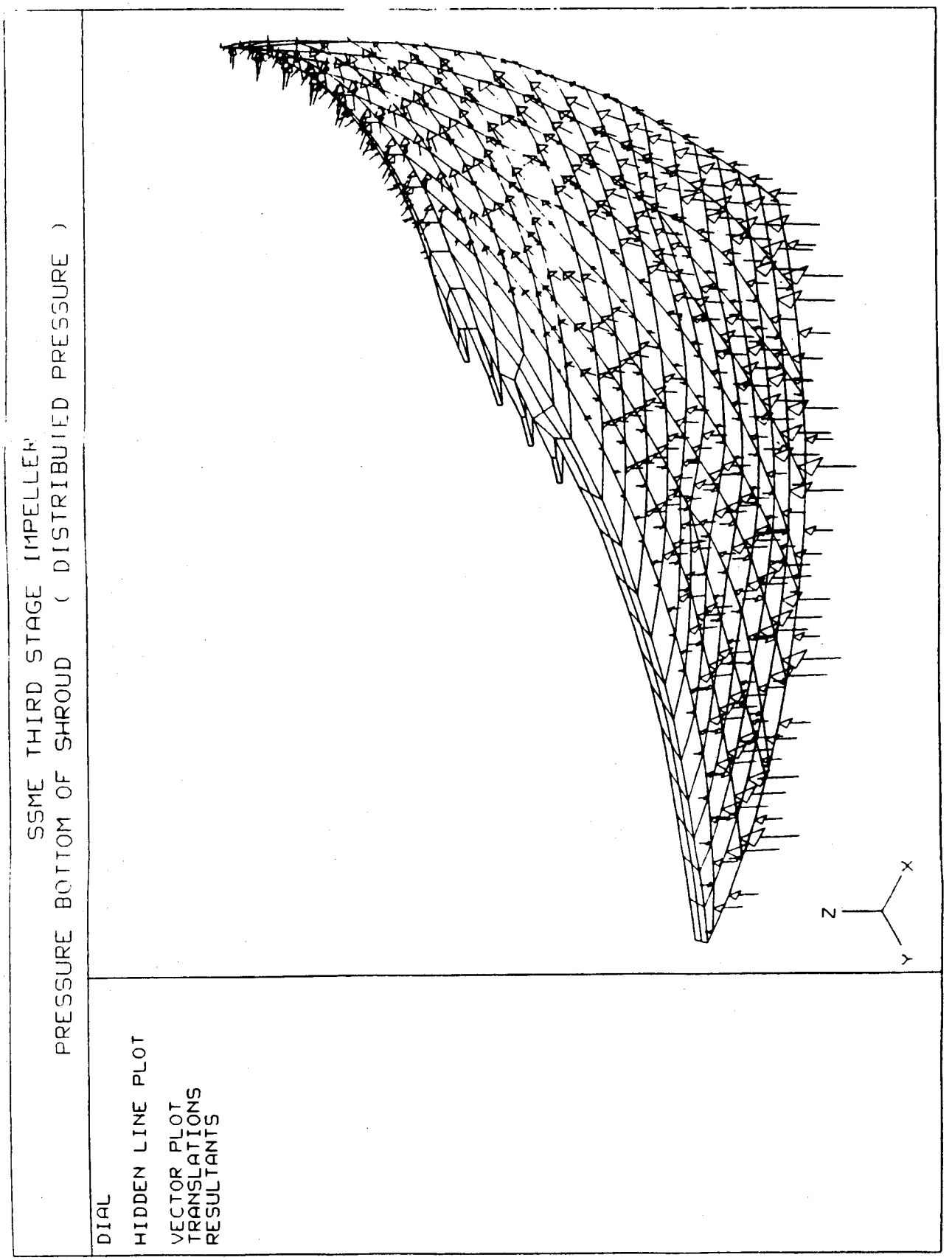

Figure 4 HPFTP Third Stage Impeller - Distributed Pressure Loading - Shroud

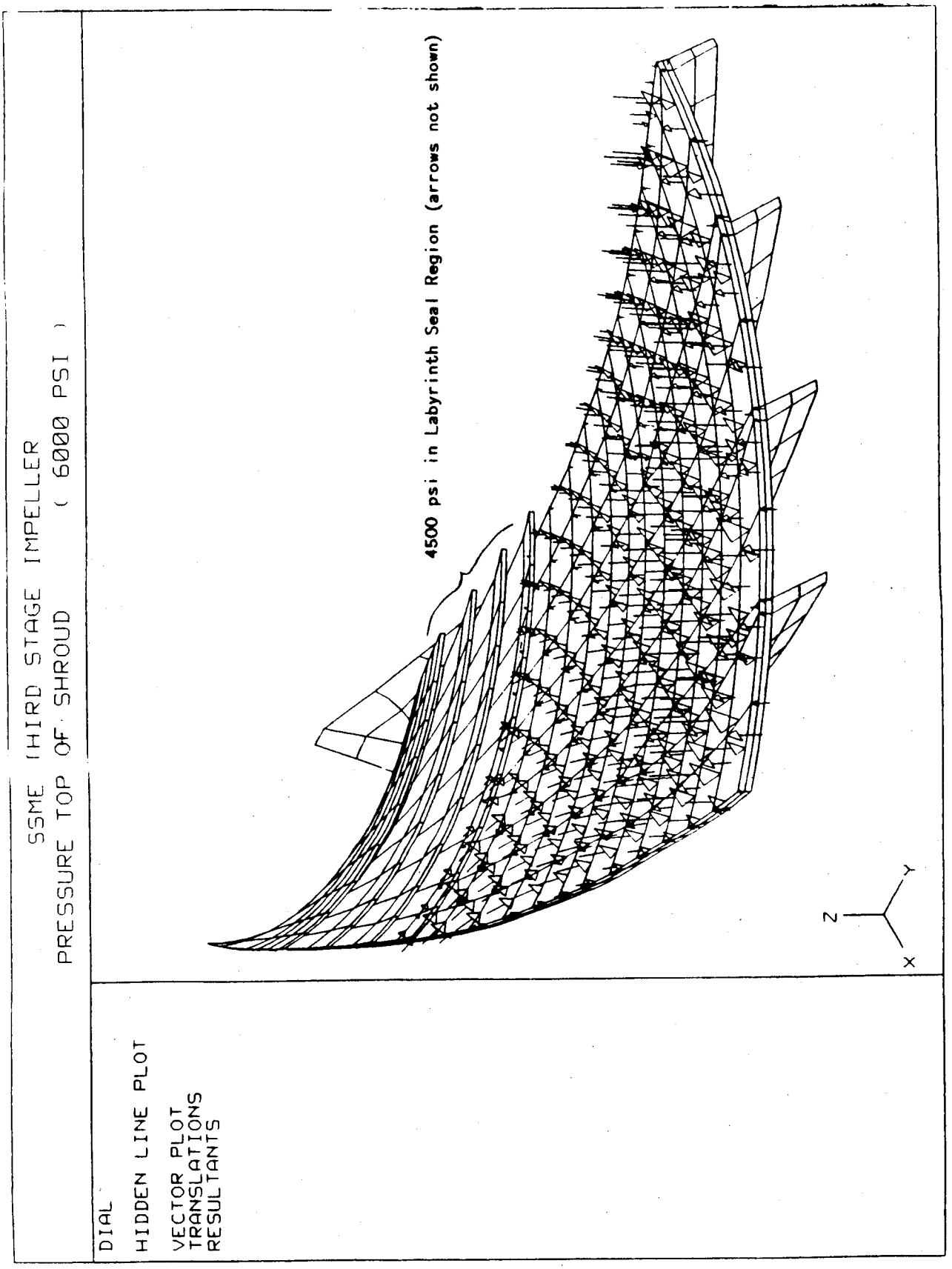

Figure 5 HPFTP Third Stage Impeller - 6000/4500 psi Pressure on Shroud

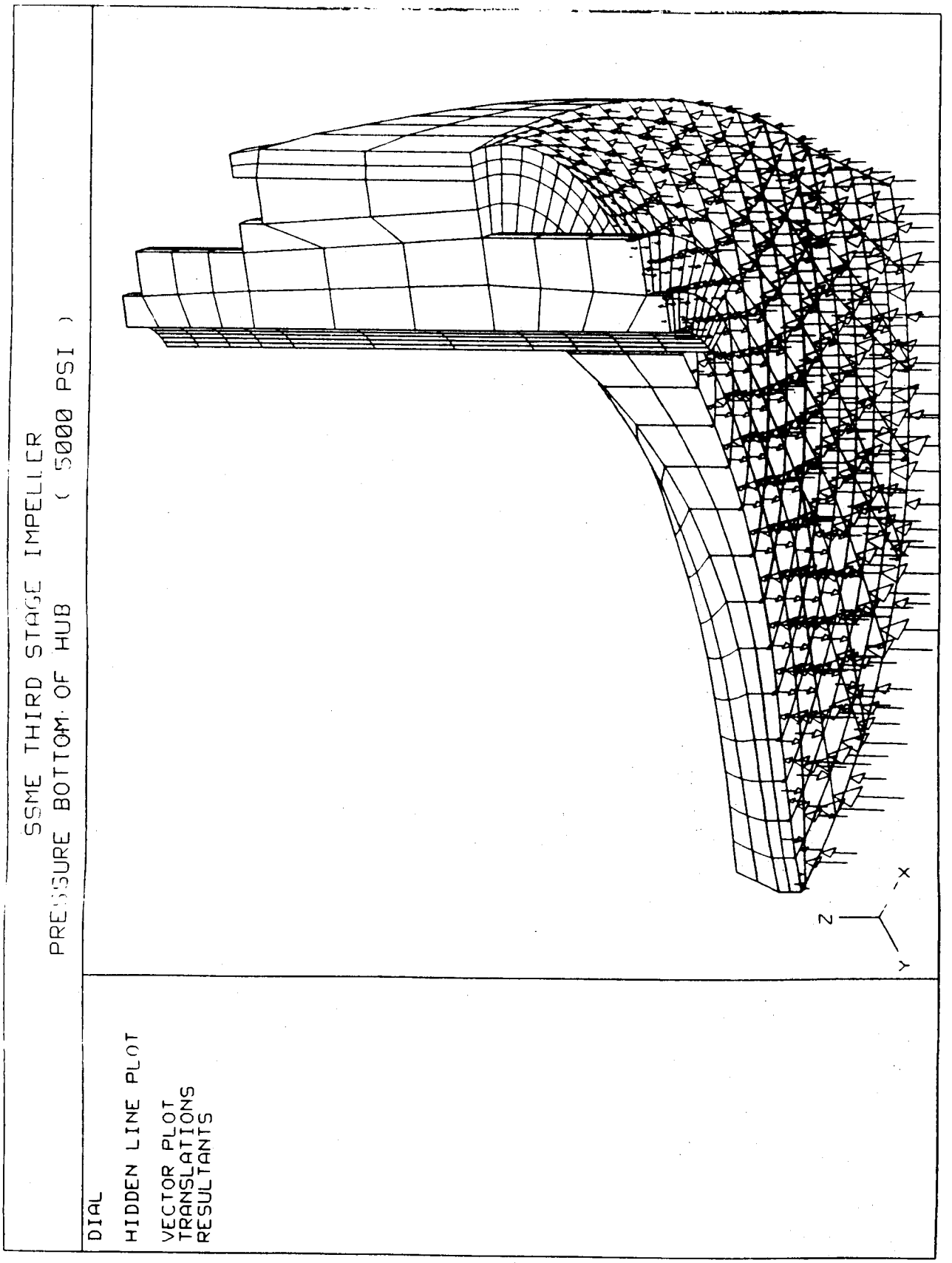

Figure 6 HPFTP Third Stage Impeller - 5000 psi Pressure on Hub

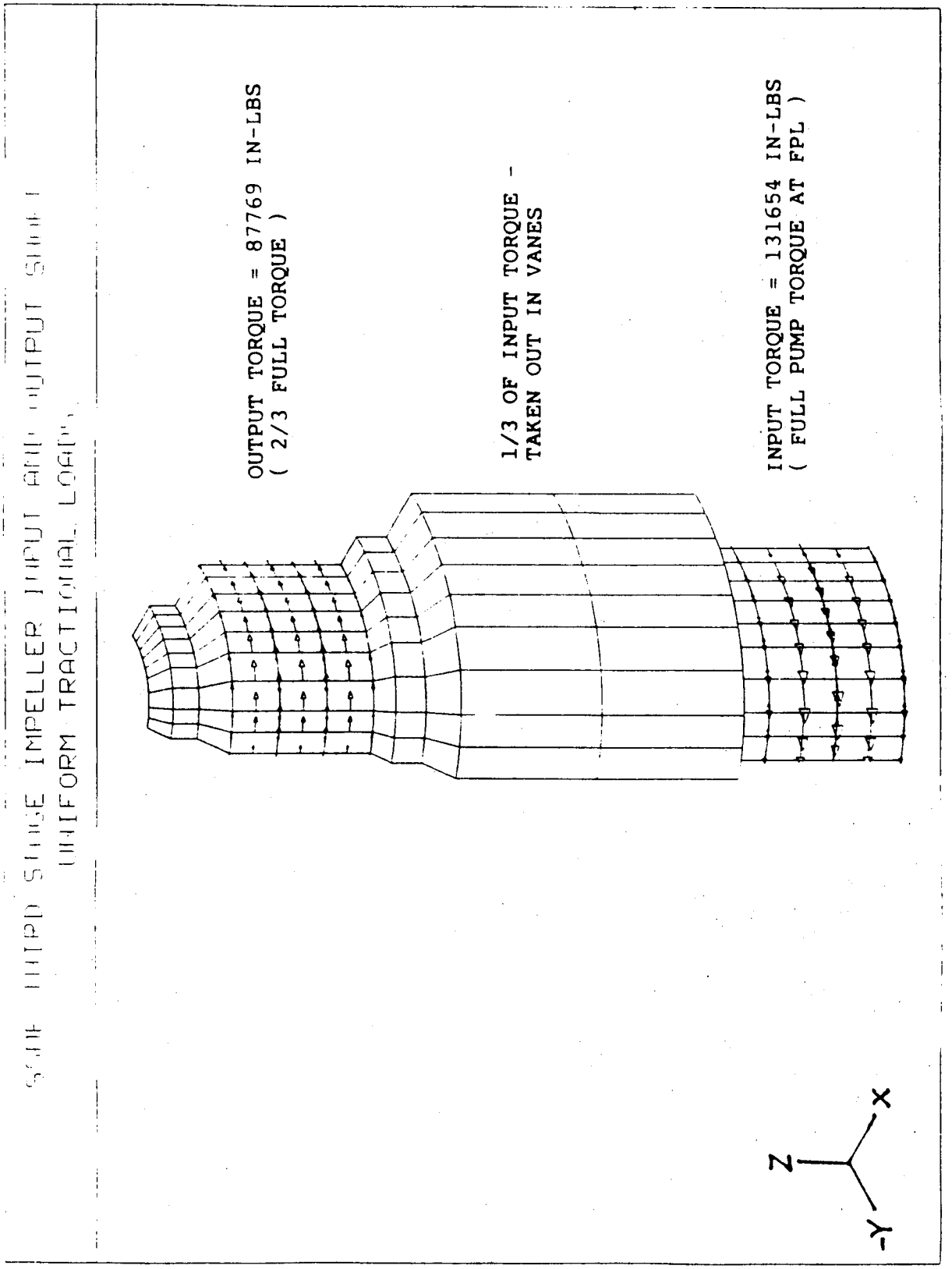

Figure 7 HPFTP Third Stage Impeller - Torque Loading on Shaft

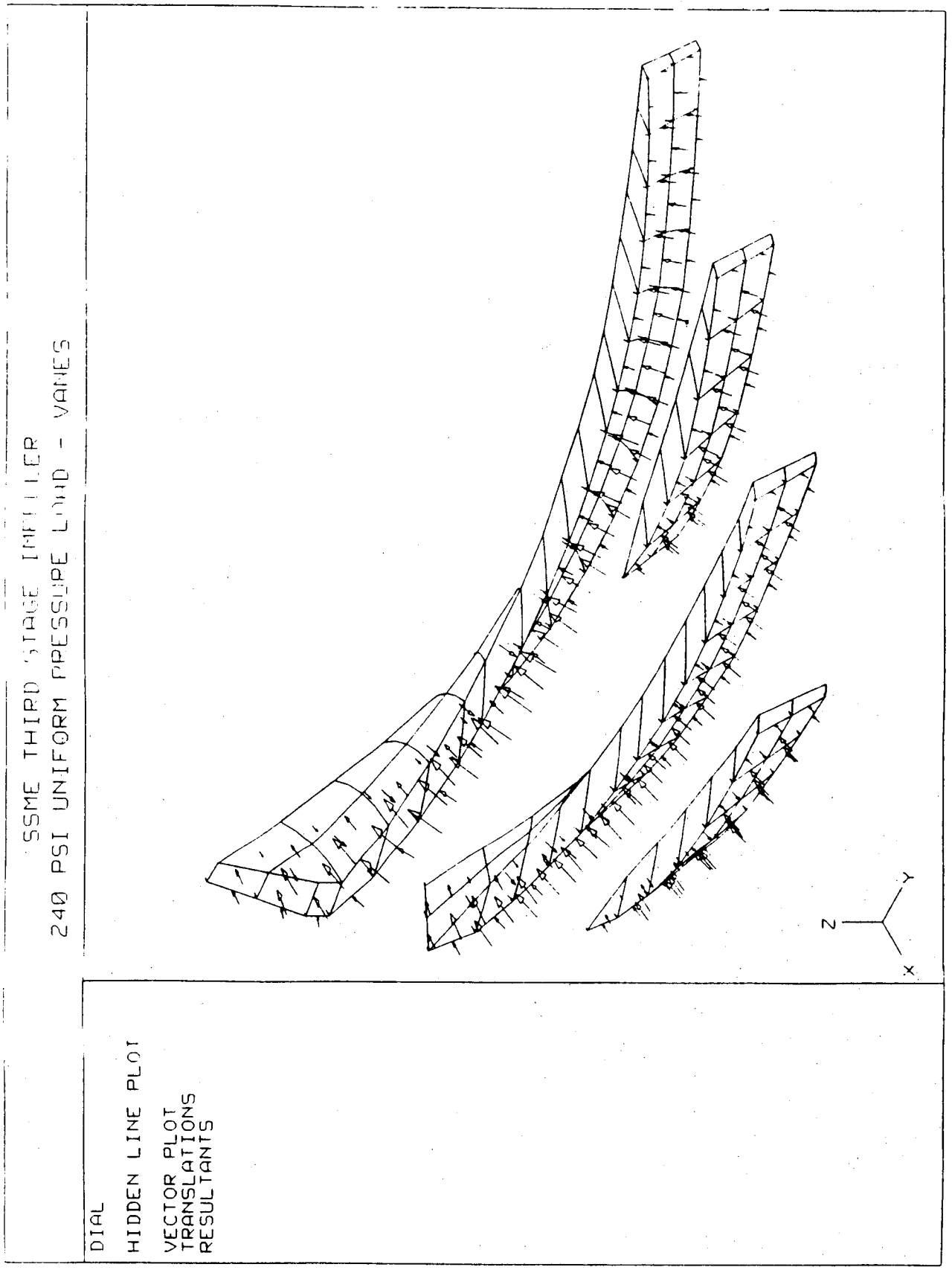

Figure 8 HPFTP Third Stage Impeller - 240 psi Pressure on Vanes

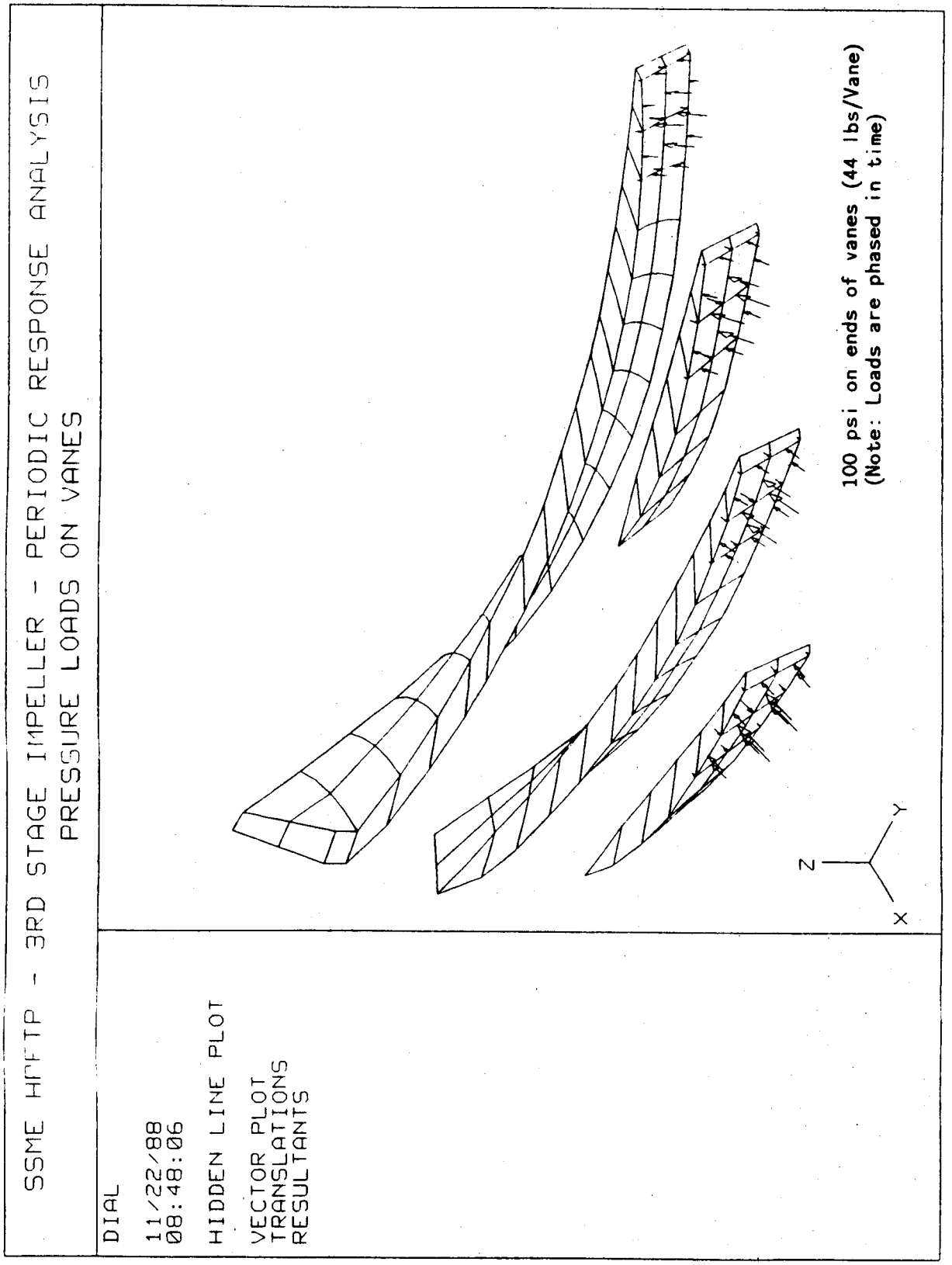

Figure 9 HPFTP Third Stage Impeller - Dynamic Spatial Loading on Vanes

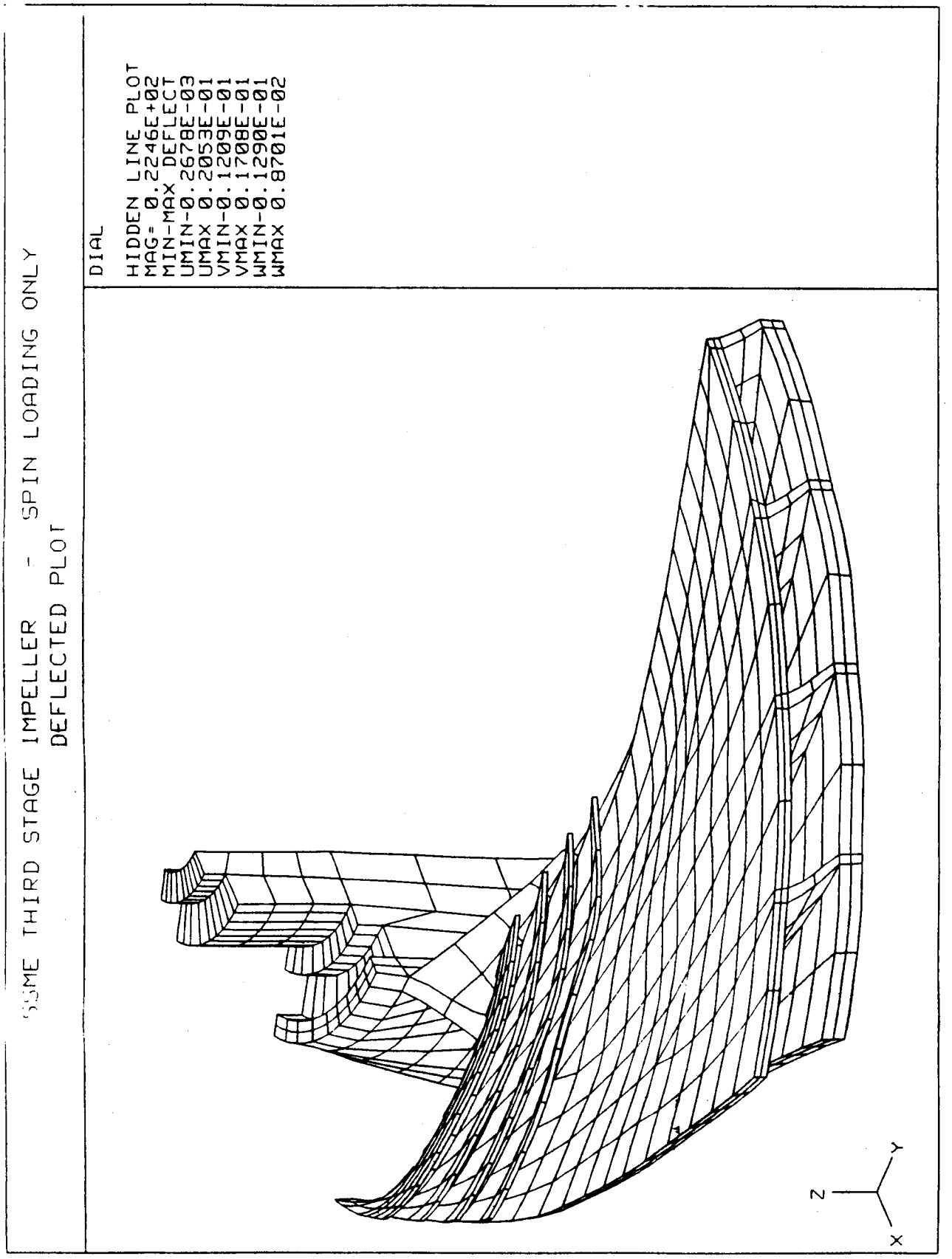

Figure 10 HPFTP Third Stage Impeller - Deflected Plot - Spin Loading Only

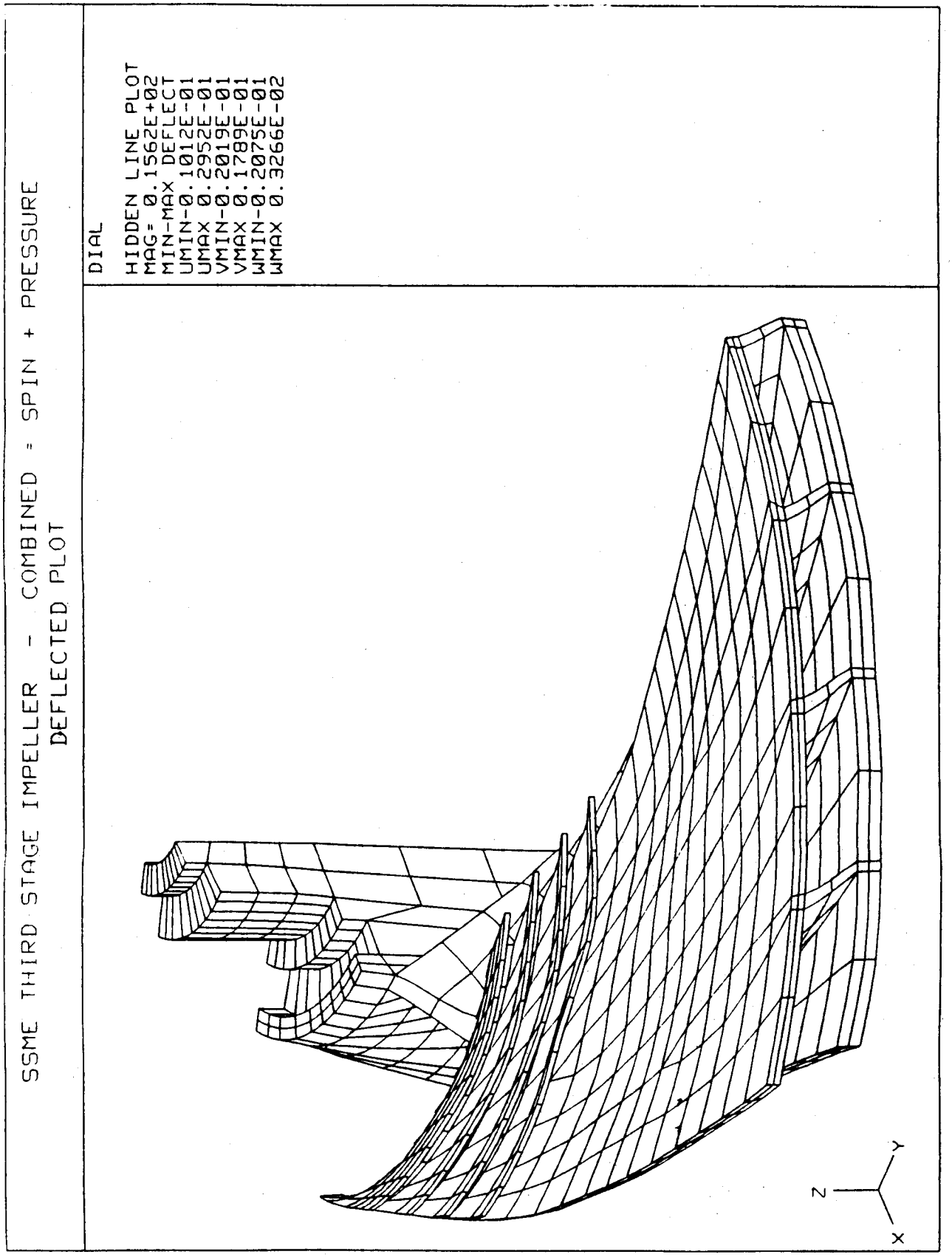

Figure 11 HPFTP Third Stage Impeller - Deflected Plot - Combined Loading

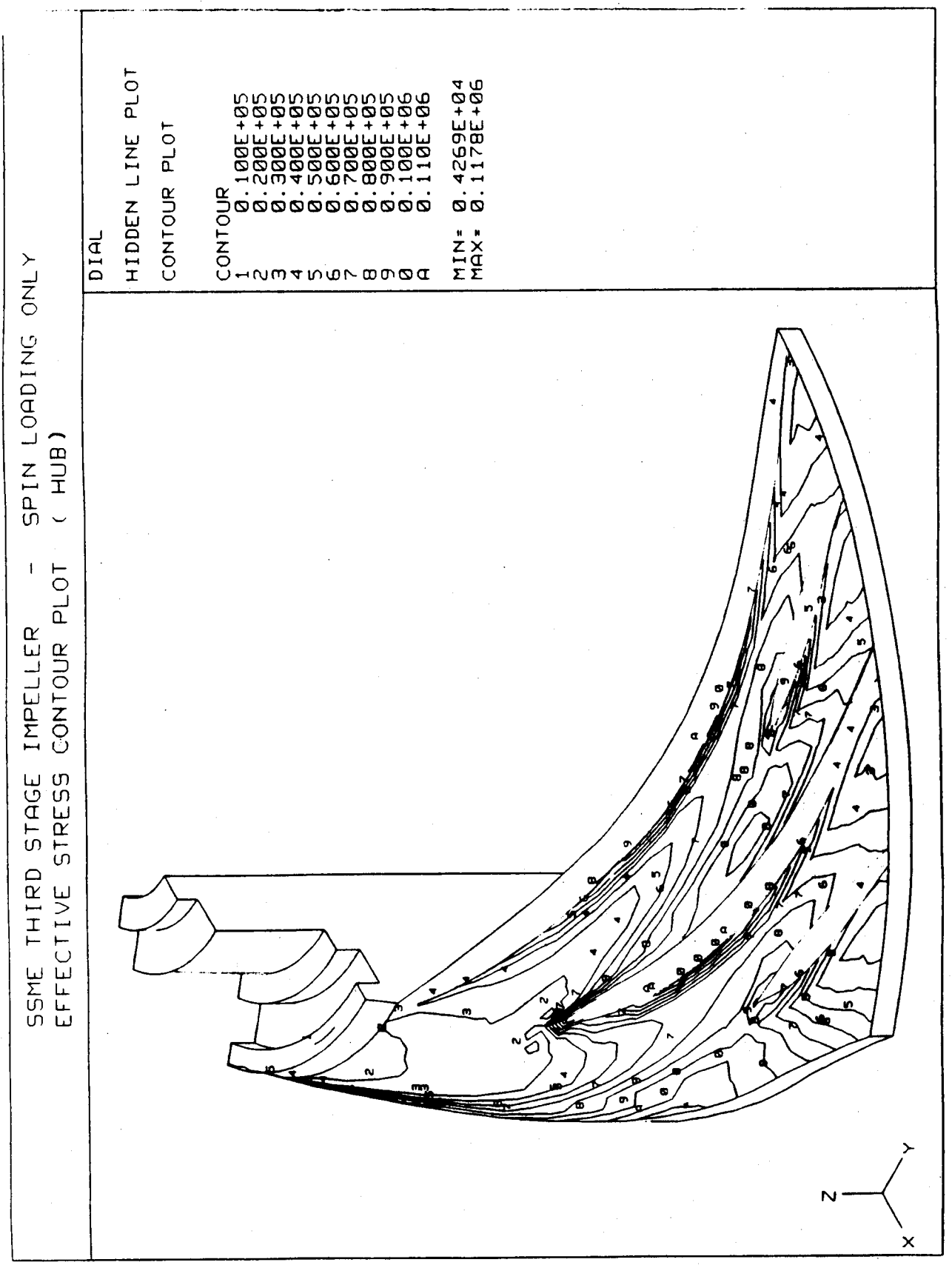

Figure 12 HPFTP Third Stage Impeller - Effective Stress Contour Plot
Spin Loading Only - Hub Inside Surface

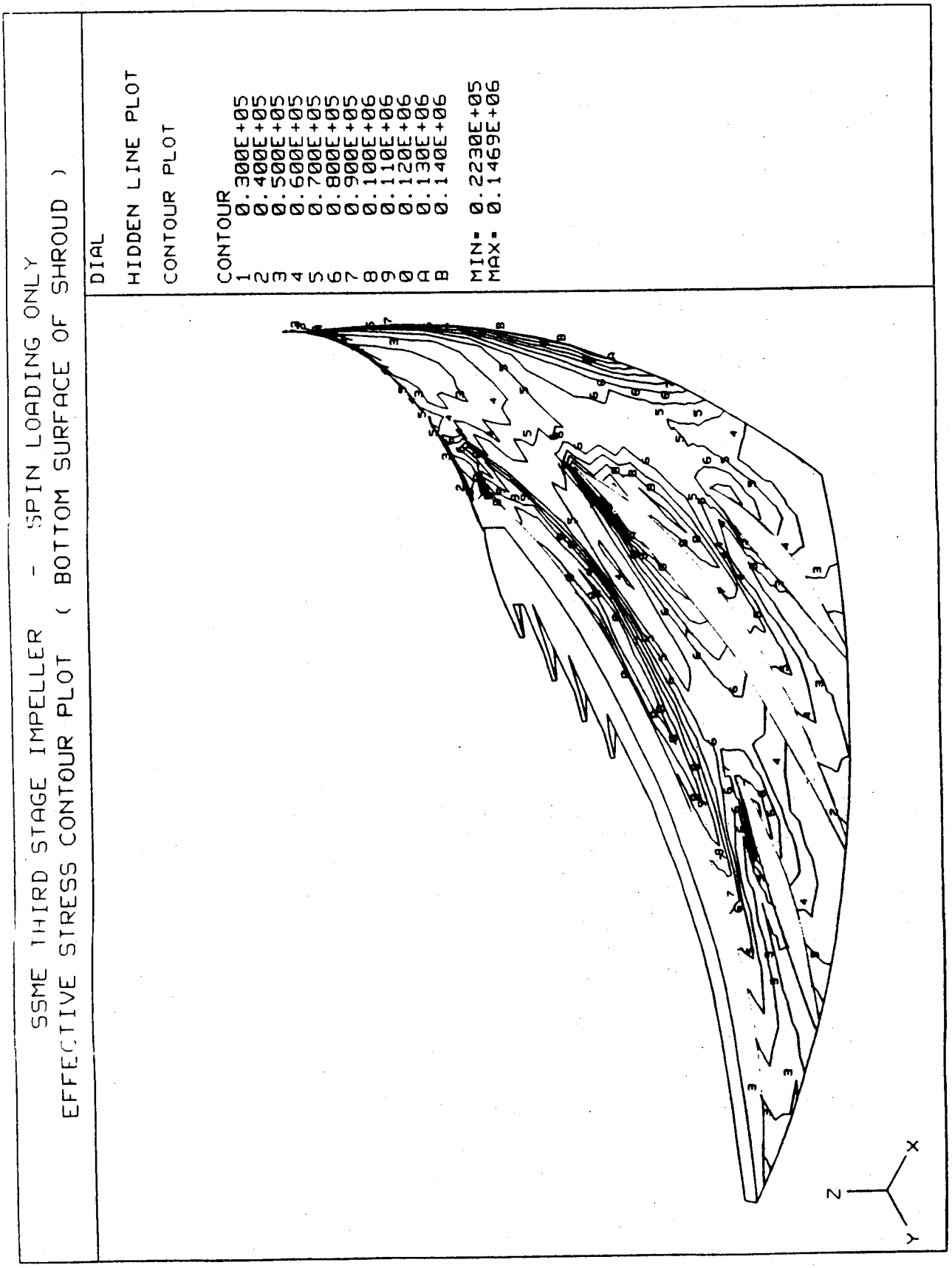

Figure 13 HPFTP Third Stage Impeller - Effective Stress Contour Plot Spin Loading Only - Shroud Inside Surface

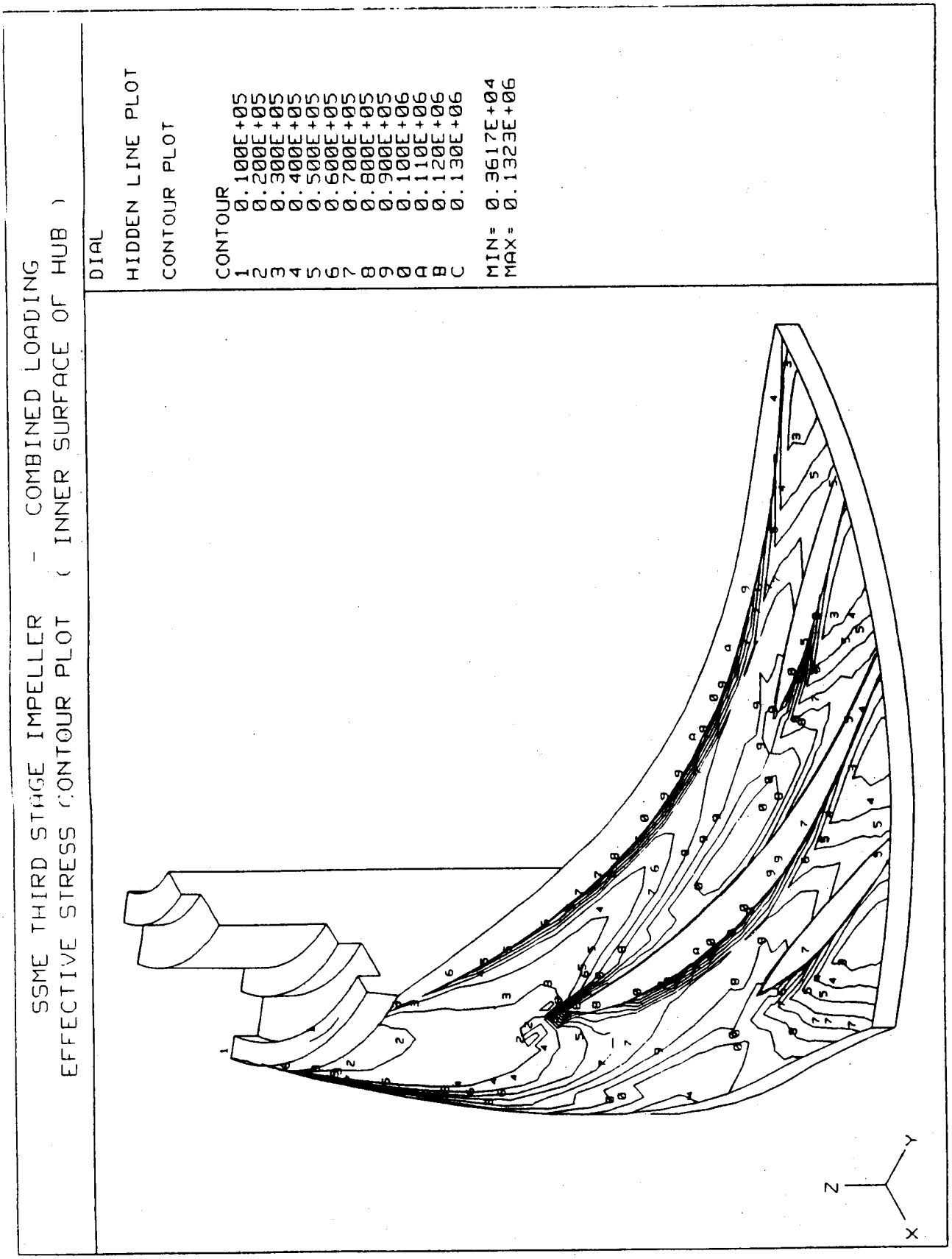

Figure 14 HPFTP Third Stage Impeller - Effective Stress Contour Plot Combined Loading - Hub Inside Surface

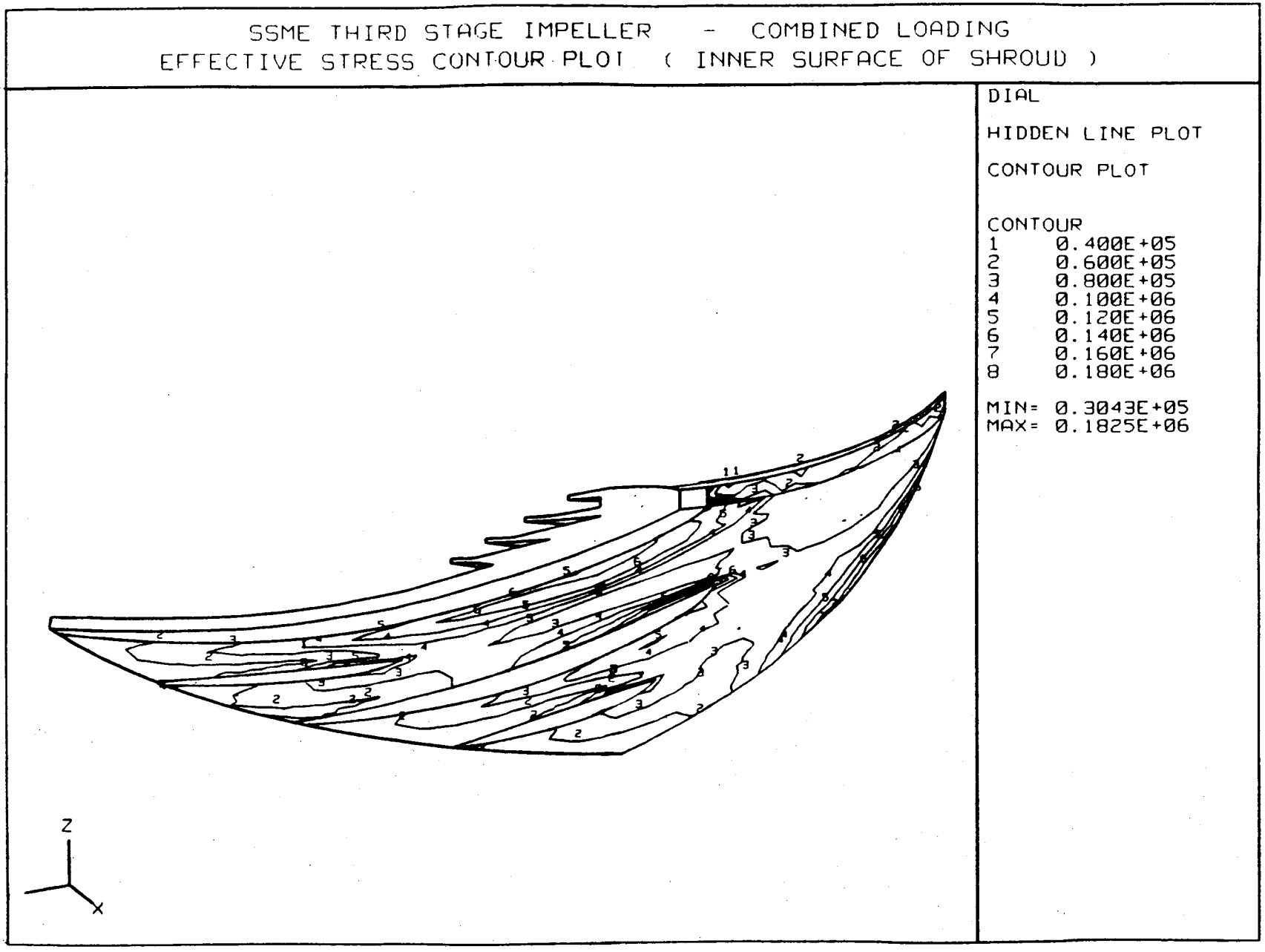

Figure 15 HPFTP Third Stage Impeller - Effective Stress Contour Plot Combined Loading - Shroud Inside Surface

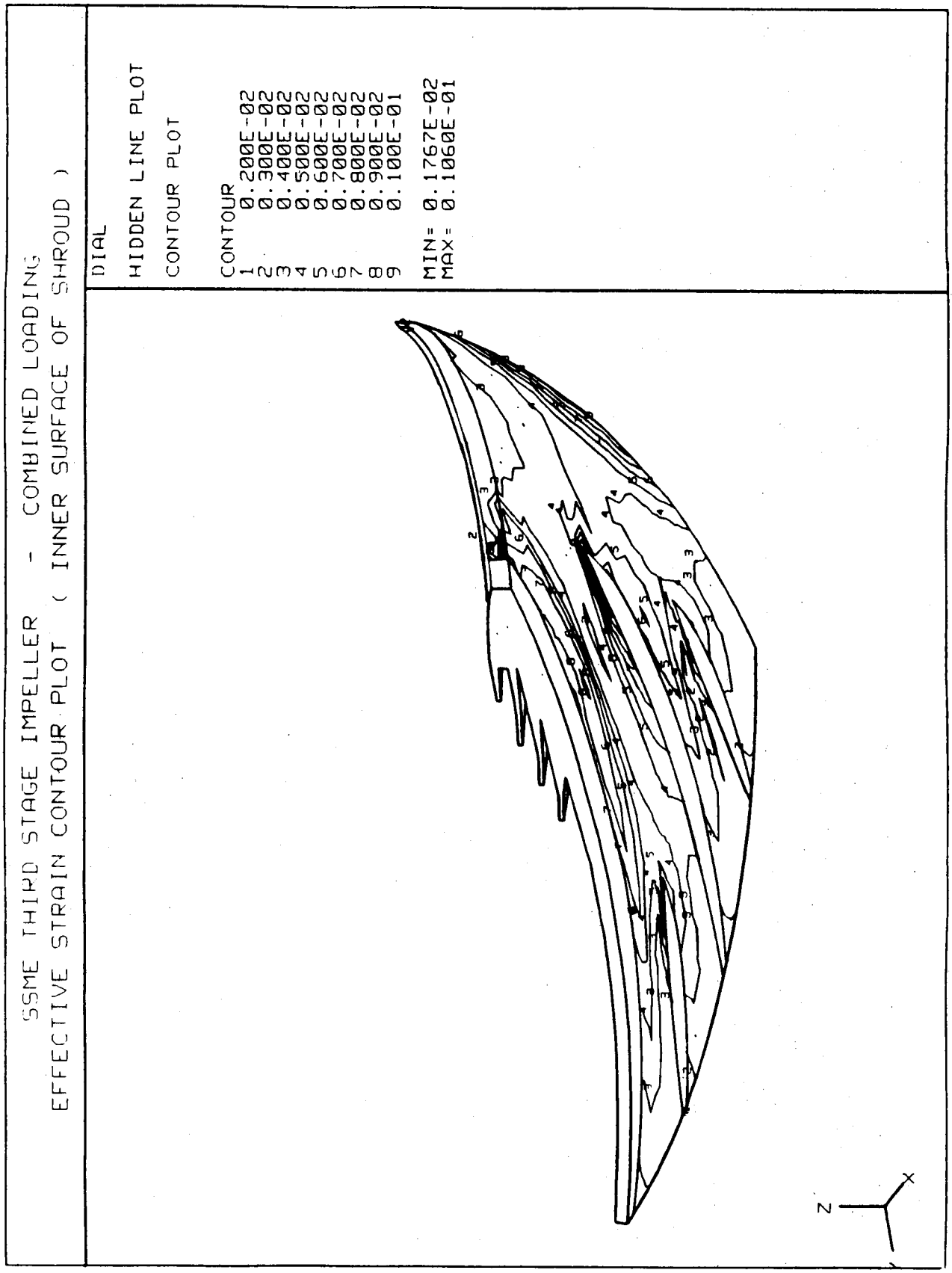

Figure 16 HPFTP Third Stage Impeller - Effective Strain Contour Plot
Combined Loading - Shroud Inside Surface

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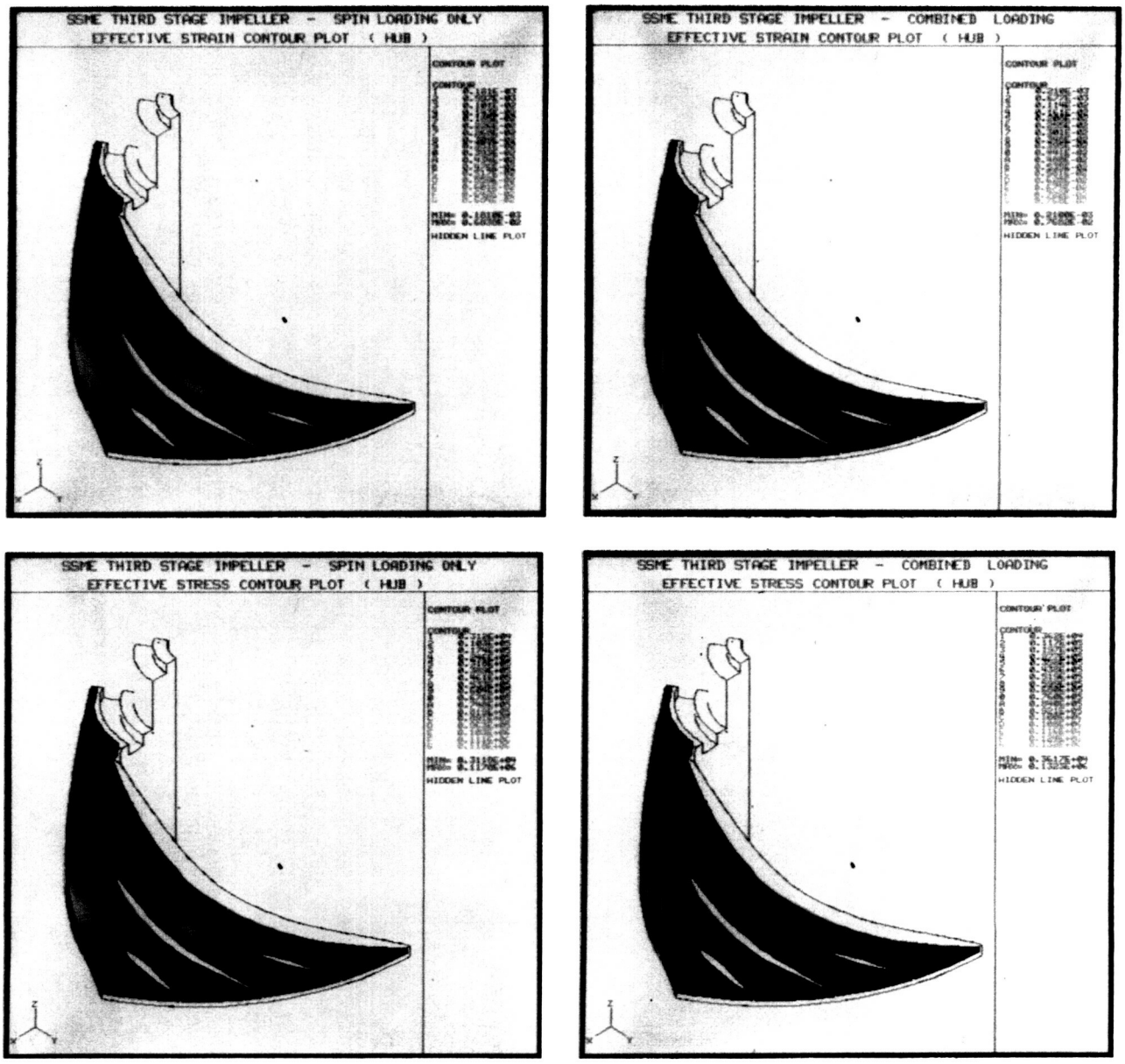

Figure 17 HPFTP Third Stage Impeller - Color Stress/Strain Contour Plots - Hub Inside Surface

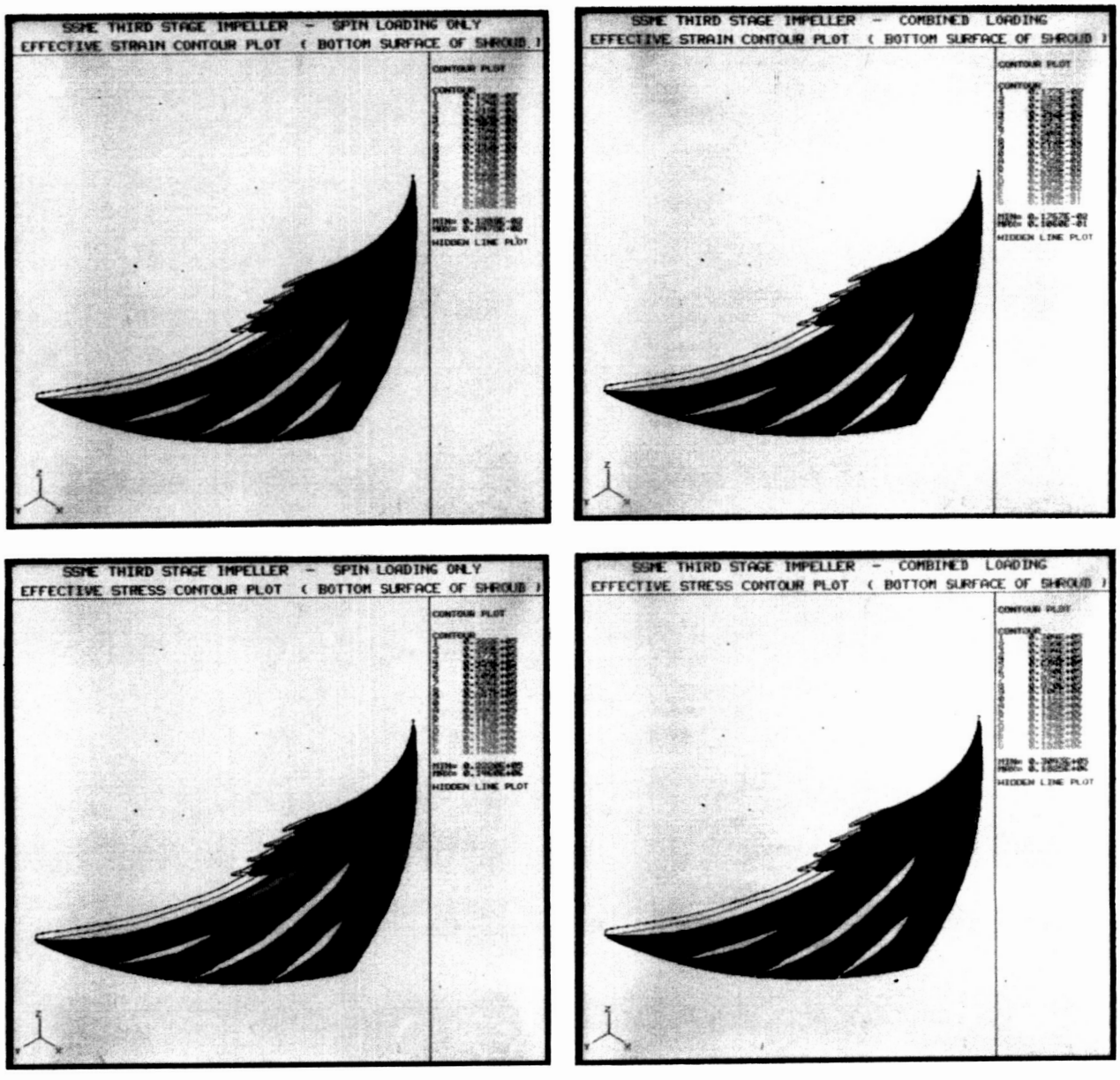

Figure 18 HPFTP Third Stage Impeller - Color Contour Stress/Strain Plots - Shroud Inside Surface

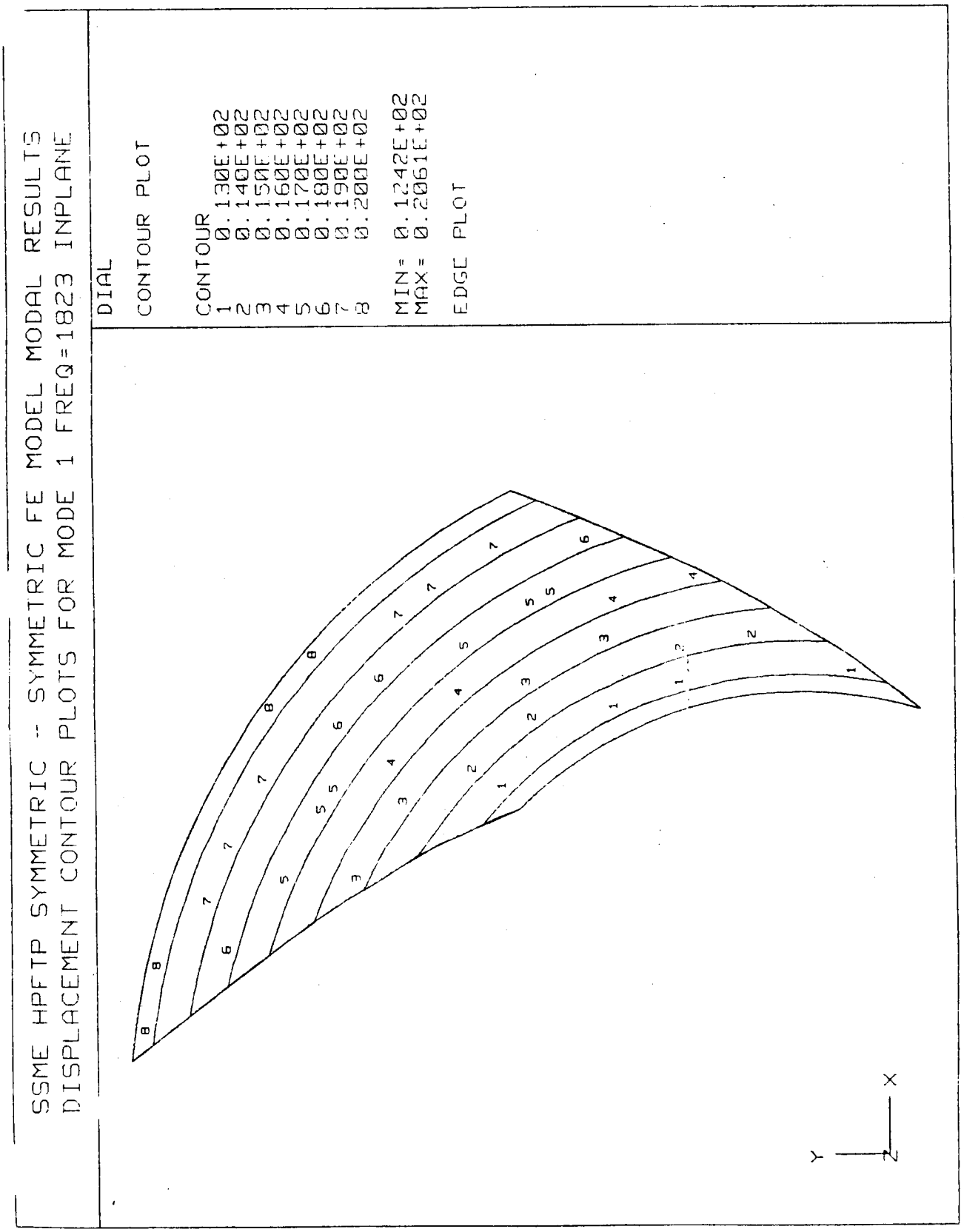

Figure 19 HPFTP Third Stage Impeller Modal Analysis - Displacement Contour Plot - Mode 1, Symmetric-Symmetric Model

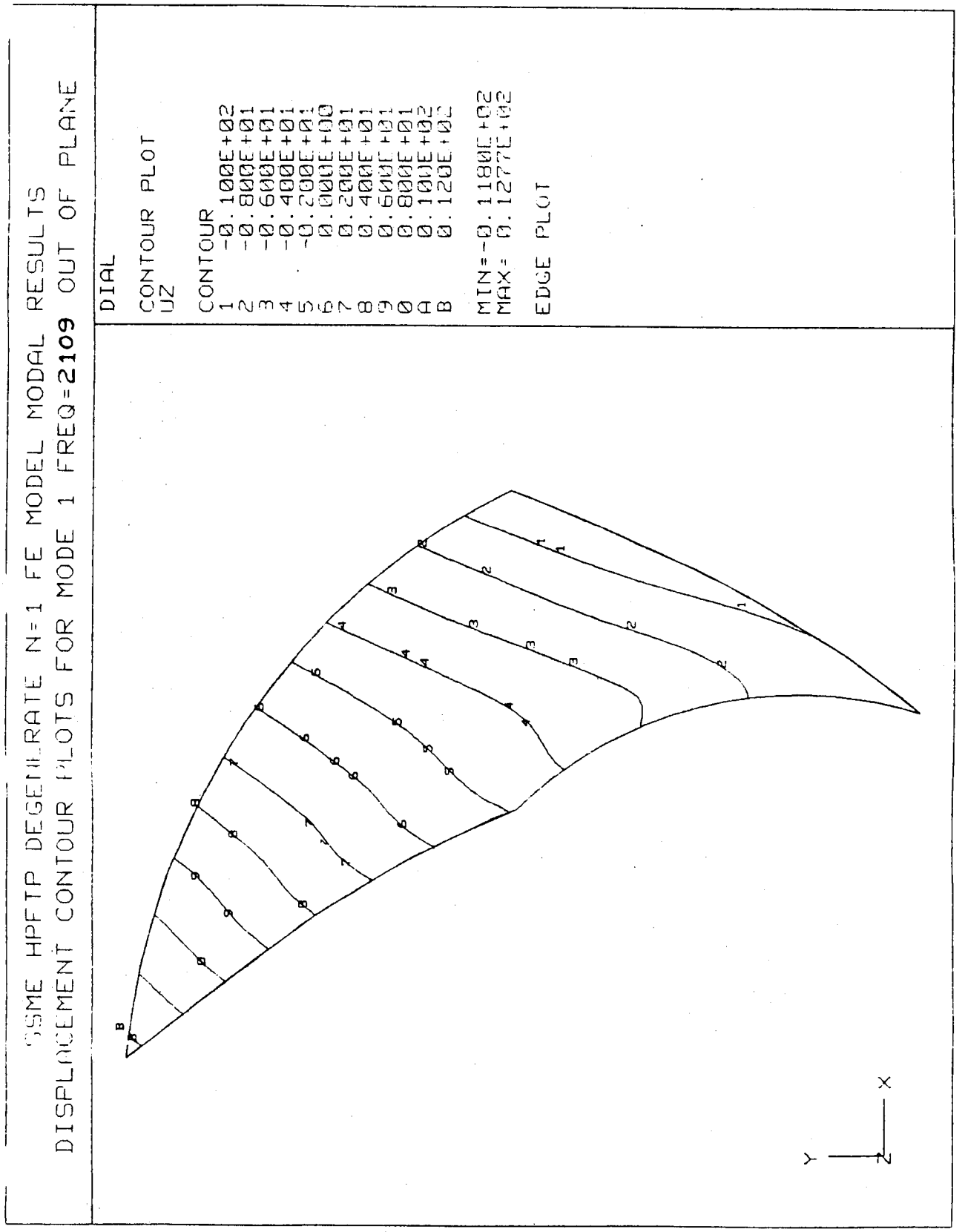

Figure 20 HPFTP Third Stage Impeller Modal Analysis - Displacement Contour Plot - Mode 1, First Degenerate Model

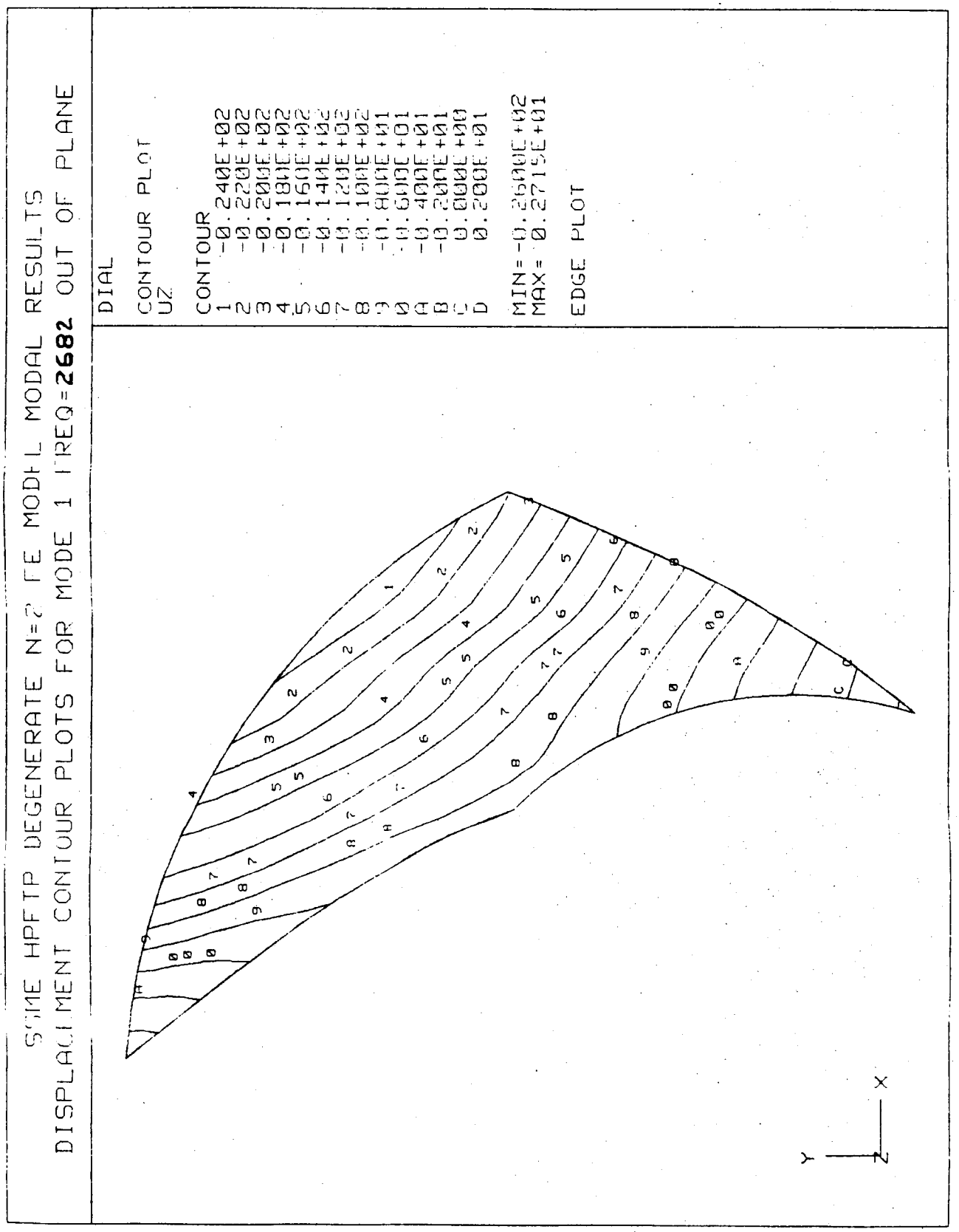

Figure 21 HPFTP Third Stage Impeller Modal Analysis - Displacement Contour Plot - Mode 1, Second Degenerate Model

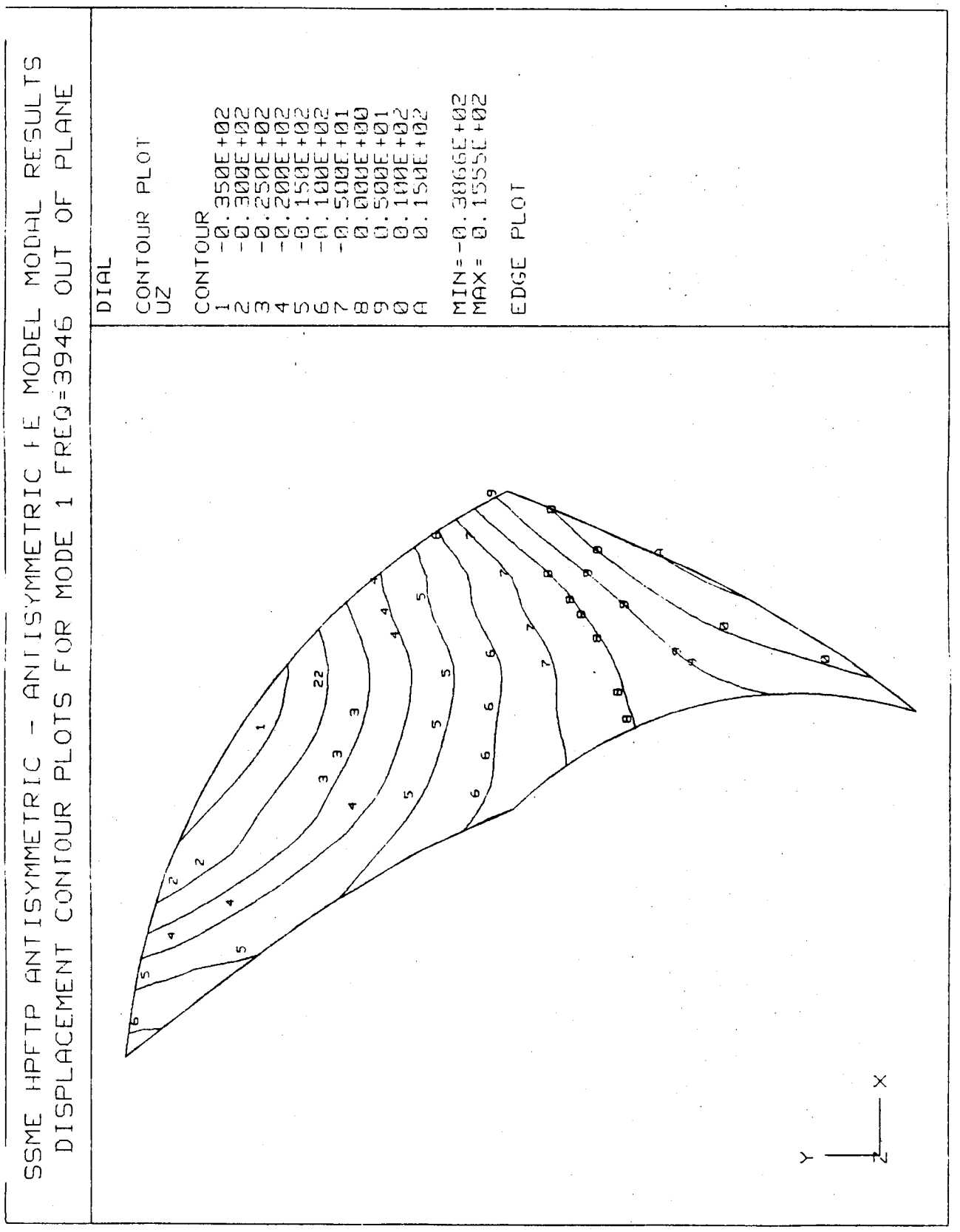

Figure 22 HPFTP Third Stage Impeller Modal Analysis - Displacement Contour Plot - Mode 1, Antisymmetric-Antisymmetric Model

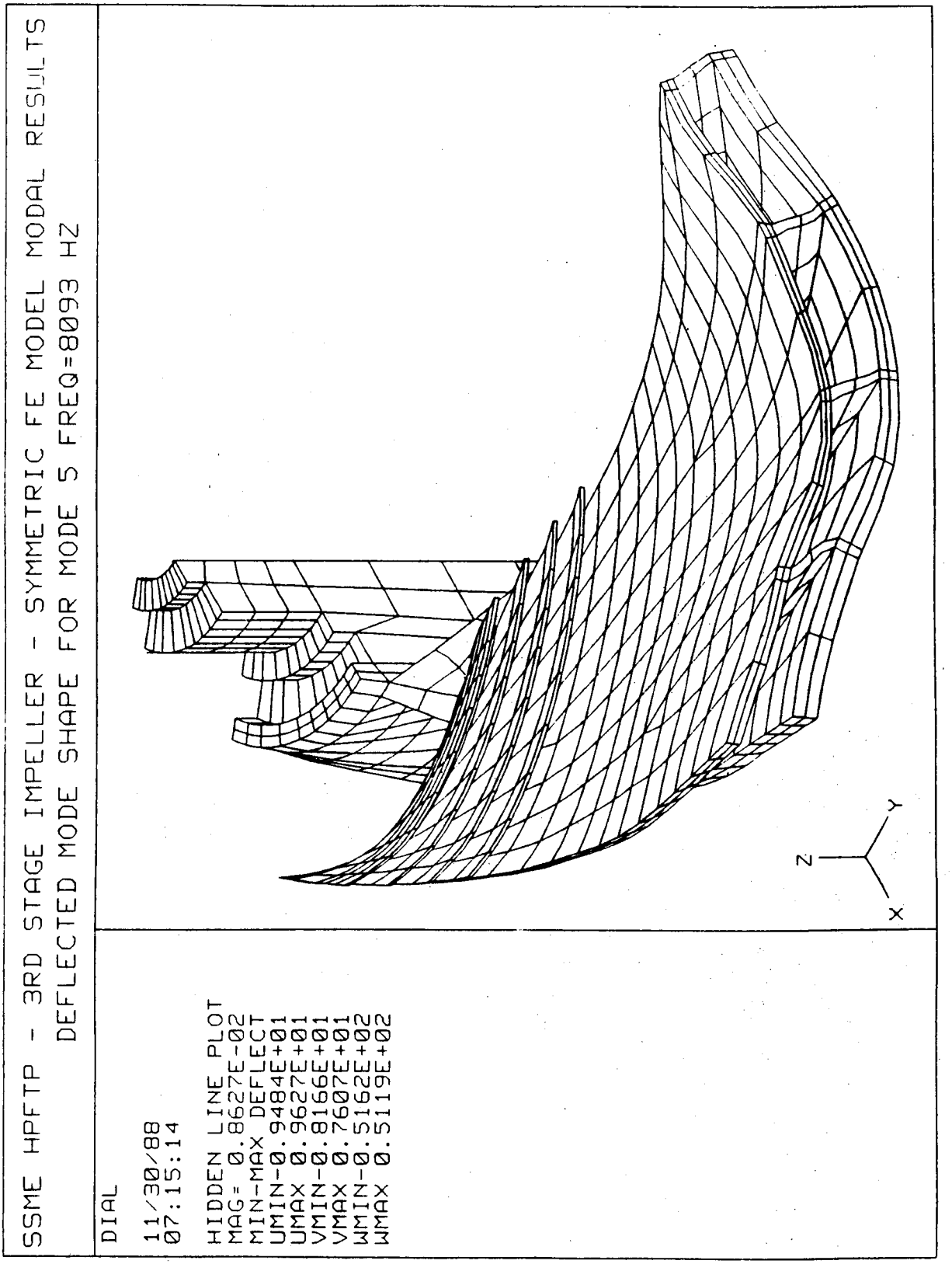

Figure 23 HPFTP Third Stage Impeller Modal Analysis - Mode Shape Deflected Plot - Mode 5, Symmetric-Symmetric Model

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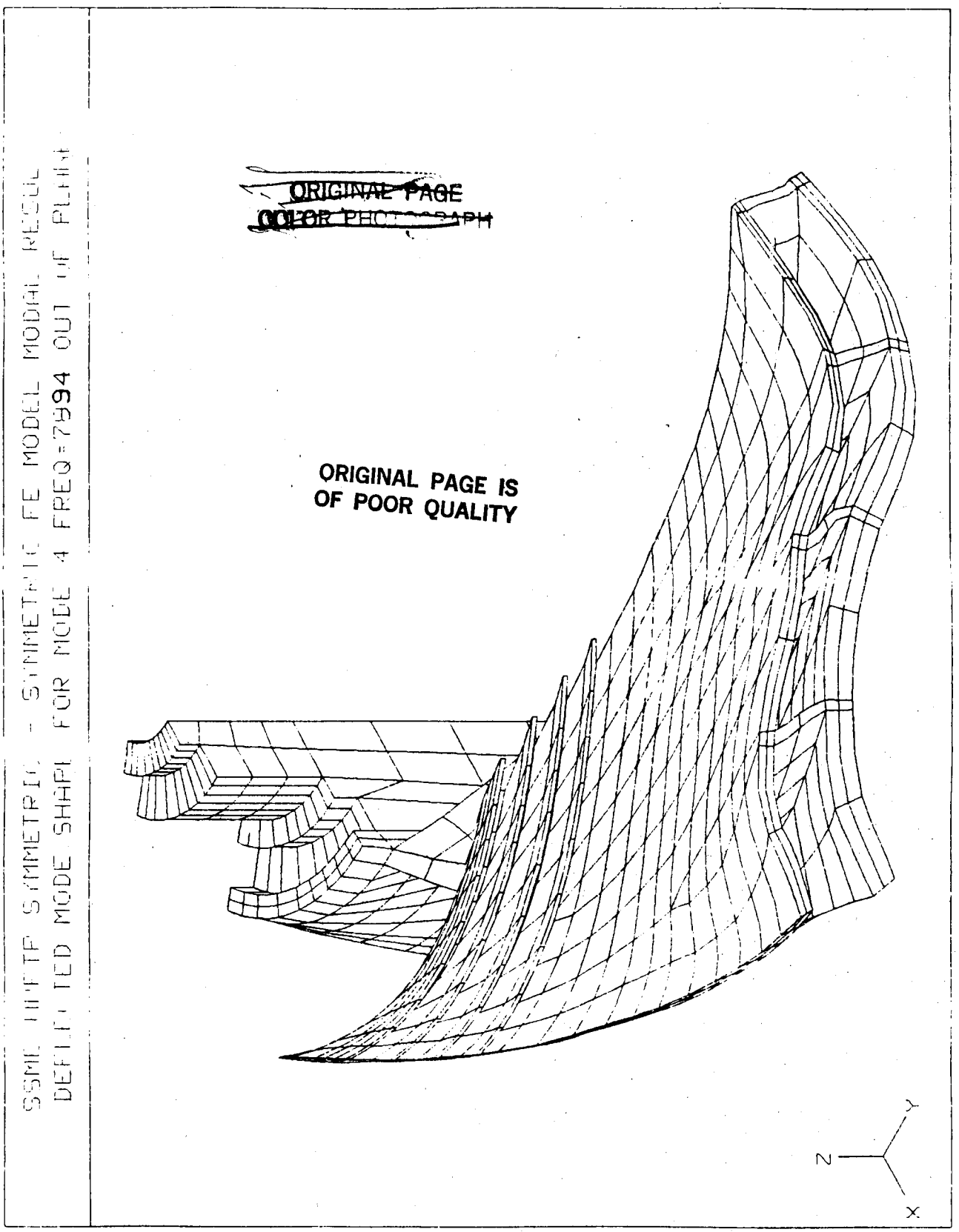


Figure 24 HPFTP Third Stage Impeller Modal Analysis - Mode Shape
Deflected Plot - Mode 4, Symmetric-Symmetric Model

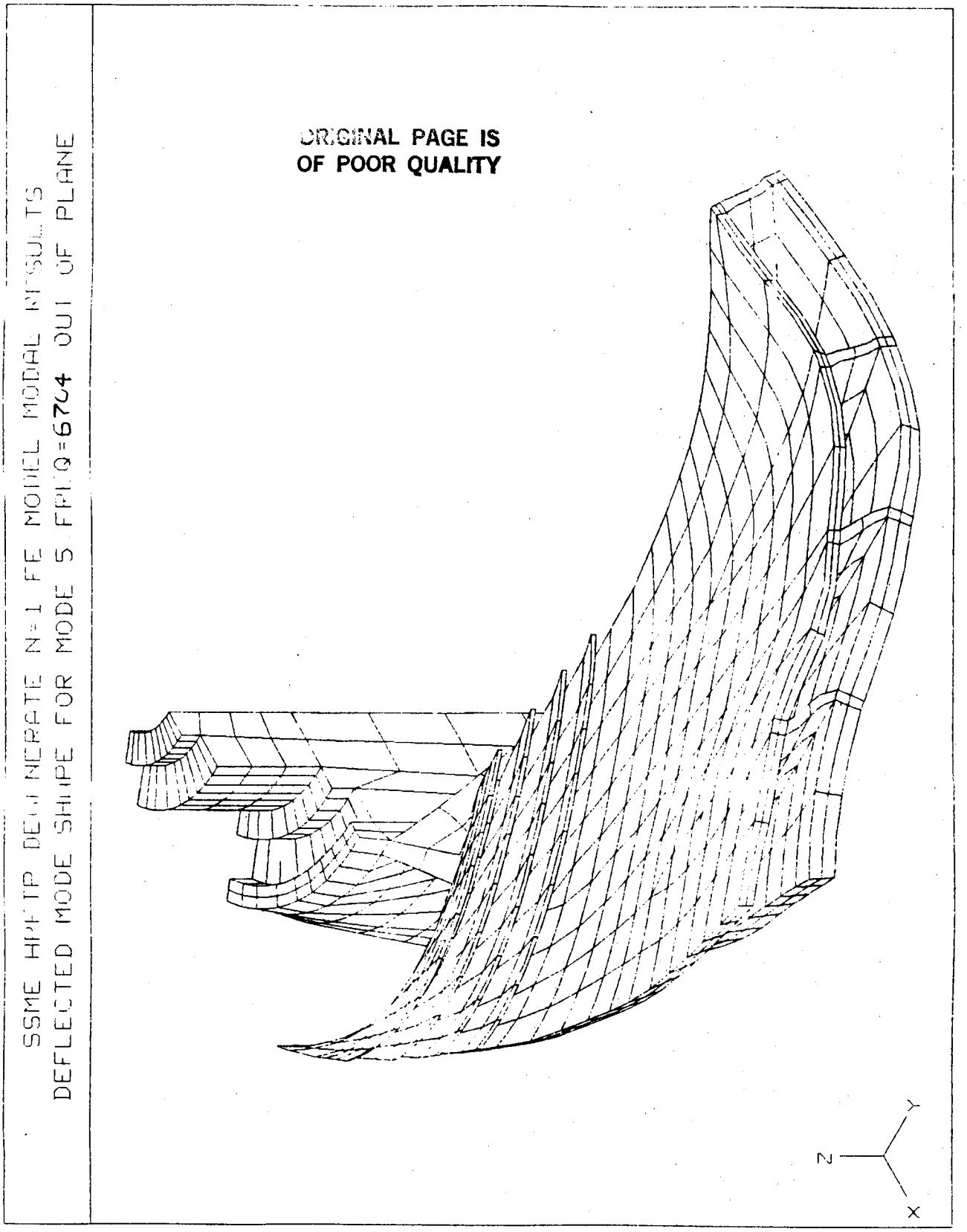


Figure 25 HPFTP Third Stage Impeller Modal Analysis - Mode Shape
Deflected Plot - Mode 5, First Degenerate Model

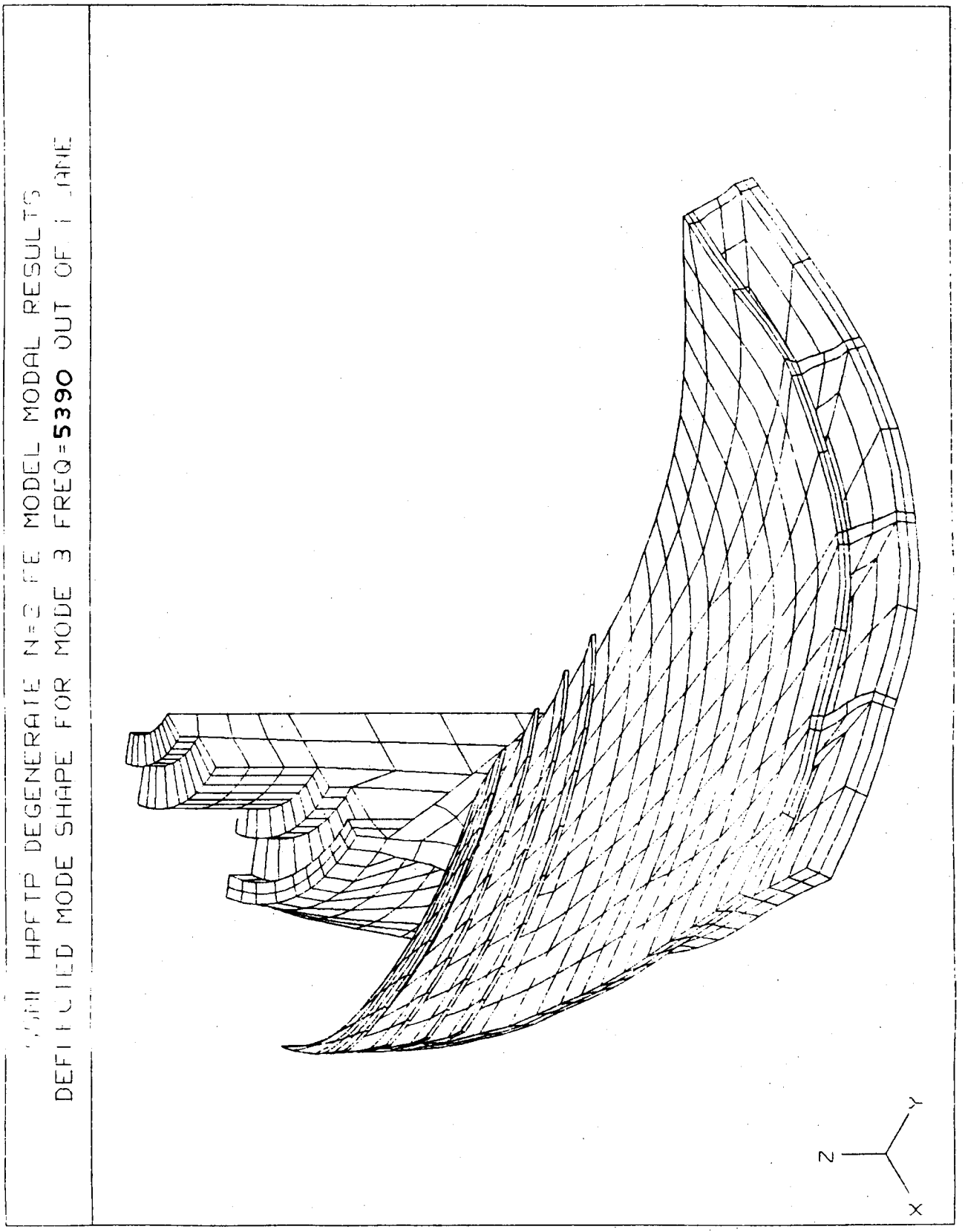


Figure 26 HPFTP Third Stage Impeller Modal Analysis - Mode Shape
Deflected Plot - Mode 3, Second Degenerate Model

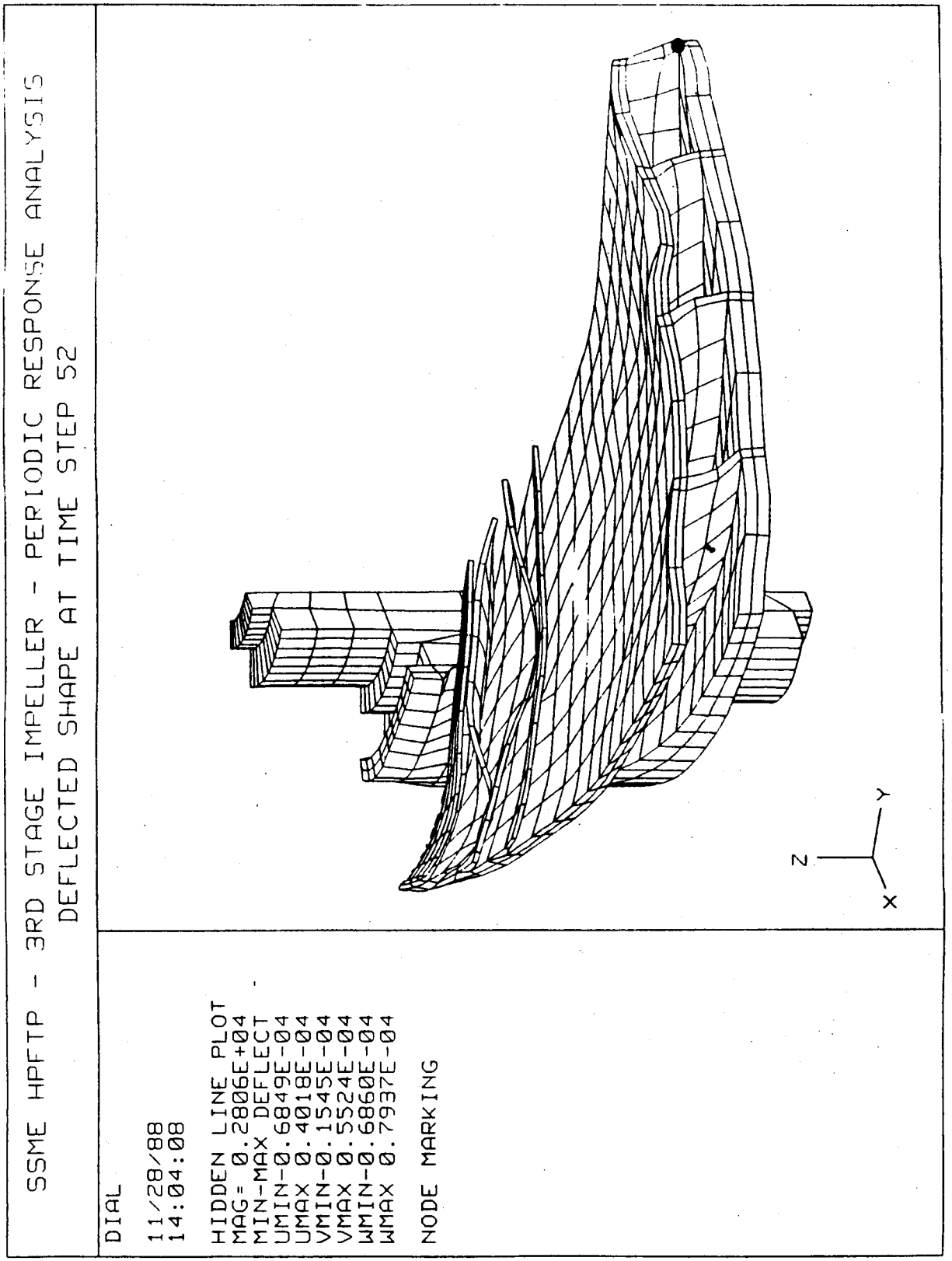


Figure 27 HPFTP Third Stage Impeller Periodic Response Analysis
Deflected Shape - First Segment at Peak Loading

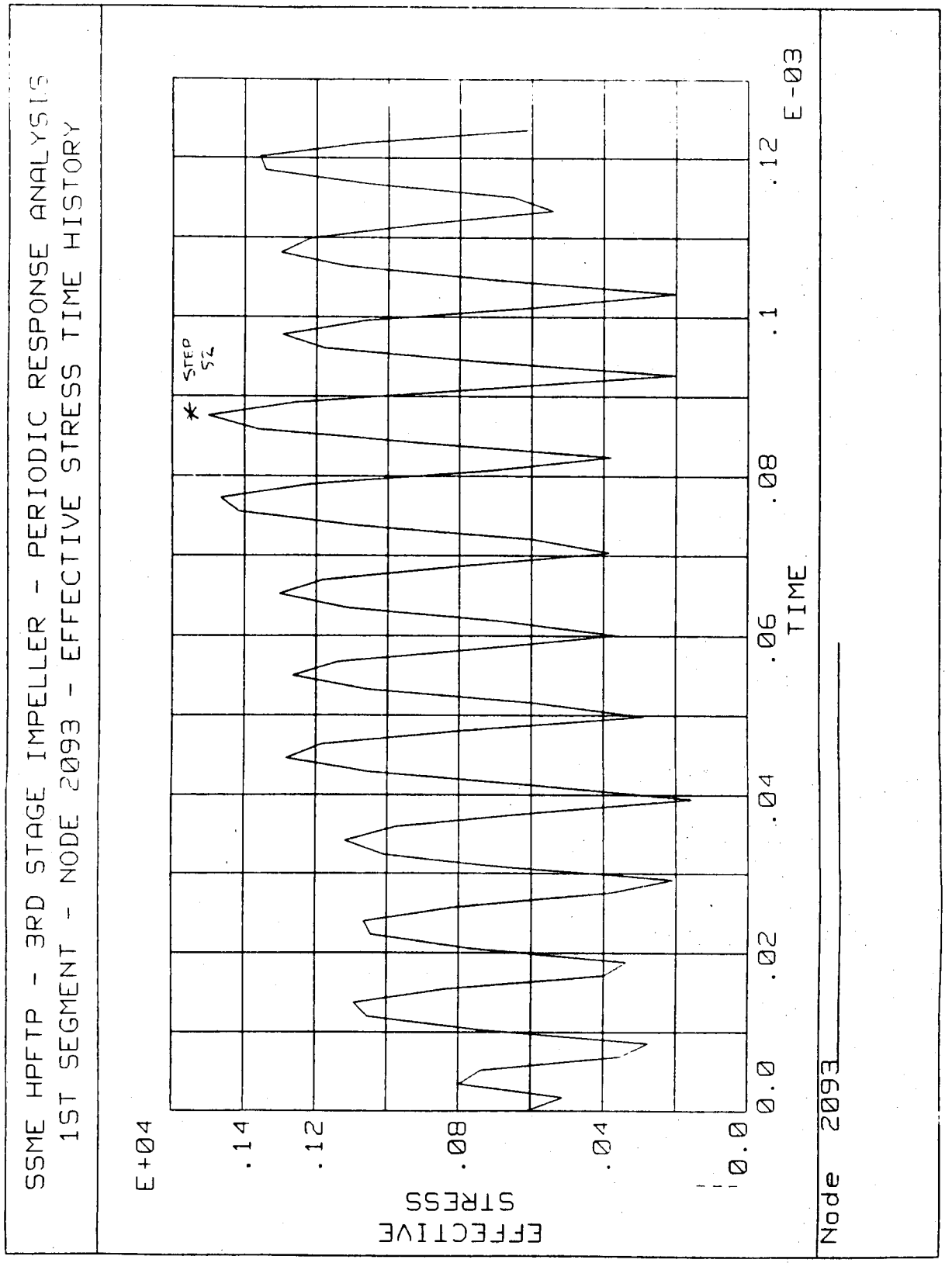


Figure 28 HPFTP Third Stage Impeller Periodic Response Analysis Deflected Shape - Stress Time History Plot - Segment 1

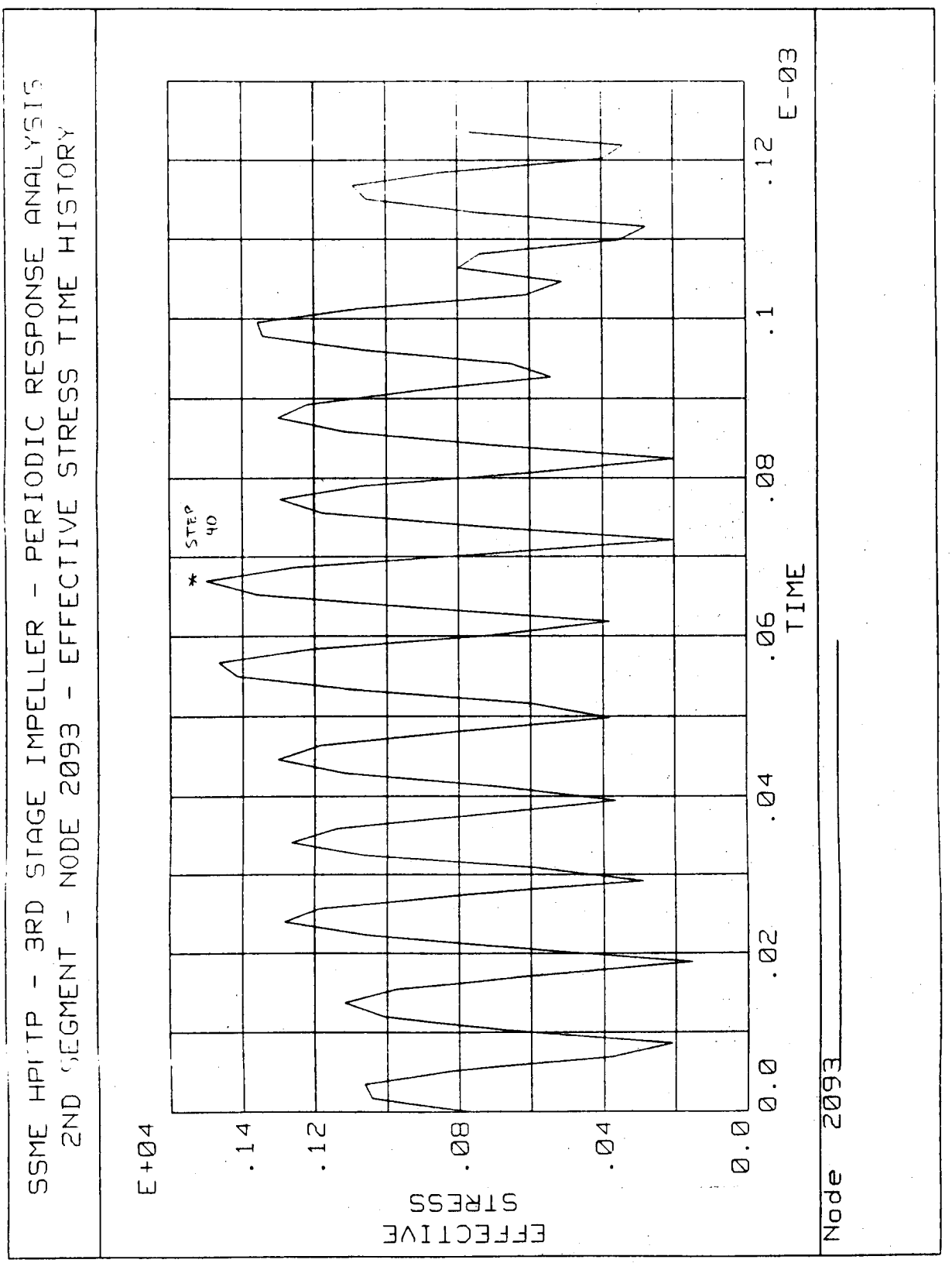


Figure 29 HPFTP Third Stage Impeller Periodic Response Analysis Deflected Shape - Stress Time Hostiry Plot - Segment 2

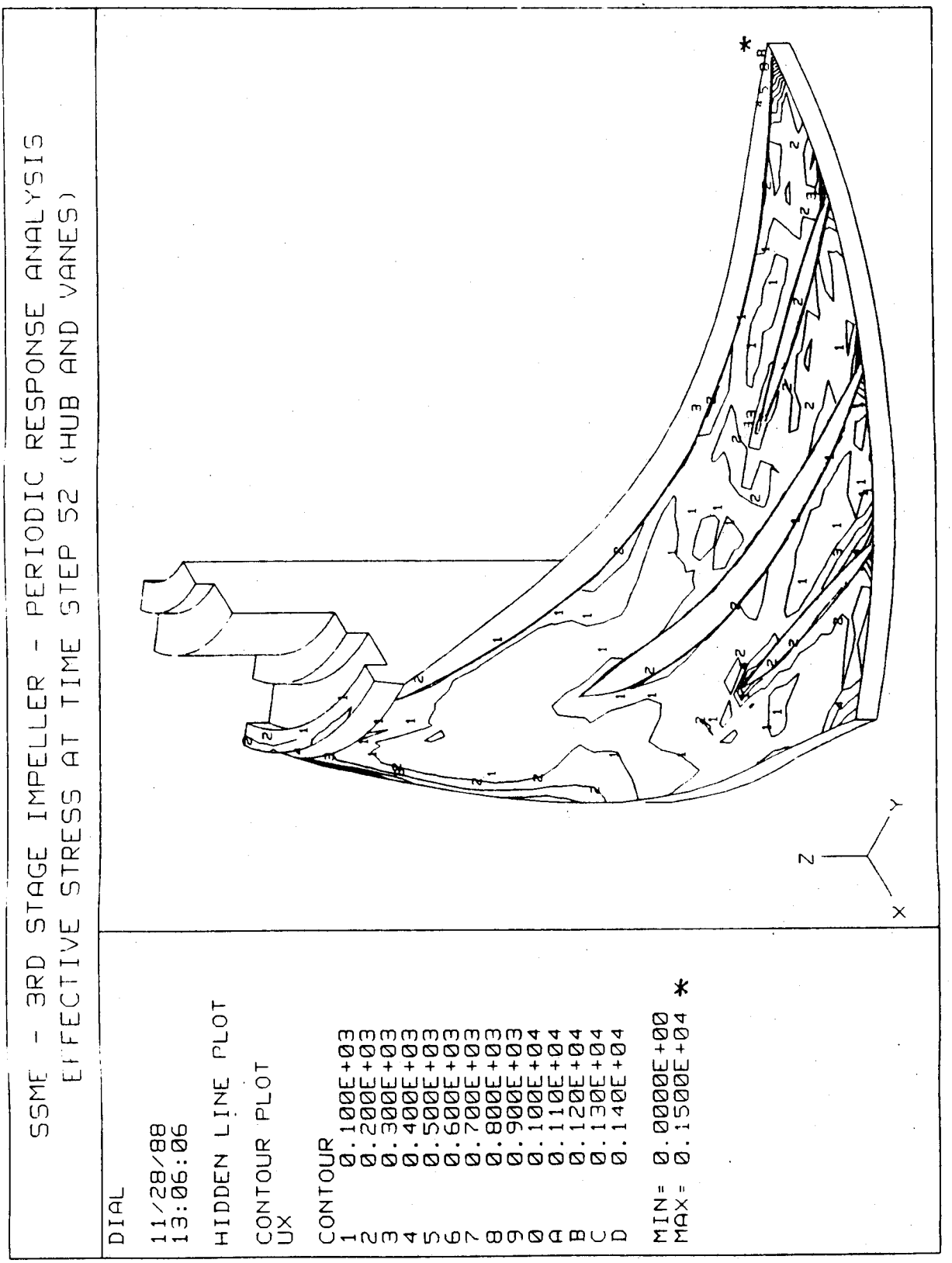


Figure 30 HPFTP Third Stage Impeller Periodic Response Analysis Effective Stress Contours - First Segment Hub at Peak Loading

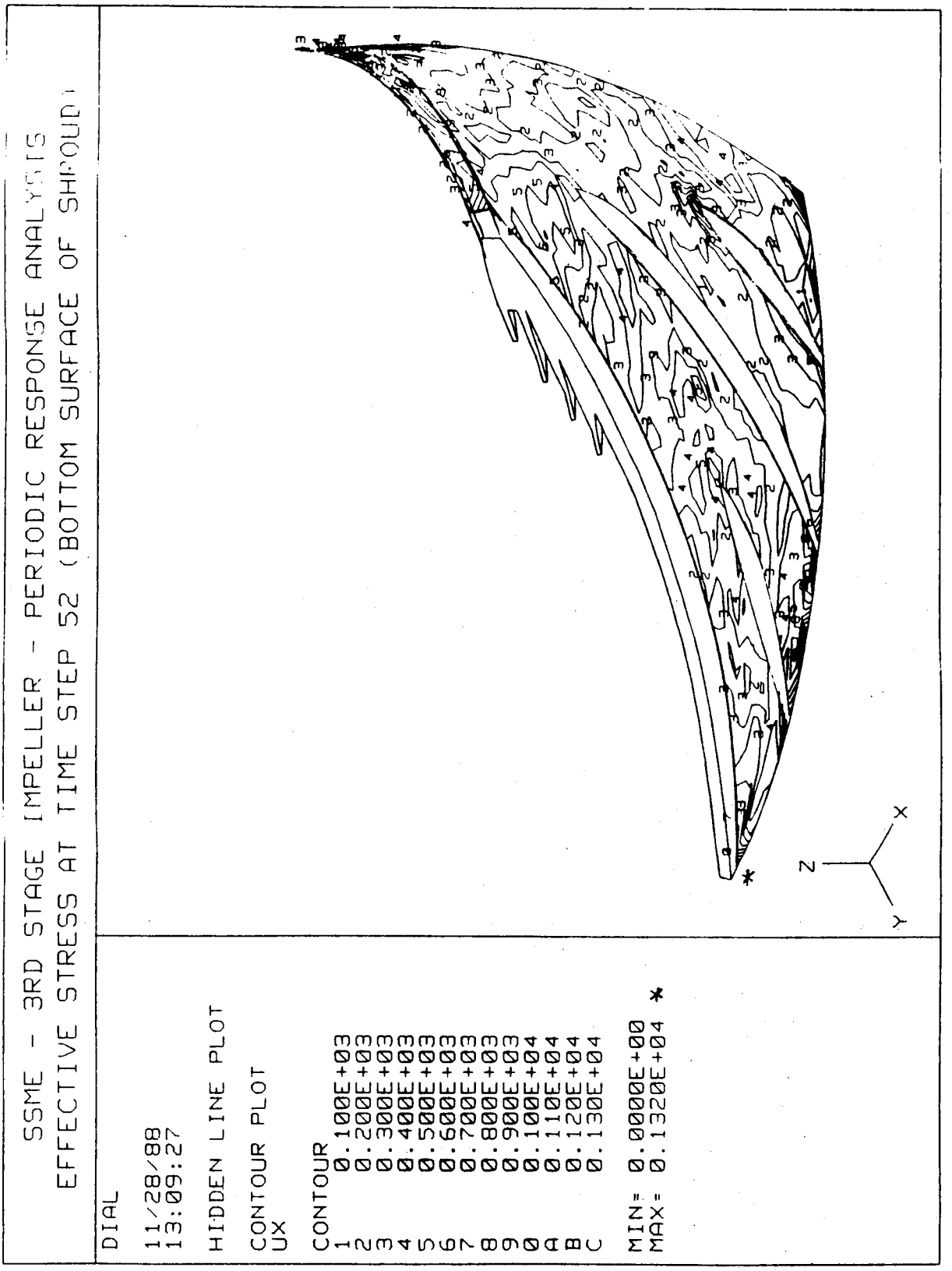


Figure 31 HPFTP Third Stage Impeller Periodic Response Analysis Effective Stress Contours - First Segment Shroud at Peak Loading

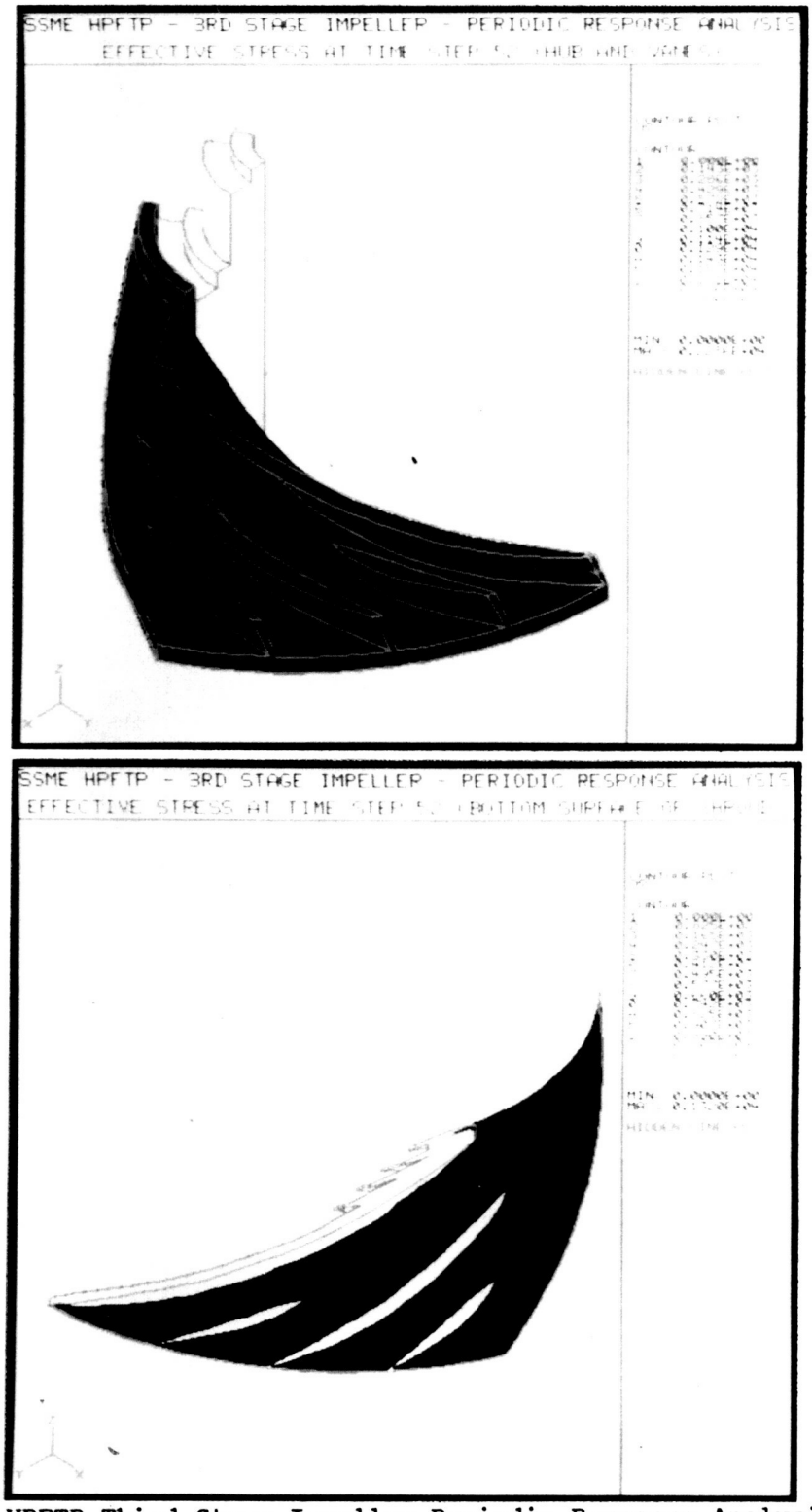


Figure 32(a,b) HPFTP Third Stage Impeller Periodic Response Analysis Effective Stress Color Contours - First Segment at Peak Loading

Appendix A

HPFTP THIRD STAGE IMPELLER LOADING

APPENDIX 3

SSME ESTIMATED MAXIMUM PERFORMANCE SUMMARY
(SURGES ARE EXCLUDED)

PAGE SUM 1
PROCESS DATE: 4/27/87
PROCESS TIME: 7:52:22
POWER BALANCE MODEL 86A

		(1) PHASE II FPL	(2) PHASE II 104%	(3) PHASE II RPL	(4) PHASE II MPL
MAIN CHAMBER					
PRESSURE I-E	PSIA	3314.	3162.	3041.	1977.
THRUST	K	520.10	496.33	477.32	310.75
SPECIFIC IMPULSE	S	454.24	454.10	453.99	452.77
COOLANT FLOW	LBM/S	32.85	30.79	29.15	19.91
COOLANT DIS TEMP	R	475.	482.	488.	484.
FUEL PREBURNER					
PRESSURE I-E	PSIA	5691.	5345.	5074.	3008.
TEMPERATURE	R	2011.	1948.	1896.	1696.
MIXTURE RATIO	O/F	0.997	0.961	0.931	0.807
OXIDIZER PREBURNER					
PRESSURE I-E	PSIA	5772.	5419.	5143.	2991.
TEMPERATURE	R	1713.	1650.	1602.	1218.
MIXTURE RATIO	O/F	0.817	0.782	0.756	0.530
TURBOPUMP SPEEDS					
LPOP	RPM	5492.	5341.	5221.	4114.
LPFP	RPM	16974.	16453.	16038.	13860.
HPOP	RPM	30162.	29002.	28094.	20408.
HPFP	RPM	37342.	36107.	35128.	27814.
PUMP DISCHARGE PRESSURES					
LPOP	PSIAT	555.	545.	536.	443.
LPFP	PSIAT	341.	325.	312.	254.
HPOP	PSIAT	4675.	4413.	4208.	2512.
BOOST	PSIAT	8052.	7613.	7267.	4301.
HPFP	PSIAT	6990.	6559.	6223.	4005.
PUMP Q/N					
LPOP	G/RPM	1.158	1.138	1.121	0.939
LPFP	G/RPM	1.010	0.996	0.984	0.754
HPOP	G/RPM	0.254	0.253	0.252	0.234
BOOST	G/RPM	0.024	0.023	0.022	0.016
HPFP	G/RPM	0.476	0.470	0.465	0.391
SUCTION SPECIFIC SPEEDS					
HPOP		15486.	14878.	14407.	10790.
HPFP		6830.	6719.	6628.	5069.
COOLANT MIXED TURBINE DISCHARGE TEMPS					
HPOT AVG	R	1546.	1494.	1455.	1134.
HPFT CHAN B	R	1824.	1771.	1727.	1557.
PREBURNER LOX VALVES					
LOX POSITION	%	0.7215	0.6937	0.6764	0.5749
LOX RESISTANCE		132.34	166.64	197.82	771.43
FUEL POSITION	%	0.8552	0.8359	0.8177	0.7185
FUEL RESISTANCE		14.99	19.29	23.35	66.85
NOZZLE COOLANT					
NOZZLE FLOW	LBM/S	63.18	58.51	54.28	41.74
CCV FLOW	LBM/S	62.76	62.24	62.31	32.54
NOZZLE DIS TEMP	R	446.0	458.7	474.2	447.6
PB SUPPLY TEMP	R	284.8	283.4	282.5	295.4

APPENDIX 3

ESTIMATED MAXIMUM ENGINE PERFORMANCE (SURGES ARE EXCLUDED)

PHASE II FPL

TURBOMACHINARY VARIABLES		LOW PRESSURE OXIDIZER	LOW PRESSURE FUEL	HIGH PRESSURE OXIDIZER MAIN	HIGH PRESSURE OXIDIZER BOOST	HIGH PRESSURE FUEL
PUMP INLET FLOWRATE	(LB/SEC)	988.73	164.25	1176.59	120.79	164.84
PUMP INLET PRESSURE	(PSIA)	220.00	45.00	515.26	4546.09	303.52
PUMP INLET TEMPERATURE	(DEG. R)	171.00	39.50	177.59	204.70	45.53
PUMP INLET DENSITY	(LB/FT3)	71.3141	4.4163	70.5728	70.5025	4.3024
PUMP DISCHARGE FLOWRATE	(LB/SEC)	1176.73	164.84	1185.25	112.17	160.32
PUMP DISCHARGE PRESSURE	(PSIA)	555.36	341.34	4674.85	8051.93	6990.14
PUMP DISCHARGE TEMPERATURE	(DEG. R)	173.12	43.27	204.70	220.13	105.79
PUMP DISCHARGE DENSITY	(LB/FT3)	70.5728	4.3466	70.5025	71.5067	5.0304
PUMP TIP SPEED	(FT/SEC)	280.38	888.77	872.55	658.03	1955.20
PUMP HEAD RISE	(FT)	735.4	9745.8	8945.4	7261.6	198646.8
PUMP VOLUMETRIC FLOW-INLET	(GPM)	6362.2	17147.5	7669.7	731.4	17764.0
PUMP HEAD COEFFICIENT-PSI		0.3031	0.4043	0.3817	0.5497	1 7130
PUMP FLOW COEFFICIENT-PHI		0.2272	0.2398	0.1448	0.0903	0.1920
PUMP INLET VAPOR PRESSURE				33.02		50.47
PUMP NPSH				1009.11		8909.72
PUMP SUCTION SPECIFIC SPEED				15486.0		6829.8
PUMP CAVITATION FACTOR				0.9861		1.0000
PUMP HORSEPOWER	(BHP)	1937.9	4079.0	28804.4	1928.4	77694.7
PUMP EFFICIENCY		0.6825	0.7131	0.6693	0.8152	0.7826
PUMP SPEED	(RPM)	5491.96	16974.16	30162.12		37341.67 ★
TURBINE FLOWRATE	(LB/SEC)	189.84	32.85	67.30		169.64
TURBINE INLET PRESSURE	(PSIA)	4480.87	5041.15	5749.00		5671.33
TURBINE INLET TEMPERATURE	(DEG. R)	204.70	475.35	1712.99		2011.31
TURBINE DISCHARGE PRESSURE	(PSIA)	555.36	3721.20	3679.01		3790.30
TURBINE DISCHARGE TEMPERATURE	(DEG R)	201.38	458.71	1563.95		1851.43
TURBINE TIP SPEED	(FT/SEC)	143.78	548 08	1327.91		1660.30
TURBINE SPOUTING VELOCITY	(FT/SEC)	303.44	2871.25	4557.96		4467.37
TURBINE ISENTROPIC VELOCITY RATIO		0.4785	0.1928	0.2978		0.3802
TURBINE PRESSURE RATIO - TOTAL/TOTAL			1.3663	1.5690		1.5034
TURBINE TORQUE	(FT-LB)	1853.59	1264.94	5354.93		10971.17 ★
TURBINE HORSEPOWER	(BHP)	1937.9	4079.0	30720.1		77698.9
TURBINE EFFICIENCY		0.6764	0.5425	0.8175		0.8510
TURBINE SPEED	(RPM)	5491.96	16974.16	30162.12		37341.67
TURBINE SPEED PARAMETER						
TURBINE FLOW PARAMETER						
EQUIVALENT SPEED						
EQUIVALENT EXPANSION RATIO						
SPECIFIC HEAT RATIO, GAMMA						

PHASE II FPL

MISCELLANEOUS COMPONENTS	FLOWRATE (LB/SEC)	DELTA P (PSI)	PRESSURE(PSIA) INLET	PRESSURE(PSIA) DISCHARGE	TEMP (DEG R)
OXIDIZER					
LOW PRESSURE PUMP DISCHARGE DUCT	1176.73	47.74	555.36	515.26	177.59
LOW PRESSURE TURBINE INLET DUCT-SECT 1	189.84	97.89	4674.85	4579.06	204.70
LOW PRESSURE TURBINE INLET DUCT-SECT 2	189.84	104.84	4579.06	4480.87	204.70
HIGH PRESSURE MAIN PUMP DISCH DUCT-SECT 1	997.24	84.39	4674.85	4592.63	204.70
HIGH PRESSURE MAIN PUMP DISCH DUCT-SECT 2	878.17	55.98	4592.63	4537.00	204.70
HIGH PRESSURE BOOST PUMP INLET DUCT-SECTION 1	123.40	29.64	4592.63	4564.54	204.70
HIGH PRESSURE BOOST PUMP INLET DUCT-SECTION 2	120.79	19.29	4564.54	4546.09	204.70
HIGH PRESSURE BOOST PUMP DISCHARGE DUCT	112.17	10.41	8051.93	8042.20	220.13
OXIDIZER PREBURNER INLET DUCT	30.45	15.89	8042.20	8026.96	220.13
OXIDIZER PREBURNER DOME	29.82	15.49	7071.46	7056.07	224.09
FUEL PREBURNER INLET DUCT	83.82	29.57	8042.20	8015.68	220.13
FUEL PREBURNER DOME	83.15	52.08	7113.20	7061.37	224.81
THRUST CHAMBER DOME	877.62	426.79	4420.19	4003.10	204.70
FUEL					
LOW PRESSURE PUMP DISCHARGE DUCT	164.84	47.95	341.34	303.52	45.53
LOW PRESSURE TURBINE INLET DUCT	32.85	279.93	5293.38	5041.15	475.35
LOW PRESSURE TURBINE DISCHARGE DUCT	31.70	52.74	3721.20	3671.71	458.71
HOT GAS MANIFOLD COOLANT DUCT-FUEL SIDE	18.29	6.93	3671.71	3664.89	458.71
HOT GAS MANIFOLD COOLANT DUCT-OXIDIZER SIDE	13.41	14.04	3671.71	3657.88	458.71
HIGH PRESSURE PUMP DISCHARGE DUCT	160.32	64.08	6990.14	6926.30	105.79
MAIN FUEL VALVE DISCHARGE DUCT	97.75	24.43	6853.94	6822.70	106.47
CHAMBER COOLING JACKET INLET DUCT	32.85	135.59	6822.70	6692.72	106.47
CHAMBER COOLING JACKET DISCHARGE MANIFOLD	32.85	70.37	5362.20	5293.38	475.35
NOZZLE COOLING JACKET INLET DUCT	63.18	140.71	6853.94	6708.66	106.47
COOLANT CONTROL VALVE INLET DUCT	62.76	391.20	6822.70	6439.34	106.47
COOLANT CONTROL VALVE DISCH DUCT & MIXER	62.76	136.79	6401.41	6290.37	106.82
NOZZLE COOLING JACKET DISCHARGE DUCT & MIXER	63.18	180.12	6441.13	6290.37	446.04
PREBURNER SUPPLY DUCT	125.77	39.76	6290.37	6251.16	284.76
FUEL PREBURNER INLET DUCT	87.38	32.01	6250.64	6219.80	284.76
OXIDIZER PREBURNER INLET DUCT	40.30	94.28	6250.29	6165.86	284.76
FUEL PREBURNER INLET MANIFOLD	87.38	106.14	6219.80	6117.61	284.76
OXIDIZER PREBURNER INLET MANIFOLD	41.26	29.23	6165.86	6139.73	284.76

MSD FAX 408-756-1062

To: H. STRUCK DATA FAX No. 824-5873 (MSFC)

From: E. JACKSON KIP POOL x1331
ORG: 81-12
BLDG 157, FAC. 1

SUBJECT: SSME HPFTP 3rd IMPELLER LOADING

PER YOUR REQUEST I HAVE ENCLOSED

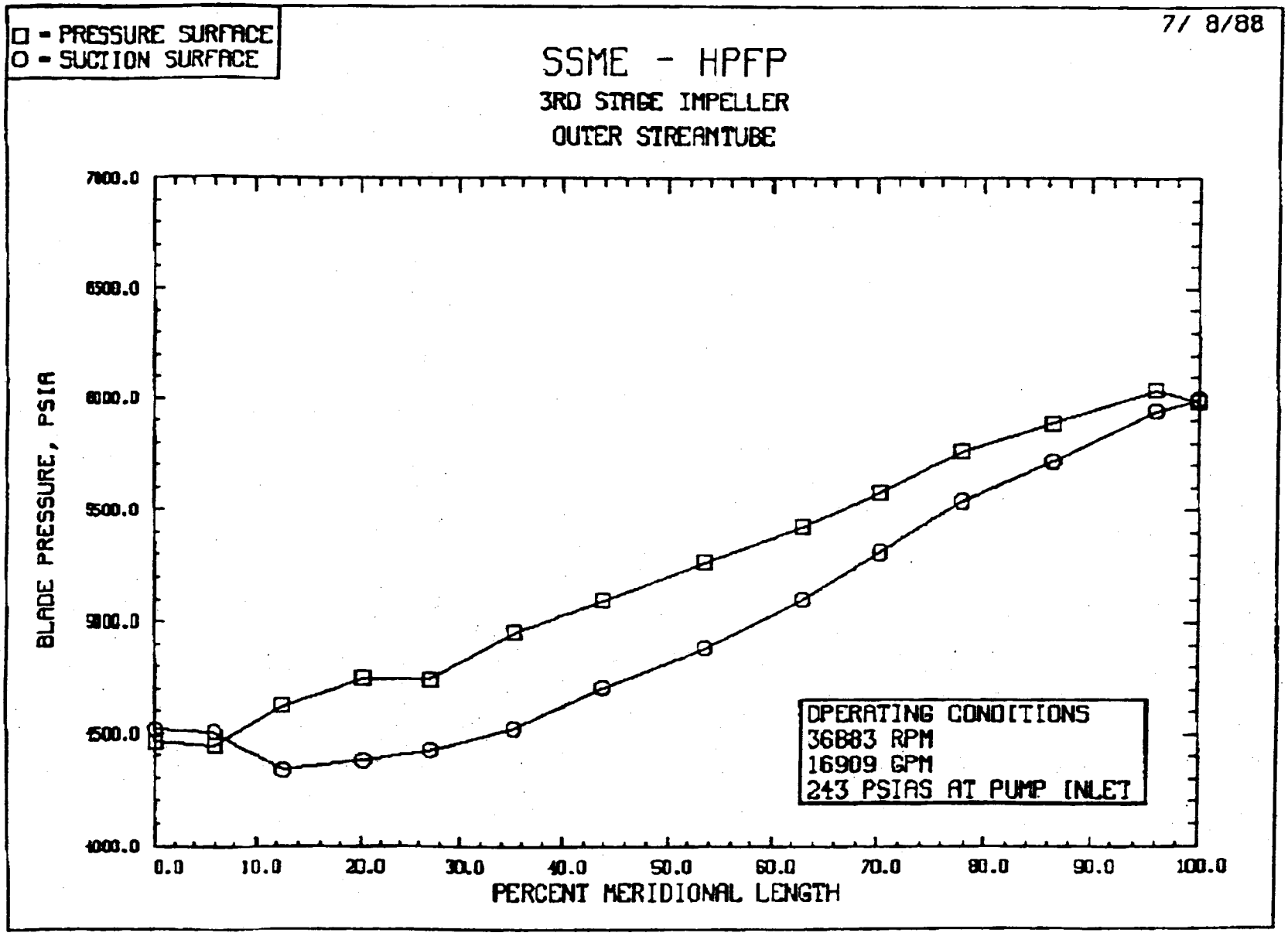
1. BLADE PRESS & SUCT SIDE PRESSURES ALONG 3 STREAMTUBES: NEAR THE TIP (OUTER), CENTER, & NEAR THE HUB (INNER)

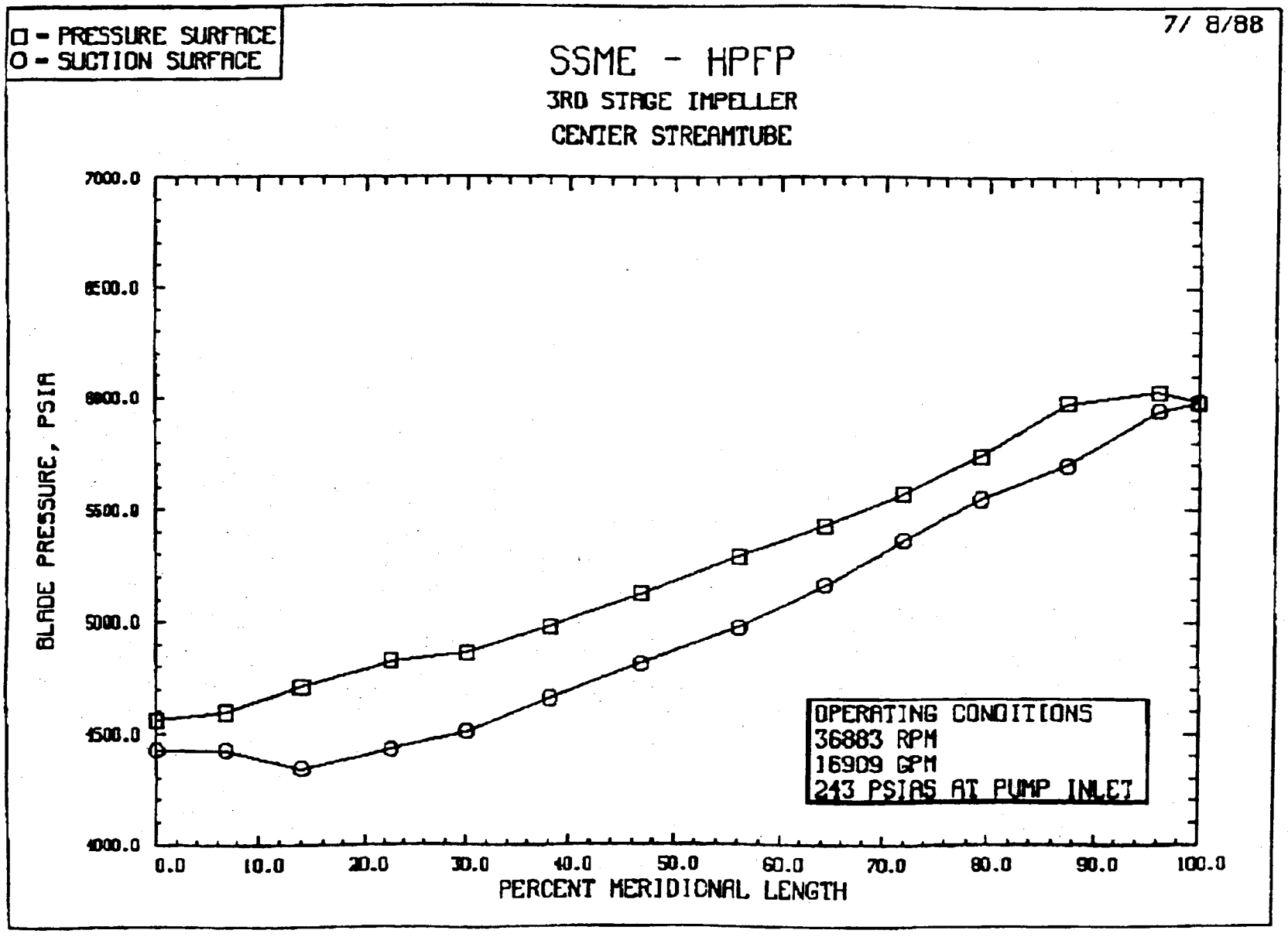
2. R-Z COORDINATES TO LOCATE PRESSURES IN THE GEOMETRIC PLANE

Gene

1) Include 5000 psi on Hub outside
2) Include 6000 psi on Shroud outside (to beginning of seals)

ORIGINAL PAGE IS
OF POOR QUALITY


□ = PRESSURE SURFACE
○ = SUCTION SURFACE
7/ 8/88
SSME - HPFP
3RD STAGE IMPELLER
OUTER STREAMTUBE
BLADE PRESSURE, PSIA
7000.0
6500.0
6000.0
5500.0
5000.0
4500.0
4000.0
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.0
PERCENT MERIDIONAL LENGTH
OPERATING CONDITIONS
36883 RPM
16909 GPM
243 PSIAS AT PUMP INLET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○ = SUCTION SURFACE
7/ 8/88
SSME - HPFP
3RD STAGE IMPELLER
CENTER STREAMTUBE
BLADE PRESSURE, PSIA
7000.0
6500.0
6000.0
5500.0
5000.0
4500.0
4000.0
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
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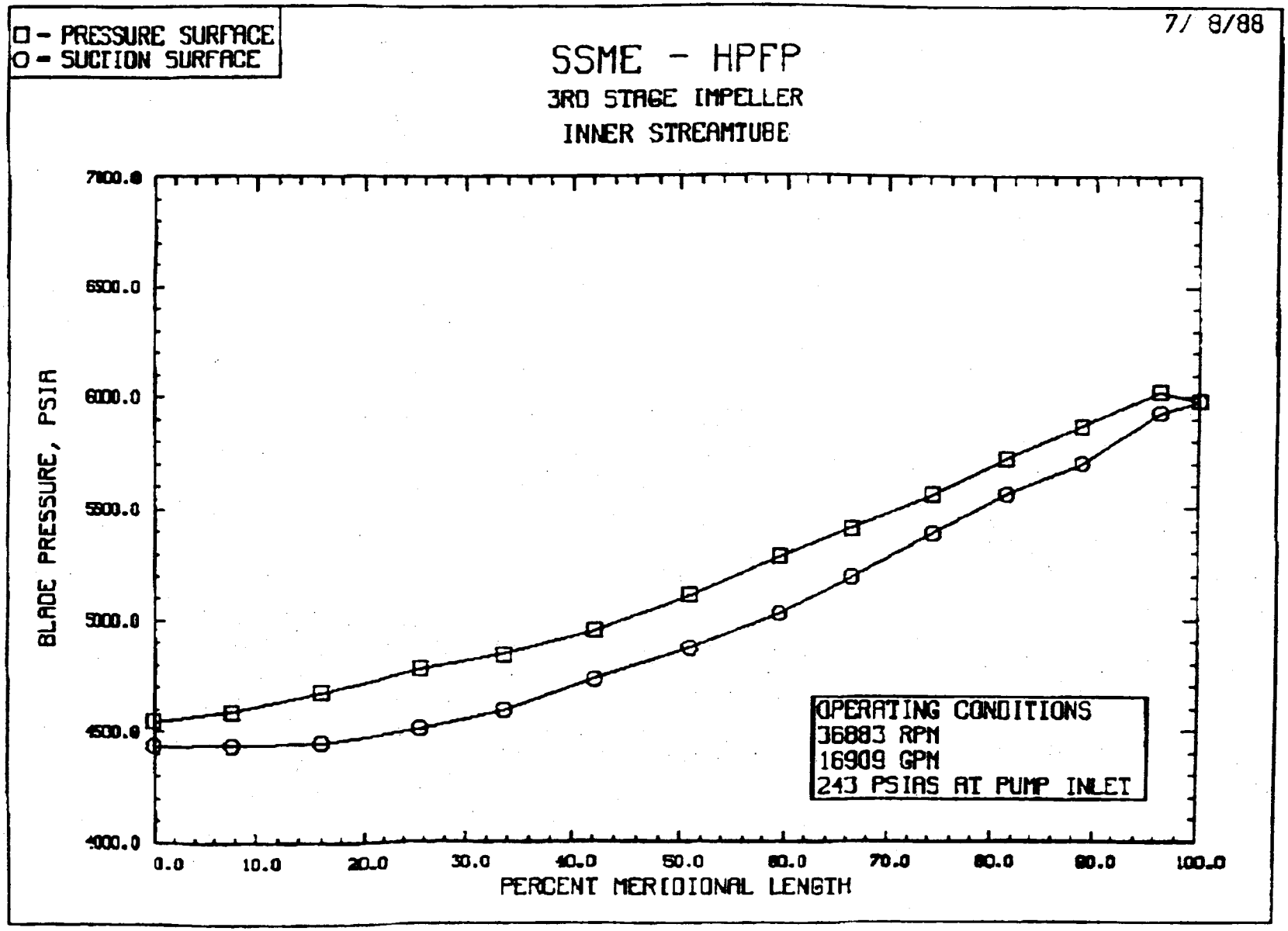
90.0
100.0
PERCENT MERIDIONAL LENGTH
OPERATING CONDITIONS
36883 RPM
16909 GPM
243 PSIAS AT PUMP INLET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○ - SUCTION SURFACE
7/ 8/88
SSME - HPFP
3RD STAGE IMPELLER
INNER STREAMTUBE
BLADE PRESSURE, PSIA
7000.0
6500.0
6000.0
5500.0
5000.0
4500.0
4000.0
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
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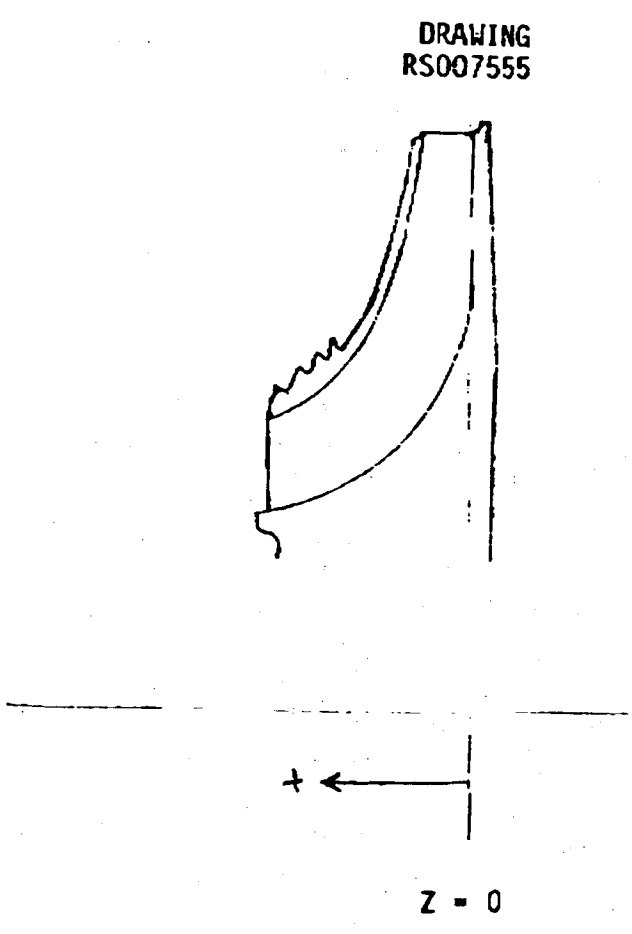
90.0
100.0
PERCENT MERIDIONAL LENGTH
OPERATING CONDITIONS
36883 RPM
16909 GPM
243 PSIAS AT PUMP INLET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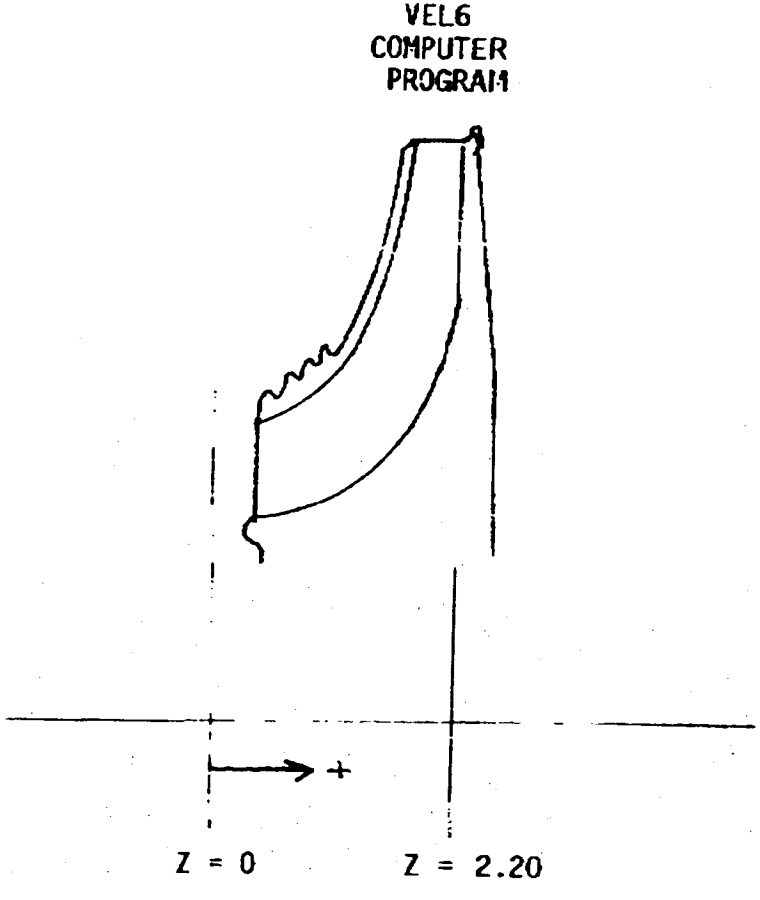
RS007555
+
Z = 0


VEL6
COMPUTER
PROGRAM
+
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Z = 2.20

DEFINITION OF MERIDIONAL COORDINATES

OUTER STREAMTUBE

PCT. MERID. LEN.	R	Z
0	3.01	0.27
5.9	3.06	0.47
12.5	3.15	0.68
20.2	3.30	0.89
27.0	3.48	1.06
35.2	3.71	1.22
43.8	3.97	1.37
53.3	4.28	1.51
62.9	4.59	1.60
70.3	4.85	1.65
77.9	5.11	1.68
86.4	5.40	1.71
96.0	5.74	1.73
100	5.88	1.74

CENTER STREAMTUBE

PCT. MERID. LEN.	R	Z
0	2.71	0.28
6.8	2.79	0.53
14.0	2.91	0.78
22.7	3.11	1.05
30.0	3.31	1.24
38.1	3.57	1.43
46.8	3.86	1.59
56.1	4.20	1.71
64.3	4.51	1.79
71.9	4.80	1.86
79.3	5.08	1.88
87.4	5.39	1.90
96.1	5.73	1.91
100	5.88	1.93

1736t

DEFINITION OF MERIDIONAL COORDINATES (CONT'D)

INNER STREAMTUBE

PCT. MERID. LEN.	R	Z
0	2.31	0.31
7.7	2.40	0.63
16.0	2.54	0.96
25.6	2.80	1.30
33.6	3.06	1.53
42.2	3.39	1.77
51.0	3.74	1.88
59.5	4.11	1.97
66.5	4.40	2.03
74.4	4.75	2.08
81.4	5.06	2.10
88.8	5.38	2.10
96.3	5.72	2.11
100	5.88	2.12

1736t

Appendix B
STATIC ANALYSIS RUNSTREAM

```
FETCH,DN=FT25,TEXT='DISK6:[CLARK]INPUTPVSR.DAT'
FETCH,DN=MESH,DF=TR,TEXT='DISKB:[FERGUSON.CEXL3D2]MESH.CEX'
MESH
FETCH,DN=BAND,DF=TR,TEXT='DISKB:[FERGUSON.CEXL3D2]BAND.CEX'
BAND
FETCH,DN=SETUP,DF=TR,TEXT='DISKB:[FERGUSON.CEXL3D2]SETUP.CEX'
SETUP
FETCH,DN=MATL,DF=TR,TEXT='DISKB:[FERGUSON.CEXL3D2]MATL.CEX'
MATL
FETCH,DN=MASS,DF=TR,TEXT='DISKB:[FERGUSON.CEXL3D2]MASS.CEX'
MASS
FETCH,DN=SCOPE,DF=TR,TEXT='DISKB:[FERGUSON.CEXL3D2]SCOPE.CEX'
SCOPE
FETCH,DN=LOAD,DF=TR,TEXT='DISKB:[FERGUSON.CEXL3D2]LOAD.CEX'
LOAD
FETCH,DN=SOLVE,DF=TR,TEXT='DISKB:[FERGUSON.CEXL3D2]SOLVE.CEX'
SOLVE
FETCH,DN=UTILITY,DF=TR,TEXT='DISKB:[FERGUSON.CEXL3D2]UTILITY.CEX'
UTILITY
DISPOSE,DF=BB,DN=FT08,TEXT='$DISK/RMS=REC SSSME.PUN'
DISPOSE,DF=BB,DN=FT07,TEXT='$DISK/RMS=REC MSSME.PUN'
BAD
EXIT
EXIT
SAVE,DN=FIL002,PDN=SSME,ID=CLARK,UQ
EXIT
ACCESS,UQ,DN=FIL002,PDN=C3ALT,ED=1,ID=CLARK
DELETE,DN=FIL002
/EOF
$MESH
CLEAR 500000
MAX/MXPO=1500 9000 4000
ELTYPE 4 2 3
ASSIGN IPNO=0 IPLC=0 IPSK=0 IPEL=0 IPCO=0
#MESH POINT FROM CADAM      WAL-SSME-HUB  FEM14
IJPOINT     1    -5     1     5 2111     2 7129    -3 6254
IJPOINT     2    -5     1     4 3907     3 9035    -3 6254
IJPOINT     3    -5     1     3 2316     4 9064    -3 6254
IJPOINT     4    -5     1     1 8508     5 5759    -3 6254
IJPOINT     5    -5     1     0 3380     5 8653    -3 6254
IJPOINT     6    -5     3     5 0396     2 4557    -3 6379
IJPOINT     7    -5     3     4 3617     3 5218    -3 6379
IJPOINT     8    -5     3     3 3006     4 5315    -3 6379
IJPOINT     9    -5     3     2 0165     5 2308    -3 6379
IJPOINT    10    -5     3     0 5963     5 5743    -3 6379
IJPOINT    11    -5     5     4 8716     2 1801    -3 6504
IJPOINT    12    -5     5     4 3232     3 1298    -3 6504
IJPOINT    13    -5     5     3 3604     4 1464    -3 6504
IJPOINT    14    -5     5     2 1791     4 8721    -3 6504
IJPOINT    15    -5     5     0 8458     5 2697    -3 6504
IJPOINT    16    -5     7     4 7009     1 8942    -3 6630
IJPOINT    17    -5     7     4 2684     2 7327    -3 6630
IJPOINT    18    -5     7     3 4157     3 7443    -3 6630
IJPOINT    19    -5     7     2 3302     4 5007    -3 6630
IJPOINT    20    -5     7     1 0914     4 9493    -3 6630
IJPOINT    21    -5     9     4 5272     1 5928    -3 6755
IJPOINT    22    -5     9     4 1718     2 3725    -3 6755
IJPOINT    23    -5     9     3 4484     3 3379    -3 6755
IJPOINT    24    -5     9     2 4267     4 1405    -3 6755
IJPOINT    25    -5     9     1 3159     4 6153    -3 6755
IJPOINT    26    -5    11     4 3535     1 2559    -3 6880
IJPOINT    27    -5    11     4 0375     2 0564    -3 6880
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IJPOINT    36    -5    15     3 9365     0 6011    -3 7000
IJPOINT    37    -5    15     3 7350     1 3810    -3 7000
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IJPOINT    40    -5    15     1 8408     3 5311    -3 7000
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IJPOINT    42    -5    17     3 5668     1 0048    -3 7000
IJPOINT    43    -5    17     3 2746     1 7346    -3 7000
IJPOINT    44    -5    17     2 5865     2 6536    -3 7000
IJPOINT    45    -5    17     1 9688     3 1394    -3 7000
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IJPOINT    47    -5    19     3 3768     0 6307    -3 7000
IJPOINT    48    -5    19     3 1683     1 3276    -3 7000
IJPOINT    49    -5    19     2 6091     2 2346    -3 7000
IJPOINT    50    -5    19     2 0791     2 7346    -3 7000
IJPOINT    51    -5    21     3 1605    -0 3034    -3 7000
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IJPOINT    57    -5    23     2 9290    -0 0893    -3 6933
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```

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IJPOINT	148	-5	31	2.0868	0.8020	-3.6622
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IJPOINT	174	-1	7	1.0914	4.9493	-3.3925
IJPOINT	175	-1	9	4.5272	1.5928	-3.3925
IJPOINT	176	-1	9	4.1718	2.3725	-3.3925
IJPOINT	177	-1	9	3.4484	3.3379	-3.3925
IJPOINT	178	-1	9	2.4267	4.1405	-3.3925
IJPOINT	179	-1	9	1.3159	4.6153	-3.3925
IJPOINT	180	-1	11	4.3535	1.2559	-3.3718
IJPOINT	181	-1	11	4.0375	2.0564	-3.3718
IJPOINT	182	-1	11	3.4431	2.9454	-3.3718
IJPOINT	183	-1	11	2.4684	3.7997	-3.3718
IJPOINT	184	-1	11	1.5078	4.2728	-3.3718
IJPOINT	185	-1	13	4.1603	0.9295	-3.3512
IJPOINT	186	-1	13	3.8775	1.7712	-3.3512
IJPOINT	187	-1	13	3.4174	2.5482	-3.3512
IJPOINT	188	-1	13	2.4724	3.4727	-3.3512
IJPOINT	189	-1	13	1.6845	3.9160	-3.3512
IJPOINT	190	-1	15	3.9365	0.6011	-3.3096
IJPOINT	191	-1	15	3.7350	1.3810	-3.3096
IJPOINT	192	-1	15	3.3596	2.1378	-3.3096
IJPOINT	193	-1	15	2.5441	3.0636	-3.3096

IJPOINT	194	-1	15	1.8408	3.5311	-3.3096
IJPOINT	195	-1	17	3.6946	0.2862	-3.2463
IJPOINT	196	-1	17	3.5668	1.0048	-3.2463
IJPOINT	197	-1	17	3.2746	1.7346	-3.2463
IJPOINT	198	-1	17	2.5865	2.6536	-3.2463
IJPOINT	199	-1	17	1.9688	3.1394	-3.2463
IJPOINT	200	-1	19	3.4351	-0.0252	-3.1615
IJPOINT	201	-1	19	3.3768	0.6307	-3.1615
IJPOINT	202	-1	19	3.1683	1.3276	-3.1615
IJPOINT	203	-1	19	2.6091	2.2346	-3.1615
IJPOINT	204	-1	19	2.0791	2.7346	-3.1615
IJPOINT	205	-1	21	3.1806	0.3034	-3.0497
IJPOINT	206	-1	21	3.1648	0.9415	-3.0497
IJPOINT	207	-1	21	3.0366	0.2572	-3.0497
IJPOINT	208	-1	21	2.6120	0.9305	-3.0497
IJPOINT	209	-1	21	2.1726	1.8050	-3.0497
IJPOINT	210	-1	23	2.8739	2.3153	-3.0497
IJPOINT	211	-1	23	2.9290	-0.5126	-2.9075
IJPOINT	212	-1	23	2.8659	-0.0893	-2.9075
IJPOINT	213	-1	23	2.5812	0.6116	-2.9075
IJPOINT	214	-1	23	2.2307	1.3872	-2.9075
IJPOINT	215	-1	25	2.5806	-0.9003	-2.9075
IJPOINT	216	-1	25	2.6773	-0.8204	-2.7329
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IJPOINT	220	-1	27	2.3067	1.4966	-2.7329
IJPOINT	221	-1	27	2.4294	-1.0249	-2.5389
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IJPOINT	224	-1	27	2.2604	0.6215	-2.5389
IJPOINT	225	-1	29	2.0199	1.1235	-2.5389
IJPOINT	226	-1	29	2.1734	-1.2256	-2.3233
IJPOINT	227	-1	29	2.3499	-0.9263	-2.3233
IJPOINT	228	-1	29	2.3454	-0.2448	-2.3233
IJPOINT	229	-1	29	2.2327	0.2845	-2.3233
IJPOINT	230	-1	31	1.7380	0.7727	-2.3233
IJPOINT	231	-1	31	1.9158	-1.4062	-2.0833
IJPOINT	232	-1	31	2.1703	-1.1523	-2.0833
IJPOINT	233	-1	31	2.2353	-0.5366	-2.0833
IJPOINT	234	-1	31	2.1934	-0.0400	-2.0833
IJPOINT	235	-1	33	1.4229	0.4323	-2.0833
IJPOINT	236	-1	33	1.6647	-1.5998	-1.8265
IJPOINT	237	-1	33	1.9875	-1.3463	-1.8265
IJPOINT	238	-1	33	2.1149	-0.7960	-1.8265
IJPOINT	239	-1	33	2.1376	-0.3336	-1.8265
IJPOINT	240	-1	35	1.0501	0.1199	-1.8265
IJPOINT	241	-1	35	1.4071	-1.7838	-1.5599
IJPOINT	242	-1	35	1.7920	-1.5182	-1.5599
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IJPOINT	245	1	39	0.9309	-0.1804	-1.5599
IJPOINT	246	1	39	1.2474	-1.5813	-1.2650
IJPOINT	247	1	39	1.5886	-1.3458	-1.2650
IJPOINT	248	1	39	1.7532	-0.9185	-1.2650
IJPOINT	249	1	39	1.8280	-0.5418	-1.2650
IJPOINT	250	-1	41	0.7370	-0.1599	-1.2650

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IJPOINT	251	-1	41	0.9875	-1.2519	-1.2650
IJPOINT	252	-1	41	1.2576	-1.0655	-1.2650
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IJPOINT	258	-1	43	1.1560	-0.6057	-1.4950
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IJPOINT	260	-1	1	4.3363	-0.1055	-1.4950
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IJPOINT	271	-1	9	3.1273	3.9934	-3.3925
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IJPOINT	330	-1	39	0.9309	-1.5813	-1.4950
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IJPOINT	1015	1	5	1.1240	5.3704	-2.8214
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IJPOINT	1021	1	9	4.8855	1.4632	-2.7787
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IJPOINT	1032	1	13	4.2742	1.5833	-2.6672
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IJPOINT	1034	1	13	2.9099	3.5082	-2.6672
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IJPOINT	1137	1	15	1.7104	4.2249	-2.6672
IJPOINT	1138	1	17	1.9074	3.9024	-2.6997
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IJPOINT	1141	1	23	2.4353	2.9346	-2.3571
IJPOINT	1142	1	25	2.6354	2.4568	-2.2085
IJPOINT	1143	1	27	2.7363	2.1802	-2.1285
IJPOINT	1144	1	29	2.8666	1.7455	-1.9961
IJPOINT	1145	1	31	2.9754	1.2792	-1.8420
IJPOINT	1146	1	33	3.0643	0.8116	-1.6596
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IJPOINT 1268	9	27	3.7497	0.0478	-1.9710
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MSYS 1
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IJGRID 1
SLINES 2T9285 331 246 309 241T156B-5 2:87 241:32 186
RULE 5 1
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IJNAME 155 240 ;;;; LOW HUB
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IJSOLID 460 165 1 SO 0 PRES  B HUB
IJSOLID 465 170 1 SO 0 PRES  C HUB
IJSOLID 470 175 1 SO 0 PRES  D HUB
IJSOLID 475 180 1 SO 0 PRES  E HUB
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IJSOLID 485 190 1 SO 0 PRES  G HUB
IJSOLID 490 195 1 SO 0 PRES  H HUB
IJSOLID 495 200 1 SO 0 PRES  I HUB
IJSOLID 500 205 1 SO 0 PRES  J HUB
IJSOLID 505 210 1 SO 0 PRES  K HUB
IJSOLID 510 215 1 SO 0 PRES  L HUB
IJSOLID 515 220 1 SO 0 PRES  M HUB
IJSOLID 520 225 1 SO 0 PRES  N HUB
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IJSOLID 530 235 1 SO 0 PRES  P HUB
IJSOLID 535 240 1 SO 0 PRES  Q HUB
IJSOLID 240 608 1 SO 0 PRES  R HUB
IJSOLID   1 540 1 SO 0 PRES  S HUB
KNAME 0 0 1 1 SIDE ONE BOT
MESH 3
#MESH 2
MSYS 1
SLINES 2T32B5 186T156B-5 2
IJGRID 1
SLINES 106T112 266T260B-1 106
RULE 3 1
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MESH 3
MERGE MESH 1
#MESH 3
MSYS 1
SLINES 106T112 37T92B5 331 246 309 241T191B-5 266T260B-1 106:87 241
SLINES 112 266
IJGRID 1
SLINES 3T93B5 332 247 310 242T157B-5 3:88 242:217 63
RULE 5 1
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IJNAME 155 240 ,,,, LOW HUB
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IJSOLID   1 540 1 SO 0 PRES  S HUB
MESH 3
MERGE MESH 1 2
#MESH 4
MSYS 1
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IJGRID 1
SLINES 113T125 279T267B-1 113
RULE 3 1
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MESH 3
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IJGRID 1
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RULE 5 1
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IJNAME 155 240 ,,,, LOW HUB
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IJSOLID 460 165 1 SO 0 PRES  B HUB
IJSOLID 465 170 1 SO 0 PRES  C HUB
IJSOLID 470 175 1 SO 0 PRES  D HUB
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IJSOLID 505 210 1 SO 0 PRES  K HUB
IJSOLID 510 215 1 SO 0 PRES  L HUB
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IJSOLID 535 240 1 SO 0 PRES  Q HUB
IJSOLID 240 608 1 SO 0 PRES  R HUB
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MESH 3
MERGE MESH 3 4
#MESH 6
MSYS 1
SLINES 4T34B5 188T158B-5 4
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SLINES 126T132 286T280B-1 126
RULE 3 1
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MERGE MESH 5
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SLINES 89 243:132 286
IJGRID 1
SLINES 5T95B5 334 249 312 244T159B-5 5:90 244
RULE 5 1
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IJSOLID 465 170 1 SO 0 PRES  C HUB
IJSOLID 470 175 1 SO 0 PRES  D HUB
IJSOLID 475 180 1 SO 0 PRES  E HUB
IJSOLID 480 185 1 SO 0 PRES  F HUB
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IJSOLID 485 190 1 SO 0 PRES  G HUB
IJSOLID 490 195 1 SO 0 PRES  H HUB
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IJSOLID 510 215 1 SO 0 PRES  L HUB
IJSOLID 515 220 1 SO 0 PRES  M HUB
IJSOLID 520 225 1 SO 0 PRES  N HUB
IJSOLID 525 230 1 SO 0 PRES  O HUB
IJSOLID 530 235 1 SO 0 PRES  P HUB
IJSOLID 535 240 1 SO 0 PRES  Q HUB
IJSOLID 240 608 1 SO 0 PRES  R HUB
IJSOLID   1 540 1 SO 0 PRES  S HUB
MESH 3
MERGE MESH 5 6
#MESH 8
MSYS 1
SLINES 5T95B5 334 249 312 244T159B-5 5:90 244
IJGRID 1
SLINES 133T151 335 305 313 304T287B-1 133:150 304
RULE 3 1
IJSOLID  0 0 1
KNAME 0 0 3 3 SIDE TWO BOT
IJSOLID 1 540 1 SO 0 PRES S HUB
MESH 3
MERGE MESH 7
#SHROUD
#MESH 9
MSYS 1
SLINES 1091 1357T1255B-6 1210T1150B-5 1001T108685
PLINE 1086 1096 1091
IJGRID 1
SLINES 1092 1358T1256B-6 1211T1151B-5 1002T108785:1032 1181
PLINE 1087 1097 1092
RULE 5 1
IJNAME 1001 1091 .... HIGH SHRD
IJSOLID  0 0 1
IJSOLID 1001 1406 1 SO 0 PRES  A SHRD
IJSOLID 1006 1411 1 SO 0 PRES  B SHRD
IJSOLID 1011 1416 1 SO 0 PRES  C SHRD
IJSOLID 1016 1421 1 SO 0 PRES  D SHRD
IJSOLID 1021 1426 1 SO 0 PRES  E SHRD
IJSOLID 1026 1431 1 SO 0 PRES  F SHRD
IJSOLID 1031 1436 1 SO 0 PRES  G SHRD
IJSOLID 1036 1441 1 SO 0 PRES  H SHRD
IJSOLID 1041 1446 1 SO 0 PRES  I SHRD
IJSOLID 1046 1451 1 SO 0 PRES  J SHRD
IJSOLID 1051 1456 1 SO 0 PRES  K SHRD
IJSOLID 1056 1461 1 SO 0 PRES  L SHRD
IJSOLID 1061 1466 1 SO 0 PRES  M SHRD
IJSOLID 1066 1471 1 SO 0 PRES  N SHRD
IJSOLID 1071 1476 1 SO 0 PRES  O SHRD
IJSOLID 1076 1481 1 SO 0 PRES  P SHRD
IJSOLID 1081 1486 1 SO 0 PRES  Q SHRD
IJSOLID 1086 1491 1 SO 0 PRES  R SHRD
IJSOLID 1401 1210 1 SO 0 PRES  S SHRD
#
```

```
IJSOLID 1210 1402 1 SO 0 PRES  T SHRD
IJSOLID 1345 1147 1 SO 0 PRES  T SHRD END
KNAME 0 0 1 1 SIDE ONE TOP
MESH 1
#MESH 10
MSYS 1
SLINES 1181T1151B-5 1002T1032B5 1181
IJGRID 1
SLINES 1101T1107 1221T1215B-1 1101
RULE 3 1
IJSOLID  0 0 1
IJSOLID 1401 1221 1 SO 0 PRES  S SHRD
MESH 1
MERGE MESH 9
#MESH 11
MSYS 1
SLINES 1092 1358T1256B-6 1211T1186B-5 1221T1215B-1 1101T1107 1037T1087B5
SLINES 1107 1221
PLINE 1087 1097 1092
IJGRID 1
SLINES 1093 1359T1257B-6 1212T1152B-5 1003T108885:1212 1063
PLINE 1088 1098 1093
RULE 5 1
IJNAME 1001 1091 .... HIGH SHRD
IJSOLID  0 0 1
IJSOLID 1001 1406 1 SO 0 PRES  A SHRD
IJSOLID 1006 1411 1 SO 0 PRES  B SHRD
IJSOLID 1011 1416 1 SO 0 PRES  C SHRD
IJSOLID 1016 1421 1 SO 0 PRES  D SHRD
IJSOLID 1021 1426 1 SO 0 PRES  E SHRD
IJSOLID 1026 1431 1 SO 0 PRES  F SHRD
IJSOLID 1031 1436 1 SO 0 PRES  G SHRD
IJSOLID 1036 1441 1 SO 0 PRES  H SHRD
IJSOLID 1041 1446 1 SO 0 PRES  I SHRD
IJSOLID 1046 1451 1 SO 0 PRES  J SHRD
IJSOLID 1051 1456 1 SO 0 PRES  K SHRD
IJSOLID 1056 1461 1 SO 0 PRES  L SHRD
IJSOLID 1061 1466 1 SO 0 PRES  M SHRD
IJSOLID 1066 1471 1 SO 0 PRES  N SHRD
IJSOLID 1071 1476 1 SO 0 PRES  O SHRD
IJSOLID 1076 1481 1 SO 0 PRES  P SHRD
IJSOLID 1081 1486 1 SO 0 PRES  Q SHRD
IJSOLID 1086 1491 1 SO 0 PRES  R SHRD
IJSOLID 1401 1210 1 SO 0 PRES  S SHRD
#
IJSOLID 1210 1402 1 SO 0 PRES  T SHRD
IJSOLID 1345 1147 1 SO 0 PRES  T SHRD END
MESH 1
MERGE MESH 9 10
#MESH 12
MSYS 1
SLINES 1212T1152B-5 1003T1063B5 1212
IJGRID 1
SLINES 1222T1234 1121T1109B-1 1222
RULE 3 1
IJSOLID  0 0 1
IJSOLID 1401 1234 1 SO 0 PRES  S SHRD
```

```
MESH 1
MERGE MESH 11
#MESH 13
MSYS 1
SLINES 1093 1359T1257B-6 1234T1222B-1 1109T1121B1 1068T1088B5:1234 1121
PLINE 1088 1098 1093
IJGRID 1
SLINES 1094 1360T1258B-6 1213T1153B-5 1004T1089B5:1034 1183
PLINE 1089 1099 1094
RULE 5 1
IJNAME 1001 1091 ,,,, HIGH SHRD
IJSOLID  0 0 1
IJSOLID 1001 1406 1 SO 0 PRES  A SHRD
IJSOLID 1006 1411 1 SO 0 PRES  B SHRD
IJSOLID 1011 1416 1 SO 0 PRES  C SHRD
IJSOLID 1016 1421 1 SO 0 PRES  D SHRD
IJSOLID 1021 1426 1 SO 0 PRES  E SHRD
IJSOLID 1026 1431 1 SO 0 PRES  F SHRD
IJSOLID 1031 1436 1 SO 0 PRES  G SHRD
IJSOLID 1036 1441 1 SO 0 PRES  H SHRD
IJSOLID 1041 1446 1 SO 0 PRES  I SHRD
IJSOLID 1046 1451 1 SO 0 PRES  J SHRD
IJSOLID 1051 1456 1 SO 0 PRES  K SHRD
IJSOLID 1056 1461 1 SO 0 PRES  L SHRD
IJSOLID 1061 1466 1 SO 0 PRES  M SHRD
IJSOLID 1066 1471 1 SO 0 PRES  N SHRD
IJSOLID 1071 1476 1 SO 0 PRES  O SHRD
IJSOLID 1076 1481 1 SO 0 PRES  P SHRD
IJSOLID 1081 1486 1 SO 0 PRES  Q SHRD
IJSOLID 1086 1491 1 SO 0 PRES  R SHRD
IJSOLID 1401 1210 1 SO 0 PRES  S SHRD
#
IJSOLID 1210 1402 1 SO 0 PRES  T SHRD
IJSOLID 1345 1147 1 SO 0 PRES  T SHRD END
MESH 1
MERGE MESH 11 12
#MESH 14
MSYS 1
SLINES 1183T1153B-6 1004T1034B5 1183
IJGRID 1
SLINES 1122T1128 1241T1235B-1 1122
RULE 3 1
IJSOLID  0 0 1
IJSOLID 1401 1241 1 SO 0 PRES  S SHRD
MESH 1
MERGE MESH 13
#MESH 15
MSYS 1
SLINES 1094 1360T1258B-6 1213T1188B-5 1241T1235B-1 1122T1128 1039T1089B5
SLINES 1128 1241
PLINE 1089 1099 1094
IJGRID 1
SLINES 1095 1361T1259B-6 1214T1154B-5 1005T1090B5
PLINE 1090 1100 1095
RULE 5 1
IJNAME 1001 1091 ,,,, HIGH SHRD
IJSOLID  0 0 1
```

```
IJSOLID 1001 1406 1 SO 0 PRES  A SHRD
IJSOLID 1006 1411 1 SO 0 PRES  B SHRD
IJSOLID 1011 1416 1 SO 0 PRES  C SHRD
IJSOLID 1016 1421 1 SO 0 PRES  D SHRD
IJSOLID 1021 1426 1 SO 0 PRES  E SHRD
IJSOLID 1026 1431 1 SO 0 PRES  F SHRD
IJSOLID 1031 1436 1 SO 0 PRES  G SHRD
IJSOLID 1036 1441 1 SO 0 PRES  H SHRD
IJSOLID 1041 1446 1 SO 0 PRES  I SHRD
IJSOLID 1046 1451 1 SO 0 PRES  J SHRD
IJSOLID 1051 1456 1 SO 0 PRES  K SHRD
IJSOLID 1056 1461 1 SO 0 PRES  L SHRD
IJSOLID 1061 1466 1 SO 0 PRES  M SHRD
IJSOLID 1066 1471 1 SO 0 PRES  N SHRD
IJSOLID 1071 1476 1 SO 0 PRES  O SHRD
IJSOLID 1076 1481 1 SO 0 PRES  P SHRD
IJSOLID 1081 1486 1 SO 0 PRES  Q SHRD
IJSOLID 1086 1491 1 SO 0 PRES  R SHRD
IJSOLID 1401 1210 1 SO 0 PRES  S SHRD
#
IJSOLID 1210 1402 1 SO 0 PRES  T SHRD
IJSOLID 1345 1147 1 SO 0 PRES  T SHRD END
MESH 1
MERGE MESH 13 14
#MESH 16
MSYS 1
SLINES 1095 1361T1259B-6 1214T1154B-5 1005T1090B5
PLINE 1090 1100 1095
IJGRID 1
SLINES 1148 1362T1260B-6 1254T1242B-1 1130T1147
PLINE 1147 1149 1148
RULE 3 1
IJSOLID  0 0 1
IJSOLID 1401 1210 1 SO 0 PRES  S SHRD
#
IJSOLID 1210 1402 1 SO 0 PRES  T SHRD
IJSOLID 1345 1147 1 SO 0 PRES  T SHRD END
KNAME 0 0 3 3 SIDE TWO TOP
MESH 1
MERGE MESH 15
#VANES
#MESH 17
MSYS 1
SLINES 1002T1032B5 186T156B-5 1002
IJGRID 1
SLINES 1101T1107 266T260B-1 1101
RULE 3 1
REFINE 0 0 2 0
IJSOLID  0 0 1
IJSOLID  159 1010 1 SO 0 PRES  A VANE
IJSOLID  164 1015 1 SO 0 PRES  B VANE
IJSOLID  169 1020 1 SO 0 PRES  C VANE
IJSOLID  174 1025 1 SO 0 PRES  D VANE
IJSOLID  179 1030 1 SO 0 PRES  E VANE
IJSOLID  184 1035 1 SO 0 PRES  F VANE
MESH 3
MERGE MESH 1 2 9 10 17
```

```
#MESH 18
MSYS 1
SLINES 1003T106385 217T157B-5 1003
IJGRID 1
SLINES 1109T1121 279T287B-1 1109
RULE 3 1
REFINE 0 0 2 0
IJSOLID  0 0 1
IJSOLID  159 1010 1 SO 0 PRES  A VANE
IJSOLID  164 1015 1 SO 0 PRES  B VANE
IJSOLID  169 1020 1 SO 0 PRES  C VANE
IJSOLID  174 1025 1 SO 0 PRES  D VANE
IJSOLID  179 1030 1 SO 0 PRES  E VANE
IJSOLID  184 1035 1 SO 0 PRES  F VANE
IJSOLID  189 1040 1 SO 0 PRES  G VANE
IJSOLID  194 1045 1 SO 0 PRES  H VANE
IJSOLID  199 1050 1 SO 0 PRES  I VANE
IJSOLID  204 1055 1 SO 0 PRES  J VANE
IJSOLID  209 1060 1 SO 0 PRES  K VANE
IJSOLID  214 1065 1 SO 0 PRES  L VANE
MESH 3
MERGE MESH 3 4 11 12 18
#MESH 19
MSYS 1
SLINES 1004T103485 188T158B-5 1004
IJGRID 1
SLINES 1122T1128 286T280B-1 1122
RULE 3 1
REFINE 0 0 2 0
IJSOLID  0 0 1
IJSOLID  159 1010 1 SO 0 PRES  A VANE
IJSOLID  164 1015 1 SO 0 PRES  B VANE
IJSOLID  169 1020 1 SO 0 PRES  C VANE
IJSOLID  174 1025 1 SO 0 PRES  D VANE
IJSOLID  179 1030 1 SO 0 PRES  E VANE
IJSOLID  184 1035 1 SO 0 PRES  F VANE
IJSOLID  189 1040 1 SO 0 PRES  G VANE
IJSOLID  194 1045 1 SO 0 PRES  H VANE
IJSOLID  199 1050 1 SO 0 PRES  I VANE
IJSOLID  204 1055 1 SO 0 PRES  J VANE
IJSOLID  209 1060 1 SO 0 PRES  K VANE
IJSOLID  214 1065 1 SO 0 PRES  L VANE
IJSOLID  219 1070 1 SO 0 PRES  M VANE
IJSOLID  224 1075 1 SO 0 PRES  N VANE
IJSOLID  229 1080 1 SO 0 PRES  O VANE
IJSOLID  234 1085 1 SO 0 PRES  P VANE
IJSOLID  239 1090 1 SO 0 PRES  Q VANE
MESH 3
MERGE MESH 7 8 15 16 20
#HUB CENTER
#MESH 21
SLINES 314T329 314 317 322 323 328 317
PRISM  5 3MO  3 12.341
PRISM  9 3MO  3 29.478
PRISM 13 3MO  3 42.341
PRISM 17 3MO  3 54.515
PRISM 19 3MO  3 59.515
IJSOLID 0 0 1
IJSOLID 326 336 1 SO 0 TORQ IPUT
IJSOLID 317 319 1 SO 0 TORQ OPUT
KNAME 322 322 1 1 ,,,,TORQ
KNAME 0 0  1  1 SIDE ONE HUB
KNAME 0 0 19 19 SIDE TWO HUB
MESH 3
ROTATE -149.515 3
MERGE MESH 1T8
#BOUNDARY CONDITIONS
NLIST 1 INSERT NAME SIDE ONE
NLIST 2 INSERT NAME SIDE TWO
SET SYNTAX ON
LET &ANG  = 60
LET &ANG1 = &ANG * %PI  180.
GENSKEW 1 1 0 &ANG 0 1
NODSKEW SKEW 1 NLIST 2
LET &IFN1 = %IFL(NLST,NV,0,1)
LET &IRN1 = %LFM(&IFN1,1)
LET &IFN2 = %IFL(NLST,NV,0,2)
LET &IRN2 = %LFM(&IFN2,1)
DO ;10 &I=1,1000,1
LET &N1  = %IBC1(&IRN1,&I)
IF &N1 ;20 ;20 1
LET &N2  = %IBC1(&IRN2,&I)
# IF C1 = -C2 SYMMETRIC-SYMMETRIC BC
# IF C1 =  C2 ANTISYMMETRIC-ANTISYMMETRIC BC
GENCON 2 &N1 &N2 1 1 -C1  1. -C2 -1. 0. 1.0E9
GENCON 2 &N1 &N2 2 2 -C1  1. -C2 -1. 0. 1.0E9
GENCON 2 &N1 &N2 3 3 -C1  1. -C2 -1. 0. 1.0E9
;10 NOP
;20 NOP
LET &IRM2 = %RFM(&IFN2,1,0,&IRN2)
LET &IRM1 = %RFM(&IFN1,1,0,&IRN1)
SET SYNTAX OFF
#
# SUPPRESS TOP EDGE OF HUB IN AXIAL DIRECTION
NSET 3 COPY MESH 21
NSET 3 DELE NAME SIDE
BCSYS -3 0 3 -5 4150 1.0E9 NSET 3
DOFSUP 2 NAME,,,,,TORQ
```

```
#
DOFLOO
FINISH
STOP
$BAND
START -1
REGPS
BAND
STOP
$SETUP
START 500000
SETUP
STOP
$MATL
START 500000
MATISO,1,15.5E6,,35  # UNKNOWN MATERIAL
DENSITY,1,,.0004196  # DENSITY IN SNAILS  LB/386.088 = SNAILS
MATL
STOP
$MASS
START 500000
MASS,1 # CONVENTIONAL LUMPED MASS MATRIX FOR BODY FORCES
STOP
$SCOPE
START
#
# READ INPUT FILE =  INPUTPVSR.DAT
# FIRST,  ASSIGN INPUTPVSR.DAT FOR025
#
   SET SYNTAX ON
#
# READ IN THE R,P DATA FOR THE INNER SURFACE
#
 ;330 FORMAT'(2F10.0)
# ;331 FORMAT'(1X,'R(I),P(I) INPUT ECHO',2E14.7)
  200 FORMAT'(I5)
   READ 25,;200 &M
    DO ;300 &I=1,&M
   READ 25,;330 &R(&I),&P(&I)
#   WRITE 6,;331 &R(&I),&P(&I)
 ;300 NOP
  STORE 1
#
# THE FOLLOWING CODING IS A SYNTACTIC SUBROUTINE TO DO A TABLE
# LOOKUP WITH LINEAR INTERPOLATION.  R IS THE INDEPENDENT VARIABLE, P
# IS THE DEPENDENT VARIABLE.  THEREFORE GIVEN RO FIND PO.
# RDC  JUL. 1988.
#
# DEFINE NODE SET 3 FOR HUB NODES FOR DISTRIBUTED LOAD 7-29-88
# DEFINE NODE SET 4 FOR SHRD NODES FOR DISTRIBUTED LOAD 7-29-88
#
    NLIST 3 INSERT NAME,,,,LOW HUB
    NLIST 4 INSERT NAME,,,,HIGH SHRD
#
#   SET SYNTAX ON
#
    SUB INTP &M,&RO,&PO
```

```
    FETCH/MERGE 1
   LET &II=2
 DO ;1 &I=2,&M
   LET &RI=&R(&I) - &RO
   IF &RI ;1,;2,;3
 3 LET &II=&I
   GOTO 4
;1 NOP
;4 LET &K=&II-1
   LET &A=&R(&II) - &RO
   LET &B=&P(&K) - &P(&II)
   LET &C=&R(&II) - &R(&K)
   LET &PO=&P(&II) + &A*&B/&C
   GOTO ;5
;2 LET &PO=&P(&I)
;5 RETURN
   END
#
# SET NSETI = # OF NODES ON THE INNER(HUB) SURFACE
# SET NSETO = # OF NODES ON THE OUTER(SHRD) SURFACE
#
# DO THE INNER(HUB) SURFACE - DETERMINE HOW MANY NODES ON SURFACE
#
   LET &NSETI=0
   DO ;50 &I=1,1000
       LET &NX=%ICFL(NLST,NV,0,3,&I)
       IF &NX ;60,;60,;70
 ;70 LET &NSETI = &NSETI+1
  ;50 NOP
  ;60 NOP
#
# READ IN THE COORDINATES FOR EACH NODE ON THE INNER(HUB) SURFACE
#
# ;658 FORMAT'(1X,'RO,PO FOR THE INNER SURFACE',2E14.7)
#
   LET &IFX=%IFL(X,NV,0,0) # RETURN INTERNAL FILE NUMBER
   LET &LFX=%LFM(&IFX,1)   # LOCK THE FILE
   LET &NNP=%IPP(1)        # OBTAIN NO. OF NODAL POINTS
#          %NFL(P,NV,0,1,&NNP,1,1,2,0) # GENERATE A NEW FILE
   LET &IFPX=%NFL(P,NV,0,1,&NNP,1,1,2,0) # GENERATE A NEW FILE
   LET &LFPX=%LFM(&IFPX,1) # LOCK FILE IN BLANK COMMON
#
   DO ;100 &J=1,&NSETI
     LET &NX=%ICFL(NLST,NV,0,3,&J)
       LET &X=%FBC2(&LFX,3,1,&NX)
       LET &Y=%FBC2(&LFX,3,2,&NX)
       LET &ARG=&X*&X+&Y*&Y + .001
       LET &RO=%SQRT(&ARG)
#
# *** CALL TABLE LOOKUP WITH LINEAR INTERPOLATION
#
        CALL INTP &M,&RO,&PO
    LET &IDUM=%BC1(&LFPX,&NX,&PO) # STORE PO ON FILE=P.NV,0,1
#       WRITE 6,;658 &RO,&PO
# *** IN LOAD USE       PSURF/NOP=n 1 4 ELEM=&mspec
#
# *** WRITE BACK TO THE DATA BASE THE PRESSURE AT EACH NODE &NX
```

```
#
   ;100 NOP
        LET &IDUM=%RFM(&IFPX,1,1,&LFPX) # RELEASE FILE=P.NV,0,1
#
# READ IN THE R,P DATA FOR THE OUTER SURFACE
#
  ;337 FORMAT'(2F10.0)
# ;336 FORMAT'(1X,'R(I) P(I) INPUT ECHO',2E14.7)
  ;200 FORMAT'(I5)
   READ 25 ;200 &M
      DO ;304 &I=1,&M
   READ 25 ;337 &R(&I),&P(&I)
#    WRITE 6,;336 &R(&I),&P(&I)
  ;304 NOP
   STORE 1
#
# DO THE OUTER(SHRD) SURFACE  - DETERMINE HOW MANY NODES ON SURFACE
#
     LET &NSETO=0
     DO ;55 &I=1,1000
          LET &NX=%ICFL(NLST,NV,0,4,&I)
          IF &NX ;655 ;655 ;755
  ;755 LET &NSETO=&NSETO+1
  ;55 NOP
  ;655 NOP
#
# READ IN THE COORDINATES FOR EACH NODE ON THE OUTER(SHRD) SURFACE
#
# ;657 FORMAT'(1X,'RO,PO FOR THE OUTER SURFACE',2E14.7)
#
     LET &IFPX=%NFL(P.NV,0,2,&NNP,1,1,2,0) # GENERATE A NEW FILE
     LET &LFPX=%LFM(&IFPX,1,) # LOCK FILE IN BLANK COMMON
#
     DO ;1055 &J=1,&NSETO
          LET &NX=%ICFL(NLST,NV,0,4,&J)
          LET &X=%FBC2(&LFPX,3,1,&NX)
          LET &Y=%FBC2(&LFPX,3,2,&NX)
          LET &ARG=&X*&X+&Y*&Y + .001
          LET &RO=%SQRT(&ARG)
        STORE 1
#
# *** CALL TABLE LOOKUP WITH LINEAR INTERPOLATION
#
          CALL INTP &M &RO &PO
          LET &IDUM=%BC1(&LFPX,&NX,&PO) # STORE PO ON FILE=P.NV,0,2
#         WRITE 6,;657 &RO,&PO
# *** IN LOAD USE       PSURF/NQP=n 1 1 ELEM=&mspec
#
     ;1055 NOP
          LET &IDUM=%RFM(&IFPX,1,1,&LFPX) # RELEASE FILE=P.NV,0,2
          LET &IDUM=%RFM(&IFX,1,0,&LFX)   # RELEASE FILE=X.NV,0,0
#
     SET SYNTAX OFF
#
# MODIFY P TO P=-P FOR P.NV,0,1 AND P.NV,0,2
DSET P.NV,0,1,10
DFUN 1 SCAL -1.0 10     # NQD(1) = -1.0*NQD(10)
```

```
DCOPY P.NV,0,1,1,1      # COPY NQD(1) ONTO FILE P.NV,0,1
DSET P.NV,0,2,10
DFUN 2 SCAL -1.0 10     # NQD(2) = -1.0*NQD(10)
DCOPY P.NV,0,2,2,1
#
DSET P.NV,0,1,1
DSET P.NV,0,2,2
STOP
$LOAD
START 500000
LCASE 1
# WE ARE USING THE GOSPEL LOADS, (OMEGA(RAD/SEC))
SPIN 3910.41 0. 0.0 0.0 0.0 10.0 0.0 0.0 0.0 0.0.  #37342 RPM ABOUT Z AXIS
LCASE 2
#
# be sure to delete elements not having faces that are loaded
# from element sets
#
# TO DEFINE THE DISTRIBUTED PRESSURE LOAD ON THE INNER(HUB)
# SURFACE AND THE OUTER(SHROUD) SURFACE, POINT BY POINT.
PSURF/NQP=1 0. 1 4 NAME PRES A HUB
PSURF/NQP=1 0. 1 4 NAME PRES B HUB
PSURF/NQP=1 0. 1 4 NAME PRES C HUB
PSURF/NQP=1 0. 1 4 NAME PRES D HUB
PSURF/NQP=1 0. 1 4 NAME PRES E HUB
PSURF/NQP=1 0. 1 4 NAME PRES F HUB
PSURF/NQP=1 0. 1 4 NAME PRES G HUB
PSURF/NQP=1 0. 1 4 NAME PRES H HUB
PSURF/NQP=1 0. 1 4 NAME PRES I HUB
PSURF/NQP=1 0. 1 4 NAME PRES J HUB
PSURF/NQP=1 0. 1 4 NAME PRES K HUB
PSURF/NQP=1 0. 1 4 NAME PRES L HUB
PSURF/NQP=1 0. 1 4 NAME PRES M HUB
PSURF/NQP=1 0. 1 4 NAME PRES N HUB
PSURF/NQP=1 0. 1 4 NAME PRES O HUB
PSURF/NQP=1 0. 1 4 NAME PRES P HUB
PSURF/NQP=1 0. 1 4 NAME PRES Q HUB
PSURF/NQP=1 0. 1 4 NAME PRES R HUB
#
PSURF/NQP=2 0. 1 1 NAME PRES A SHRD
PSURF/NQP=2 0. 1 1 NAME PRES B SHRD
PSURF/NQP=2 0. 1 1 NAME PRES C SHRD
PSURF/NQP=2 0. 1 1 NAME PRES D SHRD
PSURF/NQP=2 0. 1 1 NAME PRES E SHRD
PSURF/NQP=2 0. 1 1 NAME PRES F SHRD
PSURF/NQP=2 0. 1 1 NAME PRES G SHRD
PSURF/NQP=2 0. 1 1 NAME PRES H SHRD
PSURF/NQP=2 0. 1 1 NAME PRES I SHRD
PSURF/NQP=2 0. 1 1 NAME PRES J SHRD
PSURF/NQP=2 0. 1 1 NAME PRES K SHRD
PSURF/NQP=2 0. 1 1 NAME PRES L SHRD
PSURF/NQP=2 0. 1 1 NAME PRES M SHRD
PSURF/NQP=2 0. 1 1 NAME PRES N SHRD
PSURF/NQP=2 0. 1 1 NAME PRES O SHRD
PSURF/NQP=2 0. 1 1 NAME PRES P SHRD
PSURF/NQP=2 0. 1 1 NAME PRES Q SHRD
PSURF/NQP=2 0. 1 1 NAME PRES R SHRD
```

```
#
LCASE 3
# APPLY 6000 PSI NORMAL TO TOP SURFACE OF SHRD
PSURF -6000. 1 4 NAME PRES S SHRD
# APPLY 5000 PSI NORMAL TO BOTTOM SURFACE OF HUB  7-29-88
PSURF -5000. 1 1 NAME PRES S HUB
# APPLY 4500 PSI TO FINGERS 9-12-88
PSURF -4500. 1 4 NAME PRES T SHRD
PSURF -4500. 1 5 NAME PRES T SHRD END
#
LCASE 4
# THIS APPLIES 100 PER CENT OF 12*10971*131654 IN-LBS TOTAL
# TORQUE TO THE INPUT SHAFT TO CAUSE A -M(2) MOMENT
PSURF 10911 70 2 4 NAME TORQ IPUT
#
# TO DEFINE TWO THIRDS OF THE TOTAL INPUT TORQUE OF 131654 IN-LBS
# OR 87769 IN-LBS ACTING AT THE OUTPUT SHAFT CAUSING A +M(2).
PSURF -8989 48 2 4 NAME TORQ OPUT
#
# TO DEFINE ONE THIRD OF THE TOTAL TORQUE = .33*131654 ON FACE 3
# OF THE VANES CAUSING A + M(2) MOMENT. NO LOAD APPLIED TO FACE 6
LCASE 5
PSURF -240 12 1 3 NAME PRES A VANE
PSURF -240 12 1 3 NAME PRES B VANE
PSURF -240 12 1 3 NAME PRES C VANE
PSURF -240 12 1 3 NAME PRES D VANE
PSURF -240 12 1 3 NAME PRES E VANE
PSURF -240 12 1 3 NAME PRES F VANE
PSURF -240 12 1 3 NAME PRES G VANE
PSURF -240 12 1 3 NAME PRES H VANE
PSURF -240 12 1 3 NAME PRES I VANE
PSURF -240 12 1 3 NAME PRES J VANE
PSURF -240 12 1 3 NAME PRES K VANE
PSURF -240 12 1 3 NAME PRES L VANE
PSURF -240 12 1 3 NAME PRES M VANE
PSURF -240 12 1 3 NAME PRES N VANE
PSURF -240 12 1 3 NAME PRES O VANE
PSURF -240 12 1 3 NAME PRES P VANE
PSURF -240 12 1 3 NAME PRES Q VANE
LOAD
STOP
$SOLVE
START -1
LOADS 1 1.0
SAVE S
SAVE D
SAVE R
SAVE EF
SOLVE
#
LOADS 2 1.0
LOADS 3 1.0
LOADS 4 1.0
LOADS 5 1.0
# DISTRIBUTED P(N) ON HUB AND SHROUD. MOMENT MATCHING WITH
# COUNTER LOADS ON INPUT/OUTPUT SHAFTS.
# PLUS 6000 PSI TO TOP OF SHRD AND 5000 TO BOTTOM OF HUB
```

```
# PLUS 4500 PSI TO THE "FINGERS"
SAVE S
SAVE D
SAVE R
SAVE EF
MATRIX
SOLVE
STOP
$UTILITY
START 200000
#
BCDOUT\UNFO=VAX\MRS=8000 7 MAIL EV    :BCDOUT\UNFO=VAX\MRS=8000 7 ELEM EV
BCDOUT\UNFO=VAX\MRS=8000 7 INTO EV    :BCDOUT\UNFO=VAX\MRS=8000 7 X NV
BCDOUT\UNFO=VAX\MRS=8000 7 NORM NV    :BCDOUT\UNFO=VAX\MRS=8000 7 RDF NV
BCDOUT\UNFO=VAX\MRS=8000 7 ROT NV     :BCDOUT\UNFO=VAX\MRS=8000 7 DOF NV
BCDOUT\UNFO=VAX\MRS=8000 7 IR NV      :BCDOUT\UNFO=VAX\MRS=8000 7 IER EV
BCDOUT\UNFO=VAX\MRS=8000 7 LCS NV     :BCDOUT\UNFO=VAX\MRS=8000 7 SKEW NV
BCDOUT\UNFO=VAX\MRS=8000 7 SDF NV     :BCDOUT\UNFO=VAX\MRS=8000 7 NAME NV
BCDOUT\UNFO=VAX\MRS=8000 7 NAME EV    :BCDOUT\UNFO=VAX\MRS=8000 7 CON CON 0 ?
BCDOUT\UNFO=VAX\MRS=8000 7 MESH HED 0 ? :BCDOUT\UNFO=VAX\MRS=8000 7 NLST NV 0 ?
BCDOUT\UNFO=VAX\MRS=8000 7 CON RM DIR :BCDOUT\UNFO=VAX\MRS=8000 7 NSET NV 0 ?
BCDOUT\UNFO=VAX\MRS=8000 7 PCT HED ?  :BCDOUT\UNFO=VAX\MRS=8000 7 SYS CRM
#
BCDOUT\UNFO=VAX\MRS=8000 8 S EIP ? ?  :BCDOUT\UNFO=VAX\MRS=8000 8 STLT RM DIR
BCDOUT\UNFO=VAX\MRS=8000 8 D SV ? ?   :BCDOUT\UNFO=VAX\MRS=8000 8 EF SEV ? ?
BCDOUT\UNFO=VAX\MRS=8000 8 R SRV ? ?  :BCDOUT\UNFO=VAX\MRS=8000 8 UL NV 0 ?
BCDOUT\UNFO=VAX\MRS=8000 8 UL SV 0 ?  :BCDOUT\UNFO=VAX\MRS=8000 8 UAD NV 0 ?
BCDOUT\UNFO=VAX\MRS=8000 8 UAD SV 0 ? :BCDOUT\UNFO=VAX\MRS=8000 8 VIBE SV 0 ?
#
STOP
```

Appendix C

HPFTP THIRD STAGE IMPELLER TRANSIENT RESPONSE LOADING

APPENDIX C - HPFTP 3RD STAGE IMPELLER TRANSIENT RESPONSE LOADING.

SPATIAL LOADING

The loading for the vibration response analysis consists of two types. The inlet side of the impeller passes 15 inlet vanes per revolution and the outlet side of the impeller passes 13 diffuser vanes per revolution. These vanes induce a pressure pulse form to the impeller. The pressure pulses to the impeller were assumed to be of the same magnitude for all inlet vane positions. The 13 diffuser vane pressure pulses were also assumed to be of the same magnitude (i.e. independent of position). Modal damping of .001 (Q = 50.) was used for all modes including the Modal Truncation modes.

The spatial loading for each impeller vane was transformed to symmetrical components for the cyclic symmetry analysis. The shape of the pressure pulse was left indeterminate for the transformation to cyclic symmetry components. Rather a factor of 1.0 is assumed for the symmetry transformation of the pressure pulse shape.

The transformation to symmetrical components is given by:

$$\bar{F}^{0} = 1/6 \sum_{n=1}^{6} [\, F^{(n)} \,] \qquad \text{Symmetric-Symmetric}$$

$$\bar{F}^{kc} = 2/6 \sum_{n=1}^{6} [\, F^{(n)} \cos(n-1)ka \,] \qquad \text{Degenerates - Cosine} \quad k=1,2$$

$$\bar{F}^{ks} = 2/6 \sum_{n=1}^{6} [\, F^{(n)} \sin(n-1)ka \,] \qquad \text{Degenerates - Sine} \quad k=1,2$$

$$\bar{F}^{3} = 1/6 \sum_{n=1}^{6} [\, (-1)^{**}(n-1) * F^{(n)} \,] \qquad \text{Antisymmetric-Antisymmetric}$$

where a = 360/6 = 60 degrees for the impeller, (n) is the nth physical segment, k is an integer (1 or 2 for this case), c and s superscripts stand for cosine and sine terms.

All loadings are referenced to an arbitrary vane (in segment 1) of the impeller which aligns with an inlet (diffuser) vane at time 0 . The time domain representation is presented in terms of degrees; The conversion to time is wf * t = 360 degrees where wf is the driving frequency (spin speed of the impeller) in radians per second. For the analysis, the spin speed is 37,342 rpm.

A) Inlet Loading

The inlet loading is sketched in Figure 1. From the figure it is observed that the impeller vane in segments 1, 3 and 5 experience identical pulses simultaneously. Likewise the impeller vane in segments 2, 4 and 6 experience the same loading in time.

The transformation of the spatial loading of vanes 1, 3 and 5 to symmetrical components (load case A) is:

$$\overline{FA}^{0} = 0.5$$

$$\overline{FA}^{3} = 0.5$$

$$\overline{FA}^{kc} = \overline{FA}^{ks} = 0.0$$

with application times of 0, 24, 48, 72, ... degrees.

The transformation of the spatial loading of vanes 2, 4, 6 to symmetrical components (load case B) is

$$\overline{FB}^{0} = 0.5$$

$$\overline{FB}^{3} = -0.5$$

$$\overline{FB}^{kc} = \overline{FB}^{ks} = 0.0$$

with application times of 12, 36, 60, 84, ... degrees.

Adding the symmetric-symmetric components yields a loading of:

$$\overline{F}^{0} = 0.5 \text{ at times of } 0, 12, 24, 36, 48, 60, \ldots \text{ degrees.}$$

Adding the antisymmetric-antisymmetric components yields a loading of:

$$\overline{F}^{3} = 0.5 \text{ at times of } 0, 24, 48, \ldots \text{ degrees.}$$
$$= -0.5 \text{ at times of } 12, 36, 60, \ldots \text{ degrees.}$$

These loadings are shown in Figure 2. These are the factors for the cyclic symmetry models loadings to apply to the pressure pulse shape that is induced on the inlet side of the impeller due to the inlet vanes. For the inlet side there are no loads in the degenerate cyclic symmetry models.

B) Diffuser Vane Loading

The diffuser loading for the main vanes is sketched in Figure 3. From the figure it is observed that each vane is pulsed at a different time. Consequently each of the impeller vanes spatial loads are transformed to symmetrical components individually. The cyclic symmetry component factors for each individual vane loading are given in Table 1. The loadings in each cyclic symmetry model are given in Figure 4 and 5 for a time duration of 1/13 revolution of the impeller. The loading then repeats.

The 1st partial and 2nd partial vanes will have cyclic symmetry component factors the same as the full impeller vanes but will be different in the time of occurrence of the pulses. It may be obvious (but nonetheless is mentioned for completeness) that the pressures occur at different spatial positions (i.e the partial vane pressures occur on the finite elements associated with the partial vanes). The difference in time portion of the loadings is a phase angle. Let T be equal to the time at which to interpolate the time loadings of Figure 4 and 5 (which are in terms of t). Then the interpolation for partial and second partial vanes is:

Partial Vane (phased ahead 30 degrees) --

$$T = t + 30 \text{ degrees}$$
$$= t + 30 \text{ degrees} - n * (360/13) \text{ degrees}$$

Second Partial at 15 degrees from full vane --

$$T = t + 15 \text{ degrees}$$
$$= t + 15 \text{ degrees} - n * (360/13) \text{ degrees}$$

Second Partial at 45 degrees from full vane --

$$T = t + 45 \text{ degrees}$$
$$= t + 45 \text{ degrees} - n * (360/13) \text{ degrees}$$

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Appendix D

DYNAMIC RESPONSE ANALYSIS RUNSTREAMS

TABLE of CONTENTS

Directory [FONG.SSME.IMP.OUT] Device: SAM_DISK

File	Type	Version	Date	Time
IMPD03	CRY	1	26-OCT-1988	06 52 43
IMPD1	CRY	2	27-OCT-1988	06 46 14
IMPD2	CRY	1	21-OCT-1988	08 36 13
IMPLLR	CRY	1	26-OCT-1988	06 46 44

```
JOB JN=IMPD03 CL=DEFERRD T=3600 MFL=2000000 US=663639
ACCOUNT AC=2 UPW=
*********************************************************
*  SSME IMPELLER MODELS - SYMMETRIC AND ANTISYMMETRIC   *
*********************************************************
FETCH DN=MESH DF=TR TEXT='DISKB [FERGUSON.CEXL3D2]MESH.CEX'
MESH
FETCH DN=BAND DF=TR TEXT='DISKB [FERGUSON.CEXL3D2]BAND.CEX'
BAND
FETCH DN=SETUP DF=TR TEXT='DISKB [FERGUSON.CEXL3D2]SETUP.CEX'
SETUP
FETCH DN=MATL DF=TR TEXT='DISKB [FERGUSON.CEXL3D2]MATL.CEX'
MATL
FETCH DN=MASS DF=TR TEXT='DISKB [FERGUSON.CEXL3D2]MASS.CEX'
MASS
FETCH DN=LOAD DF=TR TEXT='DISKB [FERGUSON.CEXL3D2]LOAD.CEX'
LOAD
FETCH DN=SOLVE DF=TR TEXT='DISKB [FERGUSON.CEXL3D2]SOLVE.CEX'
SOLVE
FETCH DN=EIGEN DF=TR TEXT='DISKB [FERGUSON.CEXL3D1]EIGEN.CEX'
EIGEN
FETCH DN=UTILITY DF=TR TEXT='DISKB [FERGUSON.CEXL3D2]UTILITY.CEX'
UTILITY
DISPOSE DN=FT07 TEXT='DISK6 [FONG]IMPD03PRA.PUN'
DISPOSE DF=TR DN=FIL003 TEXT='DISKL [FONG]IMPD03.FL3'
BAD
EXIT
SAVE DN=FIL002 PDN=IMPD03 ID=FONG UQ
DISPOSE DF=TR DN=FIL002 TEXT='DISKL [FONG]IMPD03.FL2'
/EOF
$MESH
CLEAR 500000
MAX/MXPO=1500 15000 7000
ELTYPE 4 2 3

HEAD    1 'SSME IMPELLER MODEL
HEAD    2 'SYMMETRIC AND ANTISYMMETRIC MESHES

ASSIGN IPNO=0 IPLC=0 IPSK=0 IPEL=0 IPC0=0
*MESH POINT FROM CADAM      WAL-SSME-HUB  FEM14
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IUPOINT    3    -5    1    3 2316    4 9064    -3.6254
IUPOINT    4    -5    1    1 8508    5 5759    -3.6254
IUPOINT    5    -5    1    0 3380    5 8653    -3.6254
IUPOINT    6    -5    3    5 0396    2 4557    -3.6379
IUPOINT    7    -5    3    4 3617    3 5218    -3.6379
IUPOINT    8    -5    3    3 3006    4 5315    -3.6379
IUPOINT    9    -5    3    2 0165    5 2308    -3.6379
IUPOINT   10    -5    3    0 5963    5 5743    -3.6379
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IUPOINT   13    -5    5    3 3604    4 1464    -3.6504
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IUPOINT   18    -5    7    3 4157    3 7443    -3.6630
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IJPOINT	1153	5	1	2.0839	5.4930	-2.7190
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IJPOINT	1162	5	5	3.6895	3.9268	-2.6822
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IJPOINT	1186	5	15	4.2009	1.3237	-2.4830
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IJPOINT	1198	5	19	3.1096	2.6519	-2.3525
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IJPOINT 1421     3      9
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IJPOINT 1431     3     13
IJPOINT 1436     3     15
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IJPOINT 1446     3     19
IJPOINT 1451     3     21
IJPOINT 1456     3     23
IJPOINT 1461     3     25
IJPOINT 1466     3     27
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IJPOINT 1476        3       31
IJPOINT 1481        3       33
IJPOINT 1486        3       36
IJPOINT 1491        3       39
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#HUB
#MESH 1
MSYS 1
SLINES 1T91B5 330 245 308 240T155B-5 1 86 240 31 185
IJGRID 1
SLINES 2T92B5 331 246 309 241T156B-5 2 87 241 32 186
RULE 5 1
IJNAME 240 308       LOW HUB
IJNAME 155 240       LOW HUB
IJSOLID  0 0 1
IJSOLID 455 160 1 SO 0 PRES  A HUB
IJSOLID 460 165 1 SO 0 PRES  B HUB
IJSOLID 465 170 1 SO 0 PRES  C HUB
IJSOLID 470 175 1 SO 0 PRES  D HUB
IJSOLID 475 180 1 SO 0 PRES  E HUB
IJSOLID 480 185 1 SO 0 PRES  F HUB
IJSOLID 485 190 1 SO 0 PRES  G HUB
IJSOLID 490 195 1 SO 0 PRES  H HUB
IJSOLID 495 200 1 SO 0 PRES  I HUB
IJSOLID 500 205 1 SO 0 PRES  J HUB
IJSOLID 505 210 1 SO 0 PRES  K HUB
IJSOLID 510 215 1 SO 0 PRES  L HUB
IJSOLID 515 220 1 SO 0 PRES  M HUB
IJSOLID 520 225 1 SO 0 PRES  N HUB
IJSOLID 525 230 1 SO 0 PRES  O HUB
IJSOLID 530 235 1 SO 0 PRES  P HUB
IJSOLID 535 240 1 SO 0 PRES  Q HUB
IJSOLID 240 608 1 SO 0 PRES  R HUB
IJSOLID   1 540 1 SO 0 PRES  S HUB
KNAME 0 0 1 1 SIDE ONE BOT
MESH 3
#MESH 2
MSYS 1
SLINES 2T32B5 186T156B-5 2
IJGRID 1
SLINES 106T112 266T260B-1 106
RULE 3 1
IJSOLID  0 0 1
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MESH 3
MERGE MESH 1
#MESH 3
MSYS 1
SLINES 106T112 37T92B5 331 246 309 241T191B-5 266T260B-1 106 87 241
SLINES 112 266
IJGRID 1
SLINES 3T93B5 332 247 310 242T157B-5 3 88 242 217 63
RULE 5 1
IJNAME 240 308       LOW HUB
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IJNAME 155 240       LOW HUB
IJSOLID  0 0 1
IJSOLID 455 160 1 SO 0 PRES  A HUB
IJSOLID 460 165 1 SO 0 PRES  B HUB
IJSOLID 465 170 1 SO 0 PRES  C HUB
IJSOLID 470 175 1 SO 0 PRES  D HUB
IJSOLID 475 180 1 SO 0 PRES  E HUB
IJSOLID 480 185 1 SO 0 PRES  F HUB
IJSOLID 485 190 1 SO 0 PRES  G HUB
IJSOLID 490 195 1 SO 0 PRES  H HUB
IJSOLID 495 200 1 SO 0 PRES  I HUB
IJSOLID 500 205 1 SO 0 PRES  J HUB
IJSOLID 505 210 1 SO 0 PRES  K HUB
IJSOLID 510 215 1 SO 0 PRES  L HUB
IJSOLID 515 220 1 SO 0 PRES  M HUB
IJSOLID 520 225 1 SO 0 PRES  N HUB
IJSOLID 525 230 1 SO 0 PRES  O HUB
IJSOLID 530 235 1 SO 0 PRES  P HUB
IJSOLID 535 240 1 SO 0 PRES  Q HUB
IJSOLID 240 608 1 SO 0 PRES  R HUB
IJSOLID   1 540 1 SO 0 PRES  S HUB
MESH 3
MERGE MESH 1 2
#MESH 4
MSYS 1
SLINES 3T63B5 217T157B-5 3
IJGRID 1
SLINES 113T125 279T267B-1 113
RULE 3 1
IJSOLID  0 0 1
IJSOLID   1 515 1 SO 0 PRES  S HUB
MESH 3
MERGE MESH 3
#MESH 5
MSYS 1
SLINES 113T125 68T93B5 332 247 310 242T222B-5 279T267B-1 113 125 279 88 242
IJGRID 1
SLINES 4T94B5 333 248 311 243T158B-5 4 89 243 188 34
RULE 5 1
IJNAME 240 308       LOW HUB
IJNAME 155 240       LOW HUB
IJSOLID  0 0 1
IJSOLID 455 160 1 SO 0 PRES  A HUB
IJSOLID 460 165 1 SO 0 PRES  B HUB
IJSOLID 465 170 1 SO 0 PRES  C HUB
IJSOLID 470 175 1 SO 0 PRES  D HUB
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IJSOLID 485 190 1 SO 0 PRES  G HUB
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IJSOLID 495 200 1 SO 0 PRES  I HUB
IJSOLID 500 205 1 SO 0 PRES  J HUB
IJSOLID 505 210 1 SO 0 PRES  K HUB
IJSOLID 510 215 1 SO 0 PRES  L HUB
IJSOLID 515 220 1 SO 0 PRES  M HUB
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 * IMPD03 CRY;1          Directory SAM_DISK [FONG.SSME.IMP.OUT]                    22-NOV-88 06:47  Pag

IUSOLID 520 225 1 SO 0 PRES  N HUB
IUSOLID 525 230 1 SO 0 PRES  O HUB
IUSOLID 530 235 1 SO 0 PRES  P HUB
IUSOLID 535 240 1 SO 0 PRES  Q HUB
IUSOLID 240 608 1 SO 0 PRES  R HUB
IUSOLID   1 540 1 SO 0 PRES  S HUB
MESH 3
MERGE MESH 3 4
#MESH 6
MSYS 1
SLINES 4T34B5 188T158B-5 4
IUGRID 1
SLINES 126T132 286T280B-1 126
RULE 3 1
IUSOLID  0 0 1
IUSOLID   1 485 1 SO 0 PRES  S HUB
MESH 3
MERGE MESH 5
#MESH 7
MSYS 1
SLINES 126T132 39T94B5 333 248 311 243T193B-5 286T280B-1 126
SLINES 88 243 132 286
IUGRID 1
SLINES 5T95B5 334 249 312 244T159B-5 5 90 244
RULE 5 1
IUNAME 240 308      LOW HUB
IUNAME 155 240      LOW HUB
IUSOLID  0 0 1
IUSOLID 455 160 1 SO 0 PRES  A HUB
IUSOLID 460 165 1 SO 0 PRES  B HUB
IUSOLID 465 170 1 SO 0 PRES  C HUB
IUSOLID 470 175 1 SO 0 PRES  D HUB
IUSOLID 475 180 1 SO 0 PRES  E HUB
IUSOLID 480 185 1 SO 0 PRES  F HUB
IUSOLID 485 190 1 SO 0 PRES  G HUB
IUSOLID 490 195 1 SO 0 PRES  H HUB
IUSOLID 495 200 1 SO 0 PRES  I HUB
IUSOLID 500 205 1 SO 0 PRES  J HUB
IUSOLID 505 210 1 SO 0 PRES  K HUB
IUSOLID 510 215 1 SO 0 PRES  L HUB
IUSOLID 515 220 1 SO 0 PRES  M HUB
IUSOLID 520 225 1 SO 0 PRES  N HUB
IUSOLID 525 230 1 SO 0 PRES  O HUB
IUSOLID 530 235 1 SO 0 PRES  P HUB
IUSOLID 535 240 1 SO 0 PRES  Q HUB
IUSOLID 240 608 1 SO 0 PRES  R HUB
IUSOLID   1 540 1 SO 0 PRES  S HUB
MESH 3
MERGE MESH 5 6
#MESH 8
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SLINES 5T95B5 334 249 312 244T159B-5 5 90 244
IUGRID 1
SLINES 133T151 335 305 313 304T287B-1 133 150 304
RULE 3 1
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 * IMPD03 CRY;1          Directory SAM_DISK [FONG.SSME.IMP.OUT]                    22-NOV-88 06:47  Pag

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IUSOLID   1 540 1 SO 0 PRES  S HUB
KNAME 0 0 3 3 SIDE TWO BOT
MESH 3
MERGE MESH 7
#SHROUD
#MESH 9
MSYS 1
SLINES 1091 1357T1265B-6 1210T1150B-5 1001T1086B5
PLINE 1086 1096 1091
IUGRID 1
SLINES 1092 1358T1266B-6 1211T1151B-5 1002T1087B5 1032 1181
PLINE 1087 1097 1092
RULE 5 1
IUNAME 1001 1091      HIGH SHRD
IUSOLID  0 0 1
IUSOLID 1001 1406 1 SO 0 PRES  A SHRD
IUSOLID 1006 1411 1 SO 0 PRES  B SHRD
IUSOLID 1011 1416 1 SO 0 PRES  C SHRD
IUSOLID 1016 1421 1 SO 0 PRES  D SHRD
IUSOLID 1021 1426 1 SO 0 PRES  E SHRD
IUSOLID 1026 1431 1 SO 0 PRES  F SHRD
IUSOLID 1031 1436 1 SO 0 PRES  G SHRD
IUSOLID 1036 1441 1 SO 0 PRES  H SHRD
IUSOLID 1041 1446 1 SO 0 PRES  I SHRD
IUSOLID 1046 1451 1 SO 0 PRES  J SHRD
IUSOLID 1051 1456 1 SO 0 PRES  K SHRD
IUSOLID 1056 1461 1 SO 0 PRES  L SHRD
IUSOLID 1061 1466 1 SO 0 PRES  M SHRD
IUSOLID 1066 1471 1 SO 0 PRES  N SHRD
IUSOLID 1071 1476 1 SO 0 PRES  O SHRD
IUSOLID 1076 1481 1 SO 0 PRES  P SHRD
IUSOLID 1081 1486 1 SO 0 PRES  Q SHRD
IUSOLID 1086 1491 1 SO 0 PRES  R SHRD
IUSOLID 1401 1210 1 SO 0 PRES  S SHRD
KNAME 0 0 1 1 SIDE ONE TOP
MESH 1
#MESH 10
MSYS 1
SLINES 1181T1151B-5 1002T1032B5 1181
IUGRID 1
SLINES 1101T1107 1221T1215B-1 1101
RULE 3 1
IUSOLID  0 0 1
IUSOLID 1401 1221 1 SO 0 PRES  S SHRD
MESH 1
MERGE MESH 9
#MESH 11
MSYS 1
SLINES 1092 1358T1266B-6 1211T1186B-5 1221T1215B-1 1101T1107 1037T1087B5
SLINES 1107 1221
PLINE 1087 1097 1092
IUGRID 1
SLINES 1093 1359T1267B-6 1212T1152B-5 1003T1088B5 1212 1063
PLINE 1088 1098 1093
```

```
RULE 5 1
IJNAME 1001 1091 HIGH SHRD
IJSOLID 0 0 1
IJSOLID 1001 1406 1 SO 0 PRES A SHRD
IJSOLID 1006 1411 1 SO 0 PRES B SHRD
IJSOLID 1011 1416 1 SO 0 PRES C SHRD
IJSOLID 1016 1421 1 SO 0 PRES D SHRD
IJSOLID 1021 1426 1 SO 0 PRES E SHRD
IJSOLID 1026 1431 1 SO 0 PRES F SHRD
IJSOLID 1031 1436 1 SO 0 PRES G SHRD
IJSOLID 1036 1441 1 SO 0 PRES H SHRD
IJSOLID 1041 1446 1 SO 0 PRES I SHRD
IJSOLID 1046 1451 1 SO 0 PRES J SHRD
IJSOLID 1051 1456 1 SO 0 PRES K SHRD
IJSOLID 1056 1461 1 SO 0 PRES L SHRD
IJSOLID 1061 1466 1 SO 0 PRES M SHRD
IJSOLID 1066 1471 1 SO 0 PRES N SHRD
IJSOLID 1071 1476 1 SO 0 PRES O SHRD
IJSOLID 1076 1481 1 SO 0 PRES P SHRD
IJSOLID 1081 1486 1 SO 0 PRES Q SHRD
IJSOLID 1086 1491 1 SO 0 PRES R SHRD
IJSOLID 1401 1210 1 SO 0 PRES S SHRD
MESH 1
MERGE MESH 9 10
#MESH 12
MSYS 1
SLINES 1212T1152B-5 1003T1063B6 1212
IJGRID 1
SLINES 1222T1234 1121T1109B-1 1222
RULE 3 1
IJSOLID 0 0 1
IJSOLID 1401 1234 1 SO 0 PRES S SHRD
MESH 1
MERGE MESH 11
#MESH 13
MSYS 1
SLINES 1093 1359T1257B-6 1234T1222B-1 1109T1121B1 1068T1088B5 1234 1121
PLINE 1088 1098 1093
IJGRID 1
SLINES 1094 1360T1258B-6 1213T1153B-5 1004T1089B5 1034 1183
PLINE 1089 10[illegible] 1094
RULE 5 1
IJNAME 1001 1091 HIGH SHRD
IJSOLID 0 0 1
IJSOLID 1001 1406 1 SO 0 PRES A SHRD
IJSOLID 1006 1411 1 SO 0 PRES B SHRD
IJSOLID 1011 1416 1 SO 0 PRES C SHRD
IJSOLID 1016 1421 1 SO 0 PRES D SHRD
IJSOLID 1021 1426 1 SO 0 PRES E SHRD
IJSOLID 1026 1431 1 SO 0 PRES F SHRD
IJSOLID 1031 1436 1 SO 0 PRES G SHRD
IJSOLID 1036 1441 1 SO 0 PRES H SHRD
IJSOLID 1041 1446 1 SO 0 PRES I SHRD
IJSOLID 1046 1451 1 SO 0 PRES J SHRD
IJSOLID 1051 1456 1 SO 0 PRES K SHRD
```



```
IJSOLID 1056 1461 1 SO 0 PRES L SHRD
IJSOLID 1061 1466 1 SO 0 PRES M SHRD
IJSOLID 1066 1471 1 SO 0 PRES N SHRD
IJSOLID 1071 1476 1 SO 0 PRES O SHRD
IJSOLID 1076 1481 1 SO 0 PRES P SHRD
IJSOLID 1081 1486 1 SO 0 PRES Q SHRD
IJSOLID 1086 1491 1 SO 0 PRES R SHRD
IJSOLID 1401 1210 1 SO 0 PRES S SHRD
MESH 1
MERGE MESH 11 12
#MESH 14
MSYS 1
SLINES 1183T1153B-5 1004T1034B5 1183
IJGRID 1
SLINES 1122T1128 1241T1235B-1 1122
RULE 3 1
IJSOLID 0 0 1
IJSOLID 1401 1241 1 SO 0 PRES S SHRD
MESH 1
MERGE MESH 13
#MESH 15
MSYS 1
SLINES 1094 1360T1258B-6 1213T1188B-5 1241T1236B-1 1122T1128 1039T1089B5
SLINES 1128 1241
PLINE 1089 1099 1094
IJGRID 1
SLINES 1095 1361T1259B-6 1214T1154B-5 1005T1090B5
PLINE 1090 1100 1095
RULE 5 1
IJNAME 1001 1091 HIGH SHRD
IJSOLID 0 0 1
IJSOLID 1001 1406 1 SO 0 PRES A SHRD
IJSOLID 1006 1411 1 SO 0 PRES B SHRD
IJSOLID 1011 1416 1 SO 0 PRES C SHRD
IJSOLID 1016 1421 1 SO 0 PRES D SHRD
IJSOLID 1021 1426 1 SO 0 PRES E SHRD
IJSOLID 1026 1431 1 SO 0 PRES F SHRD
IJSOLID 1031 1436 1 SO 0 PRES G SHRD
IJSOLID 1036 1441 1 SO 0 PRES H SHRD
IJSOLID 1041 1446 1 SO 0 PRES I SHRD
IJSOLID 1046 1451 1 SO 0 PRES J SHRD
IJSOLID 1051 1456 1 SO 0 PRES K SHRD
IJSOLID 1056 1461 1 SO 0 PRES L SHRD
IJSOLID 1061 1466 1 SO 0 PRES M SHRD
IJSOLID 1066 1471 1 SO 0 PRES N SHRD
IJSOLID 1071 1476 1 SO 0 PRES O SHRD
IJSOLID 1076 1481 1 SO 0 PRES P SHRD
IJSOLID 1081 1486 1 SO 0 PRES Q SHRD
IJSOLID 1086 1491 1 SO 0 PRES R SHRD
IJSOLID 1401 1210 1 SO 0 PRES S SHRD
MESH 1
MERGE MESH 13 14
#MESH 16
MSYS 1
SLINES 1095 1361T1259B-6 1214T1154B-5 1005T1090B5
```

```
PLINE 1090 1100 1095
IJGRID 1
SLINES 1148 1362T1260B-6 1254T1242B-1 1130T1147
PLINE 1147 1149 1148
RULE 3 1
IJSOLID 0 0 1
IJSOLID 1401 1210 1 SO 0 PRES S SHRD
KNAME 0 0 3 3 SIDE TWO TOP
MESH 1
MERGE MESH 15
#VANES
#MESH 17
MSYS 1
SLINES 1002T1032B5 186T156B-5 1002
IJGRID 1
SLINES 1101T1107 266T260B-1 1101
RULE 3 1
REFINE 0 0 2 0
IJSOLID 0 0 1
IJSOLID 159 1010 1 SO 0 PRES A VAND
IJSOLID 164 1015 1 SO 0 PRES B VAND
IJSOLID 169 1020 1 SO 0 PRES C VAND
IJSOLID 174 1025 1 SO 0 PRES D VAND
IJSOLID 179 1030 1 SO 0 PRES E VAND
IJSOLID 184 1035 1 SO 0 PRES F VAND
MESH 3
MERGE MESH 1 2 9 10 17
#MESH 18
MSYS 1
SLINES 1003T1063B5 217T157B-5 1003
IJGRID 1
SLINES 1109T1121 279T267B-1 1109
RULE 3 1
REFINE 0 0 2 0
IJSOLID 0 0 1
IJSOLID 159 1010 1 SO 0 PRES A VANB
IJSOLID 164 1015 1 SO 0 PRES B VANB
IJSOLID 169 1020 1 SO 0 PRES C VANB
IJSOLID 174 1025 1 SO 0 PRES D VANB
IJSOLID 179 1030 1 SO 0 PRES E VANB
IJSOLID 184 1035 1 SO 0 PRES F VANB
IJSOLID 189 1040 1 SO 0 PRES G VANB
IJSOLID 194 1045 1 SO 0 PRES H VANB
IJSOLID 199 1050 1 SO 0 PRES I VANB
IJSOLID 204 1055 1 SO 0 PRES J VANB
IJSOLID 209 1060 1 SO 0 PRES K VANB
IJSOLID 214 1065 1 SO 0 PRES L VANB
MESH 3
MERGE MESH 3 4 11 12 18
#MESH 19
MSYS 1
SLINES 1004T1034B5 188T158B-5 1004
IJGRID 1
SLINES 1122T1128 286T280B-1 1122
RULE 3 1
```



```
REFINE 0 0 2 0
IJSOLID 0 0 1
IJSOLID 159 1010 1 SO 0 PRES A VANC
IJSOLID 164 1015 1 SO 0 PRES B VANC
IJSOLID 169 1020 1 SO 0 PRES C VANC
IJSOLID 174 1025 1 SO 0 PRES D VANC
IJSOLID 179 1030 1 SO 0 PRES E VANC
IJSOLID 184 1036 1 SO 0 PRES F VANC
MESH 3
MERGE MESH 5 6 13 14 19
#MESH 20
MSYS 1
SLINES 1005T1090B5 244T159B-5 1005
IJGRID 1
SLINES 1130T1147 304T287B-1 1130
RULE 3 1
REFINE 0 0 2 0
IJSOLID 0 0 1
IJSOLID 159 1010 1 SO 0 PRES A VANA
IJSOLID 164 1015 1 SO 0 PRES B VANA
IJSOLID 169 1020 1 SO 0 PRES C VANA
IJSOLID 174 1025 1 SO 0 PRES D VANA
IJSOLID 179 1030 1 SO 0 PRES E VANA
IJSOLID 184 1035 1 SO 0 PRES F VANA
IJSOLID 189 1040 1 SO 0 PRES G VANA
IJSOLID 194 1045 1 SO 0 PRES H VANA
IJSOLID 199 1050 1 SO 0 PRES I VANA
IJSOLID 204 1055 1 SO 0 PRES J VANA
IJSOLID 209 1060 1 SO 0 PRES K VANA
IJSOLID 214 1065 1 SO 0 PRES L VANA
IJSOLID 219 1070 1 SO 0 PRES M VANA
IJSOLID 224 1075 1 SO 0 PRES N VANA
IJSOLID 229 1080 1 SO 0 PRES O VANA
IJSOLID 234 1085 1 SO 0 PRES P VANA
IJSOLID 239 1090 1 SO 0 PRES Q VANA
MESH 3
MERGE MESH 7 8 15 16 20
#HUB CENTER
#MESH 21
SLINES 314T329 314 317 322 323 328 317
PRISM 5 3MO 3 12 341
PRISM 9 3MO 3 29 478
PRISM 13 3MO 3 42 341
PRISM 17 3MO 3 54 515
PRISM 19 3MO 3 59 515
IJSOLID 0 0 1
IJSOLID 326 336 1 SO 0 TORQ IPUT
IJSOLID 317 319 1 SO 0 TORQ OPUT
KNAME 322 322 1 1 TORQ
KNAME 324 325 2 18 AXIS SUPP HUB
KNAME 0 0 1 1 SIDE ONE HUB
KNAME 0 0 19 19 SIDE TWO HUB
MESH 3
ROTATE -149 515 3
MERGE MESH 1T8
```

```
# INSERT INTO MSET 11-14 FOR SYMMETRIC LOADING
MSET     11 COPY NAME PRES  A VANA
MSET     11 INSE NAME PRES  B VANA
MSET     12 COPY NAME PRES  A VANB
MSET     12 INSE NAME PRES  B VANB
MSET     13 COPY NAME PRES  A VANC
MSET     13 INSE NAME PRES  B VANC
MSET     14 COPY NAME PRES  A VAND
MSET     14 INSE NAME PRES  B VAND
#
NLIST 1 INSERT NAME SIDE ONE
NLIST 2 INSERT NAME SIDE TWO
#     MESH 22
#     SECOND IDENTICAL MODEL
DITTO    MESH 1T21
# INSERT INTO MSET 21-24 FOR ANTISYMMETRIC LOADING
MSET     21 COPY NAME PRES  A VANA
MSET     21 INSE NAME PRES  B VANA
MSET     21 DELE MSET 11
MSET     22 COPY NAME PRES  A VANB
MSET     22 INSE NAME PRES  B VANB
MSET     22 DELE MSET 12
MSET     23 COPY NAME PRES  A VANC
MSET     23 INSE NAME PRES  B VANC
MSET     23 DELE MSET 13
MSET     24 COPY NAME PRES  A VAND
MSET     24 INSE NAME PRES  B VAND
MSET     24 DELE MSET 14
#
NSET 3 COPY NAME SIDE ONE
NSET 3 DELE MESH 1T21
NSET 4 COPY NAME SIDE TWO
NSET 4 DELE MESH 1T21
NLIST 3 INSERT NSET 3
NLIST 4 INSERT NSET 4

#BOUNDARY CONDITIONS
SET SYNTAX ON
LET &ANG  = 60
GENSKEW 1 1 0 &ANG 0  1
NODSKEW SKEW 1 NLIST 2
NODSKEW SKEW 1 NLIST 4
LET &IFN1 = %IFL(NLST NV 0 1)
LET &IRN1 = %LFM(&IFN1 1)
LET &IFN2 = %IFL(NLST NV 0 2)
LET &IRN2 = %LFM(&IFN2 1)
LET &IFN3 = %IFL(NLST NV 0 3)
LET &IRN3 = %LFM(&IFN3 1)
LET &IFN4 = %IFL(NLST NV 0 4)
LET &IRN4 = %LFM(&IFN4 1)
DO  10 &I= 2000 1
  LET &N1  = %IBC1(&IRN1 &I)
  IF &N1  20  20  1
  LET &N2  = %IBC1(&IRN2 &I)
  LET &N3  = %IBC1(&IRN3 &I)
```



```
  LET &N4  = %IBC1(&IRN4 &I)
# IF C1 = -C2 SYMMETRIC-SYMMETRIC BC
  GENCON 2 &N1 &N2 1 1 -C1  1  -C2 -1  0  1 0E9
  GENCON 2 &N1 &N2 2 2 -C1  1  -C2 -1  0  1 0E9
  GENCON 2 &N1 &N2 3 3 -C1  1  -C2 -1  0  1 0E9
# IF C1 =  C2 ANTISYMMETRIC-ANTISYMMETRIC BC
  GENCON 2 &N3 &N4 1 1  C1  1  -C2  1  0  1 0E9
  GENCON 2 &N3 &N4 2 2  C1  1  -C2  1  0  1 0E9
  GENCON 2 &N3 &N4 3 3  C1  1  -C2  1  0  1 0E9
  10 NOP
  20 NOP
LET &IRM4 = %RFM(&IFN4 1 0 &IRN4)
LET &IRM3 = %RFM(&IFN3 1 0 &IRN3)
LET &IRM2 = %RFM(&IFN2 1 0 &IRN2)
LET &IRM1 = %RFM(&IFN1 1 0 &IRN1)
NSET 10 COPY FREQ 0 0 NAME TORQ IPUT
NSET 10 INSERT FREQ 0 0 NAME TORQ OPUT
NSET 10 DELETE NAME SIDE TWO
NLIST 10 INSERT NSET 10
LET &IFN1 = %IFL(NLST NV 0 10)
LET &IRN1 = %LFM(&IFN1 1)
DO  30 &I=1 2000 1
  LET &N1  = %IBC1(&IRN1 &I)
  IF &N1  40  40  1
  LET &X = %XN(&N1 1)
  LET &Y = %XN(&N1 2)
  LET &XY = &X  &Y
  GENCON 2 &N1 &N1 1 2 -C1 -1  _C2 &XY 0  1 0E9
  30 NOP
  40 NOP
LET &IRM1 = %RFM(&IFN1 1 0 &IRN1)
SET SYNTAX OFF
#
# SUPPRESS TOP EDGE OF HUB IN AXIAL DIRECTION
DOFSUP 3 NAME AXIS SUPP HUB
#
DOFLOO
FINISH
STOP
$BAND
START -1
REQPS
BAND
STOP
$SETUP
START 500000
SETUP
STOP
$MATL
START 500000
MATISO 1 15 5E6  36  # UNKNOWN MATERIAL
DENSITY 1   0004196  # DENSITY IN SNAILS   LB/386.088 * SNAILS
MATL
STOP
$MASS
```

```
START 500000
MASS 0 # LUMP MASS NEEDED FOR BODY FORCE IN LOAD
STOP
$ LOAD
START   500000
SET     SYNTAX ON
$ ***************************************************************************
$                           INPUT VARIABLES
$ ***************************************************************************
$
LET     &RPM = 37342      $ FREQUENCY IN RPM
LET     &VANE = 13        $ NUMBER OF VANES
LET     &SEGM = 6         $ NUMBER OF SEGMENTS
LET     &RATI = 3         $ RATIO ON UNLOAD TIME TO LOAD TIME
LET     &PRES = -24       $ PRESSURE ON VANES (PSI)
$
$ ***************************************************************************
$
$ SYMMETRY
DATA    &A1(1)   0 16667 $ MAX AMPLITUDE SEGMENT "1" (FULL VANE)
DATA    &A1(2)   0 16667 $ MAX AMPLITUDE SEGMENT "6" (FULL VANE)
DATA    &A1(3)   0 16667 $ MAX AMPLITUDE SEGMENT "5" (FULL VANE)
DATA    &A1(4)   0 16667 $ MAX AMPLITUDE SEGMENT "4" (FULL VANE)
DATA    &A1(5)   0 16667 $ MAX AMPLITUDE SEGMENT "3" (FULL VANE)
DATA    &A1(6)   0 16667 $ MAX AMPLITUDE SEGMENT "2" (FULL VANE)
$
DATA    &B1(1)   0 16667 $ MAX AMPLITUDE SEGMENT "6" (1ST PARTIAL VANE)
DATA    &B1(2)   0 16667 $ MAX AMPLITUDE SEGMENT "5" (1ST PARTIAL VANE)
DATA    &B1(3)   0 16667 $ MAX AMPLITUDE SEGMENT "4" (1ST PARTIAL VANE)
DATA    &B1(4)   0 16667 $ MAX AMPLITUDE SEGMENT "3" (1ST PARTIAL VANE)
DATA    &B1(5)   0 16667 $ MAX AMPLITUDE SEGMENT "2" (1ST PARTIAL VANE)
DATA    &B1(6)   0 16667 $ MAX AMPLITUDE SEGMENT "1" (1ST PARTIAL VANE)
$
DATA    &C1(1)   0 16667 $ MAX AMPLITUDE SEGMENT "3" (2ND PARTIAL VANE - A)
DATA    &C1(2)   0 16667 $ MAX AMPLITUDE SEGMENT "2" (2ND PARTIAL VANE - A)
DATA    &C1(3)   0 16667 $ MAX AMPLITUDE SEGMENT "1" (2ND PARTIAL VANE - A)
DATA    &C1(4)   0 16667 $ MAX AMPLITUDE SEGMENT "6" (2ND PARTIAL VANE - A)
DATA    &C1(5)   0 16667 $ MAX AMPLITUDE SEGMENT "5" (2ND PARTIAL VANE - A)
DATA    &C1(6)   0 16667 $ MAX AMPLITUDE SEGMENT "4" (2ND PARTIAL VANE - A)
$
DATA    &D1(1)   0 16667 $ MAX AMPLITUDE SEGMENT "3" (2ND PARTIAL VANE - B)
DATA    &D1(2)   0 16667 $ MAX AMPLITUDE SEGMENT "2" (2ND PARTIAL VANE - B)
DATA    &D1(3)   0 16667 $ MAX AMPLITUDE SEGMENT "1" (2ND PARTIAL VANE - B)
DATA    &D1(4)   0 16667 $ MAX AMPLITUDE SEGMENT "6" (2ND PARTIAL VANE - B)
DATA    &D1(5)   0 16667 $ MAX AMPLITUDE SEGMENT "5" (2ND PARTIAL VANE - B)
DATA    &D1(6)   0 16667 $ MAX AMPLITUDE SEGMENT "4" (2ND PARTIAL VANE - B)
$
$ ANTISYMMETRY
DATA    &A2(1)   0 16667 $ MAX AMPLITUDE SEGMENT "1" (FULL VANE)
DATA    &A2(2)  -0 16667 $ MAX AMPLITUDE SEGMENT "6" (FULL VANE)
DATA    &A2(3)   0 16667 $ MAX AMPLITUDE SEGMENT "5" (FULL VANE)
DATA    &A2(4)  -0 16667 $ MAX AMPLITUDE SEGMENT "4" (FULL VANE)
DATA    &A2(5)   0 16667 $ MAX AMPLITUDE SEGMENT "3" (FULL VANE)
DATA    &A2(6)  -0 16667 $ MAX AMPLITUDE SEGMENT "2" (FULL VANE)
$
```



```
DATA    &B2(1)  -0 16667 $ MAX AMPLITUDE SEGMENT "6" (1ST PARTIAL VANE)
DATA    &B2(2)   0 16667 $ MAX AMPLITUDE SEGMENT "5" (1ST PARTIAL VANE)
DATA    &B2(3)  -0 16667 $ MAX AMPLITUDE SEGMENT "4" (1ST PARTIAL VANE)
DATA    &B2(4)   0 16667 $ MAX AMPLITUDE SEGMENT "3" (1ST PARTIAL VANE)
DATA    &B2(5)  -0 16667 $ MAX AMPLITUDE SEGMENT "2" (1ST PARTIAL VANE)
DATA    &B2(6)   0 16667 $ MAX AMPLITUDE SEGMENT "1" (1ST PARTIAL VANE)
$
DATA    &C2(1)   0 16667 $ MAX AMPLITUDE SEGMENT "3" (2ND PARTIAL VANE - A)
DATA    &C2(2)  -0 16667 $ MAX AMPLITUDE SEGMENT "2" (2ND PARTIAL VANE - A)
DATA    &C2(3)   0 16667 $ MAX AMPLITUDE SEGMENT "1" (2ND PARTIAL VANE - A)
DATA    &C2(4)  -0 16667 $ MAX AMPLITUDE SEGMENT "6" (2ND PARTIAL VANE - A)
DATA    &C2(5)   0 16667 $ MAX AMPLITUDE SEGMENT "5" (2ND PARTIAL VANE - A)
DATA    &C2(6)  -0 16667 $ MAX AMPLITUDE SEGMENT "4" (2ND PARTIAL VANE - A)
$
DATA    &D2(1)   0 16667 $ MAX AMPLITUDE SEGMENT "3" (2ND PARTIAL VANE - B)
DATA    &D2(2)  -0 16667 $ MAX AMPLITUDE SEGMENT "2" (2ND PARTIAL VANE - B)
DATA    &D2(3)   0 16667 $ MAX AMPLITUDE SEGMENT "1" (2ND PARTIAL VANE - B)
DATA    &D2(4)  -0 16667 $ MAX AMPLITUDE SEGMENT "6" (2ND PARTIAL VANE - B)
DATA    &D2(5)   0 16667 $ MAX AMPLITUDE SEGMENT "5" (2ND PARTIAL VANE - B)
DATA    &D2(6)  -0 16667 $ MAX AMPLITUDE SEGMENT "4" (2ND PARTIAL VANE - B)
$
$ CALCULATE FORCE TIME HISTORIES
$
LET     &FREQ = &RPM / 60         $ FREQUENCY IN HZ
LET     &T = 1 / &FREQ            $ PERIOD IN SECS
LET     &TV = &T / &VANE          $ PERIOD FOR ONE VANE
LET     &TS = &TV / &SEGM         $ PERIOD FOR ONE SEGMENT BETWEEN VANES
$
LET     &TOF1 = &TS * 0
LET     &TOF2 = &TS * 0.50
LET     &TOF3 = &TS * 0.75
LET     &TOF4 = &TS * 0.25
$
LET     &TB = &TS / &RATI         $ LOADING & UNLOADING TIME
LET     &TA = &TB / 2             $ LOADING TIME
LET     &NSEG = %IFIX(&SEGM)
$
STORE   1                         $ SAVE TIME VARIABLES FOR SOLVE PROCESSOR
$
LET     &LC0 = 25                 $ LOAD CASE ZERO (25) = ZERO LOADS
LCASE   &LC0
P       0 3 NODE=1
$
$
LTCASE  1                         $ FULL VANE
DO .10 &I = 1 &NSEG 1             $ LOOP THROUGH NUMBER OF SEGMENTS
LCASE   &I
LET     &P1 = &PRES * &A1(&I)     $ ACTUAL PRESSURE ON SYMMETRY
LET     &P2 = &PRES * &A2(&I)     $ ACTUAL PRESSURE ON ANTISYMMETRY
PSURF   &P1 1 3 MSET 11           $ SYMMETRY
PSURF   &P2 1 3 MSET 21           $ ANTISYMMETRY
LET     &N = &I - 1               $ TIME INCREMENT FOR LOOPS
LET     &TINC = %FLOA(&N) * &TS
$
LET     &LC1 = &I
```

```
LET     &T1 = &TOF1 + &TINC
LET     &T2 = &TA + &TOF1 + &TINC
LET     &T3 = &TB + &TOF1 + &TINC
$
$                                       F
LTIME   &LC0 &T1                $      /\      /\
LTIME   &LC1 &T2                $     /  \____/  \____/
LTIME   &LC0 &T3                $ 0 1 2 3      4
$                                  <---TINC---->
 10     NOP
LTIME   &LC0 &TV                $ FINAL LOAD = 0
$
$
LTCASE  2                       $ 1ST PARTIAL VANE
LTIME   &LC0 0                  $ INITIAL LOAD = 0
DO  20 &I = 1 &NSEG 1           $ LOOP THROUGH NUMBER OF SEGMENTS
        &IC = &NSEG + &I
ELSE
        &IC = &I
LET     &P1 = &PRES * &B1(&I)   $ ACTUAL PRESSURE ON SYMMETRY
LET     &P2 = &PRES * &B2(&I)   $ ACTUAL PRESSURE ON ANTISYMMETRY
PSURF   &P1 1 3 MSET 12         $ SYMMETRY
PSURF   &P2 1 3 MSET 22         $ ANTISYMMETRY
LET     &N = &I - 1             $ TIME INCREMENT FOR LOOPS
LET     &TINC = %FLOA(&N) * &TS
$
LET     &LC1 = &IC
LET     &T1 = &TOF2 + &TINC
LET     &T2 = &TA + &TOF2 + &TINC
LET     &T3 = &TB + &TOF2 + &TINC
$
$                                       F
LTIME   &LC0 &T1                $      /\      /\
LTIME   &LC1 &T2                $     /  \____/  \____/
LTIME   &LC0 &T3                $ 0 1 2 3      4
$                                  <---TINC---->
 20     NOP
LTIME   &LC0 &TV                $ FINAL LOAD = 0
$
$
LTCASE  3                       $ 2ND PARTIAL VANE (A)
$
LET     &LC26 = 26              $ FIRST AND LAST LOAD CASES FOR LTCASE 3
LCASE   &LC26
LET     &P1 = &PRES * &C1(6) / 2        $ ACTUAL PRESSURE ON SYMMETRY
LET     &P2 = &PRES * &C2(6) / 2        $ ACTUAL PRESSURE ON ANTISYMMETRY
LET     &TS12 = &TS / 12        $ TIME AT END OF INITIAL LOAD CASE
PSURF   &P1 1 3 MSET 13         $ SYMMETRY
PSURF   &P2 1 3 MSET 23         $ ANTISYMMETRY
$
$
LTIME   &LC26 0                 $ INITIAL LOAD
LTIME   &LC0  &TS12
$
DO  30 &I = 1 &NSEG 1           $ LOOP THROUGH NUMBER OF SEGMENTS
LET     &IC = 2 * &NSEG + &I
```



```
LCASE   &IC
LET     &P1 = &PRES * &C1(&I)   $ ACTUAL PRESSURE ON SYMMETRY
LET     &P2 = &PRES * &C2(&I)   $ ACTUAL PRESSURE ON ANTISYMMETRY
PSURF   &P1 1 3 MSET 13         $ SYMMETRY
PSURF   &P2 1 3 MSET 23         $ ANTISYMMETRY
LET     &N = &I - 1             $ TIME INCREMENT FOR LOOPS
LET     &TINC = %FLOA(&N) * &TS
$
LET     &LC1 = &IC
LET     &T1 = &TOF3 + &TINC
LET     &T2 = &TA + &TOF3 + &TINC
LET     &T3 = &TB + &TOF3 + &TINC
$
$                                       F
LTIME   &LC0 &T1                $      /\      /\
LTIME   &LC1 &T2                $     /  \____/  \____/\
IF      &T3-&TV 1 1 ;31         $ 0 1 2 3      4
LTIME   &LC0 &T3                $   <---TINC---->
$
 30     NOP
GOTO    ;32
 31     CONTINUE
$
LTIME   &LC26 &TV               $ FINAL LOAD
 32     CONTINUE
$
$
LTCASE  4                       $ 2ND PARTIAL VANE (B)
LTIME   &LC0 0                  $ INITIAL LOAD = 0
DO  40 &I = 1 &NSEG 1           $ LOOP THROUGH NUMBER OF SEGMENTS
LET     &IC = 3 * &NSEG + &I
LCASE   &IC
LET     &P1 = &PRES * &D1(&I)   $ ACTUAL PRESSURE ON SYMMETRY
LET     &P2 = &PRES * &D2(&I)   $ ACTUAL PRESSURE ON ANTISYMMETRY
PSURF   &P1 1 3 MSET 14         $ SYMMETRY
PSURF   &P2 1 3 MSET 24         $ ANTISYMMETRY
LET     &N = &I - 1             $ TIME INCREMENT FOR LOOPS
LET     &TINC = %FLOA(&N) * &TS
$
LET     &LC1 = &IC
LET     &T1 = &TOF4 + &TINC
LET     &T2 = &TA + &TOF4 + &TINC
LET     &T3 = &TB + &TOF4 + &TINC
$
$                                       F
LTIME   &LC0 &T1                $      /\      /\
LTIME   &LC1 &T2                $     /  \____/  \____/
LTIME   &LC0 &T3                $ 0 1 2 3      4
$                                  <---TINC---->
 40     NOP
LTIME   &LC0 &TV                $ FINAL LOAD = 0
$
$
$ LOAD CASES 27-34 FOR MTVECT IN EIGEN PROCESSOR
$
```

```
 * IMPD03.CRY;1        Directory SAM_DISK:[FONG.SSME.IMP.OUT]                22-NOV-88 06:47  Pa
LCASE    27
PSURF    1  1 3 MSET 11
LCASE    28
PSURF    1  1 3 MSET 12
LCASE    29
PSURF    1  1 3 MSET 13
LCASE    30
PSURF    1  1 3 MSET 14
LCASE    31
PSURF    1  1 3 MSET 21
LCASE    32
PSURF    1  1 3 MSET 22
LCASE    33
PSURF    1  1 3 MSET 23
LCASE    34
PSURF    1  1 3 MSET 24
$
$
ASSIGN  IPLT=2                  $ PRINTOUT LOAD TIME HISTORY
$
LOAD
STOP
$SOLVE
START    500000
EIGEN 1
SOLVE
STOP
$EIGEN
START    1500000 2500
ASSIGN  RAT=1.001 ISL=LAN
MODES     50000
EIGEN    DIAG
MTVECT     27T34
LOADPF
STOP
$UTILITY
START 200000
#
COPY MATL EV  ? ? [3]    COPY ELEM EV ? ? [3]
COPY INTO EV  ? ? [3]    COPY X NV ? ? [3]
COPY NORM NV  ? ? [3]    COPY RDF NV ? ? [3]
COPY ROT NV   ? ? [3]    COPY DOF NV ? ? [3]
COPY IR NV    ? ? [3]    COPY IER EV ? ? [3]
COPY LCS NV   ? ? [3]    COPY SKEW NV ? ? [3]
COPY SOF NV   ? ? [3]    COPY NAME NV ? ? [3]
COPY NAME EV  ? ? [3]    COPY CON_CON 0 ? [3]
COPY MESH HED 0 ? [3]    COPY NLST NV 0 ? [3]
COPY CON RM DIR ? ? [3]  COPY NSET NV 0 ? [3]
COPY PCT HED ? ? ? [3]   COPY SYS CRM ? ? [3]
COPY MLIB MLIB ? ? [3]   COPY UL NV 0  ? [3]
COPY UL SV 0  ? [3]      COPY VIBE SV 0 ? [3]
#
COPY EV RV ? ? [3]
COPY LTH CRM ? ? [3]
COPY LMPF RV ? ? [3]
```

```
 * IMPD03.CRY;1        Directory SAM_DISK:[FONG.SSME.IMP.OUT]                22-NOV-88 06:47  Pag
#
BCDOUT/EXTEND 7 EV RV ? ?
BCDOUT/EXTEND 7 LTH CRM ? ?
BCDOUT/EXTEND 7 LMPF RV ? ?
#
STOP
/EOF
```

```
JOB JN=IMPD1 T=7200 CL=DEFERRD MFL=2000000 US=658767
ACCOUNT AC=1 UPW=
*************************************************************
*  SSME IMPELLER MODELS - 1ST DEGENERATE - COSINE & SINE    *
*************************************************************
FETCH DN=MESH DF=TR TEXT='DISK8:[FERGUSON.CEXL3D2]MESH.CEX'
MESH
FETCH DN=BAND DF=TR TEXT='DISK8:[FERGUSON.CEXL3D2]BAND.CEX'
BAND
FETCH DN=SETUP DF=TR TEXT='DISK8:[FERGUSON.CEXL3D2]SETUP.CEX'
SETUP
FETCH DN=MATL DF=TR TEXT='DISK8:[FERGUSON.CEXL3D2]MATL.CEX'
MATL
FETCH DN=MASS DF=TR TEXT='DISK8:[FERGUSON.CEXL3D2]MASS.CEX'
MASS
FETCH DN=LOAD DF=TR TEXT='DISK8:[FERGUSON.CEXL3D2]LOAD.CEX'
LOAD
FETCH DN=SOLVE DF=TR TEXT='DISK8:[FERGUSON.CEXL3D2]SOLVE.CEX'
SOLVE
FETCH DN=EIGEN DF=TR TEXT='DISK8:[FERGUSON.CEXL3D1]EIGEN.CEX'
EIGEN
FETCH DN=UTILITY DF=TR TEXT='DISK8:[FERGUSON.CEXL3D2]UTILITY.CEX'
UTILITY
DISPOSE DN=FT07 TEXT='DISK6:[KPOOL]IMPD1PRA.PUN'
DISPOSE DF=TR DN=FIL003 TEXT='DISK6:[KPOOL]IMPD1.FL3'
BAD
EXIT
SAVE DN=FIL002 PDN=IMPD1 ID=KPOOL UQ
  EOF
$MESH
CLEAR 500000
MAX/MXPO=1500 15000 7000
ELTYPE 4 2 3
HEAD    1 'SSME IMPELLER MODEL
HEAD    2 '1ST DEGENERATE MESHES (COSINE SINE)
ASSIGN IPNO=0 IPLC=0 IPSK=0 IPEL=0 IPCO=0
#MESH POINT FROM CADAM      WAL-SSME-HUB  FEM14
IUPOINT    1    -5    1    5.2111    2.7129    -3.6254
IUPOINT    2    -5    1    4.3907    3.9035    -3.6254
IUPOINT    3    -5    1    3.2316    4.9064    -3.6254
IUPOINT    4    -5    1    1.8508    5.5759    -3.6254
IUPOINT    5    -5    1    0.3380    5.8653    -3.6254
IUPOINT    6    -5    3    5.0396    2.4557    -3.6379
IUPOINT    7    -5    3    4.3617    3.5218    -3.6379
IUPOINT    8    -5    3    3.3006    4.5315    -3.6379
IUPOINT    9    -5    3    2.0165    5.2308    -3.6379
IUPOINT   10    -5    3    0.5963    5.5743    -3.6379
IUPOINT   11    -5    5    4.9716    2.1801    -3.6504
IUPOINT   12    -5    5    4.3232    3.1298    -3.6504
IUPOINT   13    -5    5    3.3604    4.1464    -3.6504
IUPOINT   14    -5    5    2.1791    4.8721    -3.6504
IUPOINT   15    -5    5    0.8458    5.2697    -3.6504
IUPOINT   16    -5    7    4.7009    1.8942    -3.6630
IUPOINT   17    -5    7    4.2684    2.7327    -3.6630
IUPOINT   18    -5    7    3.4157    3.7443    -3.6630
```



```
IUPOINT   19    -5    7    2.3302    4.5007    -3.6630
IUPOINT   20    -5    7    1.0814    4.9493    -3.6630
IUPOINT   21    -5    9    4.5272    1.5928    -3.6755
IUPOINT   22    -5    9    4.1718    2.3725    -3.6755
IUPOINT   23    -5    9    3.4484    3.3379    -3.6755
IUPOINT   24    -5    9    2.4267    4.1405    -3.6755
IUPOINT   25    -5    9    1.3159    4.6153    -3.6755
IUPOINT   26    -5   11    4.3536    1.2559    -3.6880
IUPOINT   27    -5   11    4.0375    2.0564    -3.6880
IUPOINT   28    -5   11    3.4431    2.9454    -3.6880
IUPOINT   29    -5   11    2.4694    3.7997    -3.6880
IUPOINT   30    -5   11    1.5078    4.2728    -3.6880
IUPOINT   31    -5   13    4.1603    0.9295    -3.7000
IUPOINT   32    -5   13    3.8775    1.7712    -3.7000
IUPOINT   33    -5   13    3.4174    2.6482    -3.7000
IUPOINT   34    -5   13    2.4724    3.4727    -3.7000
IUPOINT   35    -5   13    1.6845    3.9159    -3.7000
IUPOINT   36    -5   15    3.9365    0.6011    -3.7000
IUPOINT   37    -5   15    3.7350    1.3810    -3.7000
IUPOINT   38    -5   15    3.3596    2.1378    -3.7000
IUPOINT   39    -5   15    2.5441    3.0635    -3.7000
IUPOINT   40    -5   15    1.8408    3.5311    -3.7000
IUPOINT   41    -5   17    3.6946    0.2862    -3.7000
IUPOINT   42    -5   17    3.5668    1.0048    -3.7000
IUPOINT   43    -5   17    3.2746    1.7346    -3.7000
IUPOINT   44    -5   17    2.5865    2.6535    -3.7000
IUPOINT   45    -5   17    1.9688    3.1394    -3.7000
IUPOINT   46    -5   19    3.4351   -0.0252    -3.7000
IUPOINT   47    -5   19    3.3768    0.6307    -3.7000
IUPOINT   48    -5   19    3.1683    1.3276    -3.7000
IUPOINT   49    -5   19    2.6091    2.2348    -3.7000
IUPOINT   50    -5   19    2.0791    2.7346    -3.7000
IUPOINT   51    -5   21    3.1605   -0.3034    -3.7000
IUPOINT   52    -5   21    3.1646    0.2572    -3.7000
IUPOINT   53    -5   21    3.0366    0.9306    -3.7000
IUPOINT   54    -5   21    2.6120    1.8050    -3.7000
IUPOINT   55    -5   21    2.1726    2.3153    -3.7000
IUPOINT   56    -5   23    2.8738   -0.5726    -3.6933
IUPOINT   57    -5   23    2.9290   -0.0693    -3.6933
IUPOINT   58    -5   23    2.8659    0.6116    -3.6933
IUPOINT   59    -5   23    2.5812    1.3872    -3.6933
IUPOINT   60    -5   23    2.2307    1.9003    -3.6933
IUPOINT   61    -5   25    2.5806   -0.8204    -3.6833
IUPOINT   62    -5   25    2.6773   -0.4060    -3.6833
IUPOINT   63    -5   25    2.6781    0.4009    -3.6833
IUPOINT   64    -5   25    2.5216    0.9870    -3.6833
IUPOINT   65    -5   25    2.2668    1.4986    -3.6833
IUPOINT   66    -5   27    2.3067   -1.0249    -3.6751
IUPOINT   67    -5   27    2.4294   -0.6850    -3.6751
IUPOINT   68    -5   27    2.5234   -0.0813    -3.6751
IUPOINT   69    -5   27    2.4464    0.6215    -3.6751
IUPOINT   70    -5   27    2.2604    1.1235    -3.6751
IUPOINT   71    -5   29    2.0199   -1.2256    -3.6679
IUPOINT   72    -5   29    2.1734   -0.9263    -3.6679
IUPOINT   73    -5   29    2.3499   -0.2448    -3.6679
```

IJPOINT	74	-5	29	2 3454	0 2845	-3 6679	
IJPOINT	75	-5	29	2 2327	0 7727	-3 6679	
IJPOINT	76	-5	31	1 7380	-1 4062	-3 6822	
IJPOINT	77	-5	31	1 9158	-1 1523	-3 6822	
IJPOINT	78	-5	31	2 1703	-0 5366	-3 6822	
IJPOINT	79	-5	31	2 2363	-0 0400	-3 6822	
IJPOINT	80	-5	31	2 1934	0 4323	-3 6822	
IJPOINT	81	-5	33	1 4229	-1 5998	-3 6550	
IJPOINT	82	-5	33	1 6647	-1 3463	-3 6550	
IJPOINT	83	-5	33	1 9875	-0 7960	-3 6550	
IJPOINT	84	-5	33	2 1149	-0 3336	-3 6550	
IJPOINT	85	-5	33	2 1376	0 1199	-3 6550	
IJPOINT	86	-5	35	1 0601	-1 7838	-3 6550	
IJPOINT	87	-5	35	1 4071	-1 5182	-3 6550	
IJPOINT	88	-5	35	1 7920	-1 0362	-3 6550	
IJPOINT	89	-5	35	1 9777	-0 6112	-3 6550	
IJPOINT	90	-5	35	2 0621	-0 1804	-3 6550	
IJPOINT	91	-5	39	0 9309	-1 5813	-3 6550	
IJPOINT	92	-5	39	1 2474	-1 3458	-3 6550	
IJPOINT	93	-5	39	1 5886	-0 9185	-3 6550	
IJPOINT	94	-5	39	1 7532	-0 5418	-3 6550	
IJPOINT	95	-5	39	1 8280	-0 1599	-3 6550	
IJPOINT	96	-5	41	0 7370	-1 2519	-3 6550	
IJPOINT	97	-5	41	0 9875	-1 0655	-3 6550	
IJPOINT	98	-5	41	1 2576	-0 7272	-3 6550	
IJPOINT	99	-5	41	1 3880	-0 4290	-3 6550	
IJPOINT	100	-5	41	1 4472	-0 1266	-3 6550	
IJPOINT	101	-5	43	0 6138	-1 0427	-3 6550	
IJPOINT	102	-5	43	0 8225	-0 8874	-3 6550	
IJPOINT	103	-5	43	1 0475	-0 6067	-3 6550	
IJPOINT	104	-5	43	1 1550	-0 3573	-3 6550	
IJPOINT	105	-5	43	1 2054	-0 1055	-3 6550	
IJPOINT	106	-5	1	4 3363	3 9639	-3 6254	
IJPOINT	107	-5	3	4 2327	3 6759	-3 6379	
IJPOINT	108	-5	5	4 1404	3 3679	-3 6504	
IJPOINT	109	-5	7	4 0508	3 0458	-3 6630	
IJPOINT	110	-5	9	3 9639	2 7056	-3 6755	
IJPOINT	111	-5	11	3 9139	2 2829	-3 6880	
IJPOINT	112	-5	13	3 8775	1 9712	-3 7000	
IJPOINT	113	-5	1	3 1634	4 9506	-3 6254	
IJPOINT	114	-5	3	3 1372	4 6461	-3 6379	
IJPOINT	115	-5	5	3 1243	4 3271	-3 6504	
IJPOINT	116	-5	7	3 1208	3 9934	-3 6630	
IJPOINT	117	-5	9	3 1273	3 6404	-3 6755	
IJPOINT	118	-5	11	3 1436	3 2632	-3 6880	
IJPOINT	119	-5	13	3 1250	2 8994	-3 7000	
IJPOINT	120	-5	15	3 0955	2 5050	-3 7000	
IJPOINT	121	-5	17	3 0571	2 0943	-3 7000	
IJPOINT	122	-5	19	2 9876	1 6965	-3 7000	
IJPOINT	123	-5	21	2 8970	1 2993	-3 7000	
IJPOINT	124	-5	23	2 7938	0 8842	-3 6933	
IJPOINT	125	-5	25	2 6781	0 4009	-3 6833	
IJPOINT	126	-5	1	1 7734	5 6010	-3 6254	
IJPOINT	127	-5	3	1 8276	5 2898	-3 6379	
IJPOINT	128	-5	5	1 9017	4 9859	-3 6504	

IJPOINT	129	-5	7	1 9852	4 6632	-3 6630	
IJPOINT	130	-5	9	2 0800	4 3251	-3 6755	
IJPOINT	131	-5	11	2 2481	3 9340	-3 6880	
IJPOINT	132	-5	13	2 4724	3 4727	-3 7000	
IJPOINT	133	-5	1	0 2561	5 8694	-3 6254	
IJPOINT	134	-5	3	0 3931	5 5923	-3 6379	
IJPOINT	135	-5	5	0 5477	5 3090	-3 6504	
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IJPOINT	137	-5	9	0 8842	4 7171	-3 6755	
IJPOINT	138	-5	11	1 0891	4 3982	-3 6880	
IJPOINT	139	-5	13	1 2752	4 0617	-3 7000	
IJPOINT	140	-5	15	1 4476	3 7097	-3 7000	
IJPOINT	141	-5	17	1 5995	3 3427	-3 7000	
IJPOINT	142	-5	19	1 7394	2 9623	-3 7000	
IJPOINT	143	-5	21	1 8430	2 5854	-3 7000	
IJPOINT	144	-5	23	1 9329	2 2026	-3 6933	
IJPOINT	145	-5	25	2 0008	1 8247	-3 6833	
IJPOINT	146	-5	27	2 0410	1 4852	-3 6751	
IJPOINT	147	-5	29	2 0713	1 1386	-3 6679	
IJPOINT	148	-5	31	2 0868	0 8020	-3 6622	
IJPOINT	149	-5	33	2 0969	0 4323	-3 6580	
IJPOINT	150	-5	35	2 0880	0 0000	-3 6550	
IJPOINT	151	-5	39	1 8360	0 0000	-3 6550	
IJPOINT	152	-5	41	1 4527	0 0000	-3 6550	
IJPOINT	153	-5	43	1 2100	0 0000	-3 6550	
IJPOINT	155	-1	1	5 2111	2 7129	-3 3925	
IJPOINT	156	-1	1	4 3907	3 9036	-3 3925	
IJPOINT	157	-1	1	3 2316	4 9084	-3 3925	
IJPOINT	158	-1	1	1 8508	5 5759	-3 3925	
IJPOINT	159	-1	1	0 3380	5 8853	-3 3925	
IJPOINT	160	-1	3	5 0396	2 4557	-3 3925	
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IJPOINT	162	-1	3	3 3006	4 5315	-3 3925	
IJPOINT	163	-1	3	2 0165	5 2308	-3 3925	
IJPOINT	164	-1	3	0 5963	5 5743	-3 3925	
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IJPOINT	166	-1	5	4 3232	3 1298	-3 3925	
IJPOINT	167	-1	5	3 3604	4 1464	-3 3925	
IJPOINT	168	-1	5	2 1791	4 8721	-3 3925	
IJPOINT	169	-1	5	0 8458	5 2697	-3 3925	
IJPOINT	170	-1	7	4 7009	1 8942	-3 3925	
IJPOINT	171	-1	7	4 2684	2 7327	-3 3925	
IJPOINT	172	-1	7	3 4157	3 7443	-3 3925	
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IJPOINT	174	-1	7	1 0914	4 9493	-3 3925	
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IJPOINT	177	-1	9	3 4484	3 3379	-3 3925	
IJPOINT	178	-1	9	2 4267	4 1405	-3 3925	
IJPOINT	179	-1	9	1 3159	4 6153	-3 3925	
IJPOINT	180	-1	11	4 3535	1 2559	-3 3718	
IJPOINT	181	-1	11	4 0375	2 0564	-3 3718	
IJPOINT	182	-1	11	3 4431	2 9454	-3 3718	
IJPOINT	183	-1	11	2 4684	3 7997	-3 3718	
IJPOINT	184	-1	11	1 5078	4 2728	-3 3718	

IUPOINT	185	-1	13	4.1603	0	9296	-3	3512
IUPOINT	186	-1	13	3.8775	1	7712	-3	3512
IUPOINT	187	-1	13	3.4174	2	5482	-3	3512
IUPOINT	188	-1	13	2.4724	3	4727	-3	3512
IUPOINT	189	-1	13	1.6845	3	9160	-3	3512
IUPOINT	190	-1	15	3.9365	0	6011	-3	3096
IUPOINT	191	-1	15	3.7360	1	3810	-3	3096
IUPOINT	192	-1	15	3.3596	2	1378	-3	3096
IUPOINT	193	-1	15	2.5441	3	0636	-3	3096
IUPOINT	194	-1	15	1.8408	3	5311	-3	3096
IUPOINT	195	-1	17	3.6946	0	2862	-3	2463
IUPOINT	196	-1	17	3.5668	1	0048	-3	2463
IUPOINT	197	-1	17	3.2746	1	7346	-3	2463
IUPOINT	198	-1	17	2.5865	2	6536	-3	2463
IUPOINT	199	-1	17	1.9688	3	1394	-3	2463
IUPOINT	200	-1	19	3.4351	-0	0252	-3	1615
IUPOINT	201	-1	19	3.3768	0	8307	-3	1615
IUPOINT	202	-1	19	3.1683	1	3276	-3	1615
IUPOINT	203	-1	19	2.6091	2	2346	-3	1615
IUPOINT	204	-1	19	2.0791	2	7346	-3	1615
IUPOINT	205	-1	21	3.1606	-0	3034	-3	0497
IUPOINT	206	-1	21	3.1446	0	2572	-3	0497
IUPOINT	207	-1	21	3.0356	0	9305	-3	0497
IUPOINT	208	-1	21	2.6120	1	8060	-3	0497
IUPOINT	209	-1	21	2.1726	2	3153	-3	0497
IUPOINT	210	-1	23	2.8738	-0	5726	-2	9075
IUPOINT	211	-1	23	2.9290	-0	0893	-2	9075
IUPOINT	212	-1	23	2.8659	0	6116	-2	9075
IUPOINT	213	-1	23	2.5812	1	3872	-2	9075
IUPOINT	214	-1	23	2.2307	1	9003	-2	9075
IUPOINT	215	-1	25	2.5806	-0	8204	-2	7329
IUPOINT	216	-1	25	2.6773	-0	4060	-2	7329
IUPOINT	217	-1	25	2.6781	0	4009	-2	7329
IUPOINT	218	-1	25	2.5216	0	9870	-2	7329
IUPOINT	219	-1	25	2.2568	1	4966	-2	7329
IUPOINT	220	-1	27	2.3067	-1	0249	-2	5389
IUPOINT	221	-1	27	2.4294	-0	6850	-2	5389
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IJPOINT	1183	5	13	2.9099	3.5082	-2.5317
IJPOINT	1184	5	13	2.0879	4.0516	-2.5317
IJPOINT	1185	5	15	4.3869	0.3834	-2.4830
IJPOINT	1186	5	15	4.2009	1.3237	-2.4830
IJPOINT	1187	5	15	3.8273	2.1798	-2.4830
IJPOINT	1188	5	15	2.9762	3.2468	-2.4830
IJPOINT	1189	5	15	2.2236	3.8020	-2.4830
IJPOINT	1190	5	17	4.2443	0.1466	-2.4248
IJPOINT	1191	5	17	4.1144	1.0521	-2.4248
IJPOINT	1192	5	17	3.8094	1.8770	-2.4248
IJPOINT	1193	5	17	3.0371	2.9683	-2.4248
IJPOINT	1194	5	17	2.3614	3.5297	-2.4248
IJPOINT	1195	5	19	4.0845	-0.1361	-2.3525
IJPOINT	1196	5	19	4.0189	0.7418	-2.3525
IJPOINT	1197	5	19	3.7812	1.5507	-2.3525
IJPOINT	1198	5	19	3.1096	2.6519	-2.3525
IJPOINT	1199	5	19	2.4985	3.2341	-2.3525
IJPOINT	1200	5	21	3.8971	-0.4481	-2.2704
IJPOINT	1201	5	21	3.9027	0.3969	-2.2704
IJPOINT	1202	5	21	3.7346	1.2007	-2.2704
IJPOINT	1203	5	21	3.1814	2.2951	-2.2704
IJPOINT	1204	5	21	2.6348	2.9063	-2.2704
IJPOINT	1205	5	23	3.6996	-0.7330	-2.1655
IJPOINT	1206	5	23	3.7620	0.0744	-2.1655
IJPOINT	1207	5	23	3.6616	0.8666	-2.1655
IJPOINT	1208	5	23	3.2208	1.9454	-2.1655
IJPOINT	1209	5	23	2.7724	2.5440	-2.1655
IJPOINT	1210	5	25	3.4454	-1.0540	-2.0452
IJPOINT	1211	5	25	3.5912	-0.2916	-2.0452
IJPOINT	1212	5	25	3.5443	0.6478	-2.0452
IJPOINT	1213	5	25	3.2559	1.5430	-2.0452
IJPOINT	1214	5	25	2.8993	2.1390	-2.0452

IJPOINT	1215	5	1	4.4855	3.7941	-2.7190
IJPOINT	1216	5	3	4.4436	3.4568	-2.7028
IJPOINT	1217	5	5	4.4032	3.1174	-2.6822
IJPOINT	1218	5	7	4.3636	2.7729	-2.6570
IJPOINT	1219	5	9	4.3219	2.4243	-2.6248
IJPOINT	1220	5	11	4.2826	2.0575	-2.5834
IJPOINT	1221	5	13	4.2742	1.5833	-2.5317
IJPOINT	1222	5	1	3.3569	4.8215	-2.7190
IJPOINT	1223	5	3	3.4014	4.4862	-2.7028
IJPOINT	1224	5	5	3.4472	4.1500	-2.6822
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IJPOINT	1226	5	9	3.5262	3.4816	-2.6248
IJPOINT	1227	5	11	3.5666	3.1389	-2.5834
IJPOINT	1228	5	13	3.5836	2.8038	-2.5317
IJPOINT	1229	5	15	3.6026	2.4341	-2.4830
IJPOINT	1230	5	17	3.6027	2.2486	-2.4248
IJPOINT	1231	5	19	3.6042	1.9266	-2.3625
IJPOINT	1232	5	21	3.5932	1.5739	-2.2704
IJPOINT	1233	5	23	3.5889	1.1921	-2.1655
IJPOINT	1234	5	25	3.5443	0.6478	-2.0452
IJPOINT	1235	5	1	1.9321	5.5482	-2.7190
IJPOINT	1236	5	3	2.1188	5.2155	-2.7028
IJPOINT	1237	5	5	2.2646	4.9013	-2.6822
IJPOINT	1238	5	7	2.3928	4.5832	-2.6570
IJPOINT	1239	5	9	2.5307	4.2604	-2.6248
IJPOINT	1240	5	11	2.6801	3.9231	-2.5834
IJPOINT	1241	5	13	2.9099	3.5082	-2.5317
IJPOINT	1242	5	1	0.5120	5.9526	-2.7190
IJPOINT	1243	5	3	0.7026	5.5858	-2.7028
IJPOINT	1244	5	5	0.9103	5.2176	-2.6822
IJPOINT	1245	5	7	1.1112	4.8493	-2.6570
IJPOINT	1246	5	9	1.3130	4.7783	-2.6248
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IJPOINT	1248	5	13	1.7194	4.2249	-2.5317
IJPOINT	1249	5	15	1.8528	3.9959	-2.4830
IJPOINT	1250	5	17	2.0137	3.7166	-2.4248
IJPOINT	1251	5	19	2.1601	3.4692	-2.3525
IJPOINT	1252	5	21	2.3366	3.1510	-2.2704
IJPOINT	1253	5	23	2.4801	2.8297	-2.1655
IJPOINT	1254	5	25	2.6365	2.4568	-2.0452
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IJPOINT	1256	7	25	3.6596	-0.1464	-2.0160
IJPOINT	1257	7	25	3.5726	0.8067	-2.0160
IJPOINT	1258	7	25	3.2420	1.7039	-2.0160
IJPOINT	1259	7	25	2.8562	2.2926	-2.0160
IJPOINT	1260	7	25	2.5736	2.6059	-2.0160
IJPOINT	1261	9	25	3.6729	-0.7564	-2.0160
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IJPOINT	1264	9	25	3.2234	1.8162	-2.0160
IJPOINT	1265	9	25	2.7836	2.5128	-2.0160
IJPOINT	1266	9	25	2.4915	2.8027	-2.0160
IJPOINT	1267	9	27	3.6729	-0.7564	-1.9710
IJPOINT	1268	9	27	3.7497	0.0478	-1.9710
IJPOINT	1269	9	27	3.6096	1.0166	-1.9710

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IUPOINT 1271   9  27   2 7836    2 5128   -1 9710
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IUPOINT 1273   7  27   3 5436   -0 9258   -1 9710
IUPOINT 1274   7  27   3 8696   -0 1454   -1 9710
IUPOINT 1275   7  27   3 5725    0 8067   -1 9710
IUPOINT 1276   7  27   3 2420    1 7039   -1 9710
IUPOINT 1277   7  27   2 8562    2 2926   -1 9710
IUPOINT 1278   7  27   2 5736    2 6059   -1 9710
IUPOINT 1279   5  29   3 1069   -1 4376   -1 8260
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IUPOINT 1286   7  29   3 5077   -0 4582   -1 8260
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IUPOINT 1293   9  29   3 5652    0 7081   -1 8260
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IUPOINT 1307   7  31   2 9422    1 9640   -1 7810
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IUPOINT 1310   5  33   3 0981   -1 1292   -1 6360
IUPOINT 1311   5  33   3 2848   -0 2888   -1 6360
IUPOINT 1312   5  33   3 2477    0 5712   -1 6360
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IUPOINT 1314   5  33   2 9220    1 5281   -1 6360
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IUPOINT 1316   7  33   3 3248   -0 7688   -1 6360
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IUPOINT 1319   7  33   3 0171    1 5945   -1 6360
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IUPOINT 1324   9  33   3 2681    1 2527   -1 6360
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IUPOINT 1328   9  35   3 4566   -0 5492   -1 5910
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IUPOINT 1333   7  35   3 0830   -1 4630   -1 5910
IUPOINT 1334   7  35   3 3248   -0 7688   -1 5910
IUPOINT 1335   7  35   3 4106    0 1180   -1 5910
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IUPOINT 1337   7  35   3 0171    1 5945   -1 5910
IUPOINT 1338   7  35   2 8085    1 9385   -1 5910
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IUPOINT 1340   5  36   3 0981   -1 1292   -1 5450
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IUPOINT 1342   5  36   3 2477    0 5712   -1 5450
IUPOINT 1343   5  36   3 0734    1 1949   -1 5450
IUPOINT 1344   5  36   2 9220    1 5281   -1 5450
IUPOINT 1345   5  37   2 7844   -1 7665   -1 4500
IUPOINT 1346   5  37   3 0981   -1 1292   -1 4500
IUPOINT 1347   5  37   3 2848   -0 2888   -1 4500
IUPOINT 1348   5  37   3 2477    0 5712   -1 4500
IUPOINT 1349   5  37   3 0734    1 1949   -1 4500
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IUPOINT 1351   7  37   2 9936   -1 5585   -1 4500
IUPOINT 1352   7  37   3 2579   -0 8813   -1 4500
IUPOINT 1353   7  37   3 3760   -0 0080   -1 4500
IUPOINT 1354   7  37   3 2621    0 8658   -1 4500
IUPOINT 1355   7  37   3 0377    1 4707   -1 4500
IUPOINT 1356   7  37   2 8465    1 8133   -1 4500
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IUPOINT 1360   7  39   3 2621    0 8658   -1 4060
IUPOINT 1361   7  39   3 0377    1 4707   -1 4060
IUPOINT 1362   7  39   2 8465    1 8133   -1 4060
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IUPOINT 1406   3   3
IUPOINT 1411   3   5
IUPOINT 1416   3   7
IUPOINT 1421   3   9
IUPOINT 1426   3  11
IUPOINT 1431   3  13
IUPOINT 1436   3  15
IUPOINT 1441   3  17
IUPOINT 1446   3  19
IUPOINT 1451   3  21
IUPOINT 1456   3  23
IUPOINT 1461   3  25
IUPOINT 1466   3  27
IUPOINT 1471   3  29
IUPOINT 1476   3  31
IUPOINT 1481   3  33
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IUPOINT 1486        3       36
IUPOINT 1491        3       38
DEFSYS 1 1 0 0 0 0 0 0 1 0 0 0 0 0 0 1 0 1 0 0 0
#HUB
#MESH 1
MSYS 1
SLINES 1T91B5 330 245 308 240T155B-5 1 86 240 31 185
IUGRID 1
SLINES 2T92B5 331 246 309 241T156B-5 2 87 241 32 186
RULE 5 1
IUNAME 240 308       LOW HUB
IUNAME 155 240       LOW HUB
IUSOLID  0 0 1
IUSOLID 455 160 1 S0 0 PRES  A HUB
IUSOLID 460 165 1 S0 0 PRES  B HUB
IUSOLID 465 170 1 S0 0 PRES  C HUB
IUSOLID 470 175 1 S0 0 PRES  D HUB
IUSOLID 475 180 1 S0 0 PRES  E HUB
IUSOLID 480 185 1 S0 0 PRES  F HUB
IUSOLID 485 190 1 S0 0 PRES  G HUB
IUSOLID 490 195 1 S0 0 PRES  H HUB
IUSOLID 495 200 1 S0 0 PRES  I HUB
IUSOLID 500 205 1 S0 0 PRES  J HUB
IUSOLID 505 210 1 S0 0 PRES  K HUB
IUSOLID 510 215 1 S0 0 PRES  L HUB
IUSOLID 515 220 1 S0 0 PRES  M HUB
IUSOLID 520 225 1 S0 0 PRES  N HUB
IUSOLID 525 230 1 S0 0 PRES  O HUB
IUSOLID 530 235 1 S0 0 PRES  P HUB
IUSOLID 535 240 1 S0 0 PRES  Q HUB
IUSOLID 240 608 1 S0 0 PRES  R HUB
IUSOLID   1 540 1 S0 0 PRES  S HUB
KNAME 0 0 1 ' SIDE ONE BOT
MESH 3
#MESH 2
MSYS 1
SLINES 2T32B5 186T156B-5 2
IUGRID 1
SLINES 106T112 266T260B-1 106
RULE 3 1
IUSOLID  0 0 1
IUSOLID   1 485 1 S0 0 PRES  S HUB
MESH 3
MERGE MESH 1
#MESH 3
MSYS 1
SLINES 106T112 37T92B5 331 246 309 241T191B-5 266T260B-1 106 87 241
SLINES 112 266
IUGRID 1
SLINES 3T93B5 332 247 310 242T157B-5 3 88 242 217 63
RULE 5 1
IUNAME 240 308       LOW HUB
IUNAME 155 240       LOW HUB
IUSOLID  0 0 1
IUSOLID 455 160 1 S0 0 PRES  A HUB
```



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IUSOLID 460 165 1 S0 0 PRES  B HUB
IUSOLID 465 170 1 S0 0 PRES  C HUB
IUSOLID 470 175 1 S0 0 PRES  D HUB
IUSOLID 475 180 1 S0 0 PRES  E HUB
IUSOLID 480 185 1 S0 0 PRES  F HUB
IUSOLID 485 190 1 S0 0 PRES  G HUB
IUSOLID 490 195 1 S0 0 PRES  H HUB
IUSOLID 495 200 1 S0 0 PRES  I HUB
IUSOLID 500 205 1 S0 0 PRES  J HUB
IUSOLID 505 210 1 S0 0 PRES  K HUB
IUSOLID 510 215 1 S0 0 PRES  L HUB
IUSOLID 515 220 1 S0 0 PRES  M HUB
IUSOLID 520 225 1 S0 0 PRES  N HUB
IUSOLID 525 230 1 S0 0 PRES  O HUB
IUSOLID 530 235 1 S0 0 PRES  P HUB
IUSOLID 535 240 1 S0 0 PRES  Q HUB
IUSOLID 240 608 1 S0 0 PRES  R HUB
IUSOLID   1 540 1 S0 0 PRES  S HUB
MESH 3
MERGE MESH 1 2
#MESH 4
MSYS 1
SLINES 3T63B5 217T157B-5 3
IUGRID 1
SLINES 113T125 279T267B-1 113
RULE 3 1
IUSOLID  0 0 1
IUSOLID   1 515 1 S0 0 PRES  S HUB
MESH 3
MERGE MESH 3
#MESH 5
MSYS 1
SLINES 113T125 68T93B5 332 247 310 242T222B-5 279T267B-1 113 125 279 88 242
IUGRID 1
SLINES 4T94B5 333 248 311 243T158B-5 4 89 243 188 34
RULE 5 1
IUNAME 240 308       LOW HUB
IUNAME 155 240       LOW HUB
IUSOLID  0 0 1
IUSOLID 455 160 1 S0 0 PRES  A HUB
IUSOLID 460 165 1 S0 0 PRES  B HUB
IUSOLID 465 170 1 S0 0 PRES  C HUB
IUSOLID 470 175 1 S0 0 PRES  D HUB
IUSOLID 475 180 1 S0 0 PRES  E HUB
IUSOLID 480 185 1 S0 0 PRES  F HUB
IUSOLID 485 190 1 S0 0 PRES  G HUB
IUSOLID 490 195 1 S0 0 PRES  H HUB
IUSOLID 496 200 1 S0 0 PRES  I HUB
IUSOLID 500 206 1 S0 0 PRES  J HUB
IUSOLID 505 210 1 S0 0 PRES  K HUB
IUSOLID 510 215 1 S0 0 PRES  L HUB
IUSOLID 515 220 1 S0 0 PRES  M HUB
IUSOLID 520 225 1 S0 0 PRES  N HUB
IUSOLID 525 230 1 S0 0 PRES  O HUB
IUSOLID 530 236 1 S0 0 PRES  P HUB
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IUSOLID 535 240 1 SO 0 PRES  Q HUB
IUSOLID 240 608 1 SO 0 PRES  R HUB
IUSOLID   1 540 1 SO 0 PRES  S HUB
MESH 3
MERGE MESH 3 4
#MESH 6
MSYS 1
SLINES 4T34B5 188T158B-5 4
IUGRID 1
SLINES 126T132 286T280B-1 126
RULE 3 1
IUSOLID  0 0 1
IUSOLID   1 485 1 SO 0 PRES  S HUB
MESH 3
MERGE MESH 5
#MESH 7
MSYS 1
SLINES 126T132 39T94B5 333 248 311 243T193B-5 286T280B-1 126
SLINES 88 243 132 286
IUGRID 1
SLINES 5T95B5 334 249 312 244T159B-5 5 90 244
RULE 5 1
IUNAME 240 308      LOW HUB
IUNAME 156 240      LOW HUB
IUSOLID  0 0 1
IUSOLID 455 160 1 SO 0 PRES  A HUB
IUSOLID 460 165 1 SO 0 PRES  B HUB
IUSOLID 465 170 1 SO 0 PRES  C HUB
IUSOLID 470 175 1 SO 0 PRES  D HUB
IUSOLID 475 180 1 SO 0 PRES  E HUB
IUSOLID 480 185 1 SO 0 PRES  F HUB
IUSOLID 485 190 1 SO 0 PRES  G HUB
IUSOLID 490 195 1 SO 0 PRES  H HUB
IUSOLID 495 200 1 SO 0 PRES  I HUB
IUSOLID 500 205 1 SO 0 PRES  J HUB
IUSOLID 505 210 1 SO 0 PRES  K HUB
IUSOLID 510 215 1 SO 0 PRES  L HUB
IUSOLID 515 220 1 SO 0 PRES  M HUB
IUSOLID 520 225 1 SO 0 PRES  N HUB
IUSOLID 525 230 1 SO 0 PRES  O HUB
IUSOLID 530 235 1 SO 0 PRES  P HUB
IUSOLID 535 240 1 SO 0 PRES  Q HUB
IUSOLID 240 608 1 SO 0 PRES  R HUB
IUSOLID   1 540 1 SO 0 PRES  S HUB
MESH 3
MERGE MESH 5 6
#MESH 8
MSYS 1
SLINES 5T95B5 334 249 312 244T159B-5 5 90 244
IUGRID 1
SLINES 133T151 335 305 313 304T287B-1 133 150 304
RULE 3 1
IUSOLID  0 0 1
IUSOLID   1 540 1 SO 0 PRES  S HUB
KNAME 0 0 3 3 SIDE TWO BOT
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MESH 3
MERGE MESH 7
#SHROUD
#MESH 9
MSYS 1
SLINES 1091 1357T1255B-6 1210T1150B-5 1001T108885
PLINE 1086 1096 1091
IUGRID 1
SLINES 1092 1358T1256B-6 1211T1151B-5 1002T108785 1032 1181
PLINE 1087 1097 1092
RULE 5 1
IUNAME 1001 1091      HIGH SHRD
IUSOLID  0 0 1
IUSOLID 1001 1406 1 SO 0 PRES  A SHRD
IUSOLID 1006 1411 1 SO 0 PRES  B SHRD
IUSOLID 1011 1416 1 SO 0 PRES  C SHRD
IUSOLID 1016 1421 1 SO 0 PRES  D SHRD
IUSOLID 1021 1426 1 SO 0 PRES  E SHRD
IUSOLID 1026 1431 1 SO 0 PRES  F SHRD
IUSOLID 1031 1436 1 SO 0 PRES  G SHRD
IUSOLID 1036 1441 1 SO 0 PRES  H SHRD
IUSOLID 1041 1446 1 SO 0 PRES  I SHRD
IUSOLID 1046 1451 1 SO 0 PRES  J SHRD
IUSOLID 1051 1456 1 SO 0 PRES  K SHRD
IUSOLID 1056 1461 1 SO 0 PRES  L SHRD
IUSOLID 1061 1466 1 SO 0 PRES  M SHRD
IUSOLID 1066 1471 1 SO 0 PRES  N SHRD
IUSOLID 1071 1476 1 SO 0 PRES  O SHRD
IUSOLID 1076 1481 1 SO 0 PRES  P SHRD
IUSOLID 1081 1486 1 SO 0 PRES  Q SHRD
IUSOLID 1086 1491 1 SO 0 PRES  R SHRD
IUSOLID 1401 1210 1 SO 0 PRES  S SHRD
KNAME 0 0 1 1 SIDE ONE TOP
MESH 1
#MESH 10
MSYS 1
SLINES 1181T1151B-5 1002T1032B5 1181
IUGRID 1
SLINES 1101T1107 1221T1215B-1 1101
RULE 3 1
IUSOLID  0 0 1
IUSOLID 1401 1221 1 SO 0 PRES  S SHRD
MESH 1
MERGE MESH 9
#MESH 11
MSYS 1
SLINES 1092 1358T1258B-6 1211T1186B-5 1221T1215B-1 1101T1107 1037T108785
SLINES 1107 1221
PLINE 1087 1097 1092
IUGRID 1
SLINES 1093 1359T1257B-6 1212T1152B-5 1003T108885 1212 1063
PLINE 1088 1098 1093
RULE 5 1
IUNAME 1001 1091      HIGH SHRD
IUSOLID  0 0 1
```

```
IUSOLID 1001 1406 1 SO 0 PRES  A SHRD
IUSOLID 1006 1411 1 SO 0 PRES  B SHRD
IUSOLID 1011 1416 1 SO 0 PRES  C SHRD
IUSOLID 1016 1421 1 SO 0 PRES  D SHRD
IUSOLID 1021 1426 1 SO 0 PRES  E SHRD
IUSOLID 1026 1431 1 SO 0 PRES  F SHRD
IUSOLID 1031 1436 1 SO 0 PRES  G SHRD
IUSOLID 1036 1441 1 SO 0 PRES  H SHRD
IUSOLID 1041 1446 1 SO 0 PRES  I SHRD
IUSOLID 1046 1451 1 SO 0 PRES  J SHRD
IUSOLID 1051 1456 1 SO 0 PRES  K SHRD
IUSOLID 1056 1461 1 SO 0 PRES  L SHRD
IUSOLID 1061 1466 1 SO 0 PRES  M SHRD
IUSOLID 1066 1471 1 SO 0 PRES  N SHRD
IUSOLID 1071 1476 1 SO 0 PRES  O SHRD
IUSOLID 1076 1481 1 SO 0 PRES  P SHRD
IUSOLID 1081 1486 1 SO 0 PRES  Q SHRD
IUSOLID 1086 1491 1 SO 0 PRES  R SHRD
IUSOLID 1401 1210 1 SO 0 PRES  S SHRD
MESH 1
MERGE MESH 9 10
#MESH 12
MSYS 1
SLINES 1212T11528-5 1003T10638S 1212
IUGRID 1
SLINES 1222T1234 1121T1109B-1 1222
RULE 3 1
IUSOLID  0 0 1
IUSOLID 1401 1234 1 SO 0 PRES  S SHRD
MESH 1
MERGE MESH 11
#MESH 13
MSYS 1
SLINES 1093 1359T1257B-6 1234T1222B-1 1109T1121B1 1068T1088B5 1234 1121
PLINE 1088 1098 1093
IUGRID 1
SLINES 1094 1360T1258B-6 1213T11538-5 1004T1089B5 1034 1183
PLINE 1089 1099 1094
RULE 5 1
IUNAME 1001 1091      HIGH SHRD
IUSOLID  0 0 1
IUSOLID 1001 1406 1 SO 0 PRES  A SHRD
IUSOLID 1006 1411 1 SO 0 PRES  B SHRD
IUSOLID 1011 1416 1 SO 0 PRES  C SHRD
IUSOLID 1016 1421 1 SO 0 PRES  D SHRD
IUSOLID 1021 1426 1 SO 0 PRES  E SHRD
IUSOLID 1026 1431 1 SO 0 PRES  F SHRD
IUSOLID 1031 1436 1 SO 0 PRES  G SHRD
IUSOLID 1036 1441 1 SO 0 PRES  H SHRD
IUSOLID 1041 1446 1 SO 0 PRES  I SHRD
IUSOLID 1046 1451 1 SO 0 PRES  J SHRD
IUSOLID 1051 1456 1 SO 0 PRES  K SHRD
IUSOLID 1056 1461 1 SO 0 PRES  L SHRD
IUSOLID 1061 1466 1 SO 0 PRES  M SHRD
IUSOLID 1066 1471 1 SO 0 PRES  N SHRD
```



```
IUSOLID 1071 1476 1 SO 0 PRES  O SHRD
IUSOLID 1076 1481 1 SO 0 PRES  P SHRD
IUSOLID 1081 1486 1 SO 0 PRES  Q SHRD
IUSOLID 1086 1491 1 SO 0 PRES  R SHRD
IUSOLID 1401 1210 1 SO 0 PRES  S SHRD
MESH 1
MERGE MESH 11 12
#MESH 14
MSYS 1
SLINES 1183T1153B-5 1004T103485 1183
IUGRID 1
SLINES 1122T1128 1241T1235B-1 1122
RULE 3 1
IUSOLID  0 0 1
IUSOLID 1401 1241 1 SO 0 PRES  S SHRD
MESH 1
MERGE MESH 13
#MESH 15
MSYS 1
SLINES 1094 1360T1258B-6 1213T11888-5 1241T1235B-1 1122T1128 1039T108985
SLINES 1128 1241
PLINE 1089 1099 1094
IUGRID 1
SLINES 1095 1361T1259B-6 1214T11548-5 1005T109085
PLINE 1090 1100 1095
RULE 5 1
IUNAME 1001 1091      HIGH SHRD
IUSOLID  0 0 1
IUSOLID 1001 1406 1 SO 0 PRES  A SHRD
IUSOLID 1006 1411 1 SO 0 PRES  B SHRD
IUSOLID 1011 1416 1 SO 0 PRES  C SHRD
IUSOLID 1016 1421 1 SO 0 PRES  D SHRD
IUSOLID 1021 1426 1 SO 0 PRES  E SHRD
IUSOLID 1026 1431 1 SO 0 PRES  F SHRD
IUSOLID 1031 1436 1 SO 0 PRES  G SHRD
IUSOLID 1036 1441 1 SO 0 PRES  H SHRD
IUSOLID 1041 1446 1 SO 0 PRES  I SHRD
IUSOLID 1046 1451 1 SO 0 PRES  J SHRD
IUSOLID 1051 1456 1 SO 0 PRES  K SHRD
IUSOLID 1056 1461 1 SO 0 PRES  L SHRD
IUSOLID 1061 1466 1 SO 0 PRES  M SHRD
IUSOLID 1066 1471 1 SO 0 PRES  N SHRD
IUSOLID 1071 1476 1 SO 0 PRES  O SHRD
IUSOLID 1076 1481 1 SO 0 PRES  P SHRD
IUSOLID 1081 1486 1 SO 0 PRES  Q SHRD
IUSOLID 1086 1491 1 SO 0 PRES  R SHRD
IUSOLID 1401 1210 1 SO 0 PRES  S SHRD
MESH 1
MERGE MESH 13 14
#MESH 16
MSYS 1
SLINES 1095 1361T12598-6 1214T11548-5 1005T109085
PLINE 1090 1100 1095
IUGRID 1
SLINES 1148 1362T12608-6 1254T12428-1 1130T1147
```

```
PLINE 1147 1149 1148
RULE 3 1
IJSOLID  0 0 1
IJSOLID 1401 1210 1 SO 0 PRES  S SHRD
KNAME 0 0 3 3 SIDE TWO TOP
MESH 1
MERGE MESH 15
#VANES
#MESH 17
MSYS 1
SLINES 1002T1032B5 186T1568-5 1002
IJGRID 1
SLINES 1101T1107 266T2608-1 1101
RULE 3 1
REFINE 0 0 2 0
IJSOLID  0 0 1
IJSOLID  159 1010 1 SO 0 PRES  A VAND
IJSOLID  164 1015 1 SO 0 PRES  B VAND
IJSOLID  169 1020 1 SO 0 PRES  C VAND
IJSOLID  174 1025 1 SO 0 PRES  D VAND
IJSOLID  179 1030 1 SO 0 PRES  E VAND
IJSOLID  184 1035 1 SO 0 PRES  F VAND
MESH 3
MERGE MESH 1 2 9 10 17
#MESH 18
MSYS 1
SLINES 1003T106385 217T1578-5 1003
IJGRID 1
SLINES 1109T1121 279T2678-1 1109
RULE 3 1
REFINE 0 0 2 0
IJSOLID  0 0 1
IJSOLID  159 1010 1 SO 0 PRES  A VANB
IJSOLID  164 1015 1 SO 0 PRES  B VANB
IJSOLID  169 1020 1 SO 0 PRES  C VANB
IJSOLID  174 1025 1 SO 0 PRES  D VANB
IJSOLID  179 1030 1 SO 0 PRES  E VANB
IJSOLID  184 1035 1 SO 0 PRES  F VANB
IJSOLID  189 1040 1 SO 0 PRES  G VANB
IJSOLID  194 1045 1 SO 0 PRES  H VANB
IJSOLID  199 1050 1 SO 0 PRES  I VANB
IJSOLID  204 1055 1 SO 0 PRES  J VANB
IJSOLID  209 1060 1 SO 0 PRES  K VANB
IJSOLID  214 1065 1 SO 0 PRES  L VANB
MESH 3
MERGE MESH 3 4 11 12 18
#MESH 19
MSYS 1
SLINES 1004T1034B5 188T158B-5 1004
IJGRID 1
SLINES 1122T1128 286T280B-1 1122
RULE 3 1
REFINE 0 0 2 0
IJSOLID  0 0 1
IJSOLID  159 1010 1 SO 0 PRES  A VANC
```



```
IJSOLID  164 1015 1 SO 0 PRES  B VANC
IJSOLID  169 1020 1 SO 0 PRES  C VANC
IJSOLID  174 1025 1 SO 0 PRES  D VANC
IJSOLID  179 1030 1 SO 0 PRES  E VANC
IJSOLID  184 1035 1 SO 0 PRES  F VANC
MESH 3
MERGE MESH 5 6 13 14 19
#MESH 20
MSYS 1
SLINES 1005T109085 244T1598-5 1005
IJGRID 1
SLINES 1130T1147 304T2878-1 1130
RULE 3 1
REFINE 0 0 2 0
IJSOLID  0 0 1
IJSOLID  159 1010 1 SO 0 PRES  A VANA
IJSOLID  164 1015 1 SO 0 PRES  B VANA
IJSOLID  169 1020 1 SO 0 PRES  C VANA
IJSOLID  174 1025 1 SO 0 PRES  D VANA
IJSOLID  179 1030 1 SO 0 PRES  E VANA
IJSOLID  184 1035 1 SO 0 PRES  F VANA
IJSOLID  189 1040 1 SO 0 PRES  G VANA
IJSOLID  194 1045 1 SO 0 PRES  H VANA
IJSOLID  199 1050 1 SO 0 PRES  I VANA
IJSOLID  204 1055 1 SO 0 PRES  J VANA
IJSOLID  209 1060 1 SO 0 PRES  K VANA
IJSOLID  214 1065 1 SO 0 PRES  L VANA
IJSOLID  219 1070 1 SO 0 PRES  M VANA
IJSOLID  224 1075 1 SO 0 PRES  N VANA
IJSOLID  229 1080 1 SO 0 PRES  O VANA
IJSOLID  234 1085 1 SO 0 PRES  P VANA
IJSOLID  239 1090 1 SO 0 PRES  Q VANA
MESH 3
MERGE MESH 7 8 15 16 20
#HUB CENTER
#MESH 21
SLINES 314T329 314 317 322 323 328 317
PRISM  5 3MO  3 12 341
PRISM  9 3MO  3 29 478
PRISM 13 3MO  3 42 341
PRISM 17 3MO  3 54 515
PRISM 19 3MO  3 59 515
IJSOLID 0 0 1
IJSOLID 326 336 1 SO 0 TORQ IPUT
IJSOLID 317 319 1 SO 0 TORQ OPUT
KNAME 322 322 1 1      TORQ
KNAME 324 325 2 18 AXIS SUPP HUB
KNAME 0 0  1  1 SIDE ONE HUB
KNAME 0 0 19 19 SIDE TWO HUB
MESH 3
ROTATE -149 515 3
MERGE MESH 178
# INSERT INTO MSET 11-14 FOR COSINE LOADING
MSET    11 COPY NAME PRES  A VANA
MSET    11 INSE NAME PRES  B VANA
```

```
MSET     12 COPY NAME PRES  A VANB
MSET     12 INSE NAME PRES  B VANB
MSET     13 COPY NAME PRES  A VANC
MSET     13 INSE NAME PRES  B VANC
MSET     14 COPY NAME PRES  A VAND
MSET     14 INSE NAME PRES  B VAND
#
NLIST 1 INSERT NAME SIDE ONE
NLIST 2 INSERT NAME SIDE TWO
#MESH 22
#SECOND IDENTICAL MODEL
DITTO MESH 1T21
# INSERT INTO MSET 21-24 FOR SINE LOADING
MSET     21 COPY NAME PRES  A VANA
MSET     21 INSE NAME PRES  B VANA
MSET     21 DELE MSET 11
MSET     22 COPY NAME PRES  A VANB
MSET     22 INSE NAME PRES  B VANB
MSET     22 DELE MSET 12
MSET     23 COPY NAME PRES  A VANC
MSET     23 INSE NAME PRES  B VANC
MSET     23 DELE MSET 13
MSET     24 COPY NAME PRES  A VAND
MSET     24 INSE NAME PRES  B VAND
MSET     24 DELE MSET 14
NSET 3 COPY NAME SIDE ONE
NSET 3 DELE MESH 1T21
NSET 4 COPY NAME SIDE TWO
NSET 4 DELE MESH 1T21
NLIST 3 INSERT NSET 3
NLIST 4 INSERT NSET 4
#BOUNDARY CONDITIONS
SET SYNTAX ON
LET $ANG  = 60
LET $CKL  = 1   #THIS IS WHERE N IS SET FOR THIS MODEL N=1 2
GENSKEW 1 1 0 $ANG 0 1
NODSKEW SKEW 1 NLIST 2
NODSKEW SKEW 1 NLIST 4
LET $THET = $CKL * %PI  180  * $ANG
LET $COSA = %COS($THET)
LET $SINA = %SIN($THET)
LET $SINN = 0  - $SINA
LET $IFN1 = %IFL(NLST NV 0 1)
LET $IRN1 = %LFM($IFN1 1)
LET $IFN2 = %IFL(NLST NV 0 2)
LET $IRN2 = %LFM($IFN2 1)
LET $IFN3 = %IFL(NLST NV 0 3)
LET $IRN3 = %LFM($IFN3 1)
LET $IFN4 = %IFL(NLST NV 0 4)
LET $IRN4 = %LFM($IFN4 1)
DO 10 $I=1 1000 1
LET $N1  = %IBC1($IRN1 $I)
IF $N1  20 20 1
LET $N2  = %IBC1($IRN2 $I)
LET $N3  = %IBC1($IRN3 $I)
```



```
LET $N4  = %IBC1($IRN4 $I)
GENCON 3 $N1 $N2 $N4 1 1 1  -1  $COSA  $SINA 0  1 0E9
GENCON 3 $N3 $N2 $N4 1 1 1  -1  $SINN  $COSA 0  1 0E9
GENCON 3 $N1 $N2 $N4 2 2 2  -1  $COSA  $SINA 0  1 0E9
GENCON 3 $N3 $N2 $N4 2 2 2  -1  $SINN  $COSA 0  1 0E9
GENCON 3 $N1 $N2 $N4 3 3 3  -1  $COSA  $SINA 0  1 0E9
GENCON 3 $N3 $N2 $N4 3 3 3  -1  $SINN  $COSA 0  1 0E9
 10 NOP
 20 NOP
LET $IRN4 = %RFM($IFN4 1 0 $IRN4)
LET $IRN3 = %RFM($IFN3 1 0 $IRN3)
LET $IRN2 = %RFM($IFN2 1 0 $IRN2)
LET $IRN1 = %RFM($IFN1 1 0 $IRN1)
NSET 10 COPY FREQ 0 0 NAME TORQ OPUT
NSET 10 INSERT FREQ 0 0 NAME TORQ OPUT
NSET 10 DELETE NAME SIDE TWO
NLIST 10 INSERT NSET 10
LET $IFN1 = %IFL(NLST NV 0 10)
LET $IRN1 = %LFM($IFN1 1)
DO 30 $I=1 2000 1
LET $N1  = %IBC1($IRN1 $I)
IF $N1  40 40 1
LET $X = %XN($N1 1)
LET $Y = %XN($N1 2)
LET $XY = $X  $Y
GENCON 2 $N1 $N1 1 2 _C1 -1  _C2 $XY 0  1 0E9
 30 NOP
 40 NOP
LET $IRN1 = %RFM $IFN1 1 0 $IRN1)
SET SYNTAX OFF
#
# SUPPRESS TOP EDGE OF HUB IN AXIAL DIRECTION
DOFSUP 3 NAME AXIS SUPP HUB
#
DOFLOO
FINISH
STOP
$BAND
START -1
REGPS
BAND
STOP
$SETUP
START 500000
SETUP
STOP
$MATL
START 500000
MATISO 1 15 5E6  35  # UNKNOWN MATERIAL
DENSITY 1  0004196  # DENSITY IN SNAILS  LB/386.088 = SNAILS
MATL
STOP
$MASS
START 500000
MASS 0 # LUMP MASS NEEDED FOR BODY FORCE IN LOAD
```

```
STOP
$ LOAD
START   500000
SET     SYNTAX ON
$ ************************************************************************
$                              INPUT VARIABLES
$ ************************************************************************
$
LET     &RPM = 37342      $ FREQUENCY IN RPM
LET     &VANE = 13        $ NUMBER OF VANES
LET     &SEGM = 6         $ NUMBER OF SEGMENTS
LET     &RATI = 3         $ RATIO ON UNLOAD TIME TO LOAD TIME
LET     &PRES = -24       $ PRESSURE ON VANES (PSI)
$
$ ************************************************************************
$
$ COSINE MODEL
DATA    &A1(1)  0 33333 $ MAX AMPLITUDE SEGMENT "1" (FULL VANE)
DATA    &A1(2)  0 16667 $ MAX AMPLITUDE SEGMENT "6" (FULL VANE)
DATA    &A1(3) -0 16667 $ MAX AMPLITUDE SEGMENT "5" (FULL VANE)
DATA    &A1(4) -0 33333 $ MAX AMPLITUDE SEGMENT "4" (FULL VANE)
DATA    &A1(5) -0 16667 $ MAX AMPLITUDE SEGMENT "3" (FULL VANE)
DATA    &A1(6)  0 16667 $ MAX AMPLITUDE SEGMENT "2" (FULL VANE)
$
DATA    &B1(1)  0 16667 $ MAX AMPLITUDE SEGMENT "6" (1ST PARTIAL VANE)
DATA    &B1(2) -0 16667 $ MAX AMPLITUDE SEGMENT "5" (1ST PARTIAL VANE)
DATA    &B1(3) -0 33333 $ MAX AMPLITUDE SEGMENT "4" (1ST PARTIAL VANE)
DATA    &B1(4) -0 16667 $ MAX AMPLITUDE SEGMENT "3" (1ST PARTIAL VANE)
DATA    &B1(5)  0 16667 $ MAX AMPLITUDE SEGMENT "2" (1ST PARTIAL VANE)
DATA    &B1(6)  0 33333 $ MAX AMPLITUDE SEGMENT "1" (1ST PARTIAL VANE)
$
DATA    &C1(1) -0 16667 $ MAX AMPLITUDE SEGMENT "3" (2ND PARTIAL VANE - A)
DATA    &C1(2)  0 16667 $ MAX AMPLITUDE SEGMENT "2" (2ND PARTIAL VANE - A)
DATA    &C1(3)  0 33333 $ MAX AMPLITUDE SEGMENT "1" (2ND PARTIAL VANE - A)
DATA    &C1(4)  0 16667 $ MAX AMPLITUDE SEGMENT "6" (2ND PARTIAL VANE - A)
DATA    &C1(5) -0 16667 $ MAX AMPLITUDE SEGMENT "5" (2ND PARTIAL VANE - A)
DATA    &C1(6) -0 33333 $ MAX AMPLITUDE SEGMENT "4" (2ND PARTIAL VANE - A)
$
DATA    &D1(1) -0 16667 $ MAX AMPLITUDE SEGMENT "3" (2ND PARTIAL VANE - B)
DATA    &D1(2)  0 16667 $ MAX AMPLITUDE SEGMENT "2" (2ND PARTIAL VANE - B)
DATA    &D1(3)  0 33333 $ MAX AMPLITUDE SEGMENT "1" (2ND PARTIAL VANE - B)
DATA    &D1(4)  0 16667 $ MAX AMPLITUDE SEGMENT "6" (2ND PARTIAL VANE - B)
DATA    &D1(5) -0 16667 $ MAX AMPLITUDE SEGMENT "5" (2ND PARTIAL VANE - B)
DATA    &D1(6) -0 33333 $ MAX AMPLITUDE SEGMENT "4" (2ND PARTIAL VANE - B)
$
$ SINE MODEL
DATA    &A2(1)  0 00000 $ MAX AMPLITUDE SEGMENT "1" (FULL VANE)
DATA    &A2(2) -0 28868 $ MAX AMPLITUDE SEGMENT "6" (FULL VANE)
DATA    &A2(3) -0 28868 $ MAX AMPLITUDE SEGMENT "5" (FULL VANE)
DATA    &A2(4)  0 00000 $ MAX AMPLITUDE SEGMENT "4" (FULL VANE)
DATA    &A2(5)  0 28868 $ MAX AMPLITUDE SEGMENT "3" (FULL VANE)
DATA    &A2(6)  0 28868 $ MAX AMPLITUDE SEGMENT "2" (FULL VANE)
$
DATA    &B2(1) -0 28868 $ MAX AMPLITUDE SEGMENT "6" (1ST PARTIAL VANE)
DATA    &B2(2) -0 28868 $ MAX AMPLITUDE SEGMENT "5" (1ST PARTIAL VANE)
```



```
DATA    &B2(3)  0 00000 $ MAX AMPLITUDE SEGMENT "4" (1ST PARTIAL VANE)
DATA    &B2(4)  0 28868 $ MAX AMPLITUDE SEGMENT "3" (1ST PARTIAL VANE)
DATA    &B2(5)  0 28868 $ MAX AMPLITUDE SEGMENT "2" (1ST PARTIAL VANE)
DATA    &B2(6)  0 00000 $ MAX AMPLITUDE SEGMENT "1" (1ST PARTIAL VANE)
$
DATA    &C2(1)  0 28868 $ MAX AMPLITUDE SEGMENT "3" (2ND PARTIAL VANE - A)
DATA    &C2(2)  0 28868 $ MAX AMPLITUDE SEGMENT "2" (2ND PARTIAL VANE - A)
DATA    &C2(3)  0 00000 $ MAX AMPLITUDE SEGMENT "1" (2ND PARTIAL VANE - A)
DATA    &C2(4) -0 28868 $ MAX AMPLITUDE SEGMENT "6" (2ND PARTIAL VANE - A)
DATA    &C2(5) -0 28868 $ MAX AMPLITUDE SEGMENT "5" (2ND PARTIAL VANE - A)
DATA    &C2(6)  0 00000 $ MAX AMPLITUDE SEGMENT "4" (2ND PARTIAL VANE - A)
$
DATA    &D2(1)  0 28868 $ MAX AMPLITUDE SEGMENT "3" (2ND PARTIAL VANE - B)
DATA    &D2(2)  0 28868 $ MAX AMPLITUDE SEGMENT "2" (2ND PARTIAL VANE - B)
DATA    &D2(3)  0 00000 $ MAX AMPLITUDE SEGMENT "1" (2ND PARTIAL VANE - B)
DATA    &D2(4) -0 28868 $ MAX AMPLITUDE SEGMENT "6" (2ND PARTIAL VANE - B)
DATA    &D2(5) -0 28868 $ MAX AMPLITUDE SEGMENT "5" (2ND PARTIAL VANE - B)
DATA    &D2(6)  0 00000 $ MAX AMPLITUDE SEGMENT "4" (2ND PARTIAL VANE - B)
$
$ CALCULATE FORCE TIME HISTORIES
$
LET     &FREQ = &RPM / 60         $ FREQUENCY IN HZ
LET     &T = 1 / &FREQ            $ PERIOD IN SECS
LET     &TV = &T / &VANE          $ PERIOD FOR ONE VANE
LET     &TS = &TV / &SEGM         $ PERIOD FOR ONE SEGMENT BETWEEN VANES
$
LET     &TOF1 = &TS * 0
LET     &TOF2 = &TS * 0 50
LET     &TOF3 = &TS * 0 75
LET     &TOF4 = &TS * 0 25
$
LET     &TB = &TS / &RATI         $ LOADING & UNLOADING TIME
LET     &TA = &TB / 2             $ LOADING TIME
LET     &NSEG = %IFIX(&SEGM)
$
STORE   1                         $ SAVE TIME VARIABLES FOR SOLVE PROCESSOR
$
LET     &LC0 = 25                 $ LOAD CASE ZERO (25) = ZERO LOADS
LCASE   &LC0
P       0  3 NODE=1
$
$
LTCASE  1                         $ FULL VANE
DO  10 &I = 1 &NSEG 1             $ LOOP THROUGH NUMBER OF SEGMENTS
LCASE   &I
LET     &P1 = &PRES * &A1(&I)     $ ACTUAL PRESSURE ON COSINE
LET     &P2 = &PRES * &A2(&I)     $ ACTUAL PRESSURE ON SINE
PSURF   &P1  1 3 MSET 11          $ COSINE
PSURF   &P2  1 3 MSET 21          $ SINE
LET     &N = &I - 1               $ TIME INCREMENT FOR LOOPS
LET     &TINC = %FLOA(&N) * &TS
$
LET     &LCI = &I
LET     &T1 = &TOF1 + &TINC
LET     &T2 = &TA + &TOF1 + &TINC
```

```
LET     &T3 = &TB + &TOF1 + &TINC
$
$                                       F
LTIME   &LCO &T1                $      /\       /\
LTIME   &LCI &T2                $     /  \     /  \
LTIME   &LCO &T3                $ 0 1 2 3     4
$                                  <---TINC---->
 10     NOP
LTIME   &LCO &TV                $ FINAL LOAD = 0
$
$
LTCASE  2                       $ 1ST PARTIAL VANE
LTIME   &LCO 0                  $ INITIAL LOAD = 0
DO  20 &I = 1 &NSEG 1           $ LOOP THROUGH NUMBER OF SEGMENTS
LET     &IC = &NSEG + &I
LCASE   &IC
LET     &P1 = &PRES * &B1(&I)   $ ACTUAL PRESSURE ON COSINE
LET     &P2 = &PRES * &B2(&I)   $ ACTUAL PRESSURE ON SINE
PSURF   &P1 1 3 MSET 12         $ COSINE
PSURF   &P2 1 3 MSET 22         $ SINE
LET     &N = &I - 1             $ TIME INCREMENT FOR LOOPS
LET     &TINC = %FLOA(&N) * &TS
$
LET     &LCI = &IC
LET     &T1 = &TOF2 + &TINC
LET     &T2 = &TA + &TOF2 + &TINC
LET     &T3 = &TB + &TOF2 + &TINC
$
$                                       F
LTIME   &LCO &T1                $      /\       /\
LTIME   &LCI &T2                $     /  \     /  \
LTIME   &LCO &T3                $ 0 1 2 3     4
$                                  <---TINC---->
 20     NOP
LTIME   &LCO &TV                $ FINAL LOAD = 0
$
$
LTCASE  3                       $ 2ND PARTIAL VANE (A)
$
LET     &LC26 = 26              $ FIRST AND LAST LOAD CASES FOR LTCASE 3
LCASE   &LC26
LET     &P1 = &PRES * &C1(6)  / 2       $ ACTUAL PRESSURE ON COSINE
LET     &P2 = &PRES * &C2(6)  / 2       $ ACTUAL PRESSURE ON SINE
LET     &TS12 = &TS  / 12       $ TIME AT END OF INITIAL LOAD CASE
PSURF   &P1 1 3 MSET 13         $ COSINE
PSURF   &P2 1 3 MSET 23         $ SINE
$
LTIME   &LC26 0                 $ INITIAL LOAD
LTIME   &LCO  &TS12
$
DO  30 &I = 1 &NSEG 1           $ LOOP THROUGH NUMBER OF SEGMENTS
LET     &IC = 2 * &NSEG + &I
LCASE   &IC
LET     &P1 = &PRES * &C1(&I)   $ ACTUAL PRESSURE ON COSINE
LET     &P2 = &PRES * &C2(&I)   $ ACTUAL PRESSURE ON SINE
```



```
PSURF   &P1 1 3 MSET 13         $ COSINE
PSURF   &P2 1 3 MSET 23         $ SINE
LET     &N = &I - 1             $ TIME INCREMENT FOR LOOPS
LET     &TINC = %FLOA(&N) * &TS
$
LET     &LCI = &IC
LET     &T1 = &TOF3 + &TINC
LET     &T2 = &TA + &TOF3 + &TINC
LET     &T3 = &TB + &TOF3 + &TINC
$
$                                       F
LTIME   &LCO &T1                $      /\       /\       /\
LTIME   &LCI &T2                $     /  \     /  \     /
IF      &T3-&TV 1 1 31          $ 0 1 2 3     4
LTIME   &LCO &T3                $    <---TINC---->
$
 30     NOP
GOTO    32
 31     CONTINUE
$
LTIME   &LC26 &TV               $ FINAL LOAD
 32     CONTINUE
$
$
LTCASE  4                       $ 2ND PARTIAL VANE (B)
LTIME   &LCO 0                  $ INITIAL LOAD = 0
DO  40 &I = 1 &NSEG 1           $ LOOP THROUGH NUMBER OF SEGMENTS
LET     &IC = 3 * &NSEG + &I
LCASE   &IC
LET     &P1 = &PRES * &D1(&I)   $ ACTUAL PRESSURE ON COSINE
LET     &P2 = &PRES * &D2(&I)   $ ACTUAL PRESSURE ON SINE
PSURF   &P1 1 3 MSET 14         $ COSINE
PSURF   &P2 1 3 MSET 24         $ SINE
LET     &N = &I - 1             $ TIME INCREMENT FOR LOOPS
LET     &TINC = %FLOA(&N) * &TS
$
LET     &LCI = &IC
LET     &T1 = &TOF4 + &TINC
LET     &T2 = &TA + &TOF4 + &TINC
LET     &T3 = &TB + &TOF4 + &TINC
$
$                                       F
LTIME   &LCO &T1                $      /\       /\
LTIME   &LCI &T2                $     /  \     /  \
LTIME   &LCO &T3                $ 0 1 2 3     4
$                                  <---TINC---->
 40     NOP
LTIME   &LCO &TV                $ FINAL LOAD = 0
$
$
$ LOAD CASES 27-34 FOR MTVECT IN EIGEN PROCESSOR
$
LCASE   27
PSURF   1  1 3 MSET 11
LCASE   28
```

```
PSURF   1  1 3 MSET 12
LCASE   29
PSURF   1  1 3 MSET 13
LCASE   30
PSURF   1  1 3 MSET 14
LCASE   31
PSURF   1  1 3 MSET 21
LCASE   32
PSURF   1  1 3 MSET 22
LCASE   33
PSURF   1  1 3 MSET 23
LCASE   34
PSURF   1  1 3 MSET 24
$
ASSIGN  IPLT=2                  $ PRINTOUT LOAD TIME HISTORY
$
LOAD
STOP
$SOLVE
START   500000
EIGEN 1
SOLVE
STOP
$EIGEN
START   1500000 2500
ASSIGN  RAT=1 001 ISL=LAN
MODES   200 32000
EIGEN   DIAG
MTVECT    27T34
LOADPF
STOP
LOADPF
STOP
$UTILITY
START 200000
#
COPY MATL_EV  ? ? [3]   COPY ELEM_EV ? ? [3]
COPY INTO_EV  ? ? [3]   COPY X_NV ? ? [3]
COPY NORM_NV  ? ? [3]   COPY RDF_NV ? ? [3]
COPY ROT_NV   ? ? [3]   COPY DOF_NV ? ? [3]
COPY IR_NV    ? ? [3]   COPY IER_EV ? ? [3]
COPY LCS_NV   ? ? [3]   COPY SKEW_NV ? ? [3]
COPY SDF_NV   ? ? [3]   COPY NAME_NV ? ? [3]
COPY NAME_EV  ? ? [3]   COPY CON_CON 0 ? [3]
COPY MESH_HED 0 ? [3]   COPY NLST_NV 0 ? [3]
COPY CON_RM_DIR ? ? [3]  COPY NSET_NV 0 ? [3]
COPY PCT_HED ? ? ? [3]  COPY SYS_CRM ? ? [3]
COPY MLIB MLIB ? ? [3]  COPY UL_NV 0  ? [3]
COPY UL_SV 0  ? [3]     COPY VIBE_SV 0 ? [3]
#
COPY EV_RV ? ? [3]
COPY LTH_CRM ? ? [3]
COPY LMPF_RV ? ? [3]
#
```



```
BCDOUT EXTEND 7 EV_RV ? ?
BCDOUT/EXTEND 7 LTH_CRM ? ?
BCDOUT/EXTEND 7 LMPF_RV ? ?
#
STOP
/EOF
```

```
JOB JN=IMPD2,T=7002,CL=DEFERRD MFL=2000000 US=636795
ACCOUNT AC=1,UPW=
*************************************************************
*  SSME IMPELLER MODELS - 2ND DEGENERATE - COSINE & SINE    *
*************************************************************
FETCH DN=MESH,DF=TR,TEXT='DISK8:[FERGUSON.CEXL3D2]MESH.CEX'
MESH
FETCH DN=BAND,DF=TR,TEXT='DISK8:[FERGUSON.CEXL3D2]BAND.CEX'
BAND
FETCH DN=SETUP,DF=TR,TEXT='DISK8:[FERGUSON.CEXL3D2]SETUP.CEX'
SETUP
FETCH DN=MATL,DF=TR,TEXT='DISK8:[FERGUSON.CEXL3D2]MATL.CEX'
MATL
FETCH DN=MASS,DF=TR,TEXT='DISK8:[FERGUSON.CEXL3D2]MASS.CEX'
MASS
FETCH DN=LOAD,DF=TR,TEXT='DISK8:[FERGUSON.CEXL3D2]LOAD.CEX'
LOAD
FETCH DN=SOLVE,DF=TR,TEXT='DISK8:[FERGUSON.CEXL3D2]SOLVE.CEX'
SOLVE
FETCH DN=EIGEN,DF=TR,TEXT='DISK8:[FERGUSON.CEXL3D1]EIGEN.CEX'
EIGEN
FETCH DN=UTILITY,DF=TR,TEXT='DISK8:[FERGUSON.CEXL3D2]UTILITY.CEX'
UTILITY
DISPOSE DN=FT07,TEXT='DISK6:[CAT]IMPD2PRA.PUN'
DISPOSE DF=BB,DN=FT08,TEXT='$DISK/RMS=REC:DISKL:[CAT]IMPD2.PUN'
BAD
EXIT
SAVE DN=FIL002,PDN=IMPD2,ID=CAT,UQ
 EOF
$MESH
CLEAR,500000
MAX/MXPO=1500,15000,7000
ELTYPE,4,2,3
HEAD,1,'SSME IMPELLER MODEL'
HEAD,2,'2ND DEGENERATE MESHES (COSINE,SINE)'
ASSIGN,IPNO=0,IPLC=0,IPSK=0,IPEL=0,IPCO=0
#MESH POINT FROM CADAM      WAL-SSME-HUB   FEM14
!UPOINT     1     -5     1     5.2111     2.7128    -3.6254
!UPOINT     2     -5     1     4.3907     3.9035    -3.6254
!UPOINT     3     -5     1     3.2316     4.9064    -3.6254
!UPOINT     4     -5     1     1.8508     5.5759    -3.6254
!UPOINT     5     -5     1     0.3380     5.8653    -3.6254
!UPOINT     6     -5     3     5.0396     2.4557    -3.6379
!UPOINT     7     -5     3     4.3617     3.5218    -3.6379
!UPOINT     8     -5     3     3.3006     4.5315    -3.6379
!UPOINT     9     -5     3     2.0165     5.2308    -3.6379
!UPOINT    10     -5     3     0.5963     5.5743    -3.6379
!UPOINT    11     -5     5     4.8716     2.1801    -3.6504
!UPOINT    12     -5     5     4.3232     3.1298    -3.6504
!UPOINT    13     -5     5     3.3604     4.1454    -3.6504
!UPOINT    14     -5     5     2.1791     4.8721    -3.6504
!UPOINT    15     -5     5     0.8458     5.2697    -3.6504
!UPOINT    16     -5     7     4.7009     1.8942    -3.6630
!UPOINT    17     -5     7     4.2684     2.7327    -3.6630
!UPOINT    18     -5     7     3.4157     3.7443    -3.6630
```



```
!UPOINT    19     -5     7     2.3302     4.5007    -3.6630
!UPOINT    20     -5     7     1.0814     4.9493    -3.6630
!UPOINT    21     -5     9     4.5272     1.5928    -3.6755
!UPOINT    22     -5     9     4.1718     2.3725    -3.6755
!UPOINT    23     -5     9     3.4484     3.3379    -3.6755
!UPOINT    24     -5     9     2.4267     4.1405    -3.6755
!UPOINT    25     -5     9     1.3159     4.6153    -3.6755
!UPOINT    26     -5    11     4.3636     1.2559    -3.6880
!UPOINT    27     -5    11     4.0375     2.0664    -3.6880
!UPOINT    28     -5    11     3.4431     2.9454    -3.6880
!UPOINT    29     -5    11     2.4684     3.7997    -3.6880
!UPOINT    30     -5    11     1.5078     4.2728    -3.6880
!UPOINT    31     -5    13     4.1603     0.9295    -3.7000
!UPOINT    32     -5    13     3.8775     1.7712    -3.7000
!UPOINT    33     -5    13     3.4174     2.5482    -3.7000
!UPOINT    34     -5    13     2.4724     3.4727    -3.7000
!UPOINT    35     -5    13     1.6845     3.9159    -3.7000
!UPOINT    36     -5    15     3.9395     0.6011    -3.7000
!UPOINT    37     -5    15     3.7360     1.3810    -3.7000
!UPOINT    38     -5    15     3.3696     2.1378    -3.7000
!UPOINT    39     -5    15     2.5441     3.0636    -3.7000
!UPOINT    40     -5    15     1.8408     3.5311    -3.7000
!UPOINT    41     -5    17     3.6948     0.2862    -3.7000
!UPOINT    42     -5    17     3.5868     1.0048    -3.7000
!UPOINT    43     -5    17     3.2746     1.7346    -3.7000
!UPOINT    44     -5    17     2.5865     2.6536    -3.7000
!UPOINT    45     -5    17     1.9688     3.1394    -3.7000
!UPOINT    46     -5    19     3.4351    -0.0252    -3.7000
!UPOINT    47     -5    19     3.3768     0.6307    -3.7000
!UPOINT    48     -5    19     3.1683     1.3276    -3.7000
!UPOINT    49     -5    19     2.6091     2.2346    -3.7000
!UPOINT    50     -5    19     2.0791     2.7346    -3.7000
!UPOINT    51     -5    21     3.1606    -0.3034    -3.7000
!UPOINT    52     -5    21     3.1646     0.2572    -3.7000
!UPOINT    53     -5    21     3.0368     0.9306    -3.7000
!UPOINT    54     -5    21     2.6120     1.8050    -3.7000
!UPOINT    55     -5    21     2.1726     2.3153    -3.7000
!UPOINT    56     -5    23     2.8738    -0.5726    -3.6933
!UPOINT    57     -5    23     2.9290    -0.0893    -3.6933
!UPOINT    58     -5    23     2.8659     0.6116    -3.6933
!UPOINT    59     -5    23     2.5812     1.3872    -3.6933
!UPOINT    60     -5    23     2.2307     1.9003    -3.6933
!UPOINT    61     -5    25     2.5806    -0.8204    -3.6833
!UPOINT    62     -5    25     2.6773    -0.4060    -3.6833
!UPOINT    63     -5    25     2.6781     0.4009    -3.6833
!UPOINT    64     -5    25     2.5216     0.9870    -3.6833
!UPOINT    65     -5    25     2.2668     1.4986    -3.6833
!UPOINT    66     -5    27     2.3067    -1.0249    -3.6751
!UPOINT    67     -5    27     2.4294    -0.6850    -3.6751
!UPOINT    68     -5    27     2.5234    -0.0613    -3.6751
!UPOINT    69     -5    27     2.4464     0.6215    -3.6751
!UPOINT    70     -5    27     2.2604     1.1235    -3.6751
!UPOINT    71     -5    29     2.0199    -1.2256    -3.6679
!UPOINT    72     -5    29     2.1734    -0.9263    -3.6679
!UPOINT    73     -5    29     2.3499    -0.2448    -3.6679
```

IUPOINT	74	-5	29	2.3454	0.2845	-3.6679	
IUPOINT	75	-5	29	2.2327	0.7727	-3.6679	
IUPOINT	76	-5	31	1.7380	-1.4062	-3.6822	
IUPOINT	77	-5	31	1.9158	-1.1523	-3.6622	
IUPOINT	78	-5	31	2.1703	-0.5366	-3.6622	
IUPOINT	79	-5	31	2.2353	-0.0400	-3.6622	
IUPOINT	80	-5	31	2.1934	0.4323	-3.6822	
IUPOINT	81	-5	33	1.4229	-1.5998	-3.6550	
IUPOINT	82	-5	33	1.6647	-1.3463	-3.6550	
IUPOINT	83	-5	33	1.9875	-0.7960	-3.6550	
IUPOINT	84	-5	33	2.1149	-0.3336	-3.6550	
IUPOINT	85	-5	33	2.1376	0.1199	-3.6550	
IUPOINT	86	-5	35	1.0501	-1.7838	-3.6550	
IUPOINT	87	-5	35	1.4071	-1.5182	-3.6550	
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IUPOINT	89	-5	35	1.9777	-0.6112	-3.6550	
IUPOINT	90	-5	35	2.0621	-0.1804	-3.6650	
IUPOINT	91	-5	39	0.9309	-1.5813	-3.6550	
IUPOINT	92	-5	39	1.2474	-1.3458	-3.6550	
IUPOINT	93	-5	39	1.5886	-0.9185	-3.6650	
IUPOINT	94	-5	39	1.7532	-0.5418	-3.6550	
IUPOINT	95	-5	39	1.8280	-0.1599	-3.6550	
IUPOINT	96	-5	41	0.7370	-1.2519	-3.6550	
IUPOINT	97	-5	41	0.9875	-1.0655	-3.6550	
IUPOINT	98	-5	41	1.2576	-0.7272	-3.6550	
IUPOINT	99	-5	41	1.3880	-0.4290	-3.6550	
IUPOINT	100	-5	41	1.4472	-0.1266	-3.6550	
IUPOINT	101	-5	43	0.6138	-1.0427	-3.6550	
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IUPOINT	103	-5	43	1.0475	-0.6057	-3.6550	
IUPOINT	104	-5	43	1.1560	-0.3673	-3.6550	
IUPOINT	105	-5	43	1.2054	-0.1055	-3.6550	
IUPOINT	106	-5	1	4.3363	3.9639	-3.6254	
IUPOINT	107	-5	3	4.2327	3.6758	-3.6379	
IUPOINT	108	-5	5	4.1404	3.3679	-3.6504	
IUPOINT	109	-5	7	4.0508	3.0458	-3.6630	
IUPOINT	110	-5	9	3.9639	2.7056	-3.6755	
IUPOINT	111	-5	11	3.9139	2.2829	-3.6880	
IUPOINT	112	-5	13	3.8775	1.7712	-3.7000	
IUPOINT	113	-5	1	3.1634	4.9606	-3.6254	
IUPOINT	114	-5	3	3.1372	4.6461	-3.6379	
IUPOINT	115	-5	5	3.1243	4.3271	-3.6504	
IUPOINT	116	-5	7	3.1208	3.9934	-3.6630	
IUPOINT	117	-5	9	3.1273	3.6404	-3.6755	
IUPOINT	118	-5	11	3.1436	3.2632	-3.6880	
IUPOINT	119	-5	13	3.1250	2.8804	-3.7000	
IUPOINT	120	-5	15	3.0966	2.5060	-3.7000	
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IUPOINT	123	-5	21	2.8970	1.2993	-3.7000	
IUPOINT	124	-5	23	2.7938	0.8842	-3.6933	
IUPOINT	125	-6	25	2.6781	0.4009	-3.6833	
IUPOINT	126	-5	1	1.7734	5.6010	-3.6254	
IUPOINT	127	-5	3	1.8276	5.2998	-3.6379	
IUPOINT	128	-5	5	1.9017	4.9869	-3.6504	

IUPOINT	129	-5	7	1.9852	4.6632	-3.6630	
IUPOINT	130	-5	9	2.0800	4.3251	-3.6755	
IUPOINT	131	-5	11	2.2481	3.9340	-3.6880	
IUPOINT	132	-6	13	2.4724	3.4727	-3.7000	
IUPOINT	133	-5	1	0.2561	5.8694	-3.6254	
IUPOINT	134	-5	3	0.3831	5.5823	-3.6379	
IUPOINT	135	-5	5	0.5477	5.3090	-3.6504	
IUPOINT	136	-6	7	0.7100	5.0182	-3.6630	
IUPOINT	137	-5	9	0.8842	4.7171	-3.6755	
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IUPOINT	143	-6	21	1.8430	2.5854	-3.7000	
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IUPOINT	146	-5	27	2.0410	1.4852	-3.6751	
IUPOINT	147	-5	29	2.0713	1.1365	-3.6679	
IUPOINT	148	-5	31	2.0868	0.8020	-3.6622	
IUPOINT	149	-5	33	2.0969	0.4323	-3.6580	
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IUPOINT	152	-5	41	1.4527	0.0000	-3.6550	
IUPOINT	153	-5	43	1.2100	0.0000	-3.6550	
IUPOINT	155	-1	1	5.2111	2.7129	-3.3925	
IUPOINT	156	-1	1	4.3907	3.9036	-3.3925	
IUPOINT	157	-1	1	3.2316	4.9064	-3.3925	
IUPOINT	158	-1	1	1.8508	5.6769	-3.3925	
IUPOINT	159	-1	1	0.3380	5.8853	-3.3925	
IUPOINT	160	-1	3	5.0396	2.4567	-3.3925	
IUPOINT	161	-1	3	4.3617	3.5218	-3.3925	
IUPOINT	162	-1	3	3.3006	4.5316	-3.3925	
IUPOINT	163	-1	3	2.0165	5.2308	-3.3925	
IUPOINT	164	-1	3	0.5963	5.5743	-3.3925	
IUPOINT	165	-1	5	4.8716	2.1801	-3.3925	
IUPOINT	166	-1	5	4.3232	3.1298	-3.3925	
IUPOINT	167	-1	5	3.3604	4.1464	-3.3925	
IUPOINT	168	-1	5	2.1791	4.8721	-3.3925	
IUPOINT	169	-1	5	0.8458	5.2697	-3.3925	
IUPOINT	170	-1	7	4.7009	1.8942	-3.3925	
IUPOINT	171	-1	7	4.2684	2.7327	-3.3925	
IUPOINT	172	-1	7	3.4167	3.7443	-3.3925	
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IUPOINT	174	-1	7	1.0914	4.9493	-3.3925	
IUPOINT	175	-1	9	4.5272	1.5928	-3.3925	
IUPOINT	176	-1	9	4.1718	2.3726	-3.3925	
IUPOINT	177	-1	9	3.4484	3.3379	-3.3925	
IUPOINT	178	-1	9	2.4267	4.1406	-3.3925	
IUPOINT	179	-1	9	1.3159	4.6153	-3.3925	
IUPOINT	180	-1	11	4.3536	1.2659	-3.3718	
IUPOINT	181	-1	11	4.0375	2.0564	-3.3718	
IUPOINT	182	-1	11	3.4431	2.9454	-3.3718	
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IUPOINT	184	-1	11	1.5078	4.2728	-3.3718	

IUPOINT	185	-1	13	4.1603	0.9295	-3.3512	
IUPOINT	186	-1	13	3.8775	1.7712	-3.3512	
IUPOINT	187	-1	13	3.4174	2.5482	-3.3512	
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IUPOINT	189	-1	13	1.6845	3.9160	-3.3512	
IUPOINT	190	-1	15	3.8365	0.6011	-3.3096	
IUPOINT	191	-1	15	3.7360	1.3810	-3.3096	
IUPOINT	192	-1	15	3.3596	2.1378	-3.3096	
IUPOINT	193	-1	15	2.5441	3.0636	-3.3096	
IUPOINT	194	-1	15	1.8408	3.5311	-3.3096	
IUPOINT	195	-1	17	3.6946	0.2862	-3.2463	
IUPOINT	196	-1	17	3.5668	1.0048	-3.2463	
IUPOINT	197	-1	17	3.2746	1.7346	-3.2463	
IUPOINT	198	-1	17	2.5865	2.6536	-3.2463	
IUPOINT	199	-1	17	1.9618	3.1394	-3.2463	
IUPOINT	200	-1	19	3.4351	-0.0252	-3.1615	
IUPOINT	201	-1	19	3.3768	0.6307	-3.1615	
IUPOINT	202	-1	19	3.1683	1.3276	-3.1615	
IUPOINT	203	-1	19	2.6091	2.2346	-3.1615	
IUPOINT	204	-1	19	2.0791	2.7346	-3.1615	
IUPOINT	205	-1	21	3.1605	-0.3034	-3.0497	
IUPOINT	206	-1	21	3.1646	0.2572	-3.0497	
IUPOINT	207	-1	21	3.0356	0.9305	-3.0497	
IUPOINT	208	-1	21	2.6120	1.8050	-3.0497	
IUPOINT	209	-1	21	2.1726	2.3153	-3.0497	
IUPOINT	210	-1	23	2.8739	-0.5726	-2.9075	
IUPOINT	211	-1	23	2.9290	-0.0893	-2.9075	
IUPOINT	212	-1	23	2.8659	0.6116	-2.9075	
IUPOINT	213	-1	23	2.5812	1.3872	-2.9075	
IUPOINT	214	-1	23	2.2307	1.9003	-2.9075	
IUPOINT	215	-1	25	2.5806	-0.8204	-2.7329	
IUPOINT	216	-1	25	2.6773	-0.4060	-2.7329	
IUPOINT	217	-1	25	2.6781	0.4009	-2.7329	
IUPOINT	218	-1	25	2.5216	0.9870	-2.7329	
IUPOINT	219	-1	25	2.2568	1.4966	-2.7329	
IUPOINT	220	-1	27	2.3067	-1.0249	-2.5389	
IUPOINT	221	-1	27	2.4294	-0.6850	-2.5389	
IUPOINT	222	-1	27	2.5234	-0.0613	-2.5389	
IUPOINT	223	-1	27	2.4464	0.6215	-2.5389	
IUPOINT	224	-1	27	2.2604	1.1235	-2.5389	
IUPOINT	225	-1	29	2.0199	-1.2256	-2.3233	
IUPOINT	226	-1	29	2.1734	-0.8263	-2.3233	
IUPOINT	227	-1	29	2.3499	-0.2448	-2.3233	
IUPOINT	228	-1	29	2.3454	0.2845	-2.3233	
IUPOINT	229	-1	29	2.2327	0.7727	-2.3233	
IUPOINT	230	-1	31	1.7380	-1.4062	-2.0833	
IUPOINT	231	-1	31	1.9158	-1.1523	-2.0833	
IUPOINT	232	-1	31	2.1703	-0.5366	-2.0833	
IUPOINT	233	-1	31	2.2353	-0.0400	-2.0833	
IUPOINT	234	-1	31	2.1934	0.4323	-2.0833	
IUPOINT	235	-1	33	1.4229	-1.5998	-1.8265	
IUPOINT	236	-1	33	1.6647	-1.3463	-1.8265	
IUPOINT	237	-1	33	1.9875	-0.7960	-1.8265	
IUPOINT	238	-1	33	2.1149	-0.3336	-1.8265	
IUPOINT	239	-1	33	2.1376	0.1199	-1.8265	

IUPOINT	240	-1	35	1.0501	-1.7838	-1.5599	
IUPOINT	241	-1	35	1.4071	-1.5182	-1.5599	
IUPOINT	242	-1	35	1.7920	-1.0362	-1.5599	
IUPOINT	243	-1	35	1.9777	-0.6112	-1.5599	
IUPOINT	244	-1	35	2.0621	-0.1804	-1.5599	
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IJPOINT 1351	7	37	2 9836	-1 5585	-1	4500
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IJPOINT 1361	7	39	3 0377	1 4707	-1	4060
IJPOINT 1362	7	39	2 8466	1 8133	-1	4060
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IJPOINT 1406	3	3				
IJPOINT 1411	3	5				
IJPOINT 1416	3	7				
IJPOINT 1421	3	9				
IJPOINT 1426	3	11				
IJPOINT 1431	3	13				
IJPOINT 1436	3	15				
IJPOINT 1441	3	17				
IJPOINT 1446	3	19				
IJPOINT 1451	3	21				
IJPOINT 1456	3	23				
IJPOINT 1461	3	25				
IJPOINT 1466	3	27				
IJPOINT 1471	3	29				
IJPOINT 1476	3	31				
IJPOINT 1481	3	33				

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IJPOINT 1486        3       35
IJPOINT 1491        3       38
DEFSYS 1 1 0 0 0 0 0 0 1 0 0 0 0 0 1 0 1 0 0 0
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MSYS 1
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IJGRID 1
SLINES 2T92B5 331 246 309 241T156B-5 2 87 241 32 186
RULE 5 1
IJNAME 240 308       LOW HUB
IJNAME 155 240       LOW HUB
IJSOLID  0 0 1
IJSOLID 455 160 1 SO 0 PRES  A HUB
IJSOLID 460 165 1 SO 0 PRES  B HUB
IJSOLID 465 170 1 SO 0 PRES  C HUB
IJSOLID 470 175 1 SO 0 PRES  D HUB
IJSOLID 475 180 1 SO 0 PRES  E HUB
IJSOLID 480 185 1 SO 0 PRES  F HUB
IJSOLID 485 190 1 SO 0 PRES  G HUB
IJSOLID 490 195 1 SO 0 PRES  H HUB
IJSOLID 495 200 1 SO 0 PRES  I HUB
IJSOLID 500 205 1 SO 0 PRES  J HUB
IJSOLID 505 210 1 SO 0 PRES  K HUB
IJSOLID 510 215 1 SO 0 PRES  L HUB
IJSOLID 515 220 1 SO 0 PRES  M HUB
IJSOLID 520 225 1 SO 0 PRES  N HUB
IJSOLID 525 230 1 SO 0 PRES  O HUB
IJSOLID 530 235 1 SO 0 PRES  P HUB
IJSOLID 535 240 1 SO 0 PRES  Q HUB
IJSOLID 240 608 1 SO 0 PRES  R HUB
IJSOLID   1 540 1 SO 0 PRES  S HUB
KNAME 0 0 1 1 SIDE ONE BOT
MESH 3
#MESH 2
MSYS 1
SLINES 2T32B5 186T156B-5 2
IJGRID 1
SLINES 106T112 266T260B-1 106
RULE 3 1
IJSOLID  0 0 1
IJSOLID   1 485 1 SO 0 PRES  S HUB
MESH 3
MERGE MESH 1
#MESH 3
MSYS 1
SLINES 106T112 37T92B5 331 246 309 241T191B-5 266T260B-1 106 87 241
SLINES 112 266
IJGRID 1
SLINES 3T93B5 332 247 310 242T157B-5 3 88 242 217 63
RULE 5 1
IJNAME 240 308       LOW HUB
IJNAME 155 240       LOW HUB
IJSOLID  0 0 1
IJSOLID 455 160 1 SO 0 PRES  A HUB
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IJSOLID 460 165 1 SO 0 PRES  B HUB
IJSOLID 465 170 1 SO 0 PRES  C HUB
IJSOLID 470 175 1 SO 0 PRES  D HUB
IJSOLID 475 180 1 SO 0 PRES  E HUB
IJSOLID 480 185 1 SO 0 PRES  F HUB
IJSOLID 485 190 1 SO 0 PRES  G HUB
IJSOLID 490 195 1 SO 0 PRES  H HUB
IJSOLID 495 200 1 SO 0 PRES  I HUB
IJSOLID 500 205 1 SO 0 PRES  J HUB
IJSOLID 505 210 1 SO 0 PRES  K HUB
IJSOLID 510 215 1 SO 0 PRES  L HUB
IJSOLID 515 220 1 SO 0 PRES  M HUB
IJSOLID 520 225 1 SO 0 PRES  N HUB
IJSOLID 525 230 1 SO 0 PRES  O HUB
IJSOLID 530 235 1 SO 0 PRES  P HUB
IJSOLID 535 240 1 SO 0 PRES  Q HUB
IJSOLID 240 608 1 SO 0 PRES  R HUB
IJSOLID   1 540 1 SO 0 PRES  S HUB
MESH 3
MERGE MESH 1 2
#MESH 4
MSYS 1
SLINES 3T63B5 217T157B-5 3
IJGRID 1
SLINES 113T125 279T267B-1 113
RULE 3 1
IJSOLID  0 0 1
IJSOLID   1 515 1 SO 0 PRES  S HUB
MESH 3
MERGE MESH 3
#MESH 5
MSYS 1
SLINES 113T125 68T93B5 332 247 310 242T222B-5 279T267B-1 113 125 279 88 242
IJGRID 1
SLINES 4T94B5 333 248 311 243T158B-5 4 89 243 188 34
RULE 5 1
IJNAME 240 308       LOW HUB
IJNAME 155 240       LOW HUB
IJSOLID  0 0 1
IJSOLID 455 160 1 SO 0 PRES  A HUB
IJSOLID 460 165 1 SO 0 PRES  B HUB
IJSOLID 465 170 1 SO 0 PRES  C HUB
IJSOLID 470 175 1 SO 0 PRES  D HUB
IJSOLID 475 180 1 SO 0 PRES  E HUB
IJSOLID 480 185 1 SO 0 PRES  F HUB
IJSOLID 485 190 1 SO 0 PRES  G HUB
IJSOLID 490 195 1 SO 0 PRES  H HUB
IJSOLID 495 200 1 SO 0 PRES  I HUB
IJSOLID 500 205 1 SO 0 PRES  J HUB
IJSOLID 505 210 1 SO 0 PRES  K HUB
IJSOLID 510 215 1 SO 0 PRES  L HUB
IJSOLID 515 220 1 SO 0 PRES  M HUB
IJSOLID 520 225 1 SO 0 PRES  N HUB
IJSOLID 525 230 1 SO 0 PRES  O HUB
IJSOLID 530 235 1 SO 0 PRES  P HUB
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IUSOLID 535 240 1 SO 0 PRES  Q HUB
IUSOLID 240 608 1 SO 0 PRES  R HUB
IUSOLID   1 540 1 SO 0 PRES  S HUB
MESH 3
MERGE MESH 3 4
#MESH 6
MSYS 1
SLINES 4T3485 188T1588-5 4
IUGRID 1
SLINES 126T132 286T2808-1 126
RULE 3 1
IUSOLID  0 0 1
IUSOLID   1 485 1 SO 0 PRES  S HUB
MESH 3
MERGE MESH 5
#MESH 7
MSYS 1
SLINES 126T132 39T9485 333 248 311 243T1938-5 286T2808-1 126
SLINES 89 243 132 286
IUGRID 1
SLINES 5T9585 334 249 312 244T1598-5 5 90 244
RULE 5 1
IUNAME 240 308     LOW HUB
IUNAME 155 240     LOW HUB
IUSOLID  0 0 1
IUSOLID 455 160 1 SO 0 PRES  A HUB
IUSOLID 460 165 1 SO 0 PRES  B HUB
IUSOLID 465 170 1 SO 0 PRES  C HUB
IUSOLID 470 175 1 SO 0 PRES  D HUB
IUSOLID 475 180 1 SO 0 PRES  E HUB
IUSOLID 480 185 1 SO 0 PRES  F HUB
IUSOLID 485 190 1 SO 0 PRES  G HUB
IUSOLID 490 195 1 SO 0 PRES  H HUB
IUSOLID 495 200 1 SO 0 PRES  I HUB
IUSOLID 500 205 1 SO 0 PRES  J HUB
IUSOLID 505 210 1 SO 0 PRES  K HUB
IUSOLID 510 215 1 SO 0 PRES  L HUB
IUSOLID 515 220 1 SO 0 PRES  M HUB
IUSOLID 520 225 1 SO 0 PRES  N HUB
IUSOLID 525 230 1 SO 0 PRES  O HUB
IUSOLID 530 235 1 SO 0 PRES  P HUB
IUSOLID 535 240 1 SO 0 PRES  Q HUB
IUSOLID 240 608 1 SO 0 PRES  R HUB
IUSOLID   1 540 1 SO 0 PRES  S HUB
MESH 3
MERGE MESH 5 6
#MESH 8
MSYS 1
SLINES 5T9585 334 249 312 244T1598-5 5 90 244
IUGRID 1
SLINES 133T151 335 305 313 304T2878-1 133 150 304
RULE 3 1
IUSOLID  0 0 1
IUSOLID   1 540 1 SO 0 PRES  S HUB
KNAME 0 0 3 3 SIDE TWO BOT
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MESH 3
MERGE MESH 7
#SHROUD
#MESH 9
MSYS 1
SLINES 1091 1357T1255B-6 1210T1150B-5 1001T1086B5
PLINE 1086 1096 1091
IUGRID 1
SLINES 1092 1358T1256B-6 1211T1151B-5 1002T1087B5 1032 1181
PLINE 1087 1097 1092
RULE 5 1
IUNAME 1001 1091     HIGH SHRD
IUSOLID  0 0 1
IUSOLID 1001 1406 1 SO 0 PRES  A SHRD
IUSOLID 1006 1411 1 SO 0 PRES  B SHRD
IUSOLID 1011 1416 1 SO 0 PRES  C SHRD
IUSOLID 1016 1421 1 SO 0 PRES  D SHRD
IUSOLID 1021 1426 1 SO 0 PRES  E SHRD
IUSOLID 1026 1431 1 SO 0 PRES  F SHRD
IUSOLID 1031 1436 1 SO 0 PRES  G SHRD
IUSOLID 1036 1441 1 SO 0 PRES  H SHRD
IUSOLID 1041 1446 1 SO 0 PRES  I SHRD
IUSOLID 1046 1451 1 SO 0 PRES  J SHRD
IUSOLID 1051 1456 1 SO 0 PRES  K SHRD
IUSOLID 1056 1461 1 SO 0 PRES  L SHRD
IUSOLID 1061 1466 1 SO 0 PRES  M SHRD
IUSOLID 1066 1471 1 SO 0 PRES  N SHRD
IUSOLID 1071 1476 1 SO 0 PRES  O SHRD
IUSOLID 1076 1481 1 SO 0 PRES  P SHRD
IUSOLID 1081 1486 1 SO 0 PRES  Q SHRD
IUSOLID 1086 1491 1 SO 0 PRES  R SHRD
IUSOLID 1401 1210 1 SO 0 PRES  S SHRD
KNAME 0 0 1 1 SIDE ONE TOP
MESH 1
#MESH 10
MSYS 1
SLINES 1181T1151B-5 1002T1032B5 1181
IUGRID 1
SLINES 1101T1107 1221T1215B-1 1101
RULE 3 1
IUSOLID  0 0 1
IUSOLID 1401 1221 1 SO 0 PRES  S SHRD
MESH 1
MERGE MESH 9
#MESH 11
MSYS 1
SLINES 1092 1358T1256B-6 1211T1186B-5 1221T1215B-1 1101T1107 1037T1087B5
SLINES 1107 1221
PLINE 1087 1097 1092
IUGRID 1
SLINES 1093 1359T1257B-6 1212T1152B-5 1003T1088B5 1212 1083
PLINE 1088 1098 1093
RULE 5 1
IUNAME 1001 1091     HIGH SHRD
IUSOLID  0 0 1
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IUSOLID 1001 1406 1 S0 0 PRES A SHRD
IUSOLID 1006 1411 1 S0 0 PRES B SHRD
IUSOLID 1011 1416 1 S0 0 PRES C SHRD
IUSOLID 1016 1421 1 S0 0 PRES D SHRD
IUSOLID 1021 1426 1 S0 0 PRES E SHRD
IUSOLID 1026 1431 1 S0 0 PRES F SHRD
IUSOLID 1031 1436 1 S0 0 PRES G SHRD
IUSOLID 1036 1441 1 S0 0 PRES H SHRD
IUSOLID 1041 1446 1 S0 0 PRES I SHRD
IUSOLID 1046 1451 1 S0 0 PRES J SHRD
IUSOLID 1051 1456 1 S0 0 PRES K SHRD
IUSOLID 1056 1461 1 S0 0 PRES L SHRD
IUSOLID 1061 1466 1 S0 0 PRES M SHRD
IUSOLID 1066 1471 1 S0 0 PRES N SHRD
IUSOLID 1071 1476 1 S0 0 PRES O SHRD
IUSOLID 1076 1481 1 S0 0 PRES P SHRD
IUSOLID 1081 1486 1 S0 0 PRES Q SHRD
IUSOLID 1086 1491 1 S0 0 PRES R SHRD
IUSOLID 1401 1210 1 S0 0 PRES S SHRD
MESH 1
MERGE MESH 9 10
#MESH 12
MSYS 1
SLINES 1212T1152B-5 1003T1063B5 1212
IUGRID 1
SLINES 1222T1234 1121T1109B-1 1222
RULE 3 1
IUSOLID 0 0 1
IUSOLID 1401 1234 1 S0 0 PRES S SHRD
MESH 1
MERGE MESH 11
#MESH 13
MSYS 1
SLINES 1093 1359T1257B-6 1234T1222B-1 1109T1121B1 1068T1088B5 1234 1121
PLINE 1088 1098 1093
IUGRID 1
SLINES 1094 1360T1258B-6 1213T1153B-5 1004T1089B5 1034 1183
PLINE 1089 1099 1094
RULE 5 1
IUNAME 1001 1091 HIGH SHRD
IUSOLID 0 0 1
IUSOLID 1001 1406 1 S0 0 PRES A SHRD
IUSOLID 1006 1411 1 S0 0 PRES B SHRD
IUSOLID 1011 1416 1 S0 0 PRES C SHRD
IUSOLID 1016 1421 1 S0 0 PRES D SHRD
IUSOLID 1021 1426 1 S0 0 PRES E SHRD
IUSOLID 1026 1431 1 S0 0 PRES F SHRD
IUSOLID 1031 1436 1 S0 0 PRES G SHRD
IUSOLID 1036 1441 1 S0 0 PRES H SHRD
IUSOLID 1041 1446 1 S0 0 PRES I SHRD
IUSOLID 1046 1451 1 S0 0 PRES J SHRD
IUSOLID 1051 1456 1 S0 0 PRES K SHRD
IUSOLID 1056 1461 1 S0 0 PRES L SHRD
IUSOLID 1061 1466 1 S0 0 PRES M SHRD
IUSOLID 1066 1471 1 S0 0 PRES N SHRD
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IUSOLID 1071 1476 1 S0 0 PRES O SHRD
IUSOLID 1076 1481 1 S0 0 PRES P SHRD
IUSOLID 1081 1486 1 S0 0 PRES Q SHRD
IUSOLID 1086 1491 1 S0 0 PRES R SHRD
IUSOLID 1401 1210 1 S0 0 PRES S SHRD
MESH 1
MERGE MESH 11 12
#MESH 14
MSYS 1
SLINES 1183T1153B-5 1004T1034B5 1183
IUGRID 1
SLINES 1122T1128 1241T1235B-1 1122
RULE 3 1
IUSOLID 0 0 1
IUSOLID 1401 1241 1 S0 0 PRES S SHRD
MESH 1
MERGE MESH 13
#MESH 15
MSYS 1
SLINES 1094 1360T1258B-6 1213T1188B-5 1241T1235B-1 1122T1128 1039T1089B5
SLINES 1128 1241
PLINE 1089 1099 1094
IUGRID 1
SLINES 1095 1361T1259B-6 1214T1154B-5 1005T1090B5
PLINE 1090 1100 1095
RULE 5 1
IUNAME 1001 1091 HIGH SHRD
IUSOLID 0 0 1
IUSOLID 1001 1406 1 S0 0 PRES A SHRD
IUSOLID 1006 1411 1 S0 0 PRES B SHRD
IUSOLID 1011 1416 1 S0 0 PRES C SHRD
IUSOLID 1016 1421 1 S0 0 PRES D SHRD
IUSOLID 1021 1426 1 S0 0 PRES E SHRD
IUSOLID 1026 1431 1 S0 0 PRES F SHRD
IUSOLID 1031 1436 1 S0 0 PRES G SHRD
IUSOLID 1036 1441 1 S0 0 PRES H SHRD
IUSOLID 1041 1446 1 S0 0 PRES I SHRD
IUSOLID 1046 1451 1 S0 0 PRES J SHRD
IUSOLID 1051 1456 1 S0 0 PRES K SHRD
IUSOLID 1056 1461 1 S0 0 PRES L SHRD
IUSOLID 1061 1466 1 S0 0 PRES M SHRD
IUSOLID 1066 1471 1 S0 0 PRES N SHRD
IUSOLID 1071 1476 1 S0 0 PRES O SHRD
IUSOLID 1076 1481 1 S0 0 PRES P SHRD
IUSOLID 1081 1486 1 S0 0 PRES Q SHRD
IUSOLID 1086 1491 1 S0 0 PRES R SHRD
IUSOLID 1401 1210 1 S0 0 PRES S SHRD
MESH 1
MERGE MESH 13 14
#MESH 16
MSYS 1
SLINES 1095 1361T1259B-6 1214T1154B-5 1005T1090B5
PLINE 1090 1100 1095
IUGRID 1
SLINES 1148 1362T1260B-6 1264T1242B-1 1130T1147
```

```
PLINE 1147 1149 1148
RULE 3 1
IJSOLID  0 0 1
IJSOLID 1401 1210 1 SO 0 PRES  S SHRD
KNAME 0 0 3 3 SIDE TWO TOP
MESH 1
MERGE MESH 15
#VANES
#MESH 17
MSYS 1
SLINES 1002T1032B6 186T158B-5 1002
IJGRID 1
SLINES 1101T1107 286T280B-1 1101
RULE 3 1
REFINE 0 0 2 0
IJSOLID  0 0 1
IJSOLID  159 1010 1 SO 0 PRES  A VAND
IJSOLID  164 1015 1 SO 0 PRES  B VAND
IJSOLID  169 1020 1 SO 0 PRES  C VAND
IJSOLID  174 1025 1 SO 0 PRES  D VAND
IJSOLID  179 1030 1 SO 0 PRES  E VAND
IJSOLID  184 1035 1 SO 0 PRES  F VAND
MESH 3
MERGE MESH 1 2 9 10 17
#MESH 18
MSYS 1
SLINES 1003T1063B6 217T157B-5 1003
IJGRID 1
SLINES 1109T1121 279T267B-1 1109
RULE 3 1
REFINE 0 0 2 0
IJSOLID  0 0 1
IJSOLID  159 1010 1 SO 0 PRES  A VANB
IJSOLID  164 1015 1 SO 0 PRES  B VANB
IJSOLID  169 1020 1 SO 0 PRES  C VANB
IJSOLID  174 1025 1 SO 0 PRES  D VANB
IJSOLID  179 1030 1 SO 0 PRES  E VANB
IJSOLID  184 1035 1 SO 0 PRES  F VANB
IJSOLID  189 1040 1 SO 0 PRES  G VANB
IJSOLID  194 1045 1 SO 0 PRES  H VANB
IJSOLID  199 1050 1 SO 0 PRES  I VANB
IJSOLID  204 1055 1 SO 0 PRES  J VANB
IJSOLID  209 1060 1 SO 0 PRES  K VANB
IJSOLID  214 1065 1 SO 0 PRES  L VANB
#MESH 3
MERGE MESH 3 4 11 12 18
#MESH 19
MSYS 1
SLINES 1004T1034B6 188T158B-5 1004
IJGRID 1
SLINES 1122T1128 286T280B-1 1122
RULE 3 1
REFINE 0 0 2 0
IJSOLID  0 0 1
IJSOLID  159 1010 1 SO 0 PRES  A VANC
```



```
IJSOLID  164 1015 1 SO 0 PRES  B VANC
IJSOLID  169 1020 1 SO 0 PRES  C VANC
IJSOLID  174 1025 1 SO 0 PRES  D VANC
IJSOLID  179 1030 1 SO 0 PRES  E VANC
IJSOLID  184 1035 1 SO 0 PRES  F VANC
MESH 3
MERGE MESH 5 6 13 14 19
#MESH 20
MSYS 1
SLINES 1005T1090B6 244T159B-5 1005
IJGRID 1
SLINES 1130T1147 304T287B-1 1130
RULE 3 1
REFINE 0 0 2 0
IJSOLID  0 0 1
IJSOLID  159 1010 1 SO 0 PRES  A VANA
IJSOLID  164 1015 1 SO 0 PRES  B VANA
IJSOLID  169 1020 1 SO 0 PRES  C VANA
IJSOLID  174 1025 1 SO 0 PRES  D VANA
IJSOLID  179 1030 1 SO 0 PRES  E VANA
IJSOLID  184 1035 1 SO 0 PRES  F VANA
IJSOLID  189 1040 1 SO 0 PRES  G VANA
IJSOLID  194 1045 1 SO 0 PRES  H VANA
IJSOLID  199 1050 1 SO 0 PRES  I VANA
IJSOLID  204 1055 1 SO 0 PRES  J VANA
IJSOLID  209 1060 1 SO 0 PRES  K VANA
IJSOLID  214 1065 1 SO 0 PRES  L VANA
IJSOLID  219 1070 1 SO 0 PRES  M VANA
IJSOLID  224 1075 1 SO 0 PRES  N VANA
IJSOLID  229 1080 1 SO 0 PRES  O VANA
IJSOLID  234 1085 1 SO 0 PRES  P VANA
IJSOLID  239 1090 1 SO 0 PRES  Q VANA
MESH 3
MERGE MESH 7 8 15 16 20
#HUB CENTER
#MESH 21
SLINES 314T329 314 317 322 323 328 317
PRISM  5 3M0  3 12 341
PRISM  9 3M0  3 29 478
PRISM 13 3M0  3 42 341
PRISM 17 3M0  3 54 515
PRISM 19 3M0  3 59 515
IJSOLID 0 0 1
IJSOLID 326 336 1 SO 0 TORQ IPUT
IJSOLID 317 319 1 SO 0 TORQ OPUT
KNAME 322 322 1 1    TORQ
KNAME 324 326 2 18 AXIS SUPP HUB
KNAME 0 0  1  1 SIDE ONE HUB
KNAME 0 0 19 19 SIDE TWO HUB
MESH 3
ROTATE -149 515 3
MERGE MESH 178
# INSERT INTO MSET 11-14 FOR COSINE LOADING
MSET    11 COPY NAME PRES  A VANA
MSET    11 INSE NAME PRES  B VANA
```

```
MSET     12 COPY NAME PRES  A VANB
MSET     12 INSE NAME PRES  B VANB
MSET     13 COPY NAME PRES  A VANC
MSET     13 INSE NAME PRES  B VANC
MSET     14 COPY NAME PRES  A VAND
MSET     14 INSE NAME PRES  B VAND
#
NLIST 1 INSERT NAME SIDE ONE
NLIST 2 INSERT NAME SIDE TWO
#MESH 22
*SECOND IDENTICAL MODEL
DITTO MESH 1T21
# INSERT INTO MSET 21-24 FOR SINE LOADING
MSET     21 COPY NAME PRES  A VANA
MSET     21 INSE NAME PRES  B VANA
MSET     21 DELE MSET 11
MSET     22 COPY NAME PRES  A VANB
MSET     22 INSE NAME PRES  B VANB
MSET     22 DELE MSET 12
MSET     23 COPY NAME PRES  A VANC
MSET     23 INSE NAME PRES  B VANC
MSET     23 DELE MSET 13
MSET     24 COPY NAME PRES  A VAND
MSET     24 INSE NAME PRES  B VAND
MSET     24 DELE MSET 14
NSET 3 COPY NAME SIDE ONE
NSET 3 DELE MESH 1T21
NSET 4 COPY NAME SIDE TWO
NSET 4 DELE MESH 1T21
NLIST 3 INSERT NSET 3
NLIST 4 INSERT NSET 4
#BOUNDARY CONDITIONS
SET SYNTAX ON
LET &ANG  = 60
LET $CKL  = 2   #THIS IS WHERE N IS SET FOR THIS MODEL N=1,2
GENSKEW 1 1 0 &ANG 0  1
NODSKEW SKEW 1 NLIST 2
NODSKEW SKEW 1 NLIST 4
LET $THET = $CKL * %PI / 180  * &ANG
LET $COSA = %COS(&THET)
LET &SINA = %SIN(&THET)
LET &SINN = 0 - &SINA
LET &IFN1 = %IFL(NLST NV 0 1)
LET &IRN1 = %LFM(&IFN1 1)
LET &IFN2 = %IFL(NLST NV 0 2)
LET &IRN2 = %LFM(&IFN2 1)
LET &IFN3 = %IFL(NLST NV 0 3)
LET &IRN3 = %LFM(&IFN3 1)
LET &IFN4 = %IFL(NLST NV 0 4)
LET &IRN4 = %LFM(&IFN4 1)
DO  10 $I=1 1000 1
LET $N1   = %IBC1(&IRN1 &I)
IF $N1  20  20 1
LET $N2   = %IBC1(&IRN2 &I)
LET $N3   = %IBC1(&IRN3 &I)
```



```
LET $N4   = %IBC1(&IRN4 &I)
GENCON 3 $N1 &N2 &N4 1 1 1  -1  &COSA  &SINA 0  1 0E9
GENCON 3 $N3 &N2 &N4 1 1 1  -1  &SINN  &COSA 0  1 0E9
GENCON 3 &N1 $N2 &N4 2 2 2  -1  &COSA  &SINA 0  1 0E9
GENCON 3 $N3 &N2 &N4 2 2 2  -1  &SINN  &COSA 0  1 0E9
GENCON 3 $N1 &N2 &N4 3 3 3  -1  &COSA  &SINA 0  1 0E9
GENCON 3 $N3 &N2 &N4 3 3 3  -1  &SINN  &COSA 0  1 0E9
 10 NOP
 20 NOP
LET &IRN4 = %RFM(&IFN4 1 0 &IRN4)
LET &IRN3 = %RFM(&IFN3 1 0 &IRN3)
LET &IRN2 = %RFM(&IFN2 1 0 &IRN2)
LET &IRN1 = %RFM(&IFN1 1 0 &IRN1)
NSET 10 COPY FREQ 0 0 NAME TORQ IPUT
NSET 10 INSERT FREQ 0 0 NAME TORQ OPUT
NSET 10 DELETE NAME SIDE TWO
NLIST 10 INSERT NSET 10
LET &IFN1 = %IFL(NLST NV 0 10)
LET &IRN1 = %LFM(&IFN1 1)
DO  30 &I=1 2000 1
LET &N1   = %IBC1(&IRN1 &I)
IF &N1  40  40 1
LET &X = %XN(&N1 1)
LET &Y = %XN(&N1 2)
LET &XY = &X / &Y
GENCON 2 &N1 &N1 1 2 _C1 -1  _C2 &XY 0  1 0E9
 30 NOP
 40 NOP
LET &IRN1 = %RFM(&IFN1 1 0 &IRN1)
SET SYNTAX OFF
#
# SUPPRESS TOP EDGE OF HUB IN AXIAL DIRECTION
DOFSUP 3 NAME AXIS SUPP HUB
#
DOFLOO
FINISH
STOP
$BAND
START -1
REQPS
BAND
STOP
$SETUP
START 500000
SETUP
STOP
$MATL
START 500000
MATISO 1 15 5E6  35  # UNKNOWN MATERIAL
DENSITY 1  .0004196  # DENSITY IN SNAILS  LB/386.088 = SNAILS
MATL
STOP
$MASS
START 500000
MASS 0 # LUMP MASS NEEDED FOR BODY FORCE IN LOAD
```

```
STOP
$ LOAD
START   500000
SET     SYNTAX ON
$ ************************************************************************
$                          INPUT VARIABLES
$ ************************************************************************
$
LET     &RPM = 37342      $ FREQUENCY IN RPM
LET     &VANE = 13        $ NUMBER OF VANES
LET     &SEGM = 6         $ NUMBER OF SEGMENTS
LET     &RATI = 3         $ RATIO ON UNLOAD TIME TO LOAD TIME
LET     &PRES = -24       $ PRESSURE ON VANES (PSI)
$
$ ************************************************************************
$
$ COSINE MODEL
DATA    &A1(1)  0 33333 $ MAX AMPLITUDE SEGMENT "1" (FULL VANE)
DATA    &A1(2) -0 16667 $ MAX AMPLITUDE SEGMENT "6" (FULL VANE)
DATA    &A1(3) -0 16667 $ MAX AMPLITUDE SEGMENT "5" (FULL VANE)
DATA    &A1(4)  0 33333 $ MAX AMPLITUDE SEGMENT "4" (FULL VANE)
DATA    &A1(5) -0 16667 $ MAX AMPLITUDE SEGMENT "3" (FULL VANE)
DATA    &A1(6) -0 16667 $ MAX AMPLITUDE SEGMENT "2" (FULL VANE)
$
DATA    &B1(1) -0 16667 $ MAX AMPLITUDE SEGMENT "6" (1ST PARTIAL VANE)
DATA    &B1(2) -0 16667 $ MAX AMPLITUDE SEGMENT "5" (1ST PARTIAL VANE)
DATA    &B1(3)  0 33333 $ MAX AMPLITUDE SEGMENT "4" (1ST PARTIAL VANE)
DATA    &B1(4) -0 16667 $ MAX AMPLITUDE SEGMENT "3" (1ST PARTIAL VANE)
DATA    &B1(5) -0 16667 $ MAX AMPLITUDE SEGMENT "2" (1ST PARTIAL VANE)
DATA    &B1(6)  0 33333 $ MAX AMPLITUDE SEGMENT "1" (1ST PARTIAL VANE)
$
DATA    &C1(1) -0 16667 $ MAX AMPLITUDE SEGMENT "3" (2ND PARTIAL VANE - A)
DATA    &C1(2) -0 16667 $ MAX AMPLITUDE SEGMENT "2" (2ND PARTIAL VANE - A)
DATA    &C1(3)  0 33333 $ MAX AMPLITUDE SEGMENT "1" (2ND PARTIAL VANE - A)
DATA    &C1(4) -0 16667 $ MAX AMPLITUDE SEGMENT "6" (2ND PARTIAL VANE - A)
DATA    &C1(5) -0 16667 $ MAX AMPLITUDE SEGMENT "5" (2ND PARTIAL VANE - A)
DATA    &C1(6)  0 33333 $ MAX AMPLITUDE SEGMENT "4" (2ND PARTIAL VANE - A)
$
DATA    &D1(1) -0 16667 $ MAX AMPLITUDE SEGMENT "3" (2ND PARTIAL VANE - B)
DATA    &D1(2) -0 16667 $ MAX AMPLITUDE SEGMENT "2" (2ND PARTIAL VANE - B)
DATA    &D1(3)  0 33333 $ MAX AMPLITUDE SEGMENT "1" (2ND PARTIAL VANE - B)
DATA    &D1(4) -0 16667 $ MAX AMPLITUDE SEGMENT "6" (2ND PARTIAL VANE - B)
DATA    &D1(5) -0 16667 $ MAX AMPLITUDE SEGMENT "5" (2ND PARTIAL VANE - B)
DATA    &D1(6)  0 33333 $ MAX AMPLITUDE SEGMENT "4" (2ND PARTIAL VANE - B)
$
$ SINE MODEL
DATA    &A2(1)  0 00000 $ MAX AMPLITUDE SEGMENT "1" (FULL VANE)
DATA    &A2(2) -0 28868 $ MAX AMPLITUDE SEGMENT "6" (FULL VANE)
DATA    &A2(3)  0 28868 $ MAX AMPLITUDE SEGMENT "5" (FULL VANE)
DATA    &A2(4)  0 00000 $ MAX AMPLITUDE SEGMENT "4" (FULL VANE)
DATA    &A2(5) -0 28868 $ MAX AMPLITUDE SEGMENT "3" (FULL VANE)
DATA    &A2(6)  0 28868 $ MAX AMPLITUDE SEGMENT "2" (FULL VANE)
$
DATA    &B2(1) -0 28868 $ MAX AMPLITUDE SEGMENT "6" (1ST PARTIAL VANE)
DATA    &B2(2)  0 28868 $ MAX AMPLITUDE SEGMENT "5" (1ST PARTIAL VANE)
```



```
DATA    &B2(3)  0 00000 $ MAX AMPLITUDE SEGMENT "4" (1ST PARTIAL VANE)
DATA    &B2(4) -0 28868 $ MAX AMPLITUDE SEGMENT "3" (1ST PARTIAL VANE)
DATA    &B2(5)  0 28868 $ MAX AMPLITUDE SEGMENT "2" (1ST PARTIAL VANE)
DATA    &B2(6)  0 00000 $ MAX AMPLITUDE SEGMENT "1" (1ST PARTIAL VANE)
$
DATA    &C2(1) -0 28868 $ MAX AMPLITUDE SEGMENT "3" (2ND PARTIAL VANE - A)
DATA    &C2(2)  0 28868 $ MAX AMPLITUDE SEGMENT "2" (2ND PARTIAL VANE - A)
DATA    &C2(3)  0 00000 $ MAX AMPLITUDE SEGMENT "1" (2ND PARTIAL VANE - A)
DATA    &C2(4) -0 28868 $ MAX AMPLITUDE SEGMENT "6" (2ND PARTIAL VANE - A)
DATA    &C2(5)  0 28868 $ MAX AMPLITUDE SEGMENT "5" (2ND PARTIAL VANE - A)
DATA    &C2(6)  0 00000 $ MAX AMPLITUDE SEGMENT "4" (2ND PARTIAL VANE - A)
$
DATA    &D2(1) -0 28868 $ MAX AMPLITUDE SEGMENT "3" (2ND PARTIAL VANE - B)
DATA    &D2(2)  0 28868 $ MAX AMPLITUDE SEGMENT "2" (2ND PARTIAL VANE - B)
DATA    &D2(3)  0 00000 $ MAX AMPLITUDE SEGMENT "1" (2ND PARTIAL VANE - B)
DATA    &D2(4) -0 28868 $ MAX AMPLITUDE SEGMENT "6" (2ND PARTIAL VANE - B)
DATA    &D2(5)  0 28868 $ MAX AMPLITUDE SEGMENT "5" (2ND PARTIAL VANE - B)
DATA    &D2(6)  0 00000 $ MAX AMPLITUDE SEGMENT "4" (2ND PARTIAL VANE - B)
$
$ CALCULATE FORCE TIME HISTORIES
$
LET     &FREQ = &RPM / 60         $ FREQUENCY IN HZ
LET     &T = 1 / &FREQ            $ PERIOD IN SECS
LET     &TV = &T / &VANE          $ PERIOD FOR ONE VANE
LET     &TS = &TV / &SEGM         $ PERIOD FOR ONE SEGMENT BETWEEN VANES
$
LET     &TOF1 = &TS * 0
LET     &TOF2 = &TS * 0 50
LET     &TOF3 = &TS * 0 75
LET     &TOF4 = &TS * 0 25
$
LET     &TB = &TS / &RATI         $ LOADING & UNLOADING TIME
LET     &TA = &TB / 2             $ LOADING TIME
LET     &NSEG = %IFIX(&SEGM)
$
STORE   1                         $ SAVE TIME VARIABLES FOR SOLVE PROCESSOR
$
LET     &LC0 = 25                 $ LOAD CASE ZERO (25) = ZERO LOADS
LCASE   &LC0
P       0  3 NODE=1
$
$
LTCASE  1                         $ FULL VANE
DO  10 &I = 1 &NSEG 1             $ LOOP THROUGH NUMBER OF SEGMENTS
LCASE   &I
LET     &P1 = &PRES * &A1(&I)     $ ACTUAL PRESSURE ON COSINE
LET     &P2 = &PRES * &A2(&I)     $ ACTUAL PRESSURE ON SINE
PSURF   &P1 1 3 MSET 11           $ COSINE
PSURF   &P2 1 3 MSET 21           $ SINE
LET     &N = &I - 1               $ TIME INCREMENT FOR LOOPS
LET     &TINC = %FLOA(&N) * &TS
$
LET     &LCI = &I
LET     &T1 = &TOF1 + &TINC
LET     &T2 = &TA + &TOF1 + &TINC
```

```
LET     &T3 = &TB + &TOF1 + &TINC
$
$                                       F
LTIME   &LC0 &T1                        $     /\          /\
LTIME   &LCI &T2                        $    /  \        /  \
LTIME   &LC0 &T3                        $ 0 1  2 3------4   \
$                                       $      <---TINC---->
 10     NOP
LTIME   &LC0 &TV                        $ FINAL LOAD = 0
$
$
LTCASE  2                               $ 1ST PARTIAL VANE
LTIME   &LC0 0                          $ INITIAL LOAD = 0
DO 20 &I = 1 $NSEG 1                    $ LOOP THROUGH NUMBER OF SEGMENTS
LET     &IC = $NSEG + &I
LCASE   &IC
LET     &P1 = $PRES * $B1(&I)           $ ACTUAL PRESSURE ON COSINE
LET     &P2 = $PRES * $B2(&I)           $ ACTUAL PRESSURE ON SINE
PSURF   &P1 1 3 MSET 12                 $ COSINE
PSURF   &P2 1 3 MSET 22                 $ SINE
LET     &N = &I - 1                     $ TIME INCREMENT FOR LOOPS
LET     &TINC = %FLOA(&N) * &TS
$
LET     &LCI = &IC
LET     &T1 = &TOF2 + &TINC
LET     &T2 = &TA + &TOF2 + &TINC
LET     &T3 = &TB + &TOF2 + &TINC
$
$                                       F
LTIME   &LC0 &T1                        $     /\          /\
LTIME   &LCI &T2                        $    /  \        /  \
LTIME   &LC0 &T3                        $ 0 1  2 3------4   \
$                                       $      <---TINC---->
 20     NOP
LTIME   &LC0 &TV                        $ FINAL LOAD = 0
$
$
LTCASE  3                               $ 2ND PARTIAL VANE (A)
$
LET     &LC26 = 26                      $ FIRST AND LAST LOAD CASES FOR LTCASE 3
LCASE   &LC26
LET     &P1 = &PRES * &C1(6) / 2        $ ACTUAL PRESSURE ON COSINE
LET     &P2 = &PRES * &C2(6) / 2        $ ACTUAL PRESSURE ON SINE
LET     &TS12 = &TS   12                $ TIME AT END OF INITIAL LOAD CASE
PSURF   &P1 1 3 MSET 13                 $ COSINE
PSURF   &P2 1 3 MSET 23                 $ SINE
$
LTIME   &LC26 0                         $ INITIAL LOAD
LTIME   &LC0  &TS12
$
DO 30 &I = 1 $NSEG 1                    $ LOOP THROUGH NUMBER OF SEGMENTS
LET     &IC = 2 * $NSEG + &I
LCASE   &IC
LET     &P1 = &PRES * &C1(&I)           $ ACTUAL PRESSURE ON COSINE
LET     &P2 = &PRES * &C2(&I)           $ ACTUAL PRESSURE ON SINE
```



```
PSURF   &P1 1 3 MSET 13                 $ COSINE
PSURF   &P2 1 3 MSET 23                 $ SINE
LET     &N = &I - 1                     $ TIME INCREMENT FOR LOOPS
LET     &TINC = %FLOA(&N) * &TS
$
LET     &LCI = &IC
LET     &T1 = &TOF3 + &TINC
LET     &T2 = &TA + &TOF3 + &TINC
LET     &T3 = &TB + &TOF3 + &TINC
$
$                                       F
LTIME   &LC0 &T1                        $     /\          /\          /\
LTIME   &LCI &T2                        $    /  \        /  \        /
IF      &T3>&TV 1 1 31                  $ 0 1  2 3------4   \      /
LTIME   &LC0 &T3                        $      <---TINC---->
$
 30     NOP
GOTO    32
 31     CONTINUE
$
LTIME   &LC26 &TV                       $ FINAL LOAD
 32     CONTINUE
$
$
LTCASE  4                               $ 2ND PARTIAL VANE (B)
LTIME   &LC0 0                          $ INITIAL LOAD = 0
DO 40 &I = 1 $NSEG 1                    $ LOOP THROUGH NUMBER OF SEGMENTS
LET     &IC = 3 * $NSEG + &I
LCASE   &IC
LET     &P1 = &PRES * &D1(&I)           $ ACTUAL PRESSURE ON COSINE
LET     &P2 = &PRES * &D2(&I)           $ ACTUAL PRESSURE ON SINE
PSURF   &P1 1 3 MSET 14                 $ COSINE
PSURF   &P2 1 3 MSET 24                 $ SINE
LET     &N = &I - 1                     $ TIME INCREMENT FOR LOOPS
LET     &TINC = %FLOA(&N) * &TS
$
LET     &LCI = &IC
LET     &T1 = &TOF4 + &TINC
LET     &T2 = &TA + &TOF4 + &TINC
LET     &T3 = &TB + &TOF4 + &TINC
$
$                                       F
LTIME   &LC0 &T1                        $     /\          /\
LTIME   &LCI &T2                        $    /  \        /  \
LTIME   &LC0 &T3                        $ 0 1  2 3------4   \
$                                       $      <---TINC---->
 40     NOP
LTIME   &LC0 &TV                        $ FINAL LOAD = 0
$
$
$ LOAD CASES 27-34 FOR MTVECT IN EIGEN PROCESSOR
$
LCASE   27
PSURF   1  1 3 MSET 11
LCASE   28
```

```
 * IMPD2 CRY;1          Directory SAM_DISK [FONG SSME IMP OUT]                    22-NOV-88 06 48  Page

PSURF   1  1 3 MSET 12
LCASE   29
PSURF   1  1 3 MSET 13
LCASE   30
PSURF   1  1 3 MSET 14
LCASE   31
PSURF   1  1 3 MSET 21
LCASE   32
PSURF   1  1 3 MSET 22
LCASE   33
PSURF   1  1 3 MSET 23
LCASE   34
PSURF   1  1 3 MSET 24
$
$
ASSIGN  IPLT=2                  $ PRINTOUT LOAD TIME HISTORY
$
LOAD
STOP
$SOLVE
START   500000
EIGEN 1
SOLVE
STOP
$EIGEN
START   1000000 2500
ASSIGN  RAT=1 001 ISL=LAN
MODES   200 32000
EIGEN   DIAG
MTVECT     27T34
LOADPF
STOP
$UTILITY
START 200000
#
BCDOUT\UNFO=CRAY\MRS=8000 8 MATL EV    BCDOUT\UNFO=CRAY\MRS=8000 8 ELEM EV
BCDOUT\UNFO=CRAY\MRS=8000 8 INTO EV    BCDOUT\UNFO=CRAY\MRS=8000 8 X NV
BCDOUT\UNFO=CRAY\MRS=8000 8 NORM NV    BCDOUT\UNFO=CRAY\MRS=8000 8 RDE NV
BCDOUT\UNFO=CRAY\MRS=8000 8 ROT NV     BCDOUT\UNFO=CRAY\MRS=8000 8 SOF NV
BCDOUT\UNFO=CRAY\MRS=8000 8 IR NV      BCDOUT\UNFO=CRAY\MRS=8000 8 TER EV
BCDOUT\UNFO=CRAY\MRS=8000 8 LCS NV     BCDOUT\UNFO=CRAY\MRS=8000 8 SKEW NV
BCDOUT\UNFO=CRAY\MRS=8000 8 SDF NV     BCDOUT\UNFO=CRAY\MRS=8000 8 NAME NV
BCDOUT\UNFO=CRAY\MRS=8000 8 NAME EV    BCDOUT\UNFO=CRAY\MRS=8000 8 CON CON 0 ?
BCDOUT\UNFO=CRAY\MRS=8000 8 MESH HED 0 ?
BCDOUT\UNFO=CRAY\MRS=8000 8 NLST NV 0 ?
BCDOUT\UNFO=CRAY\MRS=8000 8 CON RM DIR
BCDOUT\UNFO=CRAY\MRS=8000 8 NSET NV 0 ?
BCDOUT\UNFO=CRAY\MRS=8000 8 PCT HED ?
BCDOUT\UNFO=CRAY\MRS=8000 8 SYS CRM
BCDOUT\UNFO=CRAY\MRS=8000 8 MLIB MLIB
BCDOUT\UNFO=CRAY\MRS=8000 8 UL NV 0  ?
BCDOUT\UNFO=CRAY\MRS=8000 8 UL SV 0  ?
BCDOUT\UNFO=CRAY\MRS=8000 8 VIBE SV 0 ?
BCDOUT\UNFO=CRAY\MRS=8000/EXTEND 8 EV RV ? ?
BCDOUT\UNFO=CRAY\MRS=8000/EXTEND 8 LTH CRM ? ?
```

```
 * IMPD2 CRY;1          Directory SAM_DISK [FONG SSME IMP OUT]                    22-NOV-88 06 48  Page

BCDOUT\UNFO=CRAY\MRS=8000/EXTEND 8 LMPF RV ? ?
#
BCDOUT/EXTEND 7 EV RV ? ?
BCDOUT/EXTEND 7 LTH CRM ? ?
BCDOUT/EXTEND 7 LMPF RV ? ?
#
STOP
.EOF
```

```
JOB /N=IMPLLR /CL=DEFERRD /T=300 /MFL=2000000 /US=663639
ACCOUNT /AC=2 /UPW=
*************************************************
*  SSME IMPELLER MODEL - FINAL DYNAMIC RESULTS  *
*************************************************
FETCH DN=MESH DF=TR TEXT='DISK8:[FERGUSON.CEXL3D2]MESH.CEX'
MESH
FETCH DN=BAND DF=TR TEXT='DISK8:[FERGUSON.CEXL3D2]BAND.CEX'
BAND
FETCH DN=SETUP DF=TR TEXT='DISK8:[FERGUSON.CEXL3D2]SETUP.CEX'
SETUP
FETCH DN=MATL DF=TR TEXT='DISK8:[FERGUSON.CEXL3D2]MATL.CEX'
MATL
DISPOSE DF=TR DN=FIL002 TEXT='DISK6:[FONG]IMPLLR.FL2'
 EOF
$MESH
CLEAR 500000
MAX MXPO=1500 15000 7000
ELTYPE 4 2 3

HEAD    1 'SSME IMPELLER MODEL
HEAD    2 'FINAL DYNAMIC RESULTS

ASSIGN IPNO=0 IPLC=0 IPSK=0 IPEL=0 IPCO=0
#MESH POINT FROM CADAM     WAL-SSME-HUB  FEM14
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IUPOINT    2    -5    1    4.3907    3.9035    -3.6254
IUPOINT    3    -5    1    3.2316    4.9064    -3.6254
IUPOINT    4    -5    1    1.8508    5.5759    -3.6254
IUPOINT    5    -5    1    0.3380    5.8853    -3.6254
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IUPOINT    8    -5    3    3.3006    4.5315    -3.6379
IUPOINT    9    -5    3    2.0165    5.2308    -3.6379
IUPOINT   10    -5    3    0.5983    5.5743    -3.6379
IUPOINT   11    -5    5    4.8716    2.1801    -3.6504
IUPOINT   12    -5    5    4.3232    3.1298    -3.6504
IUPOINT   13    -5    5    3.3604    4.1464    -3.6504
IUPOINT   14    -5    5    2.1781    4.8721    -3.6504
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IUPOINT   17    -5    7    4.2684    2.7327    -3.6630
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IUPOINT   19    -5    7    2.3302    4.5007    -3.6630
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IUPOINT   25    -5    9    1.3159    4.6153    -3.6755
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IUPOINT   27    -5   11    4.0375    2.0564    -3.6880
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IUPOINT   30    -5   11    1.5078    4.2728    -3.6880
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!UPOINT 1244   5   5   0  9103   5  3178   -2.6822
!UPOINT 1245   5   7   1  1112   5  0493   -2.6570
!UPOINT 1246   5   9   1  3130   4  7783   -2.6248
!UPOINT 1247   5  11   1  5193   4  5017   -2.5834
!UPOINT 1248   5  13   1  7104   4  2249   -2.5317
!UPOINT 1249   5  15   1  8628   3  9969   -2.4830
!UPOINT 1250   5  17   2  0137   3  7166   -2.4248
!UPOINT 1251   5  19   2  1801   3  4692   -2.3525
!UPOINT 1252   5  21   2  3366   3  1519   -2.2704
!UPOINT 1253   5  23   2  4801   2  8297   -2.1655
!UPOINT 1254   5  25   2  6365   2  4568   -2.0452
!UPOINT 1255   7  25   3  6436  -0.9258   -2.0160
!UPOINT 1256   7  25   3  6596  -0.1454   -2.0160
!UPOINT 1257   7  25   3  5725   0  8067   -2.0160
!UPOINT 1258   7  25   3  2420   1  7039   -2.0160
!UPOINT 1259   7  25   2  8562   2  2926   -2.0160
!UPOINT 1260   7  25   2  5735   2  6059   -2.0160
!UPOINT 1261   9  25   3  6729  -0.7564   -2.0160
!UPOINT 1262   9  25   3  7497   0  0478   -2.0160
!UPOINT 1263   9  25   3  6096   1  0166   -2.0160
!UPOINT 1264   9  25   3  2234   1  9162   -2.0160
!UPOINT 1265   9  25   2  7836   2  5128   -2.0160
!UPOINT 1266   9  25   2  4915   2  8027   -2.0160
!UPOINT 1267   9  27   3  6729  -0.7564   -1.9710
!UPOINT 1268   9  27   3  7497   0  0478   -1.9710
!UPOINT 1269   9  27   3  6096   1  0166   -1.9710
!UPOINT 1270   9  27   3  2234   1  9162   -1.9710
!UPOINT 1271   9  27   2  7836   2  5128   -1.9710
!UPOINT 1272   9  27   2  4915   2  8027   -1.9710
!UPOINT 1273   7  27   3  5436  -0.9258   -1.9710
!UPOINT 1274   7  27   3  6596  -0.1454   -1.9710
!UPOINT 1275   7  27   3  5725   0  8067   -1.9710
!UPOINT 1276   7  27   3  2420   1  7039   -1.9710
!UPOINT 1277   7  27   2  8562   2  2926   -1.9710
!UPOINT 1278   7  27   2  5735   2  6059   -1.9710
!UPOINT 1279   6  29   3  1069  -1.4376   -1.8260
!UPOINT 1280   6  29   3  3427  -0.7388   -1.8260
!UPOINT 1281   6  29   3  4200   0  1515   -1.8260
```

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IJPOINT 1282    5   29   3.2643    1.0315   -1.8260
IJPOINT 1283    5   29   3.0108    1.6294   -1.8260
IJPOINT 1284    5   29   2.7984    1.9719   -1.8260
IJPOINT 1285    7   29   3.3282   -1.1988   -1.8260
IJPOINT 1286    7   29   3.5077   -0.4582   -1.8260
IJPOINT 1287    7   29   3.5068    0.4653   -1.8260
IJPOINT 1288    7   29   3.2668    1.3671   -1.8260
IJPOINT 1289    7   29   2.9422    1.9640   -1.8260
IJPOINT 1290    7   29   2.7023    2.2829   -1.8260
IJPOINT 1291    9   29   3.4828   -1.0054   -1.8260
IJPOINT 1292    9   29   3.6173   -0.2362   -1.8260
IJPOINT 1293    9   29   3.5552    0.7081   -1.8260
IJPOINT 1294    9   29   3.2508    1.6041   -1.8260
IJPOINT 1295    9   29   2.8839    2.1962   -1.8260
IJPOINT 1296    9   29   2.6121    2.5136   -1.8260
IJPOINT 1297    9   31   3.4828   -1.0054   -1.7810
IJPOINT 1298    9   31   3.6173   -0.2362   -1.7810
IJPOINT 1299    9   31   3.5552    0.7081   -1.7810
IJPOINT 1300    9   31   3.2508    1.6041   -1.7810
IJPOINT 1301    9   31   2.8839    2.1962   -1.7810
IJPOINT 1302    9   31   2.6121    2.5136   -1.7810
IJPOINT 1303    7   31   3.3282   -1.1988   -1.7810
IJPOINT 1304    7   31   3.5077   -0.4582   -1.7810
IJPOINT 1305    7   31   3.5068    0.4653   -1.7810
IJPOINT 1306    7   31   3.2668    1.3671   -1.7810
IJPOINT 1307    7   31   2.9422    1.9640   -1.7810
IJPOINT 1308    7   31   2.7023    2.2829   -1.7810
IJPOINT 1309    5   33   2.7844   -1.7665   -1.6360
IJPOINT 1310    5   33   3.0981   -1.1292   -1.6360
IJPOINT 1311    5   33   3.2848   -0.2888   -1.6360
IJPOINT 1312    5   33   3.2477    0.5712   -1.6360
IJPOINT 1313    5   33   3.0734    1.1949   -1.6360
IJPOINT 1314    5   33   2.9220    1.5281   -1.6360
IJPOINT 1315    7   33   3.0830   -1.4630   -1.6360
IJPOINT 1316    7   33   3.3248   -0.7688   -1.6360
IJPOINT 1317    7   33   3.4105    0.1180   -1.6360
IJPOINT 1318    7   33   3.2637    0.9966   -1.6360
IJPOINT 1319    7   33   3.0171    1.5945   -1.6360
IJPOINT 1320    7   33   2.8085    1.9385   -1.6360
IJPOINT 1321    9   33   3.2588   -1.2768   -1.6360
IJPOINT 1322    9   33   3.4566   -0.5492   -1.6360
IJPOINT 1323    9   33   3.4810    0.3641   -1.6360
IJPOINT 1324    9   33   3.2681    1.2527   -1.6360
IJPOINT 1325    9   33   2.9661    1.8555   -1.6360
IJPOINT 1326    9   33   2.7351    2.1838   -1.6360
IJPOINT 1327    9   35   3.2588   -1.2768   -1.5910
IJPOINT 1328    9   35   3.4566   -0.5492   -1.5910
IJPOINT 1329    9   35   3.4810    0.3641   -1.5910
IJPOINT 1330    9   35   3.2681    1.2527   -1.5910
IJPOINT 1331    9   35   2.9661    1.8555   -1.5910
IJPOINT 1332    9   35   2.7351    2.1838   -1.5910
IJPOINT 1333    7   35   3.0830   -1.4630   -1.5910
IJPOINT 1334    7   35   3.3248   -0.7688   -1.5910
IJPOINT 1335    7   35   3.4105    0.1180   -1.5910
IJPOINT 1336    7   35   3.2637    0.9966   -1.5910
```



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IJPOINT 1337    7   35   3.0171    1.5945   -1.5910
IJPOINT 1338    7   35   2.8085    1.9385   -1.5910
IJPOINT 1339    5   36   2.7844   -1.7665   -1.5450
IJPOINT 1340    5   36   3.0981   -1.1292   -1.5450
IJPOINT 1341    5   36   3.2848   -0.2888   -1.5450
IJPOINT 1342    5   36   3.2477    0.5712   -1.5450
IJPOINT 1343    5   36   3.0734    1.1949   -1.5450
IJPOINT 1344    5   36   2.9220    1.5281   -1.5450
IJPOINT 1345    5   37   2.7844   -1.7665   -1.4500
IJPOINT 1346    5   37   3.0981   -1.1292   -1.4500
IJPOINT 1347    5   37   3.2848   -0.2888   -1.4500
IJPOINT 1348    5   37   3.2477    0.5712   -1.4500
IJPOINT 1349    5   37   3.0734    1.1949   -1.4500
IJPOINT 1350    5   37   2.9220    1.5281   -1.4500
IJPOINT 1351    7   37   2.9936   -1.5585   -1.4500
IJPOINT 1352    7   37   3.2578   -0.8813   -1.4500
IJPOINT 1353    7   37   3.3750   -0.0080   -1.4500
IJPOINT 1354    7   37   3.2621    0.8658   -1.4500
IJPOINT 1355    7   37   3.0377    1.4707   -1.4500
IJPOINT 1356    7   37   2.8465    1.8133   -1.4500
IJPOINT 1357    7   39   2.9936   -1.5585   -1.4060
IJPOINT 1358    7   39   3.2578   -0.8813   -1.4060
IJPOINT 1359    7   39   3.3750   -0.0080   -1.4060
IJPOINT 1360    7   39   3.2621    0.8658   -1.4060
IJPOINT 1361    7   39   3.0377    1.4707   -1.4060
IJPOINT 1362    7   39   2.8465    1.8133   -1.4060
IJPOINT 1401    3    1
IJPOINT 1406    3    3
IJPOINT 1411    3    5
IJPOINT 1416    3    7
IJPOINT 1421    3    9
IJPOINT 1426    3   11
IJPOINT 1431    3   13
IJPOINT 1436    3   15
IJPOINT 1441    3   17
IJPOINT 1446    3   19
IJPOINT 1451    3   21
IJPOINT 1456    3   23
IJPOINT 1461    3   25
IJPOINT 1466    3   27
IJPOINT 1471    3   29
IJPOINT 1476    3   31
IJPOINT 1481    3   33
IJPOINT 1486    3   35
IJPOINT 1491    3   39
DEFSYS 1 1 0 0 0 0 0 0 1 0 0 0 0 0 0 1 0 1 0 0 0
#HUB
#MESH 1
MSYS 1
SLINES 1T9186 330 245 308 240T1568-5 1 86 240 31 185
IJGRID 1
SLINES 2T9286 331 246 309 241T1568-5 2 87 241 32 186
RULE 5 1
IJNAME 240 308     LOW HUB
IJNAME 155 240     LOW HUB
```

```
IJSOLID  0 0 1
IJSOLID 455 160 1 SO 0 PRES  A HUB
IJSOLID 460 165 1 SO 0 PRES  B HUB
IJSOLID 465 170 1 SO 0 PRES  C HUB
IJSOLID 470 175 1 SO 0 PRES  D HUB
IJSOLID 475 180 1 SO 0 PRES  E HUB
IJSOLID 480 185 1 SO 0 PRES  F HUB
IJSOLID 485 190 1 SO 0 PRES  G HUB
IJSOLID 490 195 1 SO 0 PRES  H HUB
IJSOLID 495 200 1 SO 0 PRES  I HUB
IJSOLID 500 205 1 SO 0 PRES  J HUB
IJSOLID 505 210 1 SO 0 PRES  K HUB
IJSOLID 510 215 1 SO 0 PRES  L HUB
IJSOLID 515 220 1 SO 0 PRES  M HUB
IJSOLID 520 225 1 SO 0 PRES  N HUB
IJSOLID 525 230 1 SO 0 PRES  O HUB
IJSOLID 530 235 1 SO 0 PRES  P HUB
IJSOLID 535 240 1 SO 0 PRES  Q HUB
IJSOLID 240 608 1 SO 0 PRES  R HUB
IJSOLID   1 540 1 SO 0 PRES  S HUB
KNAME 0 0 1 1 SIDE ONE BOT
MESH 3
#MESH 2
MSYS 1
SLINES 2T32B5 186T156B-5 2
IJGRID 1
SLINES 106T112 266T260B-1 106
RULE 3 1
IJSOLID  0 0 1
IJSOLID   1 485 1 SO 0 PRES  S HUB
MESH 3
MERGE MESH 1
#MESH 3
MSYS 1
SLINES 106T112 37T92B5 331 246 309 241T191B-5 266T260B-1 106 87 241
SLINES 112 266
IJGRID 1
SLINES 3T93B5 332 247 310 242T157B-5 3 88 242 217 63
RULE 5 1
IJNAME 240 308      LOW HUB
IJNAME 155 240      LOW HUB
IJSOLID  0 0 1
IJSOLID 455 160 1 SO 0 PRES  A HUB
IJSOLID 460 165 1 SO 0 PRES  B HUB
IJSOLID 465 170 1 SO 0 PRES  C HUB
IJSOLID 470 175 1 SO 0 PRES  D HUB
IJSOLID 475 180 1 SO 0 PRES  E HUB
IJSOLID 480 185 1 SO 0 PRES  F HUB
IJSOLID 485 190 1 SO 0 PRES  G HUB
IJSOLID 490 195 1 SO 0 PRES  H HUB
IJSOLID 495 200 1 SO 0 PRES  I HUB
IJSOLID 500 205 1 SO 0 PRES  J HUB
IJSOLID 505 210 1 SO 0 PRES  K HUB
IJSOLID 510 215 1 SO 0 PRES  L HUB
IJSOLID 515 220 1 SO 0 PRES  M HUB
```



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IJSOLID 520 225 1 SO 0 PRES  N HUB
IJSOLID 525 230 1 SO 0 PRES  O HUB
IJSOLID 530 235 1 SO 0 PRES  P HUB
IJSOLID 535 240 1 SO 0 PRES  Q HUB
IJSOLID 240 608 1 SO 0 PRES  R HUB
IJSOLID   1 540 1 SO 0 PRES  S HUB
MESH 3
MERGE MESH 1 2
#MESH 4
MSYS 1
SLINES 3T63B5 21?T157B-5 3
IJGRID 1
SLINES 113T125 279T267B-1 113
RULE 3 1
IJSOLID  0 0 1
IJSOLID   1 515 1 SO 0 PRES  S HUB
MESH 3
MERGE MESH 3
#MESH 5
MSYS 1
SLINES 113T125 68T93B5 332 247 310 242T222B-5 279T267B-1 113 125 279 88 242
IJGRID 1
SLINES 4T94B5 333 248 311 243T158B-5 4 89 243 188 34
RULE 5 1
IJNAME 240 308      LOW HUB
IJNAME 155 240      LOW HUB
IJSOLID  0 0 1
IJSOLID 455 160 1 SO 0 PRES  A HUB
IJSOLID 460 165 1 SO 0 PRES  B HUB
IJSOLID 465 170 1 SO 0 PRES  C HUB
IJSOLID 470 175 1 SO 0 PRES  D HUB
IJSOLID 475 180 1 SO 0 PRES  E HUB
IJSOLID 480 185 1 SO 0 PRES  F HUB
IJSOLID 485 190 1 SO 0 PRES  G HUB
IJSOLID 490 195 1 SO 0 PRES  H HUB
IJSOLID 495 200 1 SO 0 PRES  I HUB
IJSOLID 500 205 1 SO 0 PRES  J HUB
IJSOLID 505 210 1 SO 0 PRES  K HUB
IJSOLID 510 215 1 SO 0 PRES  L HUB
IJSOLID 515 220 1 SO 0 PRES  M HUB
IJSOLID 520 225 1 SO 0 PRES  N HUB
IJSOLID 525 230 1 SO 0 PRES  O HUB
IJSOLID 530 235 1 SO 0 PRES  P HUB
IJSOLID 535 240 1 SO 0 PRES  Q HUB
IJSOLID 240 608 1 SO 0 PRES  R HUB
IJSOLID   1 540 1 SO 0 PRES  S HUB
MESH 3
MERGE MESH 3 4
#MESH 6
MSYS 1
SLINES 4T34B5 188T158B-5 4
IJGRID 1
SLINES 126T132 286T280B-1 126
RULE 3 1
IJSOLID  0 0 1
```

```
IJSOLID   1 485 1 SO 0 PRES  S HUB
MESH 3
MERGE MESH 5
#MESH 7
MSYS 1
SLINES 126T132 39T9485 333 248 311 243T193B-5 286T280B-1 126
SLINES 89 243 132 286
IJGRID 1
SLINES 5T9585 334 249 312 244T159B-5 5 90 244
RULE 5 1
IJNAME 240 308       LOW HUB
IJNAME 155 240       LOW HUB
IJSOLID  0 0 1
IJSOLID 455 160 1 SO 0 PRES  A HUB
IJSOLID 460 165 1 SO 0 PRES  B HUB
IJSOLID 465 170 1 SO 0 PRES  C HUB
IJSOLID 470 175 1 SO 0 PRES  D HUB
IJSOLID 475 180 1 SO 0 PRES  E HUB
IJSOLID 480 185 1 SO 0 PRES  F HUB
IJSOLID 485 190 1 SO 0 PRES  G HUB
IJSOLID 490 195 1 SO 0 PRES  H HUB
IJSOLID 495 200 1 SO 0 PRES  I HUB
IJSOLID 500 205 1 SO 0 PRES  J HUB
IJSOLID 505 210 1 SO 0 PRES  K HUB
IJSOLID 510 215 1 SO 0 PRES  L HUB
IJSOLID 515 220 1 SO 0 PRES  M HUB
IJSOLID 520 225 1 SO 0 PRES  N HUB
IJSOLID 525 230 1 SO 0 PRES  O HUB
IJSOLID 530 235 1 SO 0 PRES  P HUB
IJSOLID 535 240 1 SO 0 PRES  Q HUB
IJSOLID 240 608 1 SO 0 PRES  R HUB
IJSOLID   1 540 1 SO 0 PRES  S HUB
MESH 3
MERGE MESH 5 6
#MESH 8
MSYS 1
SLINES 5T9585 334 249 312 244T159B-5 5 90 244
IJGRID 1
SLINES 133T151 335 305 313 304T287B-1 133 150 304
RULE 3 1
IJSOLID  0 0 1
IJSOLID   1 540 1 SO 0 PRES  S HUB
KNAME 0 0 3 3 SIDE TWO BOT
MESH 3
MERGE MESH 7
#SHROUD
#MESH 9
MSYS 1
SLINES 1091 1357T1255B-6 1210T1150B-5 1001T1086B5
PLINE 1086 1096 1091
IJGRID 1
SLINES 1092 1358T1256B-6 1211T1151B-5 1002T1087B5 1032 1181
PLINE 1087 1097 1092
RULE 5 1
IJNAME 1001 1091      HIGH SHRD
```



```
IJSOLID  0 0 1
IJSOLID 1001 1406 1 SO 0 PRES  A SHRD
IJSOLID 1006 1411 1 SO 0 PRES  B SHRD
IJSOLID 1011 1416 1 SO 0 PRES  C SHRD
IJSOLID 1016 1421 1 SO 0 PRES  D SHRD
IJSOLID 1021 1426 1 SO 0 PRES  E SHRD
IJSOLID 1026 1431 1 SO 0 PRES  F SHRD
IJSOLID 1031 1436 1 SO 0 PRES  G SHRD
IJSOLID 1036 1441 1 SO 0 PRES  H SHRD
IJSOLID 1041 1446 1 SO 0 PRES  I SHRD
IJSOLID 1046 1451 1 SO 0 PRES  J SHRD
IJSOLID 1051 1456 1 SO 0 PRES  K SHRD
IJSOLID 1056 1461 1 SO 0 PRES  L SHRD
IJSOLID 1061 1466 1 SO 0 PRES  M SHRD
IJSOLID 1066 1471 1 SO 0 PRES  N SHRD
IJSOLID 1071 1476 1 SO 0 PRES  O SHRD
IJSOLID 1076 1481 1 SO 0 PRES  P SHRD
IJSOLID 1081 1486 1 SO 0 PRES  Q SHRD
IJSOLID 1086 1491 1 SO 0 PRES  R SHRD
IJSOLID 1401 1210 1 SO 0 PRES  S SHRD
KNAME 0 0 1 1 SIDE ONE TOP
MESH 1
#MESH 10
MSYS 1
SLINES 1181T1151B-5 1002T1032B5 1181
IJGRID 1
SLINES 1101T1107 1221T1215B-1 1101
RULE 3 1
IJSOLID  0 0 1
IJSOLID 1401 1221 1 SO 0 PRES  S SHRD
MESH 1
MERGE MESH 9
#MESH 11
MSYS 1
SLINES 1092 1358T1256B-6 1211T1186B-5 1221T1215B-1 1101T1107 1037T1087B5
SLINES 1107 1221
PLINE 1087 1097 1092
IJGRID 1
SLINES 1093 1359T1257B-6 1212T1152B-5 1003T1088B5 1212 1063
PLINE 1088 1098 1093
RULE 5 1
IJNAME 1001 1091      HIGH SHRD
IJSOLID  0 0 1
IJSOLID 1001 1406 1 SO 0 PRES  A SHRD
IJSOLID 1006 1411 1 SO 0 PRES  B SHRD
IJSOLID 1011 1416 1 SO 0 PRES  C SHRD
IJSOLID 1016 1421 1 SO 0 PRES  D SHRD
IJSOLID 1021 1426 1 SO 0 PRES  E SHRD
IJSOLID 1026 1431 1 SO 0 PRES  F SHRD
IJSOLID 1031 1436 1 SO 0 PRES  G SHRD
IJSOLID 1036 1441 1 SO 0 PRES  H SHRD
IJSOLID 1041 1446 1 SO 0 PRES  I SHRD
IJSOLID 1046 1451 1 SO 0 PRES  J SHRD
IJSOLID 1051 1456 1 SO 0 PRES  K SHRD
IJSOLID 1056 1461 1 SO 0 PRES  L SHRD
```

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IJSOLID 1061 1466 1 S0 0 PRES  M SHRD
IJSOLID 1066 1471 1 S0 0 PRES  N SHRD
IJSOLID 1071 1476 1 S0 0 PRES  O SHRD
IJSOLID 1076 1481 1 S0 0 PRES  P SHRD
IJSOLID 1081 1486 1 S0 0 PRES  Q SHRD
IJSOLID 1086 1491 1 S0 0 PRES  R SHRD
IJSOLID 1401 1210 1 S0 0 PRES  S SHRD
MESH 1
MERGE MESH 9 10
#MESH 12
MSYS 1
SLINES 1212T1152B-5 1003T1063B5 1212
IJGRID 1
SLINES 1222T1234 1121T1109B-1 1222
RULE 3 1
IJSOLID  0 0 1
IJSOLID 1401 1234 1 S0 0 PRES  S SHRD
MESH 1
MERGE MESH 11
#MESH 13
MSYS 1
SLINES 1093 1359T1257B-6 1234T1222B-1 1109T1121B1 1068T1088B5 1234 1121
PLINE 1088 1098 1093
IJGRID 1
SLINES 1094 1360T1258B-6 1213T1153B-5 1004T1089B5 1034 1183
PLINE 1089 1099 1094
RULE 5 1
IJNAME 1001 1091       HIGH SHRD
IJSOLID  0 0 1
IJSOLID 1001 1406 1 S0 0 PRES  A SHRD
IJSOLID 1006 1411 1 S0 0 PRES  B SHRD
IJSOLID 1011 1416 1 S0 0 PRES  C SHRD
IJSOLID 1016 1421 1 S0 0 PRES  D SHRD
IJSOLID 1021 1426 1 S0 0 PRES  E SHRD
IJSOLID 1026 1431 1 S0 0 PRES  F SHRD
IJSOLID 1031 1436 1 S0 0 PRES  G SHRD
IJSOLID 1036 1441 1 S0 0 PRES  H SHRD
IJSOLID 1041 1446 1 S0 0 PRES  I SHRD
IJSOLID 1046 1451 1 S0 0 PRES  J SHRD
IJSOLID 1051 1456 1 S0 0 PRES  K SHRD
IJSOLID 1056 1461 1 S0 0 PRES  L SHRD
IJSOLID 1061 1466 1 S0 0 PRES  M SHRD
IJSOLID 1066 1471 1 S0 0 PRES  N SHRD
IJSOLID 1071 1476 1 S0 0 PRES  O SHRD
IJSOLID 1076 1481 1 S0 0 PRES  P SHRD
IJSOLID 1081 1486 1 S0 0 PRES  Q SHRD
IJSOLID 1086 1491 1 S0 0 PRES  R SHRD
IJSOLID 1401 1210 1 S0 0 PRES  S SHRD
MESH 1
MERGE MESH 11 12
#MESH 14
MSYS 1
SLINES 1183T1153B-5 1004T1034B5 1183
IJGRID 1
SLINES 1122T1128 1241T1236B-1 1122
```



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RULE 3 1
IJSOLID  0 0 1
IJSOLID 1401 1241 1 S0 0 PRES  S SHRD
MESH 1
MERGE MESH 13
#MESH 15
MSYS 1
SLINES 1094 1360T1258B-6 1213T1188B-5 1241T1236B-1 1122T1128 1039T1089B5
SLINES 1128 1241
PLINE 1089 1099 1094
IJGRID 1
SLINES 1095 1361T1259B-6 1214T1154B-5 1005T1090B5
PLINE 1090 1100 1095
RULE 5 1
IJNAME 1001 1091       HIGH SHRD
IJSOLID  0 0 1
IJSOLID 1001 1406 1 S0 0 PRES  A SHRD
IJSOLID 1006 1411 1 S0 0 PRES  B SHRD
IJSOLID 1011 1416 1 S0 0 PRES  C SHRD
IJSOLID 1016 1421 1 S0 0 PRES  D SHRD
IJSOLID 1021 1426 1 S0 0 PRES  E SHRD
IJSOLID 1026 1431 1 S0 0 PRES  F SHRD
IJSOLID 1031 1436 1 S0 0 PRES  G SHRD
IJSOLID 1036 1441 1 S0 0 PRES  H SHRD
IJSOLID 1041 1446 1 S0 0 PRES  I SHRD
IJSOLID 1046 1451 1 S0 0 PRES  J SHRD
IJSOLID 1051 1456 1 S0 0 PRES  K SHRD
IJSOLID 1056 1461 1 S0 0 PRES  L SHRD
IJSOLID 1061 1466 1 S0 0 PRES  M SHRD
IJSOLID 1066 1471 1 S0 0 PRES  N SHRD
IJSOLID 1071 1476 1 S0 0 PRES  O SHRD
IJSOLID 1076 1481 1 S0 0 PRES  P SHRD
IJSOLID 1081 1486 1 S0 0 PRES  Q SHRD
IJSOLID 1086 1491 1 S0 0 PRES  R SHRD
IJSOLID 1401 1210 1 S0 0 PRES  S SHRD
MESH 1
MERGE MESH 13 14
#MESH 16
MSYS 1
SLINES 1095 1361T1259B-6 1214T1154B-5 1005T1090B5
PLINE 1090 1100 1095
IJGRID 1
SLINES 1148 1362T1260B-6 1254T1242B-1 1130T1147
PLINE 1147 1149 1148
RULE 3 1
IJSOLID  0 0 1
IJSOLID 1401 1210 1 S0 0 PRES  S SHRD
KNAME 0 0 3 3 SIDE TWO TOP
MESH 1
MERGE MESH 15
#VANES
#MESH 17
MSYS 1
SLINES 1002T1032B5 186T156B-5 1002
IJGRID 1
```

```
 * IMPLLR CRY;1        Directory SAM_DISK [FONG.SSME.IMP.OUT]                22-NOV-88 06:48  Page
SLINES 1101T1107 266T260B-1 1101
RULE 3 1
REFINE 0 0 2 0
IJSOLID  0 0 1
IJSOLID  159 1010 1 SO 0 PRES  A VAND
IJSOLID  164 1015 1 SO 0 PRES  B VAND
IJSOLID  169 1020 1 SO 0 PRES  C VAND
IJSOLID  174 1025 1 SO 0 PRES  D VAND
IJSOLID  179 1030 1 SO 0 PRES  E VAND
IJSOLID  184 1035 1 SO 0 PRES  F VAND
MESH 3
MERGE MESH 1 2 9 10 17
#MESH 18
MSYS 1
SLINES 1003T1063B5 217T157B-5 1003
IJGRID 1
SLINES 1109T1121 279T267B-1 1109
RULE 3 1
REFINE 0 0 2 0
IJSOLID  0 0 1
IJSOLID  159 1010 1 SO 0 PRES  A VANB
IJSOLID  164 1015 1 SO 0 PRES  B VANB
IJSOLID  169 1020 1 SO 0 PRES  C VANB
IJSOLID  174 1025 1 SO 0 PRES  D VANB
IJSOLID  179 1030 1 SO 0 PRES  E VANB
IJSOLID  184 1035 1 SO 0 PRES  F VANB
IJSOLID  189 1040 1 SO 0 PRES  G VANB
IJSOLID  194 1045 1 SO 0 PRES  H VANB
IJSOLID  199 1050 1 SO 0 PRES  I VANB
IJSOLID  204 1055 1 SO 0 PRES  J VANB
IJSOLID  209 1060 1 SO 0 PRES  K VANB
IJSOLID  214 1065 1 SO 0 PRES  L VANB
MESH 3
MERGE MESH 3 4 11 12 18
#MESH 19
MSYS 1
SLINES 1004T1034B5 188T158B-5 1004
IJGRID 1
SLINES 1122T1128 286T280B-1 1122
RULE 3 1
REFINE 0 0 2 0
IJSOLID  0 0 1
IJSOLID  159 1010 1 SO 0 PRES  A VANC
IJSOLID  164 1015 1 SO 0 PRES  B VANC
IJSOLID  169 1020 1 SO 0 PRES  C VANC
IJSOLID  174 1025 1 SO 0 PRES  D VANC
IJSOLID  179 1030 1 SO 0 PRES  E VANC
IJSOLID  184 1035 1 SO 0 PRES  F VANC
MESH 3
MERGE MESH 5 6 13 14 19
#MESH 20
MSYS 1
SLINES 1005T1090B5 244T159B-5 1005
IJGRID 1
SLINES 1130T1147 304T287B-1 1130
```

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 * IMPLLR CRY;1        Directory SAM_DISK [FONG.SSME.IMP.OUT]                22-NOV-88 06:48  Page
RULE 3 1
REFINE 0 0 2 0
IJSOLID  0 0 1
IJSOLID  159 1010 1 SO 0 PRES  A VANA
IJSOLID  164 1015 1 SO 0 PRES  B VANA
IJSOLID  169 1020 1 SO 0 PRES  C VANA
IJSOLID  174 1025 1 SO 0 PRES  D VANA
IJSOLID  179 1030 1 SO 0 PRES  E VANA
IJSOLID  184 1035 1 SO 0 PRES  F VANA
IJSOLID  189 1040 1 SO 0 PRES  G VANA
IJSOLID  194 1045 1 SO 0 PRES  H VANA
IJSOLID  199 1050 1 SO 0 PRES  I VANA
IJSOLID  204 1055 1 SO 0 PRES  J VANA
IJSOLID  209 1060 1 SO 0 PRES  K VANA
IJSOLID  214 1065 1 SO 0 PRES  L VANA
IJSOLID  219 1070 1 SO 0 PRES  M VANA
IJSOLID  224 1075 1 SO 0 PRES  N VANA
IJSOLID  229 1080 1 SO 0 PRES  O VANA
IJSOLID  234 1085 1 SO 0 PRES  P VANA
IJSOLID  239 1090 1 SO 0 PRES  Q VANA
MESH 3
MERGE MESH 7 8 15 16 20
#HUB CENTER
#MESH 21
SLINES 314T329 314 317 322 323 328 317
PRISM  5 3MO  3 12 341
PRISM  9 3MO  3 29 478
PRISM 13 3MO  3 42 341
PRISM 17 3MO  3 54 515
PRISM 19 3MO  3 59 515
IJSOLID 3 0 1
IJSOLID 326 336 1 SO 0 TORQ IPUT
IJSOLID 317 319 1 SO 0 TORQ OPUT
KNAME 322 322 1 1      TORQ
KNAME 324 325 2 18 AXIS SUPP HUB
KNAME 0 0  1  1 SIDE ONE HUB
KNAME 0 0 18 18 SIDE TWO HUB
MESH 3
ROTATE -149 515 3
MERGE MESH 1T8
# INSERT INTO MSET 11-14 FOR SYMMETRIC LOADING
MSET    11 COPY NAME PRES  A VANA
MSET    11 INSE NAME PRES  B VANA
MSET    12 COPY NAME PRES  A VANB
MSET    12 INSE NAME PRES  B VANB
MSET    13 COPY NAME PRES  A VANC
MSET    13 INSE NAME PRES  B VANC
MSET    14 COPY NAME PRES  A VAND
MSET    14 INSE NAME PRES  B VAND
#
NLIST 1 INSERT NAME SIDE ONE
NLIST 2 INSERT NAME SIDE TWO
#     MESH 22
#     SECOND IDENTICAL MODEL
DITTO   MESH 1T21
```

```
# INSERT INTO MSET 21-24 FOR ANTISYMMETRIC LOADING
MSET    21 COPY NAME PRES  A VANA
MSET    21 INSE NAME PRES  B VANA
MSET    21 DELE MSET 11
MSET    22 COPY NAME PRES  A VANB
MSET    22 INSE NAME PRES  B VANB
MSET    22 DELE MSET 12
MSET    23 COPY NAME PRES  A VANC
MSET    23 INSE NAME PRES  B VANC
MSET    23 DELE MSET 13
MSET    24 COPY NAME PRES  A VAND
MSET    24 INSE NAME PRES  B VAND
MSET    24 DELE MSET 14
#
NSET 3 COPY NAME SIDE ONE
NSET 3 DELE MESH 1T21
NSET 4 COPY NAME SIDE TWO
NSET 4 DELE MESH 1T21
NLIST 3 INSERT NSET 3
NLIST 4 INSERT NSET 4

#BOUNDARY CONDITIONS
SET SYNTAX ON
LET &ANG  = 60
GENSKEW 1 1 0 &ANG 0  1
NODSKEW SKEW 1 NLIST 2
NODSKEW SKEW 1 NLIST 4
LET &IFN1 = %IFL(NLST NV 0 1)
LET &IRN1 = %LFM(&IFN1 1)
LET &IFN2 = %IFL(NLST NV 0 2)
LET &IRN2 = %LFM(&IFN2 1)
LET &IFN3 = %IFL(NLST NV 0 3)
LET &IRN3 = %LFM(&IFN3 1)
LET &IFN4 = %IFL(NLST NV 0 4)
LET &IRN4 = %LFM(&IFN4 1)
DO  10 &I=1 2000 1
LET &N1   = %IBC1(&IRN1 &I)
IF &N1  20  20 1
LET &N2   = %IBC1(&IRN2 &I)
LET &N3   = %IBC1(&IRN3 &I)
LET &N4   = %IBC1(&IRN4 &I)
# IF C1 = -C2 SYMMETRIC-SYMMETRIC BC
GENCON 2 &N1 &N2 1 1 _C1  1  _C2 -1  0  1 0E9
GENCON 2 &N1 &N2 2 2 _C1  1  _C2 -1  0  1 0E9
GENCON 2 &N1 &N2 3 3 _C1  1  _C2 -1  0  1 0E9
# IF C1 = -C2 ANTISYMMETRIC-ANTISYMMETRIC BC
GENCON 2 &N3 &N4 1 1 _C1  1  _C2  1  0  1 0E9
GENCON 2 &N3 &N4 2 2 _C1  1  _C2  1  0  1 0E9
GENCON 2 &N3 &N4 3 3 _C1  1  _C2  1  0  1 0E9
 10 NOP
 20 NOP
LET &IRM4 = %RFM(&IFN4 1 0 &IRN4)
LET &IRM3 = %RFM(&IFN3 1 0 &IRN3)
LET &IRM2 = %RFM(&IFN2 1 0 &IRN2)
LET &IRM1 = %RFM(&IFN1 1 0 &IRN1)
```



```
NSET 10 COPY FREQ 0 0 NAME TORQ IPUT
NSET 10 INSERT FREQ 0 0 NAME TORQ OPUT
NSET 10 DELETE NAME SIDE TWO
NLIST 10 INSERT NSET 10
LET &IFN1 = %IFL(NLST NV 0 10)
LET &IRN1 = %LFM(&IFN1 1)
DO  30 &I=1 2000 1
LET &N1   = %IBC1(&IRN1 &I)
IF &N1  40  40 1
LET &X = %XN(&N1 1)
LET &Y = %XN(&N1 2)
LET &XY = &X / &Y
GENCON 2 &N1 &N1 1 2 _C1 -1  _C2 &XY 0  1 0E9
 30 NOP
 40 NOP
LET &IRM1 = %RFM(&IFN1 1 0 &IRN1)
SET SYNTAX OFF
#
# SUPPRESS TOP EDGE OF HUB IN AXIAL DIRECTION
DOFSUP 3 NAME AXIS SUPP HUB
#
# DELETE IDENTICAL MESH TO REDUCE COMPUTATIONS IN SOLVE (VAR 1)
ELTDEL  MESH 22
#
DOFLOO
FINISH
STOP
$BAND
START -1
STEPS
BAND
STOP
$SETUP
START 500000
SETUP
STOP
$MATL
START 500000
MATISO 1 15 5E6  35  # UNKNOWN MATERIAL
DENSITY 1   0004196  # DENSITY IN SNAILS   LB/386 088 = SNAILS
MATL
STOP
.EOF
```

Appendix E

MASS AND LOAD PARTICIPATION FACTOR TABLES (OUTPUT)

1Mass Modal Participation Factors
0 Active Global Mass: X-direction (1.58244E-02)
Y-direction (1.58248E-02)
Z-direction (1.58024E-02)

Mode Number	Frequency	Participation Factors Global X Direction	Participation Factors Global Y Direction	Participation Factors Global Z Direction	Percent of Total Mass Global X Direction	Percent of Total Mass Global Y Direction	Percent of Total Mass Global Z Direction
1	1822.6353	-3.363705E-02	5.324215E-02	7.637010E-03	7.150	17.913	0.369
2	2249.4185	2.917637E-03	-5.424198E-03	7.379896E-02	0.054	0.186	34.465
3	3945.7726	-2.639906E-03	-9.053317E-04	-3.674374E-02	0.044	0.005	8.544
4	4100.8064	-1.084252E-03	7.215513E-04	-1.902887E-02	0.007	0.003	2.291
5	5075.8308	-1.812323E-03	1.391613E-03	4.671577E-02	0.021	0.012	13.810
6	7894.4050	1.274686E-04	-7.249231E-04	-6.171209E-04	0.000	0.003	0.002
7	8093.0523	1.450199E-04	-1.937430E-05	-2.969366E-04	0.000	0.000	0.001
8	8831.5289	2.710729E-02	2.684742E-02	-9.439822E-05	4.643	4.555	0.000
9	9727.9254	5.768948E-03	2.492029E-02	1.266221E-02	0.210	3.924	1.015
10	9931.8538	-2.002918E-02	-1.149871E-02	8.191133E-03	2.535	0.836	0.425
11	9945.8979	-1.534926E-02	6.924617E-03	-1.628634E-02	1.489	0.303	1.679
12	10639.5981	1.307011E-02	-4.915161E-03	1.361505E-02	1.080	0.153	1.173
13	11784.3428	5.710490E-03	2.463908E-03	2.978693E-03	0.206	0.038	0.056
14	11827.3405	8.596551E-04	2.859118E-03	-7.120710E-03	0.005	0.052	0.321
15	11834.4034	1.737490E-02	5.179054E-03	2.155198E-04	1.908	0.169	0.000
16	12575.8349	-1.963228E-02	1.667215E-03	1.360208E-02	2.436	0.018	1.171
17	12852.4416	-1.888990E-02	-2.071591E-02	3.204900E-03	2.255	2.712	0.065
18	13952.5732	-8.019395E-03	-2.962417E-02	6.873903E-04	0.406	5.546	0.003
19	14220.0474	-3.473418E-02	-1.763001E-02	-3.887581E-03	7.624	1.964	0.098
20	14374.8945	7.981069E-03	2.755343E-02	-9.404613E-03	0.403	4.797	0.560
21	14453.0410	-2.369560E-02	-1.507063E-02	-1.982665E-03	3.548	1.435	0.025
22	14869.8609	4.927119E-04	7.074679E-05	1.129138E-04	0.002	0.000	0.000
23	14929.8547	-1.995621E-02	1.106555E-02	5.811159E-03	2.517	0.774	0.214
24	15548.9861	-7.911798E-03	-2.535099E-03	-2.607743E-03	0.396	0.041	0.043
25	16447.4653	2.738039E-03	2.705879E-03	1.303085E-03	0.047	0.046	0.011
26	16795.7514	5.132519E-03	-2.415611E-02	-6.812568E-03	0.166	3.687	0.294
27	16983.0608	-2.813177E-03	-5.267743E-03	-2.652626E-03	0.050	0.175	0.045
28	16987.4620	-1.551189E-02	1.313952E-02	-4.118682E-03	1.521	1.091	0.107
29	17838.0283	2.486171E-03	-9.248148E-03	-6.667384E-03	0.039	0.540	0.281
30	18091.9781	2.895926E-03	8.870142E-05	5.208353E-04	0.053	0.000	0.002
31	18377.3672	1.682702E-03	4.437505E-04	8.383157E-04	0.018	0.001	0.004
32	18396.8821	-5.833003E-03	3.284584E-03	3.042178E-03	0.215	0.068	0.059
33	18512.4999	-8.974416E-03	1.555077E-02	-6.721635E-03	0.509	1.528	0.286
34	18966.2883	3.957499E-03	6.098169E-03	4.104835E-04	0.099	0.235	0.001
35	18967.4758	1.659452E-04	-2.439844E-03	2.215930E-03	0.000	0.038	0.031
36	19086.3451	-8.082080E-04	3.504069E-03	-2.010692E-03	0.004	0.078	0.026
37	19982.4040	1.729137E-02	-1.292808E-03	2.468846E-03	1.889	0.011	0.039
38	20118.8672	-3.135270E-03	-5.887461E-04	-7.132000E-04	0.062	0.002	0.003
39	20228.9985	1.072416E-02	-2.175259E-04	6.840048E-04	0.727	0.000	0.003
40	20441.2134	4.539987E-03	1.419423E-03	2.357820E-03	0.130	0.013	0.035
41	20894.0888	-1.634358E-03	-2.847567E-04	-4.917758E-03	0.017	0.001	0.153
42	21073.9388	-1.194217E-02	3.913495E-03	-1.853216E-03	0.901	0.097	0.022
43	21118.2038	-2.620072E-03	7.919026E-04	5.874378E-03	0.043	0.004	0.218

1Mass Modal Participation Factors

Mode Number	Frequency	Participation Factors Global X Direction	Participation Factors Global Y Direction	Participation Factors Global Z Direction	Percent of Total Mass Global X Direction	Percent of Total Mass Global Y Direction	Percent of Total Mass Global Z Direction
44	21282.1832	-1.075397E-03	-1.204736E-03	-2.166981E-04	0.007	0.009	0.000
45	21385.6993	-3.330482E-03	3.729656E-04	-8.609701E-04	0.070	0.001	0.005
46	21440.7917	-2.990349E-03	-4.028078E-04	-9.156449E-04	0.057	0.001	0.005
47	21770.8601	5.142875E-03	-4.044585E-03	1.167305E-03	0.167	0.103	0.009
48	21849.5606	6.448074E-04	-8.551555E-03	1.419383E-04	0.003	0.462	0.000
49	21873.7909	-1.161613E-03	6.133447E-03	-2.537838E-03	0.009	0.238	0.041
50	22122.6863	8.571745E-03	-1.122448E-02	8.446607E-04	0.464	0.796	0.005
51	22459.5346	3.484712E-03	5.336551E-03	-1.929446E-03	0.077	0.180	0.024
52	22485.3742	4.368795E-03	9.815840E-03	7.655407E-04	0.121	0.609	0.004
53	23456.9006	-8.711804E-04	-2.822818E-03	6.282932E-03	0.005	0.050	0.250

54	23479.0957	9.102925E-04	3.422977E-03	1.626156E-04	0.005	0.074	0.000
55	23536.9192	-5.761577E-03	7.328534E-03	-1.073965E-03	0.210	0.339	0.007
56	23851.5910	1.240995E-02	1.408861E-03	1.175789E-03	0.973	0.013	0.009
57	24154.0112	-1.293630E-03	1.251826E-02	-2.209118E-03	0.011	0.990	0.031
58	24613.6132	2.130943E-03	1.495567E-03	7.440121E-03	0.029	0.014	0.350
59	24705.4333	3.248463E-03	-2.331711E-03	5.079896E-03	0.067	0.034	0.163
60	24973.2988	3.542196E-03	3.363176E-03	9.769008E-04	0.079	0.071	0.006
61	25213.9434	3.873811E-03	1.273431E-03	-4.035608E-04	0.095	0.010	0.001
62	25411.5261	-1.041649E-02	-8.652364E-03	-9.526597E-03	0.686	0.473	0.574
63	25846.2899	4.212768E-03	7.396244E-03	-2.846222E-03	0.112	0.346	0.051
64	25884.7305	2.791220E-03	4.569046E-03	-6.321678E-04	0.049	0.132	0.003
65	25971.4296	-2.562228E-03	-1.248280E-03	-9.026585E-04	0.041	0.010	0.005
66	26162.9167	-5.754685E-03	-1.963420E-03	-3.326955E-04	0.209	0.024	0.001
67	26269.7446	1.123272E-03	-1.513390E-03	5.043823E-03	0.008	0.014	0.161
68	26461.0156	4.902039E-04	6.725125E-04	-5.206295E-04	0.002	0.003	0.002
69	26737.2059	-6.245297E-03	3.893594E-03	3.874829E-04	0.246	0.096	0.001
70	26786.8482	8.131021E-03	1.724717E-02	-3.330728E-03	0.418	1.880	0.070
71	26999.0584	-1.890685E-03	-9.901077E-04	1.282813E-03	0.023	0.006	0.010
72	27351.6660	-1.259241E-02	-4.045140E-04	1.068887E-02	1.002	0.001	0.723
73	27822.3949	-2.320774E-03	-7.678070E-04	4.195485E-04	0.034	0.004	0.001
74	27865.2645	-8.897415E-03	4.128257E-03	4.022489E-04	0.500	0.108	0.001
75	27973.9175	-1.182349E-02	-2.446230E-03	6.167176E-03	0.883	0.038	0.241
76	28065.8451	-5.495997E-03	2.096375E-03	-4.378370E-05	0.191	0.028	0.000
77	28168.4204	-8.145936E-03	4.459575E-03	4.244351E-03	0.419	0.126	0.114
78	28567.4597	-6.928633E-03	7.918428E-03	-9.154988E-04	0.303	0.396	0.005
79	28635.4558	5.092686E-03	6.966016E-03	-2.433558E-03	0.164	0.307	0.037
80	28656.3417	-1.201126E-02	1.161400E-03	9.041013E-04	0.912	0.009	0.005
81	28947.6102	-1.369574E-02	2.100191E-03	4.518474E-03	1.185	0.028	0.129
82	29515.6775	-3.356303E-03	-1.264009E-02	-7.928275E-04	0.071	1.010	0.004
83	29613.5861	1.953634E-03	-4.639768E-03	6.309932E-04	0.024	0.136	0.003
84	29799.0351	1.176551E-03	-5.899200E-04	-3.870692E-04	0.009	0.002	0.001
85	29958.2241	1.395285E-03	3.319323E-03	7.738618E-04	0.012	0.070	0.004
86	30041.7236	1.191120E-03	5.061127E-03	3.189309E-03	0.009	0.162	0.064
87	30205.5354	-7.391037E-03	3.282726E-03	-3.474424E-03	0.345	0.068	0.076

1Mass Modal Participation Factors

Mode Number	Frequency	Global X Direction	Global Y Direction	Global Z Direction	Global X Direction	Global Y Direction	Global Z Direction
88	30215.2579	-9.112579E-03	4.079954E-03	2.833611E-04	0.525	0.105	0.001
89	30718.7320	-6.449597E-04	2.003876E-03	-1.377943E-03	0.003	0.025	0.012
90	30750.9109	6.019844E-03	5.050355E-03	1.078547E-03	0.229	0.161	0.007
91	30935.3633	-5.388389E-03	4.535998E-05	1.200263E-03	0.183	0.000	0.009
92	31017.5194	1.760970E-03	-9.750039E-04	1.357776E-03	0.020	0.006	0.012
93	31166.3978	-3.907548E-03	5.467123E-03	1.676187E-03	0.096	0.189	0.018
94	31219.1357	-7.978061E-04	-9.354575E-03	-8.562656E-04	0.004	0.553	0.005
95	31337.8369	4.520815E-03	-6.290668E-03	2.106958E-04	0.129	0.250	0.000
96	31453.1466	1.096975E-02	6.857872E-03	-4.215266E-03	0.760	0.297	0.112
97	31666.4818	-5.435448E-03	-4.472321E-03	2.823117E-03	0.187	0.126	0.050
98	31859.6627	2.182457E-03	-3.858942E-03	-3.385419E-03	0.030	0.094	0.073
99	31996.9426	1.054841E-05	1.319968E-03	-1.729502E-04	0.000	0.011	0.000
100	32149.5738	-2.919402E-03	1.021240E-03	1.140025E-03	0.054	0.007	0.008
101	32267.7877	-3.426643E-03	5.478836E-03	1.359668E-02	0.074	0.190	1.170
102	32327.1828	1.105367E-02	-3.462184E-03	1.099680E-03	0.772	0.076	0.008
103	32373.9583	-1.399244E-02	7.305036E-03	2.747081E-03	1.237	0.337	0.048
104	32631.9218	1.914258E-03	6.545270E-03	-1.242638E-03	0.023	0.271	0.010
105	32996.4943	-4.686294E-03	3.048938E-03	-1.657000E-03	0.139	0.059	0.017
106	33012.3717	5.617533E-03	9.422562E-04	-9.617170E-04	0.199	0.006	0.006
107	33130.5488	1.534871E-02	-8.670529E-03	1.121969E-03	1.489	0.475	0.008
108	33285.9096	5.825639E-04	1.955857E-03	-1.975789E-04	0.002	0.024	0.000
109	33406.8530	-1.568165E-02	8.869132E-03	-2.223584E-03	1.554	0.497	0.031
110	33595.2301	-9.731241E-03	-6.456957E-03	-8.789881E-03	0.598	0.263	0.489
111	33608.2365	-1.179221E-02	4.840449E-03	1.504853E-04	0.879	0.148	0.000
112	33848.1156	-4.285784E-03	6.401374E-03	3.741542E-03	0.116	0.259	0.089
113	33965.7183	5.658253E-03	-6.089279E-03	4.147275E-04	0.202	0.234	0.001
114	34008.3175	6.493806E-04	2.205467E-03	6.059755E-04	0.003	0.031	0.002

115	34018.3679	-1.538574E-02	-3.294281E-03	1.732560E-03	1.496	0.069	0.019
116	34287.8902	-3.556127E-03	-5.181467E-04	-6.079174E-04	0.080	0.002	0.002
117	34559.0369	6.820096E-03	-2.379314E-03	-1.394085E-03	0.294	0.036	0.012
118	34697.2522	4.343545E-03	-2.416356E-03	3.938953E-04	0.119	0.037	0.001
119	35008.3703	-4.227889E-03	-1.902690E-03	-4.785079E-03	0.113	0.023	0.145
120	35017.8251	-3.875458E-04	5.213601E-04	-5.452193E-04	0.001	0.002	0.002
121	35129.9877	-3.435873E-03	4.610080E-04	-8.140457E-03	0.075	0.001	0.419
122	35526.9375	-2.441058E-03	5.329636E-03	8.632419E-05	0.038	0.179	0.000
123	35552.5518	1.378656E-02	1.851912E-03	5.273709E-03	1.201	0.022	0.176
124	35831.3059	6.574877E-03	-2.014758E-03	6.705638E-04	0.273	0.026	0.003
125	35987.9786	-7.822135E-03	4.422728E-03	-3.254256E-04	0.387	0.124	0.001
126	36083.6119	-4.257053E-03	2.587706E-03	1.104377E-03	0.115	0.042	0.008
127	36321.6573	1.020133E-03	2.062381E-03	-3.468390E-03	0.007	0.027	0.076
128	36500.2374	3.096016E-03	-4.022451E-03	1.862974E-04	0.061	0.102	0.000
129	36592.2129	-3.903597E-04	-1.098402E-03	3.750150E-03	0.001	0.008	0.089
130	36649.6406	-8.713996E-03	7.502434E-03	-3.387945E-04	0.480	0.356	0.001
131	36900.2809	-7.945774E-04	-3.870661E-03	-2.934099E-04	0.004	0.095	0.001

1Mass Modal Participation Factors

Mode Number	Frequency	Global X Direction	Global Y Direction	Global Z Direction	Global X Direction	Global Y Direction	Global Z Direction
132	36986.5875	-8.097125E-03	2.092180E-03	-4.708760E-03	0.414	0.028	0.140
133	37328.9177	6.042750E-03	-1.816322E-03	3.955037E-03	0.231	0.021	0.099
134	37619.3414	3.034817E-03	4.725307E-03	1.987313E-04	0.058	0.141	0.000
135	37645.6084	9.731699E-03	-6.798381E-05	-3.495275E-05	0.598	0.000	0.000
136	37714.2369	8.281137E-03	-9.112876E-04	1.545350E-03	0.433	0.005	0.015
137	37918.6451	-3.933404E-03	-1.266797E-03	1.251228E-03	0.098	0.010	0.010
138	38110.6994	-3.454973E-03	-5.339189E-03	-5.017627E-03	0.075	0.180	0.159
139	38141.4341	1.375061E-03	-3.758383E-03	-1.141851E-03	0.012	0.089	0.008
140	38214.3872	-1.669268E-03	-1.463284E-04	-3.388219E-03	0.018	0.000	0.073
141	38455.6499	1.729357E-04	-5.994157E-03	-4.311646E-03	0.000	0.227	0.118
142	38505.8261	3.821100E-03	-8.508577E-04	-5.160074E-04	0.092	0.005	0.002
143	38929.3651	-7.931276E-03	-4.823581E-03	1.742605E-03	0.398	0.147	0.019
144	39003.2065	-6.194744E-03	4.201604E-03	-8.653643E-03	0.243	0.112	0.474
145	39212.0229	-6.261979E-03	2.530946E-03	5.432102E-04	0.248	0.040	0.002
146	39229.2573	6.535320E-04	-8.905153E-04	1.270274E-03	0.003	0.005	0.010
147	39320.9892	-4.231773E-03	2.217608E-03	-2.330370E-03	0.113	0.031	0.034
148	39446.4942	-2.791754E-03	7.296873E-03	-1.157678E-02	0.049	0.336	0.848
149	39532.4159	1.531619E-03	7.238036E-04	1.612962E-03	0.015	0.003	0.016
150	39648.3726	-1.289022E-03	4.699350E-03	-7.309080E-04	0.011	0.140	0.003
151	39752.5185	-2.728020E-03	-2.400238E-03	8.409545E-04	0.047	0.036	0.004
152	39858.5332	1.540064E-03	-2.786333E-03	3.121588E-03	0.015	0.049	0.062
153	40008.7386	1.804757E-03	1.766920E-03	-1.909585E-03	0.021	0.020	0.023
154	40276.3210	-5.710437E-04	3.558986E-04	2.093726E-03	0.002	0.001	0.028
155	40293.8063	6.302285E-04	-1.610320E-03	-1.064676E-03	0.003	0.016	0.007
156	40415.7783	-5.851634E-03	2.705929E-03	1.362268E-03	0.216	0.046	0.012
157	40576.4465	-6.471771E-03	-1.243991E-03	-3.078593E-03	0.265	0.010	0.060
158	40680.0891	5.175038E-05	8.563220E-05	-1.437387E-03	0.000	0.000	0.013
159	40681.8302	8.077767E-04	-1.701327E-03	-5.667539E-04	0.004	0.018	0.002
160	40947.6838	-6.479081E-04	3.593344E-04	-7.727545E-04	0.003	0.001	0.004
161	40978.6367	-1.880157E-03	5.614141E-03	1.988183E-04	0.022	0.199	0.000
162	41199.3420	-2.422873E-03	-2.992769E-04	4.507189E-04	0.037	0.001	0.001
163	41291.0252	4.629198E-03	-1.884103E-03	3.437029E-03	0.135	0.022	0.075
164	41341.4451	2.811017E-03	1.905410E-03	-1.496837E-03	0.050	0.023	0.014
165	41356.1824	6.756331E-03	2.466116E-03	-1.610474E-02	0.288	0.038	1.641
166	41634.6702	-1.028636E-03	6.615144E-03	6.739894E-05	0.007	0.277	0.000
167	41847.3430	1.134749E-05	-4.024274E-03	2.424051E-04	0.000	0.102	0.000
168	42225.3819	2.526280E-03	-6.106254E-03	-6.357777E-04	0.040	0.236	0.003
169	42284.5521	-5.907193E-03	-2.723211E-03	2.847120E-03	0.221	0.047	0.051
170	42435.4401	-5.947653E-03	1.822627E-03	-8.344271E-03	0.224	0.021	0.441
171	42443.3823	5.841911E-04	1.460012E-03	-8.351737E-05	0.002	0.013	0.000
172	42587.8411	-3.056239E-03	4.292028E-03	2.496620E-04	0.059	0.116	0.000
173	42873.5275	-7.225938E-04	3.647411E-03	-2.064440E-04	0.003	0.084	0.000
174	43049.7492	-4.310368E-03	-2.088971E-03	6.055126E-03	0.117	0.028	0.232
175	43153.3591	4.798818E-04	1.089653E-03	-1.241894E-04	0.001	0.008	0.000

1Mass Modal Participation Factors

Mode Number	Frequency	Global X Direction	Global Y Direction	Global Z Direction	Global X Direction	Global Y Direction	Global Z Direction
176	43192.0757	1.925605E-03	-5.519702E-04	1.361096E-04	0.023	0.002	0.000
177	43260.0832	-2.237709E-03	-5.978237E-05	-9.514908E-04	0.032	0.000	0.006
178	43414.7486	-3.890058E-03	1.820482E-03	-1.199453E-04	0.096	0.021	0.000
179	43650.8399	-1.509849E-04	8.504767E-04	7.862785E-05	0.000	0.005	0.000
180	43683.0604	2.937383E-03	-2.315556E-03	-8.455545E-03	0.055	0.034	0.452
181	43822.3742	-3.582192E-03	-1.187943E-03	-3.766140E-05	0.081	0.009	0.000
182	43928.6836	3.321820E-04	9.846313E-05	1.333914E-04	0.001	0.000	0.000
183	44081.3161	-3.501616E-03	-2.983723E-03	-2.252823E-03	0.077	0.056	0.032
184	44361.0394	7.265859E-04	1.202321E-03	1.715358E-04	0.003	0.009	0.000
185	44426.5359	-7.231147E-03	3.243534E-03	2.406321E-03	0.330	0.066	0.037
186	44493.4098	-1.349418E-03	-3.295599E-03	-2.742215E-04	0.012	0.069	0.000
187	44705.1053	-5.405858E-03	1.589892E-03	-1.958515E-03	0.185	0.016	0.024
188	44713.4062	-6.762330E-03	-1.780559E-03	1.817700E-03	0.289	0.020	0.021
189	44796.4593	3.105602E-04	1.281387E-03	8.505782E-05	0.001	0.010	0.000
190	44839.2645	4.469809E-03	-4.538844E-03	1.169346E-02	0.126	0.130	0.865
191	44972.1034	-8.554024E-03	-7.897154E-04	5.159234E-04	0.462	0.004	0.002
192	45005.5440	-2.433342E-03	1.948219E-03	-1.280148E-05	0.037	0.024	0.000
193	45079.0141	-1.035635E-02	6.422320E-03	-1.260402E-03	0.678	0.261	0.010
194	45137.9279	-6.517620E-04	-2.976044E-03	-1.900284E-04	0.003	0.056	0.000
195	45249.5757	-2.029191E-03	-1.712125E-04	-3.542472E-04	0.026	0.000	0.001
196	45373.0696	-5.849564E-03	1.930654E-03	6.303266E-03	0.216	0.024	0.251
197	45420.3768	-1.517120E-03	-1.045514E-03	-1.321440E-04	0.015	0.007	0.000
198	45491.7138	3.585405E-03	6.110004E-03	-2.430520E-03	0.081	0.236	0.037
199	45683.7934	1.471811E-03	-2.887647E-03	-3.984186E-03	0.014	0.053	0.100
200	45703.0905	2.048361E-04	1.653549E-03	-5.530719E-04	0.000	0.017	0.002
201	45926.4220	3.074255E-03	1.588002E-03	4.619729E-04	0.060	0.016	0.001
202	45990.6498	-1.050090E-03	1.475323E-03	4.892740E-04	0.007	0.014	0.002
203	46012.0464	-1.307023E-03	2.037165E-03	7.029506E-05	0.011	0.026	0.000
204	46113.4228	5.989221E-03	-3.436365E-03	-2.406605E-03	0.227	0.075	0.037
205	46235.2532	7.100619E-04	-4.347257E-04	7.887811E-04	0.003	0.001	0.004
206	46320.8098	-3.098797E-03	7.163908E-03	1.838688E-03	0.061	0.324	0.021
207	46365.3678	-2.352811E-03	-1.973519E-03	-1.299982E-04	0.035	0.025	0.000
208	46449.0939	7.857548E-04	3.034205E-03	-1.342583E-03	0.004	0.058	0.011
209	46545.3896	3.650999E-03	1.404398E-03	6.926435E-03	0.084	0.012	0.304
210	46585.4825	7.496940E-04	5.280298E-04	3.611254E-04	0.004	0.002	0.001
211	46695.9479	6.055890E-04	1.535750E-03	-1.712035E-04	0.002	0.015	0.000
212	46830.2985	2.486674E-04	-2.776950E-03	2.894642E-04	0.000	0.049	0.001
213	46863.9310	6.390869E-05	-3.462377E-03	-4.561988E-03	0.000	0.076	0.132
214	47124.4595	2.907997E-07	1.193783E-03	-4.708023E-04	0.000	0.009	0.001
215	47246.6260	-7.012194E-03	5.099172E-03	-7.813109E-04	0.311	0.164	0.004
216	47477.4131	1.970518E-03	4.926541E-03	-3.074027E-03	0.025	0.153	0.060
217	47516.2502	2.814975E-03	2.026978E-03	4.530002E-04	0.050	0.028	0.001
218	47597.1265	-4.944144E-03	7.559979E-04	-9.988392E-04	0.154	0.004	0.006
219	47819.7419	1.522658E-04	-1.012242E-03	2.297024E-04	0.000	0.006	0.000

1Mass Modal Participation Factors

Mode Number	Frequency	Global X Direction	Global Y Direction	Global Z Direction	Global X Direction	Global Y Direction	Global Z Direction
220	47886.2288	-2.424084E-03	3.621530E-03	-9.939992E-04	0.037	0.083	0.006
221	47999.5792	-9.467005E-03	3.271911E-03	4.844187E-04	0.586	0.068	0.001
222	48126.4540	1.078965E-03	-2.824763E-03	-6.152249E-05	0.007	0.050	0.000
223	48156.3311	4.001988E-03	1.180162E-03	5.892634E-04	0.101	0.009	0.002
224	48382.6607	-3.346796E-03	-1.029164E-03	-1.165068E-03	0.071	0.007	0.009
225	48412.7807	1.486155E-03	-6.966340E-04	-1.470925E-04	0.014	0.003	0.000
226	48627.4962	1.112748E-04	-4.673026E-04	-6.264216E-04	0.000	0.001	0.002
227	48653.9824	-4.540604E-04	8.665533E-03	2.320366E-03	0.001	0.475	0.034
228	48828.4441	1.123770E-03	1.314673E-03	-3.262173E-04	0.008	0.011	0.001
229	48972.2100	2.290736E-03	-6.456509E-03	-3.449805E-03	0.033	0.263	0.075
230	49072.5236	6.363516E-04	-3.316381E-04	-1.291274E-04	0.003	0.001	0.000
231	49338.1777	1.417659E-03	-2.737491E-03	-3.541023E-03	0.013	0.047	0.079
232	49385.8370	-1.745369E-03	2.055923E-03	-6.006168E-04	0.019	0.027	0.002

233	49442.9498	1.116349E-03	5.039856E-04	-5.453919E-04	0.008	0.002	0.002
234	49510.3251	-9.745155E-04	-7.855394E-05	3.087226E-03	0.006	0.000	0.060
235	49778.4751	5.599119E-03	1.549974E-03	-5.560169E-03	0.198	0.015	0.196
236	49796.5998	1.369965E-04	-9.228377E-04	1.587502E-04	0.000	0.005	0.000
237	49946.7558	-3.287236E-03	1.926937E-03	5.317640E-03	0.068	0.023	0.179
238	63479.6542	-4.391721E-04	5.617402E-04	-4.970482E-06	0.001	0.002	0.000
239	65861.8086	-1.232522E-03	1.161506E-03	1.017568E-03	0.010	0.009	0.007
240	65905.2180	1.334921E-03	6.952415E-05	-8.284015E-05	0.011	0.000	0.000
241	67508.5292	2.535149E-04	2.117299E-03	2.210186E-03	0.000	0.028	0.031
242	67666.8736	-6.108871E-04	1.948526E-03	-4.838460E-05	0.002	0.024	0.000
243	68783.0925	1.341994E-03	-1.077772E-03	1.441751E-04	0.011	0.007	0.000
244	69763.9709	-7.261367E-04	1.671433E-03	-2.536417E-04	0.003	0.018	0.000
245	69769.9985	-1.229318E-05	-5.937649E-04	-6.354654E-05	0.000	0.002	0.000
					79.951	74.865	82.104

1Mass Modal Participation Factors
Ø Active Global Mass: X-direction (1.58244E-02)
Y-direction (1.58246E-02)
Z-direction (1.58026E-02)

Mode Number	Frequency	Participation Factors Global X Direction	Participation Factors Global Y Direction	Participation Factors Global Z Direction	Percent of Total Mass Global X Direction	Percent of Total Mass Global Y Direction	Percent of Total Mass Global Z Direction
1	2108.7961	7.987612E-03	1.526497E-03	6.740829E-02	Ø.403	Ø.Ø15	28.754
2	2108.7961	-8.Ø54230E-04	9.703493E-03	4.1Ø5266E-02	Ø.ØØ4	Ø.595	1Ø.665
3	4206.7368	2.735171E-02	-7.689351E-02	6.ØØ3392E-03	4.728	37.363	Ø.228
4	4206.7368	7.2Ø6729E-02	1.371423E-02	2.259490E-03	32.821	1.189	Ø.Ø32
5	6703.5Ø51	-7.181982E-04	2.395143E-03	1.219662E-02	Ø.ØØ3	Ø.Ø36	Ø.941
6	6703.5Ø51	9.Ø79631E-04	1.347534E-03	-5.85Ø462E-03	Ø.ØØ5	Ø.Ø11	Ø.217
7	7745.5701	9.648610E-03	-1.578796E-02	-5.Ø16855E-02	Ø.588	1.575	15.926
8	7745.5701	6.18Ø257E-04	1.458878E-02	-2.986782E-02	Ø.ØØ2	1.345	5.645
9	9115.8478	-1.84Ø736E-02	-3.595322E-02	8.721575E-03	2.141	8.169	Ø.286
1Ø	9115.8478	2.455522E-02	2.12Ø5Ø4E-02	-3.167453E-03	3.81Ø	2.841	Ø.Ø63
11	9277.8146	-2.899937E-03	-5.96Ø422E-04	5.757379E-03	Ø.Ø53	Ø.ØØ2	Ø.21Ø
12	9277.8146	4.361989E-03	6.187401E-03	4.483212E-04	Ø.12Ø	Ø.242	Ø.ØØ1
13	1Ø498.2463	3.Ø79167E-02	9.374104E-03	5.79Ø89ØE-04	5.992	Ø.555	Ø.ØØ2
14	1Ø498.2463	4.631442E-03	4.77Ø514E-03	-1.284640E-03	Ø.136	Ø.144	Ø.Ø1Ø
15	11646.3505	7.992841E-03	3.641ØØ9E-03	-7.883611E-03	Ø.4Ø4	Ø.Ø84	Ø.393
16	11646.3505	6.491749E-03	6.136951E-03	4.568360E-03	Ø.266	Ø.238	Ø.132
17	13167.1228	-4.216253E-04	-3.253798E-03	1.826865E-02	Ø.ØØ1	Ø.Ø67	2.112
18	13167.1228	-4.262994E-03	2.933ØØØE-03	-3.389431E-02	Ø.115	Ø.Ø54	7.184
19	13714.6429	-2.156784E-03	-4.192820E-03	-5.68Ø5Ø5E-03	Ø.Ø29	Ø.111	Ø.2Ø4
2Ø	13714.6429	-3.789218E-03	1.799767E-03	-7.84Ø238E-03	Ø.Ø91	Ø.Ø2Ø	Ø.389
21	13965.9388	1.652213E-03	9.923595E-05	-5.244810E-03	Ø.Ø17	Ø.ØØØ	Ø.174
22	13965.9388	1.Ø38592E-04	-3.Ø34964E-04	4.883209E-03	Ø.ØØØ	Ø.ØØ1	Ø.151
23	15803.7Ø53	-2.413750E-03	2.4Ø9424E-03	-2.551245E-03	Ø.Ø37	Ø.Ø37	Ø.Ø41
24	15803.7Ø53	2.585863E-03	-2.523785E-04	6.135109E-03	Ø.Ø42	Ø.ØØØ	Ø.238
25	17348.7Ø43	-1.738423E-03	4.ØØ9Ø36E-03	-8.542407E-03	Ø.Ø19	Ø.1Ø2	Ø.462
26	17348.7Ø43	-6.745726E-03	9.539762E-04	1.Ø41725E-03	Ø.288	Ø.ØØ6	Ø.ØØ7
27	17723.4712	2.149685E-02	-1.821213E-02	1.451349E-02	2.92Ø	2.Ø96	1.333
28	17723.4712	1.1Ø9Ø73E-02	6.487387E-03	-8.278862E-03	Ø.777	Ø.266	Ø.434
29	17944.1355	4.311562E-03	3.225Ø58E-04	-5.692Ø86E-03	Ø.117	Ø.ØØ1	Ø.2Ø5
3Ø	17944.1355	-4.Ø99190E-04	-3.8Ø7Ø05E-03	2.126Ø94E-03	Ø.ØØ1	Ø.Ø92	Ø.Ø29
31	18360.8346	-2.78Ø91ØE-03	5.945783E-04	-2.978Ø91E-03	Ø.Ø49	Ø.ØØ2	Ø.Ø56
32	18360.8346	-1.644750E-03	8.738876E-04	-2.454678E-03	Ø.Ø17	Ø.ØØ5	Ø.Ø38
33	18688.Ø196	-1.714620E-03	-5.992251E-03	1.319170E-02	Ø.Ø19	Ø.227	1.1Ø1
34	18688.Ø196	-4.329491E-03	-6.6Ø5899E-04	9.266998E-03	Ø.118	Ø.ØØ3	Ø.543
35	19Ø46.4985	-1.653794E-02	1.474706E-02	2.1Ø3550E-02	1.728	1.374	2.8ØØ
36	19Ø46.4985	-1.722837E-02	-9.732568E-03	8.772525E-03	1.876	Ø.599	Ø.487
37	19611.8222	-9.113802E-03	8.8Ø5224E-03	-6.Ø65394E-03	Ø.525	Ø.49Ø	Ø.233
38	19611.8222	-1.321396E-02	-1.213348E-02	-1.Ø58ØØØE-02	1.1Ø3	Ø.93Ø	Ø.7Ø9
39	19947.6711	-5.3Ø7915E-03	6.126805E-03	9.262728E-04	Ø.178	Ø.237	Ø.ØØ5
4Ø	19947.6711	-1.Ø22536E-02	-3.497307E-03	-5.668915E-03	Ø.661	Ø.Ø77	Ø.2Ø3
41	2Ø413.9234	1.632507E-04	-1.352Ø16E-03	-4.399470E-03	Ø.ØØØ	Ø.Ø12	Ø.122
42	2Ø413.9234	-2.61ØØ29E-03	-1.Ø35559E-03	3.Ø76101E-03	Ø.Ø43	Ø.ØØ7	Ø.Ø6Ø
43	2Ø8Ø4.2238	1.168586E-03	-1.345235E-03	-6.984466E-04	Ø.ØØ9	Ø.Ø11	Ø.ØØ3

1Mass Modal Participation Factors

Mode Number	Frequency	Participation Factors Global X Direction	Participation Factors Global Y Direction	Participation Factors Global Z Direction	Percent of Total Mass Global X Direction	Percent of Total Mass Global Y Direction	Percent of Total Mass Global Z Direction
44	2Ø8Ø4.2238	-1.3Ø3170E-04	-4.1Ø8614E-05	1.273884E-03	Ø.ØØØ	Ø.ØØØ	Ø.Ø1Ø
45	21137.2761	-6.1Ø7752E-Ø6	-1.697564E-04	4.375752E-03	Ø.ØØØ	Ø.ØØØ	Ø.121
46	21137.2761	6.433369E-03	2.962811E-03	4.493573E-03	Ø.262	Ø.Ø55	Ø.128
47	21403.3Ø27	2.115466E-03	2.765398E-03	-2.552564E-03	Ø.Ø28	Ø.Ø48	Ø.Ø41
48	21403.3Ø27	4.484746E-03	-3.Ø24968E-03	-1.455243E-03	Ø.127	Ø.Ø58	Ø.Ø13
49	22128.6713	9.362Ø99E-03	-3.712830E-03	-9.55ØØ33E-03	Ø.554	Ø.Ø87	Ø.577
5Ø	22128.6713	4.499214E-03	6.986518E-03	4.4Ø4821E-03	Ø.128	Ø.3Ø8	Ø.123
51	22657.8837	-5.3Ø7186E-03	-6.751575E-04	6.319239E-04	Ø.178	Ø.ØØ3	Ø.ØØ3
52	22657.8837	1.923783E-03	-3.619896E-03	6.995849E-04	Ø.Ø23	Ø.Ø83	Ø.ØØ3
53	22966.9970	9.91Ø495E-03	-1.Ø13617E-03	-4.5ØØ6Ø7E-03	Ø.821	Ø.ØØ6	Ø.128

54	22966.9970	2.585576E-03	-8.138833E-03	5.832088E-03	0.042	0.419	0.215
55	23155.8038	-6.928804E-03	1.893167E-03	9.038888E-03	0.303	0.023	0.517
56	23155.8038	-3.138487E-03	-7.271877E-03	-5.649947E-03	0.062	0.334	0.202
57	23570.5022	-2.286222E-03	3.667704E-04	1.639374E-02	0.033	0.001	1.701
58	23570.5022	-1.311350E-03	4.841755E-03	-9.308187E-03	0.011	0.148	0.548
59	24230.3522	-4.366088E-03	3.147116E-03	1.863540E-03	0.120	0.063	0.022
60	24230.3522	-3.487075E-03	-3.440419E-03	3.437720E-03	0.077	0.075	0.075
61	24697.6459	-4.034131E-03	2.002700E-03	-7.990305E-04	0.103	0.025	0.004
62	24697.6459	1.324161E-04	-5.276235E-03	3.548354E-03	0.000	0.176	0.080
63	24911.9905	-8.272980E-04	3.423457E-03	2.967503E-03	0.004	0.074	0.056
64	24911.9905	5.178466E-03	1.642780E-03	6.554108E-04	0.169	0.017	0.003
65	26014.3613	2.753033E-03	-1.287003E-03	-4.776638E-03	0.048	0.010	0.144
66	26014.3613	1.062484E-03	2.510123E-03	3.550557E-03	0.007	0.040	0.080
67	26229.1127	-3.797271E-03	-3.641699E-04	1.705918E-03	0.091	0.001	0.018
68	26229.1127	1.299409E-03	-2.460942E-03	-3.769831E-03	0.011	0.038	0.090
69	26369.5374	-3.988038E-03	-2.417826E-03	4.383443E-03	0.101	0.037	0.122
70	26369.5374	-4.862907E-03	3.985618E-03	-3.378444E-03	0.149	0.100	0.072
71	26737.9662	1.318647E-02	-2.610691E-03	-1.330145E-03	1.099	0.043	0.011
72	26737.9662	1.506605E-04	-1.320877E-02	2.042108E-03	0.000	1.103	0.026
73	27154.7875	4.822273E-04	-1.722327E-03	5.725912E-03	0.001	0.019	0.207
74	27154.7875	7.476872E-04	7.196958E-05	-5.452968E-05	0.004	0.000	0.000
75	27736.6385	-5.777357E-03	1.995313E-03	1.526468E-03	0.211	0.025	0.015
76	27736.6385	5.175386E-04	5.853120E-03	8.559451E-04	0.002	0.216	0.005
77	28017.9851	1.354218E-02	7.244345E-03	2.462972E-03	1.159	0.332	0.038
78	28017.9851	-1.353746E-02	1.428476E-02	1.449173E-03	1.158	1.289	0.013
79	28237.2556	-1.769802E-02	7.362062E-03	2.334958E-03	1.979	0.343	0.035
80	28237.2556	3.555159E-03	1.389357E-02	7.705817E-04	0.080	1.220	0.004
81	28828.7957	3.948837E-03	2.084813E-03	-2.284178E-03	0.099	0.027	0.033
82	28828.7957	-3.537449E-03	4.688896E-03	3.074328E-03	0.079	0.139	0.060
83	29132.8701	-1.967580E-03	3.566098E-03	1.392615E-03	0.024	0.080	0.012
84	29132.8701	-4.092060E-03	-8.178194E-04	-1.190867E-03	0.106	0.004	0.009
85	29427.9851	5.618162E-03	-3.659489E-03	-5.667255E-03	0.199	0.085	0.203
86	29427.9851	5.306799E-04	4.336563E-03	-2.509038E-03	0.002	0.119	0.040
87	29761.8522	-2.597665E-03	8.265802E-03	1.488426E-03	0.043	0.432	0.014

1Mass Modal Participation Factors

Mode Number	Frequency	Global X Direction	Global Y Direction	Global Z Direction	Global X Direction	Global Y Direction	Global Z Direction
88	29761.8522	-6.286756E-03	2.273437E-03	4.590946E-03	0.250	0.033	0.133
89	29994.8339	9.455259E-04	2.538545E-03	7.050369E-03	0.006	0.041	0.315
90	29994.8339	-5.980398E-03	1.969681E-03	3.553660E-04	0.226	0.025	0.001
91	30107.3079	-6.884740E-03	-1.083866E-03	-1.410896E-03	0.300	0.007	0.013
92	30107.3079	-4.065597E-03	8.604760E-03	-6.321011E-04	0.104	0.468	0.003
93	30492.9954	-4.958329E-03	1.647685E-03	2.629116E-03	0.155	0.017	0.044
94	30492.9954	1.651316E-02	-6.573322E-03	2.634192E-03	1.723	0.273	0.044
95	30861.7471	5.189982E-03	-5.830954E-03	2.195205E-04	0.170	0.215	0.000
96	30861.7471	2.404893E-03	7.354662E-03	3.725419E-03	0.037	0.342	0.088
97	31099.4621	-2.850058E-03	3.507095E-04	-5.153249E-04	0.051	0.001	0.002
98	31099.4621	2.989720E-03	-2.443571E-03	-3.137723E-03	0.056	0.038	0.062
99	31271.7721	-2.498736E-04	-1.051161E-03	-1.151303E-03	0.000	0.007	0.008
100	31271.7721	-5.459930E-04	-8.177062E-04	-8.142016E-04	0.002	0.004	0.002
101	31825.2777	-4.001349E-03	4.609203E-03	2.873639E-03	0.101	0.134	0.052
102	31825.2780	-1.297591E-03	4.615572E-03	2.913318E-03	0.011	0.135	0.054
103	31971.4463	2.589032E-04	-3.471737E-04	-8.032051E-04	0.000	0.001	0.004
104	31971.4474	-1.548546E-03	-2.453866E-03	-1.166891E-03	0.015	0.038	0.009
105	43040.5569	3.982657E-04	-1.241460E-03	-8.132847E-04	0.001	0.010	0.004
106	43040.6765	-5.358579E-04	-2.303852E-03	-1.842899E-03	0.002	0.034	0.021
107	44806.0073	5.124361E-04	2.414767E-04	-2.387133E-04	0.002	0.000	0.000
108	44806.1258	6.681071E-04	-3.393291E-04	-1.441561E-04	0.003	0.001	0.000
109	45788.6728	-1.892462E-04	-1.035694E-03	-4.901256E-04	0.000	0.007	0.002
110	45788.7998	-4.706822E-04	-1.583790E-04	2.889907E-05	0.001	0.000	0.000
111	47748.8967	1.572258E-03	-2.669471E-03	-3.103996E-04	0.016	0.045	0.001
112	47749.2386	-2.715974E-03	-1.661006E-03	2.891434E-04	0.047	0.017	0.001
					75.036	70.828	89.514

2ND DEGENERATE RC MODEL

1Mass Modal Participation Factors
Ø Active Global Mass: X-direction (1.58244E-02)
Y-direction (1.58246E-02)
Z-direction (1.58026E-02)

Ø

Mode Number	Frequency	Participation Factors -- Global X Direction	Global Y Direction	Global Z Direction	Percent of Total Mass -- Global X Direction	Global Y Direction	Global Z Direction
1	2682.1226	-1.936908E-03	-2.500301E-03	-4.847788E-02	0.024	0.040	14.872
2	2682.1227	1.322029E-03	1.877747E-04	3.248251E-02	0.011	0.000	6.677
3	5389.7998	-3.214801E-03	6.240568E-04	-2.486941E-02	0.065	0.002	3.914
4	5389.7998	-6.565315E-04	-4.388831E-04	7.169920E-03	0.003	0.001	0.325
5	7634.7190	9.387590E-03	5.008562E-02	5.542938E-03	0.557	15.852	0.194
6	7634.7190	-4.935841E-02	7.970729E-04	-2.366746E-02	15.396	0.004	3.545
7	9754.7032	-5.077091E-03	3.292465E-02	-5.931067E-03	0.163	6.850	0.223
8	9754.7032	3.096634E-02	4.517278E-03	-3.169078E-02	6.060	0.129	6.355
9	10518.8792	1.725438E-03	-2.144048E-03	-1.007637E-02	0.019	0.029	0.643
10	10518.8792	-1.153618E-03	-2.681294E-03	2.975390E-03	0.008	0.045	0.056
11	11036.6335	-1.045808E-02	-1.265107E-02	1.080444E-02	0.691	1.011	0.739
12	11036.6335	2.506158E-03	1.364828E-03	-6.883977E-03	0.040	0.012	0.300
13	11919.9365	5.749168E-04	-1.813928E-03	1.677831E-02	0.002	0.021	1.781
14	11919.9365	1.023533E-02	-2.783508E-02	-6.660158E-06	0.662	4.896	0.000
15	12083.1289	-2.344054E-02	2.204023E-02	-2.674981E-03	3.472	3.070	0.045
16	12083.1289	7.281853E-03	8.076029E-03	4.305437E-03	0.335	0.412	0.117
17	12993.4254	-1.361582E-03	2.197748E-03	7.151231E-03	0.012	0.031	0.324
18	12993.4254	1.346880E-03	-4.757054E-03	-2.935947E-03	0.011	0.143	0.055
19	13376.1488	3.542424E-03	3.535522E-02	-5.010770E-04	0.079	7.899	0.002
20	13376.1488	1.011956E-02	3.104357E-03	8.179827E-03	0.647	0.061	0.423
21	14957.0548	-8.666927E-03	-1.290385E-02	-1.812602E-03	0.475	1.052	0.021
22	14957.0548	-1.668094E-03	1.201522E-02	6.950320E-04	0.018	0.912	0.003
23	15395.3482	2.252200E-03	8.185018E-03	1.859094E-02	0.032	0.423	2.187
24	15395.3482	5.079507E-03	8.263224E-03	-1.497125E-02	0.163	0.431	1.418
25	16340.0113	-7.568010E-04	1.797057E-02	4.902239E-04	0.004	2.041	0.002
26	16340.0113	-2.214809E-02	-6.310837E-03	6.892524E-03	3.100	0.252	0.301
27	17880.1679	1.948270E-04	-1.477661E-03	3.598022E-03	0.000	0.014	0.082
28	17880.1679	-9.189570E-04	1.349859E-02	-5.558027E-03	0.005	1.151	0.195
29	18685.9195	6.919181E-03	-3.483898E-04	-5.548950E-03	0.303	0.001	0.195
30	18685.9195	-1.120684E-03	1.505145E-03	2.351492E-03	0.008	0.014	0.035
31	18776.9321	-1.686233E-03	2.651415E-03	4.461978E-03	0.018	0.044	0.126
32	18776.9321	-5.091825E-04	-1.030366E-03	1.838028E-03	0.002	0.007	0.021
33	19240.4923	7.465563E-03	-2.416457E-03	-4.361488E-03	0.352	0.037	0.120
34	19240.4923	-8.552993E-03	1.356936E-02	4.285181E-03	0.462	1.164	0.116
35	19746.9190	3.197016E-02	5.804005E-03	4.640898E-04	6.459	0.213	0.001
36	19746.9190	1.253943E-02	-7.415760E-03	-1.576822E-03	0.994	0.348	0.016
37	20485.2293	-1.453204E-02	-4.554236E-03	-6.391375E-03	1.335	0.131	0.258
38	20485.2293	1.533986E-02	7.447022E-03	8.078252E-03	1.487	0.350	0.413
39	20700.9547	-6.623099E-03	-4.136322E-03	-1.961290E-03	0.277	0.108	0.024
40	20700.9547	-7.968760E-03	-4.651063E-03	-1.287152E-02	0.401	0.137	1.048
41	20937.8322	7.920881E-03	1.589717E-03	-2.265305E-03	0.396	0.016	0.032
42	20937.8322	1.968052E-03	-1.571305E-05	5.894896E-03	0.024	0.000	0.220
43	21107.7206	-7.594152E-03	1.090597E-03	5.012650E-03	0.364	0.008	0.159

1Mass Modal Participation Factors

Mode Number	Frequency	Global X Direction	Global Y Direction	Global Z Direction	Global X Direction	Global Y Direction	Global Z Direction
44	21107.7206	-7.644573E-03	-5.904768E-03	-7.703649E-04	0.369	0.220	0.004
45	21564.5447	-6.163757E-03	1.150319E-02	5.077870E-03	0.240	0.836	0.163
46	21564.5447	3.026308E-03	2.870778E-03	-3.034057E-03	0.058	0.052	0.058
47	22013.6056	9.257854E-03	2.342783E-03	-1.649264E-02	0.542	0.035	1.721
48	22013.6056	-5.182001E-03	4.815291E-03	-2.405249E-03	0.170	0.147	0.037
49	22545.5320	-7.479712E-03	-6.497878E-03	2.412906E-03	0.354	0.267	0.037
50	22545.5320	-1.414441E-02	1.135620E-02	-8.157869E-03	1.264	0.815	0.421
51	23063.2613	3.260921E-03	1.003416E-03	9.568953E-03	0.067	0.006	0.579
52	23063.2613	4.152468E-05	2.406782E-03	5.520148E-03	0.000	0.037	0.193
53	23566.0039	6.291122E-03	1.236452E-03	-8.282026E-03	0.250	0.010	0.434

54	23566.0039	9.266454E-04	3.004100E-03	-2.107988E-03	0.005	0.057	0.028
55	24016.6034	-3.481649E-04	3.853905E-03	-7.761976E-03	0.001	0.094	0.381
56	24016.6034	-1.279388E-02	3.332189E-03	2.390399E-03	1.034	0.070	0.036
57	24611.1870	-2.401244E-03	-1.072458E-03	1.999669E-03	0.036	0.007	0.025
58	24611.1870	-2.863380E-03	6.369971E-05	-1.536488E-03	0.052	0.000	0.015
59	24778.6283	-4.271532E-03	5.288300E-03	3.942353E-03	0.115	0.177	0.098
60	24778.6283	2.770229E-03	2.613765E-03	2.213991E-03	0.048	0.043	0.031
61	25125.3250	1.153869E-02	-2.486780E-04	-2.062895E-03	0.841	0.000	0.027
62	25125.3250	-6.668657E-03	7.916534E-03	4.279364E-03	0.281	0.396	0.116
63	25531.3284	-6.071323E-04	6.495307E-05	-9.440191E-04	0.002	0.000	0.006
64	25531.3284	1.055259E-02	-8.357540E-03	-4.343065E-03	0.704	0.441	0.119
65	26049.2342	7.728359E-03	-4.754447E-03	-2.723518E-03	0.377	0.143	0.047
66	26049.2342	3.407511E-03	-4.829285E-03	1.196593E-03	0.073	0.147	0.009
67	26532.3401	-3.973695E-03	4.189004E-03	3.568282E-03	0.100	0.111	0.081
68	26532.3401	-6.022323E-03	-5.767275E-03	1.207178E-03	0.229	0.210	0.009
69	27512.7029	-3.409863E-03	4.025312E-03	3.035682E-04	0.073	0.102	0.001
70	27512.7029	5.978306E-03	-2.797527E-03	-3.693872E-03	0.226	0.049	0.086
71	27951.7870	-3.546089E-04	-2.515927E-03	1.340168E-02	0.001	0.040	1.137
72	27951.7870	-4.793146E-04	-2.600699E-03	1.218687E-03	0.001	0.043	0.009
73	28010.1810	7.757815E-03	3.578180E-03	-1.884313E-05	0.380	0.081	0.000
74	28010.1810	4.521224E-03	4.712240E-04	-5.477670E-03	0.129	0.001	0.190
75	28346.6721	-1.478234E-02	2.026213E-03	-1.483712E-02	1.381	0.026	1.393
76	28346.6721	-7.613099E-03	-1.051008E-03	2.124744E-03	0.366	0.007	0.029
77	28832.6605	-4.958382E-03	2.560448E-04	-6.668033E-03	0.155	0.000	0.281
78	28832.6605	6.350862E-03	-2.984019E-03	7.861199E-03	0.255	0.056	0.391
79	29172.0119	-9.099595E-03	6.352391E-03	-5.577759E-03	0.523	0.255	0.197
80	29172.0119	7.400986E-03	3.803601E-03	-8.597827E-04	0.346	0.091	0.005
81	29447.8676	6.523640E-04	6.985190E-04	-3.271775E-03	0.003	0.003	0.068
82	29447.8676	5.863513E-03	-3.501665E-03	-3.012893E-03	0.217	0.077	0.057
83	29657.1444	1.675745E-03	1.251367E-03	3.326718E-03	0.018	0.010	0.070
84	29657.1444	1.787306E-03	-8.440445E-04	6.673140E-03	0.020	0.005	0.282
85	29861.7578	3.452269E-03	-5.237332E-03	1.289315E-02	0.075	0.173	1.052
86	29861.7578	1.152230E-02	4.618532E-03	-9.926865E-03	0.839	0.135	0.624
87	30204.0613	2.193120E-03	1.888774E-03	-1.018563E-02	0.030	0.023	0.657

Mass Modal Participation Factors

Mode Number	Frequency	Global X Direction	Global Y Direction	Global Z Direction	Global X Direction	Global Y Direction	Global Z Direction
88	30204.0613	-4.900717E-03	1.785672E-03	8.140407E-04	0.152	0.020	0.004
89	30871.7576	7.076204E-03	2.257777E-03	-4.439104E-03	0.316	0.032	0.125
90	30871.7576	-8.370589E-04	2.513475E-03	5.805012E-03	0.004	0.040	0.213
91	31021.9219	3.437129E-03	-1.137245E-03	1.101630E-03	0.075	0.008	0.008
92	31021.9220	2.507106E-03	3.447063E-03	-9.255325E-03	0.040	0.075	0.542
93	31129.1084	3.062779E-03	-7.879140E-04	3.942410E-04	0.059	0.004	0.001
94	31129.1085	-1.500595E-03	1.425558E-03	-4.922443E-03	0.014	0.013	0.153
95	31571.9339	1.846292E-03	8.646117E-04	4.362511E-03	0.022	0.005	0.120
96	31571.9339	-2.020361E-03	-2.082963E-03	9.179124E-03	0.026	0.027	0.533
97	31927.5659	3.966040E-03	-7.015505E-03	-1.941224E-03	0.099	0.311	0.024
98	31927.5680	-4.135304E-03	1.594838E-03	-6.086166E-04	0.108	0.016	0.002
99	44205.8137	-5.464798E-03	4.766256E-06	4.145910E-03	0.189	0.000	0.109
100	44205.8714	6.830288E-04	2.521138E-03	-2.082563E-03	0.003	0.040	0.027
101	45810.7731	-4.895203E-03	-1.512902E-03	-5.688987E-05	0.151	0.014	0.000
102	45810.7910	1.487924E-03	2.185389E-03	-2.451203E-03	0.014	0.030	0.038
103	46366.3053	2.428264E-03	1.968708E-03	7.411138E-04	0.037	0.024	0.003
104	46366.4829	1.598700E-04	4.947117E-05	-1.891389E-03	0.000	0.000	0.023
105	47783.8305	2.744734E-03	-1.671137E-03	1.141376E-03	0.048	0.018	0.008
106	47783.8551	2.280436E-03	-4.701210E-05	-1.021852E-03	0.033	0.000	0.007
					58.581	55.542	80.729

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1 MODAL TRUNCATION VECTORS - LOAD PARTICIPATION FACTORS
SYMMETRIC-SYMMETRIC (27-30) ANTISYMMETRIC-ANTISYMMETRIC (31-34)

0Load Case (27) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode - Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
1	1822.8353	-5.8098425E+00	18.870	-29.889	-4.284
2	2249.4185	-2.8400236E+00	-0.858	1.595	-21.697
3	3945.7726	9.7906377E-13	0.000	0.000	0.000
4	4100.8064	1.4726744E-12	0.000	0.000	0.000
5	5075.8308	2.8105437E+00	-0.473	0.363	12.185
6	7894.4060	4.2887658E+00	0.055	-0.311	-0.285
7	8093.0523	-6.5700811E+00	-0.095	0.013	0.195
8	8831.5289	4.5295620E+00	12.278	12.161	-0.043
9	9727.9264	-8.3843825E-12	0.000	0.000	0.000
10	9831.8538	-4.5558106E+00	9.125	5.739	-3.782
11	9945.8979	-1.0619466E-09	0.000	0.000	0.000
12	10639.5981	4.6283188E-11	0.000	0.000	0.000
13	11784.3428	1.7942396E-12	0.000	0.000	0.000
14	11827.3405	-3.9348824E-11	0.000	0.000	0.000
15	11834.4034	-5.1879216E-02	-0.090	-0.027	-0.001
16	12575.8349	1.0068016E-11	0.000	0.000	0.000
17	12852.4416	-3.8892746E-11	0.000	0.000	0.000
18	13852.5732	-4.4060166E+00	3.533	13.062	-0.303
19	14220.0474	-6.4643657E+00	22.453	11.397	2.513
20	14374.8945	4.3620636E-11	0.000	0.000	0.000
21	14453.0410	7.1368825E+00	-16.811	-10.756	-1.415
22	14869.8809	1.3518796E+00	0.067	0.010	0.015
23	14929.8547	7.4501746E-11	0.000	0.000	0.000
24	15548.9881	-1.8814777E+00	1.390	0.426	0.438
25	15447.4853	-9.1330866E+00	-2.501	-2.471	-1.180
26	16796.7514	-6.7008226E-11	0.000	0.000	0.000
27	16983.0608	-4.8970866E+00	1.378	2.580	1.299
28	16987.4620	-1.9018664E-09	0.000	0.000	0.000
29	17838.0283	-6.3622906E-11	0.000	0.000	0.000
30	18091.9781	-4.1559876E+00	-1.204	-0.037	-0.216
31	18377.3672	-9.5158676E-01	-0.160	-0.042	-0.080
32	18396.8821	-2.1510446E-11	0.000	0.000	0.000
33	18512.4888	-2.3741136E-11	0.000	0.000	0.000
34	18565.2883	-1.5709236E+00	-0.892	-0.858	-0.084
35	18967.4758	-3.5512416E-09	0.000	0.000	0.000
36	19086.3451	3.0296586E-11	0.000	0.000	0.000
37	19982.4040	4.5085696E+00	7.798	-0.583	1.113
38	20118.8672	-5.2268976E+00	2.894	0.543	0.862
39	20228.9985	-6.7835836E-01	-0.727	0.015	-0.046
40	20441.2134	-3.1158136E-11	0.000	0.000	0.000
41	20894.0838	1.4587846E-11	0.000	0.000	0.000
42	21073.9388	5.1610836E+00	-6.183	2.020	-0.965
43	21118.2038	1.2932416E-10	0.000	0.000	0.000
44	21282.1832	-1.0079006E-10	0.000	0.000	0.000
45	21385.6993	-6.8267386E+00	2.307	-0.258	0.596
46	21440.7917	-2.7160146E+00	0.812	0.109	0.249

47	21770.8601	1.1259586E+00	0.579	-0.455	0.131
48	21849.5806	9.5888876E+00	0.817	-8.183	0.136

1Load Case (27) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode - Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
49	21873.7909	1.2407746E-10	0.000	0.000	0.000
50	22122.8863	-5.8252906E+00	-4.822	8.314	-0.475
51	22459.5346	-8.6083026E-01	-0.300	-0.459	0.166
52	22485.3742	2.0290586E-10	0.000	0.000	0.000
53	23456.9006	1.6362516E-10	0.000	0.000	0.000
54	23479.0853	-3.4273226E-11	0.000	0.000	0.000
55	23536.9192	2.5895436E+00	-1.488	1.893	-0.277
56	23851.5910	-5.0847806E+00	-6.310	-0.716	-0.599
57	24154.0112	5.0906876E+00	-0.859	8.373	-1.125
58	24613.8132	8.3317726E-12	0.000	0.000	0.000
59	24706.4333	8.6248636E-11	0.000	0.000	0.000
60	24973.2988	1.1907276E-11	0.000	0.000	0.000
61	25213.9434	2.3218736E-01	0.090	0.030	-0.009
62	25411.5261	-7.4068906E-11	0.000	0.000	0.000
63	25548.2899	2.8812076E-10	0.000	0.000	0.000
64	25884.7306	2.0888126E+00	0.583	0.954	-0.132
65	25971.4296	-1.7848236E+00	0.451	0.220	0.159
66	26182.9157	-4.0625956E+00	2.360	0.802	0.136
67	26269.9446	1.5208796E-10	0.000	0.000	0.000
68	26461.0156	-1.8973206E-02	-0.001	-0.001	0.001
69	26737.2069	-2.6729846E-11	0.000	0.000	0.000
70	26786.8442	4.7011826E-11	0.000	0.000	0.000
71	26999.0584	3.9025816E-01	-0.074	-0.039	0.060
72	27351.6860	2.7367766E-11	0.000	0.000	0.000
73	27822.3949	-7.1524806E-01	0.186	0.065	-0.090
74	27865.2845	9.1451516E-01	-0.814	0.378	0.037
75	27873.9176	-1.4912826E-10	0.000	0.000	0.000
76	28065.8451	2.6889186E+00	-1.467	0.580	-0.012
77	28168.4204	-2.1727506E-12	0.000	0.000	0.000
78	28567.4587	-1.0771746E+00	0.746	-0.853	0.088
79	28636.4558	-6.7417186E-11	0.000	0.000	0.000
80	28668.3417	5.9560916E+00	-7.154	0.892	0.538
81	28947.8102	-1.0073476E-11	0.000	0.000	0.000
82	28515.8775	5.2002756E-11	0.000	0.000	0.000
83	29013.5981	2.8547406E+00	0.577	-1.371	0.186
84	29799.0351	-2.7022836E-01	-0.032	0.016	0.010
85	29958.2241	-8.6981286E-01	-0.121	-0.289	-0.067
86	30041.7236	1.3578606E-10	0.000	0.000	0.000
87	30206.5364	-1.6810276E-09	0.000	0.000	0.000
88	30215.2679	7.4700466E+00	-8.807	3.048	0.212
89	30718.7320	7.7216236E+00	-0.488	1.547	-1.084
90	30750.9109	1.5879146E-11	0.000	0.000	0.000
91	30888.3833	1.3868126E+00	-0.758	0.000	0.184
92	31017.5194	-6.1984856E-11	0.000	0.000	0.000
93	31166.3978	-4.5857476E+00	1.782	-2.507	-0.789
94	31218.1357	-1.1007776E-11	0.000	0.000	0.000
95	31337.8389	2.1554816E+00	0.974	-1.368	0.045

96	31453.1486	7.578151E-11	0.000	0.000	0.000

1Load Case (27) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
97	31666.4818	-1.198362E-10	0.000	0.000	0.000
98	31859.6627	6.672447E-11	0.000	0.000	0.000
99	31896.9426	-9.181987E+00	-0.010	-1.212	0.158
100	32149.5738	1.030417E+00	-0.301	0.105	0.117
101	32267.7877	-6.132770E-11	0.000	0.000	0.000
102	32327.1828	1.892584E-10	0.000	0.000	0.000
103	32373.9583	2.752482E+00	-3.851	2.011	0.766
104	32631.9218	3.322304E-11	0.000	0.000	0.000
105	32996.4943	-1.048640E-10	0.000	0.000	0.000
106	33012.3717	6.382391E-01	0.359	0.060	-0.061
107	33130.5488	-2.520675E+00	-3.869	2.186	-0.283
108	33285.9096	5.913976E+00	0.345	1.157	-0.117
109	33406.8530	9.765455E-11	0.000	0.000	0.000
110	33695.2301	1.798531E-09	0.000	0.000	0.000
111	33808.2365	-8.704404E+00	10.284	-4.213	-0.131
112	33848.1156	-5.203189E-12	0.000	0.000	0.000
113	33965.7183	-3.452381E+00	-1.953	2.102	-0.143
114	34008.3176	-3.175374E-01	-0.021	-0.070	-0.019
115	34018.3679	2.994812E-11	0.000	0.000	0.000
116	34287.8902	-7.575819E+00	2.694	0.393	0.481
117	34559.0369	-1.857223E-10	0.000	0.000	0.000
118	34697.2522	3.939304E+00	1.711	-0.962	0.155
119	35008.3703	1.433114E-10	0.000	0.000	0.000
120	35017.8261	-4.060925E+00	0.157	-0.211	0.221
121	35129.9877	-4.948956E-11	0.000	0.000	0.000
122	35526.9375	1.096974E+01	-2.678	5.846	0.095
123	35552.5518	7.947754E-12	0.000	0.000	0.000
124	35831.3059	-4.829644E+00	-3.044	0.933	-0.310
125	35987.9786	-7.505071E+00	5.871	-3.319	0.244
126	36083.6119	-1.176048E-10	0.000	0.000	0.000
127	36321.6573	-5.188788E-11	0.000	0.000	0.000
128	36500.2374	3.447198E+00	1.067	-1.387	0.064
129	36592.2129	8.914022E-12	0.000	0.000	0.000
130	36649.6406	1.931787E+00	-1.683	1.449	-0.065
131	36900.2809	2.415759E+00	-0.182	-0.835	-0.071
132	36986.6876	-3.281307E-11	0.000	0.000	0.000
133	37328.9177	6.131646E-11	0.000	0.000	0.000
134	37619.3414	-4.425073E+00	-1.343	-2.091	-0.088
135	37645.8984	-6.584528E+00	-6.471	0.031	0.018
136	37714.2369	-2.000885E-10	0.000	0.000	0.000
137	37918.6451	1.912861E-10	0.000	0.000	0.000
138	38110.6994	-6.600425E-10	0.000	0.000	0.000
139	38141.4341	4.822970E+00	0.663	-1.812	-0.551
140	38214.3872	-2.906007E-09	0.000	0.000	0.000
141	38455.6499	6.949967E-10	0.000	0.000	0.000
142	38505.8261	-1.285786E+00	-0.491	0.109	0.086
143	38929.3651	-4.764554E+00	3.778	2.288	-0.830
144	39003.2086	-9.885677E-11	0.000	0.000	0.000

1Load Case (27) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
145	39212.0229	-1.050037E-08	0.000	0.000	0.000
146	39229.2673	6.839044E+00	0.447	-0.809	0.869
147	39320.9892	-3.806157E+00	1.611	-0.844	0.887
148	39446.4942	6.002282E-10	0.000	0.000	0.000
149	39532.4159	-2.780482E+00	-0.427	-0.202	-0.450
150	39848.3726	9.606266E+00	-1.238	4.514	-0.702
151	39752.5185	3.550649E-09	0.000	0.000	0.000
152	39858.5332	3.549017E+00	0.547	-0.889	1.108
153	40008.7386	-7.274408E-10	0.000	0.000	0.000
154	40276.3210	1.629579E-09	0.000	0.000	0.000
155	40293.8063	6.555523E-01	0.041	-0.106	-0.070
156	40415.7783	1.254453E-08	0.000	0.000	0.000
157	40576.4486	4.697330E-10	0.000	0.000	0.000
158	40680.0891	2.984589E-08	0.000	0.000	0.000
159	40681.8302	2.919370E+00	0.238	-0.497	-0.185
160	40947.6838	5.688820E-01	-0.037	0.920	-0.044
161	40978.6367	1.289128E+00	-0.242	0.724	0.026
162	41199.3420	2.493078E-01	-0.060	-0.007	0.011
163	41291.0252	-8.028906E-10	0.000	0.000	0.000
164	41341.4451	-1.400658E+00	-0.394	-0.267	0.210
165	41356.1824	5.378134E-09	0.000	0.000	0.000
166	41634.6702	1.834572E-09	0.000	0.000	0.000
167	41847.3430	6.148132E+00	0.007	-2.474	0.149
168	42225.3819	2.172778E+00	0.548	-1.327	-0.138
169	42284.6521	-4.218847E-08	0.000	0.000	0.000
170	42435.4401	1.210268E-08	0.000	0.000	0.000
171	42443.3823	-5.983506E+00	-0.348	-0.871	0.050
172	42587.9411	-4.258264E+00	1.301	-1.828	-0.106
173	42873.5275	-8.672648E-02	0.006	-0.032	0.002
174	43049.7492	-1.111094E-07	0.000	0.000	0.000
175	43153.3691	-3.233644E+00	-0.155	-0.352	0.040
176	43192.0757	2.460395E-01	0.047	-0.014	0.003
177	43260.0832	-1.493928E-06	0.000	0.000	0.000
178	43414.7486	6.628589E-01	-0.258	0.121	-0.008
179	43660.8399	-1.173048E+00	0.018	-0.100	-0.009
180	43683.0604	-7.388689E-08	0.000	0.000	0.000
181	43822.3742	1.788128E+00	-0.841	-0.213	-0.007
182	43928.6836	-7.784770E+00	-0.269	-0.077	-0.104
183	44081.3161	-6.147511E-05	0.000	0.000	0.000
184	44361.0394	-1.225472E+00	-0.048	-0.147	-0.021
185	44426.5369	6.784383E-04	0.000	0.000	0.000
186	44493.4098	-7.331777E+00	0.989	2.416	0.201
187	44706.1063	-1.846650E-06	0.000	0.000	0.000
188	44713.4082	3.409163E-06	0.000	0.000	0.000
189	44796.4583	-8.871882E-01	-0.031	-0.128	-0.008
190	44839.2845	6.182232E-06	0.000	0.000	0.000
191	44972.1034	4.022833E-05	0.000	0.000	0.000
192	45005.5440	3.267215E+00	-0.795	0.837	-0.004

1Load Case (27) Load Modal Participation Factors

0 /------- Physical Load in Each Mode -------/

Mode Number	Frequency	Participation Factor	Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
193	45079.0141	9.111253E-05	0.000	0.000	0.000
194	45137.9279	6.680781E-01	-0.043	-0.188	-0.013
195	45249.5767	-4.040926E-02	0.008	0.001	0.001
196	45373.0696	1.688179E-04	0.000	0.000	0.000
197	45420.3788	-6.978837E-01	0.106	0.073	0.008
198	45491.7138	6.719764E-05	0.000	0.000	0.000
199	45883.7934	1.882408E-04	0.000	0.000	0.000
200	45703.0905	2.590585E+00	0.053	0.428	-0.143
201	45826.4220	-2.007512E-04	0.000	0.000	0.000
202	45990.6498	-4.780376E-03	0.000	-0.001	0.000
203	46012.0464	6.485519E+00	-0.848	1.321	0.046
204	46113.4228	-4.050708E-03	-0.002	0.001	0.001
205	46235.2532	-2.423868E+00	-0.172	0.105	-0.181
206	46320.8098	-2.561255E-03	0.001	-0.002	0.000
207	46365.3678	6.021398E+00	-1.417	-1.188	-0.078
208	46449.0939	4.566541E-04	0.000	0.000	0.000
209	46545.3896	8.565145E-04	0.000	0.000	0.001
210	46585.4825	3.523025E+00	0.284	0.186	0.127
211	46695.9479	4.331150E+00	0.262	0.865	-0.074
212	46830.2985	3.462773E+00	0.086	-0.962	0.100
213	46863.9310	2.155536E-03	0.000	-0.001	-0.001
214	47124.4595	6.126772E+00	0.000	0.731	-0.288
215	47246.6260	-1.624657E-03	0.001	-0.001	0.000
216	47477.4131	-1.137903E-03	0.000	-0.001	0.000
217	47516.2502	9.004749E+00	2.535	1.825	0.498
218	47597.1285	2.549908E-03	-0.001	0.000	0.000
219	47819.7419	8.629067E-01	0.013	-0.087	0.020
220	47886.2288	-1.590400E-03	0.000	-0.001	0.000
221	47999.5792	-2.248883E-03	-0.002	0.001	0.000
222	48126.4540	-1.943118E+00	-0.210	0.549	0.012
223	48156.3311	1.972738E-04	0.000	0.000	0.000
224	48382.8807	-2.933288E-03	0.001	0.000	0.000
225	48412.7807	7.870589E+00	1.170	-0.548	-0.116
226	48827.4962	2.639705E-03	0.000	0.000	0.000
227	48853.9824	-2.327531E-03	0.000	-0.002	-0.001
228	48928.4441	-1.986266E+00	-0.221	-0.258	0.064
229	48972.2100	-4.053809E-03	-0.001	0.003	0.001
230	49012.5236	2.762842E+00	0.175	-0.091	-0.036
231	49338.1777	2.338450E-03	0.000	-0.001	-0.001
232	49385.8370	9.457445E+00	-1.851	1.944	-0.473
233	49442.9498	-1.361230E+01	-1.520	-0.886	0.742
234	49510.3251	2.906890E-03	0.000	0.000	0.001
235	49778.4761	3.248818E-04	0.000	0.000	0.000
236	49796.5998	1.563699E+00	0.021	-0.144	0.025
237	49946.7558	-4.345149E-03	0.001	-0.001	-0.002
238	63478.6542	2.676537E+01	-1.176	1.504	-0.013
239	65861.8086	2.445455E-02	-0.003	0.003	0.002
240	65906.2180	8.573867E+00	1.145	0.060	-0.071

1Load Case (27) Load Modal Participation Factors

0 /------- Physical Load in Each Mode -------/

Mode Number	Frequency	Participation Factor	Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
241	67608.5292	1.000896E-02	0.000	0.002	0.002
242	67995.8736	3.867147E+01	-2.234	7.126	-0.177
243	68783.0925	-5.270023E-03	-0.001	0.001	0.000
244	69763.9709	2.925615E+01	-2.124	4.890	-0.742
245	69769.9985	8.484627E-01	-0.001	-0.050	-0.006
	Sum of Modal Physical Loads		28.781	27.894	-16.958
0	Resultant of Applied Load		29.796	27.788	-16.458
	Unscaled Applied Load		2.97947E-01	2.77878E-01	-1.64585E-01

1Load Case (28) Load Modal Participation Factors

0 /------- Physical Load in Each Mode -------/

Mode Number	Frequency	Participation Factor	Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
1	1822.6353	-5.805116E+00	18.854	-28.843	-4.281
2	2249.4185	-2.987600E+00	-0.888	1.810	-21.990
3	3945.7726	-1.488832E-12	0.000	0.000	0.000
4	4100.8064	1.772005E-12	0.000	0.000	0.000
5	5075.8308	2.633062E+00	-0.477	0.988	12.298
6	7894.4060	-4.318947E+00	-0.055	0.313	0.267
7	8093.0523	8.571578E+00	0.095	-0.013	-0.185
8	8831.5289	4.397482E+00	11.769	11.645	-0.041
9	9727.9254	-3.178118E-11	0.000	0.000	0.000
10	9931.8538	-4.864040E+00	9.742	5.593	-3.984
11	9945.8529	-1.028428E-08	0.000	0.000	0.000
12	10839.5981	2.444902E-11	0.000	0.000	0.000
13	11784.3428	-6.408732E-12	0.000	0.000	0.000
14	11827.3406	2.059024E-10	0.000	0.000	0.000
15	11834.4034	5.155258E-01	0.898	0.267	0.011
16	12576.8349	2.783490E-12	0.000	0.000	0.000
17	12852.4416	-1.742715E-11	0.000	0.000	0.000
18	13952.5732	-4.258642E+00	3.414	12.610	-0.293
19	14220.0474	-8.567878E+00	22.813	11.578	2.553
20	14374.8946	3.364568E-11	0.000	0.000	0.000
21	14453.0410	7.089100E+00	-16.751	-10.854	-1.402
22	14869.8809	-1.448507E+00	-0.071	-0.010	-0.016
23	14928.8547	-4.890282E-11	0.000	0.000	0.000
24	15545.8861	3.397456E+00	-2.881	-0.161	-0.888
25	16447.4853	1.032073E+01	2.538	2.793	1.345
26	16795.7514	4.146181E-11	0.000	0.000	0.000
27	16883.0808	-1.695310E+00	0.477	0.894	0.450
28	16887.4820	-6.382110E-10	0.000	0.000	0.000
29	17838.0283	-1.082906E-10	0.000	0.000	0.000
30	18091.9781	-3.974618E+00	-1.151	-0.035	-0.207
31	18377.3672	-2.048067E+00	-0.344	-0.091	-0.172
32	18388.8821	-9.088284E-11	0.000	0.000	0.000
33	18512.4999	-3.314280E-12	0.000	0.000	0.000
34	18986.2883	-2.498659E+00	-0.989	-1.524	-0.103
35	18987.4758	-5.854443E-09	0.000	0.000	0.000
36	19088.3451	5.120924E-11	0.000	0.000	0.000

37	19982.4040	1.507905E+00	2.807	-0.195	0.372
38	20118.8672	-5.077125E+00	1.592	0.299	-0.382
39	20228.9885	-6.855210E+00	-1.352	0.149	-0.489
40	20441.2134	2.484866E-11	0.000	0.000	0.000
41	20894.0888	-3.236754E-11	0.000	0.000	0.000
42	21073.9388	-5.183392E+00	6.190	-2.028	0.861
43	21118.2038	-1.338227E-10	0.000	0.000	0.000
44	21282.1832	1.178022E-10	0.000	0.000	0.000
45	21385.6993	9.497334E+00	-3.163	0.354	-0.818
46	21440.7817	-3.990094E-01	0.102	0.014	0.031
47	21770.8801	1.518639E+00	0.780	-0.813	0.177
48	21949.5606	-1.004837E+01	-0.648	8.593	-0.143

1Load Case (28) Load Modal Participation Factors
0

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode / Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
49	21873.7909	-1.447329E-10	0.000	0.000	0.000
50	22122.6863	1.198871E+00	1.028	-1.346	0.101
51	22459.5346	-3.463029E+00	-1.207	-1.848	0.668
52	22485.3742	8.018513E-10	0.000	0.000	0.000
53	23455.9006	3.809511E-10	0.000	0.000	0.000
54	23479.0957	-5.234804E-11	0.000	0.000	0.000
55	23536.9192	5.024366E+00	-2.895	3.882	-0.540
56	23851.5910	-4.259885E+00	-5.286	-0.900	-0.501
57	24164.0112	4.260180E-01	-0.055	0.533	-0.094
58	24813.6132	1.398420E-11	0.000	0.000	0.000
59	24905.4333	6.013111E-11	0.000	0.000	0.000
60	24973.2988	1.052901E-11	0.000	0.000	0.000
61	25213.9434	-1.458871E+00	-0.584	-0.186	0.059
62	25411.5261	-8.995146E-11	0.000	0.000	0.000
63	25846.2899	1.949096E-10	0.000	0.000	0.000
64	25884.7305	1.075409E+00	0.300	0.491	-0.088
65	25971.4296	-1.326292E+00	0.340	0.166	0.130
66	26162.9167	1.500438E+00	-0.883	-0.295	-0.060
67	26269.7446	-2.583575E-11	0.000	0.000	0.000
68	26461.0156	-8.972190E-01	-0.940	-0.054	0.042
69	26737.2069	6.932962E-12	0.000	0.000	0.000
70	26786.8482	4.682454E-11	0.000	0.000	0.000
71	26999.0584	1.183622E+00	-0.224	-0.117	0.152
72	27351.8680	-1.991947E-12	0.000	0.000	0.000
73	27622.3949	-1.240642E+00	0.288	0.095	-0.062
74	27865.2645	-8.292240E-01	0.738	-0.342	-0.033
75	27973.9176	7.467080E-11	0.000	0.000	0.000
76	28085.8451	-2.791242E+00	1.534	-0.585	0.012
77	28168.4204	-8.039172E-11	0.000	0.000	0.000
78	28567.4597	6.959650E+00	-4.752	5.431	-0.628
79	28635.4558	9.724073E-11	0.000	0.000	0.000
80	28656.3417	-6.389021E+00	7.638	-0.738	-0.575
81	28847.6102	4.257003E-11	0.000	0.000	0.000
82	29515.6775	-3.257736E-10	0.000	0.000	0.000
83	29613.5861	-3.023811E+00	-0.591	1.403	-0.191
84	29709.9351	-6.303803E+00	-0.742	0.372	0.244
85	29958.2241	5.884759E-01	0.078	0.189	0.044

86	30041.7236	6.180547E-11	0.000	0.000	0.000
87	30205.5364	-1.304482E-09	0.000	0.000	0.000
88	30215.2579	6.241286E+00	-5.693	2.549	0.177
89	30718.7320	-5.991043E+00	0.386	-1.201	0.826
90	30760.9109	9.286630E-11	0.000	0.000	0.000
91	30835.3633	2.728407E+00	-1.488	0.012	0.327
92	31017.5194	1.610687E-10	0.000	0.000	0.000
93	31166.3978	-5.858071E+00	2.289	-3.203	-0.982
94	31219.1367	-6.243155E-11	0.000	0.000	0.000
95	31337.8369	1.375556E-01	0.062	-0.087	0.003
96	31453.1466	1.815048E-10	0.000	0.000	0.000

1Load Case (28) Load Modal Participation Factors
0

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode / Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
97	31866.4818	7.753926E-11	0.000	0.000	0.000
98	31959.6827	-1.011253E-10	0.000	0.000	0.000
99	31996.9426	8.201489E+00	0.009	1.063	-0.142
100	32149.5738	9.903149E-02	-0.029	0.010	0.011
101	32267.7877	2.041268E-10	0.000	0.000	0.000
102	32327.1828	-1.019674E-11	0.000	0.000	0.000
103	32373.9583	3.704199E-01	-0.518	0.271	0.102
104	32831.9218	1.347871E-11	0.000	0.000	0.000
105	32996.4943	-1.614832E-10	0.000	0.000	0.000
106	33012.3717	2.366550E+00	1.329	0.223	-0.227
107	33130.5488	-1.822414E+00	-2.797	1.580	-0.204
108	33285.9096	6.360784E+00	0.371	1.244	-0.126
109	33408.8530	2.642864E-11	0.000	0.000	0.000
110	33585.2301	-1.004915E-09	0.000	0.000	0.000
111	33608.2385	4.215859E+00	-4.971	2.041	0.063
112	33848.1156	-1.318707E-10	0.000	0.000	0.000
113	33985.7183	1.027436E+01	5.813	-6.256	0.428
114	34008.3176	4.063240E+00	0.744	0.196	0.248
115	34018.3679	-5.441803E-10	0.000	0.000	0.000
116	34287.8902	-6.578643E+00	2.339	0.341	0.400
117	34559.0389	-6.411985E-11	0.000	0.000	0.000
118	34807.2522	2.273842E+00	0.988	-0.549	0.090
119	35008.3703	-2.998533E-10	0.000	0.000	0.000
120	35017.8251	6.198412E+00	-0.240	0.323	-0.338
121	35129.9877	-9.275181E-11	0.000	0.000	0.000
122	35526.9376	4.300093E+00	-1.050	2.787	0.037
123	35552.5518	1.003779E-10	0.000	0.000	0.000
124	35831.3069	-2.547112E+00	-1.675	0.513	-0.171
125	35867.9786	-5.083690E+00	3.977	-2.248	0.185
126	36083.6119	-1.211591E-10	0.000	0.000	0.000
127	36321.6573	-8.572739E-12	0.000	0.000	0.000
128	36500.2374	3.361656E+00	1.038	-1.348	0.082
129	36582.2128	2.578361E-10	0.000	0.000	0.000
130	36648.6408	7.067034E+00	-6.158	5.302	-0.239
131	36900.2809	3.815683E+00	-0.303	-1.477	-0.112
132	36986.5876	-1.074888E-10	0.000	0.000	0.000
133	37128.9177	-2.844329E-10	0.000	0.000	0.000
134	37619.3414	-9.258810E+00	-2.818	-4.386	-0.186

135	37845.8084	2.6094846E+00	2.539	-0.018	-0.009
136	37714.2369	-3.9390726E-10	0.000	0.000	0.000
137	37918.6451	-1.2829106E-10	0.000	0.000	0.000
138	38110.6984	3.8414336E-10	0.000	0.000	0.000
139	38141.4341	-3.5061236E+00	-0.482	1.318	0.400
140	38214.3872	2.1034156E-09	0.000	0.000	0.000
141	38465.8498	-1.7151366E-09	0.000	0.000	0.000
142	38505.8261	3.8146776E+00	1.458	-0.325	-0.197
143	38929.3651	-1.1091766E+00	0.880	0.535	-0.193
144	39003.2065	-7.5320736E-10	0.000	0.000	0.000

1Load Case (28) Load Modal Participation Factors
0

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode - Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
145	39212.0229	-1.4042176E-08	0.000	0.000	0.000
146	39228.2573	8.5737886E+00	0.580	-0.784	1.989
147	39320.8892	-1.7485016E+00	0.738	-0.397	0.407
148	39446.4942	-9.2970888E-10	0.000	0.000	0.000
149	39532.4159	-5.1196456E+00	-0.784	-0.371	-0.826
150	39648.3726	3.7295686E+00	-0.481	1.753	-0.273
151	39752.5185	2.1000276E-09	0.000	0.000	0.000
152	39859.5332	-1.9180926E+00	-0.295	0.534	-0.589
153	40008.7386	1.1912156E-10	0.000	0.000	0.000
154	40276.3210	-2.0217746E-09	0.000	0.000	0.000
155	40293.8063	-9.9608086E-01	-0.063	0.160	0.106
156	40415.7783	-6.3893486E-10	0.000	0.000	0.000
157	40576.4486	-1.1049706E-09	0.000	0.000	0.000
158	40680.0891	-4.7145386E-08	0.000	0.000	0.000
159	40681.8302	-4.6381616E+00	-0.375	0.789	0.283
160	40947.6838	-2.9100836E+00	0.189	-0.105	0.225
161	40978.6367	-1.7162086E+00	0.323	-0.964	-0.034
162	41189.3420	1.9008246E+00	-0.461	-0.057	0.986
163	41291.0252	-1.1738876E-09	0.000	0.000	0.000
164	41341.4451	-6.8407106E+00	-1.887	-1.265	0.984
165	41356.1824	2.2133886E-08	0.000	0.000	0.000
166	41634.6702	-1.5880516E-09	0.000	0.000	0.000
167	41847.3430	-1.4033826E+00	-0.002	0.595	-0.034
168	42225.3819	5.0042496E+00	1.264	-3.066	-0.318
169	42284.5521	4.0082916E-10	0.000	0.000	0.000
170	42435.4491	-4.7278716E-09	0.000	0.000	0.000
171	42443.3823	4.1408216E+00	0.242	0.605	-0.095
172	42587.8411	-5.0168006E+00	1.533	-2.153	-0.125
173	42873.5275	-2.1719086E+00	0.157	-0.792	0.045
174	43048.7482	2.3186496E-07	0.000	0.000	0.000
175	43153.3591	-1.7673116E+00	-0.084	-0.181	0.073
176	43192.0757	2.1678046E+00	0.417	-0.120	0.030
177	43260.0832	3.7381366E-06	0.000	0.000	0.000
178	43414.7486	7.5781876E-01	-0.299	0.140	-0.009
179	43560.8399	3.0037316E+00	-0.046	0.255	0.024
180	43683.0604	2.1120396E-06	0.000	0.000	0.000
181	43822.3742	-4.6440066E+00	1.864	0.552	0.017
182	43828.6836	5.3296776E+00	0.177	0.062	0.071
183	44081.3161	1.6694996E-04	0.000	0.000	0.000

184	44361.0394	-8.1928626E-01	-0.060	-0.099	-0.014
185	44426.5369	-2.0859216E-03	0.002	-0.001	-0.001
186	44493.4088	2.5143956E+00	-0.349	-0.852	-0.071
187	44706.1063	4.5914276E-06	0.000	0.000	0.000
188	44713.4062	-8.4060636E-06	0.000	0.000	0.000
189	44796.4593	1.0258796E-01	0.003	0.013	0.001
190	44839.2845	-1.4186246E-06	0.000	0.000	0.000
191	44972.1034	-8.8282306E-06	0.000	0.000	0.000
192	45006.5440	2.1519826E+00	-0.524	0.419	-0.003

1Load Case (28) Load Modal Participation Factors
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Mode Number	Frequency	Participation Factor	Physical Load in Each Mode - Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
193	45079.0141	-1.9494006E-05	0.000	0.000	0.000
194	45137.9279	2.0486566E+00	-0.133	-0.809	-0.039
195	45249.5757	4.4233886E+00	-0.889	-0.078	-0.157
196	45373.0696	-3.5881786E-06	0.000	0.000	0.000
197	45420.3765	-2.0602826E+00	0.316	0.217	0.027
198	45491.7138	-1.3418736E-05	0.000	0.000	0.000
199	45583.7934	-3.4328966E-06	0.000	0.000	0.000
200	45703.0976	-1.4143716E+00	-0.078	-0.294	0.078
201	45926.4220	8.8453106E-06	0.000	0.000	0.000
202	45990.8498	1.0030916E-03	0.000	0.000	0.000
203	46012.0494	-7.9880736E+00	1.944	-1.828	-0.956
204	46113.4228	7.7673896E-04	0.000	0.000	0.000
205	46235.2532	-3.9100816E+00	-0.278	0.170	-0.308
206	46320.8098	4.9983326E-04	0.000	0.000	0.000
207	46385.3678	-3.9228176E+00	0.823	0.774	0.051
208	46449.0839	-1.6084076E-04	0.000	0.000	0.000
209	46545.3896	-1.4690766E-04	0.000	0.000	0.000
210	46585.4825	2.9636946E+00	0.222	0.156	0.107
211	46695.9479	-3.7212566E+00	-0.226	-0.572	0.064
212	46850.2985	4.9108496E+00	0.133	-1.944	0.142
213	46863.9310	-3.7080506E-04	0.000	0.000	0.000
214	47124.4595	9.8618586E+00	0.000	1.152	-0.454
215	47246.8280	3.9417186E-04	0.000	0.000	0.000
216	47477.4131	2.5889806E-04	0.000	0.000	0.000
217	47516.2502	2.2090406E+00	0.822	0.448	0.100
218	47597.1265	-4.9584736E-04	0.000	0.000	0.000
219	47818.7419	1.5002686E+00	0.023	-0.152	0.034
220	47886.2288	2.4806826E-04	0.000	0.000	0.000
221	47999.5782	-4.3674486E-04	0.000	0.000	0.000
222	48126.4540	1.0383486E+00	0.112	-0.294	-0.008
223	48156.3311	2.7832086E-05	0.000	0.000	0.000
224	48382.8907	4.7890066E-04	0.000	0.000	0.000
225	48412.7807	-6.4599186E+00	-0.880	0.480	0.065
226	48627.4982	-5.3954846E-04	0.000	0.000	0.000
227	48653.9824	4.0448826E-04	0.000	0.000	0.000
228	48820.4441	9.2242186E+00	1.037	1.213	-0.301
229	48972.2100	7.1327696E-04	0.000	0.000	0.000
230	49072.6226	-3.3742026E+00	-0.215	0.112	0.044
231	49338.1777	-4.0038416E-04	0.000	0.000	0.000
232	49386.8370	-4.1509146E+00	0.724	-0.853	0.208

233	49442.9498	3.590910E+00	0.401	0.181	-0.196
234	49510.3251	-5.003671E-04	0.000	0.000	0.000
235	49778.4751	-3.714325E-04	0.000	0.000	0.000
236	49796.5998	1.438747E+01	0.197	-1.328	0.228
237	49946.7558	-3.622938E-04	0.000	0.000	0.000
238	63479.6542	2.448884E+01	-1.075	1.375	-0.812
239	65861.8086	-7.883788E-02	0.009	-0.009	-0.008
240	65905.2180	-2.458972E+01	-3.283	-0.171	0.204

1Load Case (28) Load Modal Participation Factors

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Mode Number	Frequency	Participation Factor	Physical Load in Each Mode - Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
241	67508.5292	-1.530887E-02	0.000	-0.003	-0.003
242	67666.8736	-3.280379E+01	2.004	-6.392	0.159
243	68783.0925	-1.657680E-03	0.000	0.000	0.000
244	69763.9709	2.782954E+01	-2.928	4.868	-0.708
245	69769.9985	8.100284E-01	-0.001	-0.048	-0.005
	Sum of Modal Physical Loads		38.068	8.743	-16.838
0	Resultant of Applied Load		39.727	9.313	-16.616
	Unscaled Applied Load	3.97272E-01	9.31337E-02	-1.66160E-01	

1Load Case (29) Load Modal Participation Factors

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Mode Number	Frequency	Participation Factor	Physical Load in Each Mode - Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
1	1822.6353	-5.949238E+00	20.011	-31.875	-4.543
2	2249.4185	-3.200687E+00	-0.934	1.736	-23.821
3	3945.7726	-1.670257E-12	0.000	0.000	0.000
4	4100.8064	1.964181E-12	0.000	0.000	0.000
5	5075.8308	2.893269E+00	-0.524	0.403	13.516
6	7894.4060	6.692921E+00	0.085	-0.485	-0.413
7	8093.0523	4.801721E+00	0.070	-0.009	-0.143
8	8831.5289	5.905304E+00	16.008	15.854	-0.056
9	9727.9254	-2.078085E-11	0.000	0.000	0.000
10	9931.8538	-4.403442E+00	8.820	5.083	-3.607
11	9945.8979	-1.024701E-09	0.000	0.000	0.000
12	10639.5981	3.474252E-11	0.000	0.000	0.000
13	11784.3428	1.310087E-11	0.000	0.000	0.000
14	11827.3406	5.600915E-11	0.000	0.000	0.000
15	11834.4034	1.599601E-01	0.278	0.083	0.003
16	12575.8349	3.818522E-12	0.000	0.000	0.000
17	12852.4416	-3.112672E-11	0.000	0.000	0.000
18	13952.5732	-2.630197E+00	2.109	7.782	-0.181
19	14220.0474	5.630580E+00	-19.557	-9.927	-2.189
20	14374.8945	3.837638E-11	0.000	0.000	0.000
21	14453.0410	-8.857252E+00	20.888	13.348	1.756
22	14469.9809	8.046881E+00	0.366	0.057	0.091
23	14929.8547	3.082387E-10	0.000	0.000	0.000
24	15548.9881	-3.672207E+00	2.905	0.931	0.958
25	16447.4653	2.994139E+00	0.812	0.803	0.387
26	16795.7514	-5.553006E-12	0.000	0.000	0.000

27	18983.0808	-5.240209E+00	1.474	2.780	1.390
28	18987.4620	-2.001042E-09	0.000	0.000	0.000
29	17838.0283	-4.476988E-11	0.000	0.000	0.000
30	18091.9781	5.193607E+00	1.504	0.046	0.271
31	18377.3672	-3.341664E+00	-0.562	-0.148	-0.280
32	18396.8821	-1.527118E-10	0.000	0.000	0.000
33	18612.4999	-2.048574E-11	0.000	0.000	0.000
34	18966.2883	-4.781636E+00	-1.892	-2.916	-0.186
35	18967.4758	-1.084961E-08	0.000	0.000	0.000
36	19086.3451	1.235388E-10	0.000	0.000	0.000
37	19982.4040	-5.385079E+00	-9.280	0.692	-1.322
38	20118.8672	4.984488E+00	-1.553	-0.293	-0.365
39	20228.9985	4.381882E+00	4.699	-0.095	0.300
40	20441.2134	-5.185851E-12	0.000	0.000	0.000
41	20894.0888	-4.559313E-11	0.000	0.000	0.000
42	21073.9388	-4.600603E+00	5.494	-1.800	0.859
43	21118.2038	-1.271282E-10	0.000	0.000	0.000
44	21282.1832	-7.094784E-11	0.000	0.000	0.000
45	21385.6993	-2.337047E+00	0.778	-0.087	0.201
46	21440.7917	-9.507725E+00	2.843	0.383	0.871
47	21770.8601	-6.603833E+00	-3.398	2.671	-0.771
48	21849.5606	-1.581502E-01	-0.010	0.135	-0.002

1Load Case (29) Load Modal Participation Factors

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Mode Number	Frequency	Participation Factor	Physical Load in Each Mode - Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
49	21873.7909	-1.758448E-11	0.000	0.000	0.000
50	22122.8853	-4.734987E+00	-4.058	5.315	-0.400
51	22459.5346	-5.712321E+00	-1.991	-3.048	1.102
52	22485.3742	1.297201E-09	0.000	0.000	0.000
53	23456.9006	5.365690E-10	0.000	0.000	0.000
54	23479.0957	-7.036007E-11	0.000	0.000	0.000
55	23538.9192	6.909152E+00	-3.923	4.990	-0.731
56	23851.5910	-3.782689E+00	-4.884	-0.533	-0.445
57	24154.0112	1.351748E+00	-0.176	1.662	-0.289
58	24613.6132	-4.941282E-12	0.000	0.000	0.000
59	24705.4333	5.284486E-11	0.000	0.000	0.000
60	24973.2088	-7.423364E-12	0.000	0.000	0.000
61	25213.9434	-6.606004E-01	-0.266	-0.084	0.027
62	25411.5261	-1.084168E-10	0.000	0.000	0.000
63	25648.2699	8.623597E-10	0.000	0.000	0.000
64	25884.7305	6.904336E+00	1.927	3.155	-0.436
65	25971.4296	2.113881E+00	-0.542	-0.284	-0.181
66	26182.9167	-1.467858E+00	0.845	0.288	0.049
67	26269.7448	9.486113E-11	0.000	0.000	0.000
68	26461.0155	-4.898805E+00	-0.240	-0.329	0.285
69	26737.2069	2.289734E-11	0.000	0.000	0.000
70	26738.8412	8.140298E-11	0.000	0.000	0.000
71	26998.0584	1.672437E+00	-0.297	-0.158	0.202
72	27351.6660	1.357283E-11	0.000	0.000	0.000
73	27822.3949	3.990063E-01	-0.092	-0.031	0.017
74	27895.2845	-8.170008E-01	0.746	-0.346	-0.034
75	27973.9175	-1.303834E-10	0.000	0.000	0.000

76	28985.8451	3.527943E+00	-1.939	0.740	-0.015
77	29188.4204	2.547891E-11	0.000	0.000	0.000
78	29567.4697	2.437672E+00	-1.889	1.890	-0.223
79	29636.4658	1.741832E-11	0.000	0.000	0.000
80	29656.3417	-4.397304E-01	0.528	-0.051	-0.040
81	29847.6102	-4.472085E-12	0.000	0.000	0.000
82	29915.8776	3.649871E-10	0.000	0.000	0.000
83	29913.5861	5.051989E+00	0.987	-2.344	0.319
84	29799.0361	-5.983784E+00	-0.704	0.353	0.232
85	29858.2241	1.088807E+01	1.516	3.807	0.841
86	30041.7236	2.522404E-10	0.000	0.000	0.000
87	30206.5364	-7.889120E-10	0.000	0.000	0.000
88	30215.2579	3.061159E+00	-2.780	1.245	0.086
89	30718.7320	4.508484E+00	-0.281	0.902	-0.821
90	30760.9109	1.998534E-11	0.000	0.000	0.000
91	30936.3633	-4.930721E-01	0.288	-0.002	-0.069
92	31017.5194	3.784632E-11	0.000	0.000	0.000
93	31166.3978	-4.533769E+00	1.772	-2.478	-0.780
94	31219.1357	-1.224706E-10	0.000	0.000	0.000
95	31337.8369	-4.477606E+00	-2.024	2.817	-0.094
96	31463.1486	8.862686E-12	0.000	0.000	0.000

1Load Case (29) Load Modal Participation Factors
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Mode Number	Frequency	Participation Factor	Physical Load in Each Mode - Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
97	31686.4818	1.147617E-12	0.000	0.000	0.000
98	31859.8627	-9.703178E-11	0.000	0.000	0.000
99	31998.8426	4.118444E+00	0.994	0.543	-0.071
100	32149.5738	-1.047472E+00	0.306	-0.107	-0.119
101	32267.7877	4.027765E-10	0.000	0.000	0.000
102	32327.1928	-4.067042E-11	0.000	0.000	0.000
103	32373.8543	2.372857E+00	-3.326	1.733	0.859
104	32631.8218	-1.771912E-11	0.000	0.000	0.000
105	32996.4943	-2.947615E-10	0.000	0.000	0.000
106	33012.3717	4.432446E+00	2.480	0.418	-0.426
107	33130.5488	-4.091758E+00	-6.280	3.548	-0.459
108	33285.9036	5.604442E+00	0.326	1.095	-0.111
109	33406.8530	1.877634E-10	0.000	0.000	0.000
110	33595.2301	1.551532E-09	0.000	0.000	0.000
111	33808.2366	-7.709544E+00	8.198	-3.775	-0.117
112	33848.1156	-9.355444E-11	0.000	0.000	0.000
113	33985.7183	1.680302E+00	0.939	-1.011	0.088
114	34008.3176	1.320791E+01	0.858	2.913	0.800
115	34018.3679	-1.383471E-09	0.000	0.000	0.000
116	34287.8902	4.462774E+00	-1.587	-0.931	0.911
117	34559.0369	-5.026995E-11	0.000	0.000	0.000
118	34697.2522	1.415588E+00	0.615	-0.342	0.056
119	35008.3703	2.280784E-11	0.000	0.000	0.000
120	35017.8251	-8.308497E-01	0.031	-0.043	0.045
121	35129.9877	-7.764871E-11	0.000	0.000	0.000
122	35526.9376	1.324573E+00	-0.323	0.706	0.011
123	35552.5518	8.862738E-11	0.000	0.000	0.000
124	35831.3069	2.547697E+00	1.875	-0.513	0.171

125	35987.9786	8.970511E+00	-7.017	3.987	-0.292
126	36083.8119	1.314701E-10	0.000	0.000	0.000
127	36321.6573	1.745719E-10	0.000	0.000	0.000
128	36500.2374	-2.817706E-01	-0.087	0.113	-0.005
129	36592.2129	-3.995203E-10	0.000	0.000	0.000
130	36648.8406	-9.203688E+00	8.020	-6.805	0.312
131	36900.2809	4.999698E-01	-0.040	-0.184	-0.015
132	36986.6875	-1.574251E-10	0.000	0.000	0.000
133	37328.9177	9.751003E-11	0.000	0.000	0.000
134	37619.3414	5.059318E+00	1.595	2.391	0.101
135	37648.6084	1.734424E+00	1.686	-0.012	-0.006
136	37714.2289	4.944308E-10	0.000	0.000	0.000
137	37918.6451	-3.723714E-11	0.000	0.000	0.000
138	38110.8894	3.943782E-10	0.000	0.000	0.000
139	38141.4341	-3.853635E+00	-0.544	1.487	0.452
140	38214.3872	1.695038E-09	0.000	0.000	0.000
141	38455.8499	1.206782E-09	0.000	0.000	0.000
142	38505.8281	-3.286976E+00	-1.256	0.280	0.170
143	38929.3651	2.442286E+00	-1.638	-1.178	0.428
144	39003.2065	3.576649E-10	0.000	0.000	0.000

1Load Case (29) Load Modal Participation Factors
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Mode Number	Frequency	Participation Factor	Physical Load in Each Mode - Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
145	39212.0229	7.304065E-09	0.000	0.000	0.000
146	39229.2573	-3.788639E+00	-0.248	0.338	-0.482
147	39320.8892	1.908732E+00	-0.785	0.401	-0.421
148	39446.4942	-1.874786E-09	0.000	0.000	0.000
149	39532.4159	-1.138606E+01	-1.744	-0.824	-1.894
150	39648.3726	4.083061E-01	-0.063	0.182	-0.030
151	39752.5185	-3.233933E-09	0.000	0.000	0.000
152	39856.5332	5.341012E+00	0.823	-1.488	1.887
153	40009.7386	-9.766280E-11	0.000	0.000	0.000
154	40276.3210	4.315126E-09	0.000	0.000	0.000
155	40293.8063	2.185971E+00	0.138	-0.362	-0.233
156	40415.7783	7.780522E-10	0.000	0.000	0.000
157	40576.4486	1.328012E-09	0.000	0.000	0.000
158	40680.0891	5.168997E-09	0.000	0.000	0.000
159	40681.8302	5.021311E+00	0.408	-0.864	-0.285
160	40947.8828	-5.108566E+00	0.341	-0.184	0.196
161	40978.6587	5.388103E+00	-1.015	3.031	0.167
162	41199.3420	-1.639e40E+00	0.373	0.046	-0.089
163	41291.0252	-4.016748E-09	0.000	0.000	0.000
164	41341.4451	-6.885337E+00	-1.888	-1.330	1.047
165	41356.1124	2.077632E-08	0.000	0.000	0.000
166	41634.9702	1.186710E-10	0.000	0.000	0.000
167	41847.3430	-3.249328E+00	-0.004	1.308	-0.079
168	42226.3818	2.888581E+00	0.678	-1.840	-0.171
169	42284.8521	-3.107778E-09	0.000	0.000	0.000
170	42436.4401	9.428653E-09	0.000	0.000	0.000
171	42443.3923	-3.185128E+00	-0.188	-0.486	0.027
172	42547.8411	-4.172044E+00	1.275	-1.791	-0.104
173	42873.5276	3.585250E-01	-0.024	0.123	-0.007

174	43049.7492	1.002878E-07	0.000	0.000	0.000
175	43153.3581	5.558226E+00	0.287	0.808	-0.069
176	43192.0757	-4.603517E-01	-0.089	0.025	-0.006
177	43260.0832	1.311381E-06	0.000	0.000	0.000
178	43414.7486	3.710504E+00	-1.443	0.676	-0.045
179	43650.8389	4.200685E+00	-0.063	0.367	0.033
180	43883.0804	1.142888E-06	0.000	0.000	0.000
181	43822.3742	-1.272503E+00	0.456	0.151	0.005
182	43928.8836	-2.370241E+00	-0.079	-0.023	-0.032
183	44081.3181	5.858053E-06	0.000	0.000	0.000
184	44361.0384	-1.529891E+00	-0.111	-0.184	-0.028
185	44426.5359	-7.198418E-04	0.001	0.000	0.000
186	44493.4098	-4.608479E-02	0.006	0.015	0.001
187	44706.1053	-2.432616E-06	0.000	0.000	0.000
188	44713.4062	4.581330E-06	0.000	0.000	0.000
189	44796.4593	1.149858E-01	0.004	0.015	0.001
190	44839.2845	9.503364E-06	0.000	0.000	0.000
191	44972.1034	6.701306E-06	0.000	0.000	0.000
192	45005.5440	3.597336E+00	-0.875	0.701	-0.005

1Load Case (29) Load Modal Participation Factors
0

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode: Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
193	45078.0141	1.588788E-05	0.000	0.000	0.000
194	45137.9279	2.034783E+00	-0.133	-0.806	-0.038
195	45249.5767	1.771774E+00	-0.360	-0.030	-0.063
196	45373.0686	2.971003E-05	0.000	0.000	0.000
197	45420.3788	-4.210185E+00	0.639	0.440	0.056
198	45491.7138	1.313408E-05	0.000	0.000	0.000
199	45683.7834	4.851407E-05	0.000	0.000	0.000
200	45703.0905	3.955333E+00	0.081	0.854	-0.219
201	45826.4220	6.747405E-07	0.000	0.000	0.000
202	45990.6498	-8.988058E-04	0.000	0.000	0.000
203	46012.0484	-1.708472E+00	0.223	-0.348	-0.012
204	46113.4228	-8.153192E-04	0.000	0.000	0.000
205	46235.2532	1.293744E+00	0.092	-0.056	0.102
206	46320.8098	-4.617420E-04	0.000	0.000	0.000
207	46365.3678	1.039330E-01	-0.024	-0.021	-0.001
208	46449.0839	-1.371621E-05	0.000	0.000	0.000
209	46545.3896	1.698121E-04	0.000	0.000	0.000
210	46595.4826	6.847697E+00	0.521	0.367	0.251
211	46695.9479	-2.000880E+00	-0.121	-0.307	0.034
212	46830.2985	1.126300E+01	0.280	-3.128	0.326
213	46863.5310	4.649010E-04	0.000	0.000	0.000
214	47124.4595	4.718463E+00	0.000	0.563	-0.999
215	47246.6260	-2.443982E-04	0.000	0.000	0.000
216	47477.4131	-2.482679E-04	0.000	0.000	0.000
217	47516.2502	-3.323137E+00	-0.935	-0.674	-0.151
218	47597.1265	4.254748E-04	0.000	0.000	0.000
219	47819.7419	-1.194920E+01	-0.182	1.210	-0.274
220	47886.2288	-3.725592E-04	0.000	0.000	0.000
221	47999.5792	4.895081E-04	0.000	0.000	0.000
222	48126.4540	2.139403E+00	0.231	-0.804	-0.013

223	48156.3311	1.972798E-04	0.000	0.000	0.000
224	48342.8907	-6.826246E-04	0.000	0.000	0.000
225	48413.7807	-3.406342E+00	-0.506	0.237	0.060
226	48627.4982	4.725128E-04	0.000	0.000	0.000
227	48653.9824	-6.365026E-04	0.000	-0.001	0.000
228	48828.4441	-7.555696E+00	-0.849	-0.883	0.246
229	48972.2100	-8.196543E-04	0.000	0.001	0.000
230	49072.6238	-8.254414E+00	-0.526	0.274	0.107
231	49338.1777	8.171750E-04	0.000	0.000	0.000
232	49385.8370	-5.180808E+00	0.901	-1.081	0.258
233	49442.9488	1.776888E+00	0.198	0.090	-0.097
234	49510.3251	3.017211E-04	0.000	0.000	0.000
235	49778.4751	2.484573E-04	0.000	0.000	0.000
236	49798.5888	-1.133515E+01	-0.185	1.048	-0.180
237	49848.7883	1.207882E-04	0.000	0.000	0.000
238	63479.6542	-1.281907E+01	0.554	-0.709	0.006
239	65861.8086	1.371057E-01	-0.017	0.016	0.014
240	66905.2180	4.477847E+01	5.978	0.311	-0.371

1Load Case (29) Load Modal Participation Factors
0

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode: Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
241	67508.5292	-2.156801E-02	-0.001	-0.005	-0.005
242	67966.8736	-2.123471E+01	1.297	-4.138	0.103
243	68783.0925	-5.104460E-03	-0.001	0.001	0.000
244	69763.9709	2.448985E+01	-1.778	4.083	-0.621
245	69769.9985	7.064481E-01	-0.001	-0.042	-0.004
	Sum of Modal Physical Loads		41.256	22.997	-18.288
0	Resultant of Applied Load		38.685	21.155	-17.823
	Unscaled Applied Load		3.86851E-01	2.11545E-01	-1.78228E-01

1Load Case (30) Load Modal Participation Factors
0

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode: Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
1	1822.6353	-5.956861E+00	20.037	-31.716	-4.549
2	2249.4185	-3.189194E+00	-0.890	1.790	-23.536
3	3945.7726	-9.159094E-13	0.000	0.000	0.000
4	4100.8084	1.906838E-12	0.000	0.000	0.000
5	5075.8308	2.753858E+00	-0.499	0.383	12.865
6	7894.4060	-6.690434E+00	-0.085	0.495	0.413
7	8083.0523	-4.802786E+00	-0.070	0.009	0.143
8	8931.5289	4.960628E+00	13.528	13.399	-0.047
9	9727.9264	-1.060067E-11	0.000	0.000	0.000
10	9931.0538	-5.065443E+00	10.148	5.826	-4.149
11	9945.8479	-1.183622E-09	0.000	0.000	0.000
12	10839.5881	4.491187E-11	0.000	0.000	0.000
13	11784.3428	-3.329985E-11	0.000	0.000	0.000
14	11827.3405	6.784852E-10	0.000	0.000	0.000
15	11834.4034	1.000000E+00	2.545	0.759	0.032
16	12676.8349	3.576529E-12	0.000	0.000	0.000

17	12852.4416	-3.886307E-11	0.000	0.000	0.000
18	13952.5732	-1.820280E+00	1.480	5.382	-0.125
19	14236.0474	4.398186E+00	-15.777	-7.764	-1.710
20	14374.8945	5.348893E-11	0.000	0.000	0.000
21	14453.0410	-8.949324E+00	21.206	13.487	1.774
22	14859.8809	-1.008481E+01	-0.487	-0.971	-0.114
23	14929.8547	-4.290902E-10	0.000	0.000	0.000
24	15548.9981	-2.188908E+00	1.716	0.550	0.586
25	16447.4653	-1.850999E-01	-0.051	-0.050	-0.024
26	16795.7514	-2.109098E-11	0.000	0.000	0.000
27	16983.0808	-3.876771E+00	1.034	1.836	0.975
28	16987.4820	-1.413784E-09	0.000	0.000	0.000
29	17838.0283	-2.067844E-11	0.000	0.000	0.000
30	18091.9781	5.253415E+00	1.521	0.847	0.274
31	18377.3672	-1.672210E-01	-0.028	-0.007	-0.014
32	18396.8821	-1.038032E-12	0.000	0.000	0.000
33	18512.4999	-1.733641E-11	0.000	0.000	0.000
34	18966.2883	-4.863732E-01	-0.192	-0.297	-0.020
35	18987.4768	-1.105812E-09	0.000	0.000	0.000
36	19086.3451	3.092270E-12	0.000	0.000	0.000
37	19982.4040	7.783414E+00	13.459	-1.006	1.922
38	20118.8672	6.784486E+00	-2.121	-0.398	-0.482
39	20228.9985	7.263677E-01	0.779	-0.016	0.060
40	20441.2134	1.220036E-10	0.000	0.000	0.000
41	20894.0888	1.403762E-10	0.000	0.000	0.000
42	21073.9388	8.514503E+00	-10.188	3.332	-1.578
43	21118.2038	2.128089E-10	0.000	0.000	0.000
44	21282.1832	7.042268E-11	0.000	0.000	0.000
45	21385.6993	3.580399E+00	-1.182	0.134	-0.308
46	21440.7917	8.821223E+00	-2.838	-0.365	-0.898
47	21770.8601	8.381278E+00	4.300	-3.382	0.976
48	21849.5806	2.620369E-01	0.017	-0.224	0.004

1Load Case (30) Load Modal Participation Factors
0 /-------- Physical Load in Each Mode --------/

Mode Number	Frequency	Participation Factor	Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
49	21873.7909	9.881968E-12	0.000	0.000	0.000
50	22122.6863	-1.291089E+00	-1.107	1.449	-0.109
51	22459.5346	-3.658459E+00	-1.275	-1.952	0.706
52	22485.3742	8.385466E-10	0.000	0.000	0.000
53	23456.9006	2.783615E-11	0.000	0.000	0.000
54	23479.0957	-1.543021E-11	0.000	0.000	0.000
55	23536.9192	5.656989E-01	-0.326	0.415	-0.061
56	23851.5910	-4.077372E+00	-5.060	-0.574	-0.479
57	24154.0112	3.906568E+00	-0.506	4.988	-0.883
58	24613.8132	2.807932E-11	0.000	0.000	0.000
59	24705.4333	7.949536E-11	0.000	0.000	0.000
60	24873.2988	4.391884E-11	0.000	0.000	0.000
61	25213.8434	-1.797429E+00	-0.595	-0.229	0.073
62	25411.5261	-9.307196E-11	0.000	0.000	0.000
63	25846.2899	-3.038060E-10	0.000	0.000	0.000
64	25884.7305	-2.786207E+00	-0.778	-1.273	0.176
65	25971.4295	-4.372881E+00	1.120	0.646	0.385

66	26162.9167	-2.378189E+00	1.389	0.467	0.079
67	26269.7446	5.793995E-11	0.000	0.000	0.000
68	26461.0156	4.590634E+00	0.726	0.301	-0.238
69	26737.2059	-3.305945E-11	0.000	0.000	0.000
70	26786.8482	3.182117E-11	0.000	0.000	0.000
71	26899.0584	3.904111E+00	-0.825	-0.327	0.424
72	27351.6880	6.709224E-11	0.000	0.000	0.000
73	27822.3949	-1.366810E+00	0.317	0.105	-0.057
74	27865.2645	2.419635E+00	-2.153	0.999	0.097
75	27973.9175	-4.061392E-11	0.000	0.000	0.000
76	28065.8451	-2.215759E+00	1.218	-0.486	0.010
77	28168.4204	-4.709097E-11	0.000	0.000	0.000
78	28567.4597	1.719745E+00	-1.182	1.382	-0.157
79	28636.4558	6.672584E-11	0.000	0.000	0.000
80	28868.3417	-2.476862E+00	2.974	-0.288	-0.224
81	28947.6102	5.312228E-12	0.000	0.000	0.000
82	29515.6776	-3.552990E-10	0.000	0.000	0.000
83	29613.5881	-2.032000E+00	-0.387	0.943	-0.128
84	29798.0351	-6.148341E+00	-0.729	0.389	-0.234
85	29958.2241	-1.374121E+01	-1.917	-4.581	-1.083
86	30041.7236	-9.483502E-11	0.000	0.000	0.000
87	30206.5364	-5.881128E-10	0.000	0.000	0.000
88	30215.2579	2.800892E+00	-2.416	1.012	0.076
89	30718.7320	3.883624E-01	-0.024	0.074	-0.051
90	30750.9109	6.388488E-11	0.000	0.000	0.000
91	30835.3833	2.881858E+00	-1.558	0.013	0.347
92	31017.5194	4.083721E-11	0.000	0.000	0.000
93	31166.3978	-4.384625E+00	1.717	-2.403	-0.737
94	31219.1357	-2.187430E-11	0.000	0.000	0.000
95	31337.8369	1.177945E+00	0.523	-0.741	0.025
96	31463.1486	1.086483E-10	0.000	0.000	0.000

1Load Case (30) Load Modal Participation Factors
0 /-------- Physical Load in Each Mode --------/

Mode Number	Frequency	Participation Factor	Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
97	31886.4818	-8.035795E-11	0.000	0.000	0.000
98	31859.6827	-1.473593E-11	0.000	0.000	0.000
99	31996.9426	-2.177952E+00	-0.002	-0.287	0.038
100	32148.5738	7.575678E-02	-0.022	0.006	0.009
101	32287.7877	2.885478E-10	0.000	0.000	0.000
102	32421.1828	1.430012E-10	0.000	0.000	0.000
103	32573.8583	4.980828E+00	-6.889	3.638	1.388
104	32631.9218	3.854068E-11	0.000	0.000	0.000
105	32886.4943	-2.124713E-10	0.000	0.000	0.000
106	33012.3717	1.280820E+00	0.720	0.121	-0.123
107	33130.6488	-2.665185E+00	-4.091	2.311	-0.299
108	33285.9096	1.293408E+01	0.753	2.529	-0.256
109	33406.8530	1.240047E-10	0.000	0.000	0.000
110	33565.2301	1.897649E-10	0.000	0.000	0.000
111	33608.2385	-1.189039E+00	1.378	-0.586	-0.018
112	33848.1156	5.572379E-12	0.000	0.000	0.000
113	33885.7183	-2.764891E-01	-0.156	0.188	-0.011
114	34008.3176	2.628613E+00	0.171	0.580	0.159

115	34018.3679	-3.936853E-10	0.000	0.000	0.000
116	34287.8902	6.860386E+00	-2.369	-0.345	-0.405
117	34559.0389	-3.506888E-10	0.000	0.000	0.000
118	34697.2522	5.186011E+00	2.244	-1.248	0.203
119	35008.3703	1.998024E-10	0.000	0.000	0.000
120	35017.8251	-4.800581E+00	0.186	-0.250	0.282
121	35129.9877	2.113588E-11	0.000	0.000	0.000
122	35528.9375	-1.165810E+01	2.845	-6.212	-0.101
123	35552.5518	1.540221E-10	0.000	0.000	0.000
124	35831.3059	-2.054153E-01	-0.135	0.041	-0.014
125	35987.9786	-4.697580E+00	3.674	-2.078	0.153
126	36083.6119	-9.861195E-11	0.000	0.000	0.000
127	36321.6573	-1.366232E-10	0.000	0.000	0.000
128	36500.2374	-3.440911E+00	-1.065	1.384	-0.084
129	36592.2129	9.538608E-11	0.000	0.000	0.000
130	36649.6406	8.347967E-01	-0.727	0.826	-0.028
131	36900.2809	-1.216758E-01	0.010	0.047	0.004
132	36986.5875	-6.070778E-11	0.000	0.000	0.000
133	37328.9177	3.525340E-11	0.000	0.000	0.000
134	37619.3414	4.940827E+00	1.499	2.336	0.098
135	37645.6084	5.106153E+00	4.989	-0.036	-0.018
136	37714.2369	4.503488E-10	0.000	0.000	0.000
137	37918.6451	-6.652880E-11	0.000	0.000	0.000
138	38110.6994	-1.408761E-10	0.000	0.000	0.000
139	38141.4341	-5.651226E-01	-0.078	0.212	0.065
140	38214.3872	-5.188760E-10	0.000	0.000	0.000
141	38466.6499	4.283831E-09	0.000	0.000	0.000
142	38505.8261	-1.110070E+01	-4.242	0.945	0.573
143	38929.3651	4.401275E+00	-3.491	-2.123	0.767
144	39003.2085	2.013685E-09	0.000	0.000	0.000

1Load Case (30) Load Modal Participation Factors
0

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
145	39212.0229	1.575174E-08	0.000	0.000	0.000
146	39228.2573	-5.359758E+00	-0.350	0.477	-0.681
147	39330.8892	-4.570119E+00	1.934	-1.013	1.086
148	39446.4942	4.398350E-10	0.000	0.000	0.000
149	39532.4159	-7.499818E+00	-1.149	-0.543	-1.210
150	39648.3728	-5.679916E-01	0.073	-0.267	0.042
151	39762.5185	-8.496832E-10	0.000	0.000	0.000
152	39858.5332	-2.932038E+00	-0.452	0.817	-0.915
153	40008.7386	8.033434E-10	0.000	0.000	0.000
154	40278.3210	-6.287798E-10	0.000	0.000	0.000
155	40293.8083	1.256003E-01	0.008	-0.021	-0.014
156	40415.7783	-2.226852E-09	0.000	0.000	0.000
157	40576.4465	-6.278196E-10	0.000	0.000	0.000
158	40680.0881	-1.803231E-08	0.000	0.000	0.000
159	40681.8302	-1.558175E+00	-0.126	0.266	0.088
160	40947.6838	6.892637E-01	-0.045	0.025	-0.053
161	40978.6367	5.231258E-01	-0.098	0.294	0.010
162	41189.3429	3.371620E+00	-0.817	-0.101	0.152
163	41291.0252	1.420140E-09	0.000	0.000	0.000

164	41341.4451	-1.958439E+00	-0.551	-0.373	0.293
165	41366.1824	8.017077E-09	0.000	0.000	0.000
166	41634.6702	5.924774E-11	0.000	0.000	0.000
167	41847.3430	2.151734E+00	0.002	-0.866	0.052
168	42225.3819	-3.256037E+00	-0.823	1.988	0.207
169	42284.5521	2.023015E-09	0.000	0.000	0.000
170	42436.4401	-1.234367E-09	0.000	0.000	0.000
171	42443.3823	5.806884E-02	0.003	0.008	0.000
172	42587.8411	-6.529521E+00	1.996	-2.802	-0.183
173	42873.5275	-2.977899E+00	0.215	-1.085	0.061
174	43049.7492	-2.189931E-08	0.000	0.000	0.000
175	43163.3591	-6.170659E+00	-0.298	-0.872	0.077
176	43192.0757	5.422647E+00	1.044	-0.299	0.074
177	43260.0832	-1.729171E-07	0.000	0.000	0.000
178	43414.7486	-6.481641E+00	2.514	-1.176	0.078
179	43650.8399	-4.319454E-01	0.007	-0.037	-0.003
180	43683.0804	-1.228379E-07	0.000	0.000	0.000
181	43822.3742	-8.945328E-01	0.248	0.083	0.003
182	43928.6836	-9.100814E-01	-0.030	-0.009	-0.012
183	44081.3161	-4.019323E-08	0.000	0.000	0.000
184	44361.0394	-1.474484E+00	-0.107	-0.177	-0.025
185	44428.5359	-4.104796E-06	0.000	0.000	0.000
186	44483.4098	-2.248172E+00	0.302	0.131	0.061
187	44706.1063	-7.307434E-08	0.000	0.000	0.000
188	44713.4082	1.355788E-06	0.000	0.000	0.000
189	44788.4593	-1.238063E+00	-0.038	-0.158	-0.011
190	44839.2845	2.538420E-06	0.000	0.000	0.000
191	44972.1034	1.685942E-06	0.000	0.000	0.000
192	45005.5440	1.250345E+00	-0.304	0.244	-0.002

1Load Case (30) Load Modal Participation Factors
0

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
193	45079.0141	3.863139E-06	0.000	0.000	0.000
194	45137.9279	-4.416759E-01	0.029	0.131	0.008
195	45249.5757	4.094570E+00	-0.825	-0.079	-0.144
196	45373.0696	1.258907E-06	0.000	0.000	0.000
197	45420.3768	-1.388006E+00	0.208	0.143	0.018
198	45491.7138	2.958481E-06	0.000	0.000	0.000
199	45683.7934	8.594444E-06	0.000	0.000	0.000
200	45703.0905	6.092007E-01	0.012	0.101	-0.034
201	45926.4220	-6.934175E-06	0.000	0.000	0.000
202	45990.6498	-2.131420E-03	0.000	0.000	0.000
203	46012.0464	2.988840E+00	-0.381	0.808	0.021
204	46113.4228	-1.789884E-03	-0.001	0.001	0.000
205	46236.2532	-1.186440E+00	-0.083	0.051	-0.092
206	46320.8098	-1.102383E-03	0.000	-0.001	0.000
207	46395.3671	1.193198E+00	-0.274	-0.230	-0.015
208	46449.0939	1.595788E-04	0.000	0.000	0.000
209	46545.3898	3.832348E-04	0.000	0.000	0.000
210	46585.4825	4.004257E+00	0.300	0.211	0.145
211	46695.9479	-1.845355E+00	-0.100	-0.253	0.028
212	46830.2985	4.019065E+00	0.100	-1.116	0.116

213	46883.9310	9.595276E-04	0.000	0.000	0.000
214	47124.4585	3.588855E+00	0.000	0.430	-0.188
215	47246.6260	-7.136725E-04	0.001	0.000	0.000
216	47477.4131	-5.889420E-04	0.000	0.000	0.000
217	47516.2502	-1.219178E+00	-0.343	-0.247	-0.065
218	47597.1295	1.141451E-03	-0.001	0.000	0.000
219	47819.7419	1.688823E+01	0.364	-1.890	0.394
220	47886.2288	-8.282904E-04	0.000	0.000	0.000
221	47999.5792	9.882243E-04	-0.001	0.000	0.000
222	48126.4540	2.[illegible]E+00	0.276	-0.723	-0.016
223	48156.3311	1.[illegible]E-04	0.000	0.000	0.000
224	48382.6807	-1.355373E-03	0.000	0.000	0.000
225	48412.7807	3.694769E+00	0.549	-0.257	-0.064
226	48627.4962	1.[illegible]E-03	0.000	0.000	0.000
227	48663.9824	-1.070739E-03	0.000	-0.001	0.000
228	48828.4441	-7.503498E+00	-0.843	-0.986	0.245
229	48972.2100	-1.869784E-03	0.000	0.001	0.001
230	49072.5236	8.[illegible]E+00	0.518	-0.270	-0.105
231	49338.1777	1.[illegible]E-03	0.000	0.000	0.000
232	49385.8370	-1.082939E+00	0.189	-0.223	0.064
233	49442.9498	8.223137E+00	0.918	0.414	-0.448
234	49519.3251	1.[illegible]E-03	0.000	0.000	0.000
235	49778.4761	5.208839E-04	0.000	0.000	0.000
236	49796.5998	5.624129E-01	0.008	-0.052	0.009
237	49946.7558	-4.526790E-03	0.001	-0.001	-0.002
238	63479.6542	-4.282290E+01	1.881	-2.406	0.021
239	65861.8046	-6.682428E-02	0.008	-0.008	-0.007
240	65906.2180	-2.178628E+01	-2.910	-0.152	0.181

1Load Case (30) Load Modal Participation Factors
0

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode: Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
241	67508.5292	6.424402E-03	0.000	0.001	0.001
242	67686.8736	1.128932E+01	-0.690	2.200	-0.055
243	68783.0925	-1.868799E-03	0.000	0.000	0.000
244	68783.9709	2.942836E+01	-2.137	4.819	-0.746
245	68789.9986	8.559838E-01	-0.001	-0.051	-0.005
	Sum of Modal Physical Loads		41.639	0.004	-18.179
0	Resultant of Applied Load		44.080	-1.022	-17.825
	Unscaled Applied Load		4.40802E-01	-1.02203E-02	-1.78248E-01

1Load Case (31) Load Modal Participation Factors
0

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode: Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
1	1822.6353	-2.537515E-14	0.000	0.000	0.000
2	2249.4185	3.[illegible]E-13	0.000	0.000	0.000
3	3945.7726	2.284772E+00	-0.803	-0.207	-8.395
4	4100.8064	-5.521839E+00	0.599	-0.398	10.507
5	5075.8308	-1.[illegible]E-12	0.000	0.000	0.000
6	7894.4060	-9.[illegible]E-13	0.000	0.000	0.000

7	8093.0523	-1.199510E-11	0.000	0.000	0.000
8	8831.5289	4.[illegible]E-11	0.000	0.000	0.000
9	9727.9254	-2.[illegible]E+00	-1.581	-6.745	-3.427
10	9931.8538	-1.827973E-09	0.000	0.000	0.000
11	9945.8979	8.423380E+00	-12.929	5.833	-13.719
12	10639.5981	-2.[illegible]E+00	-3.082	1.159	-3.210
13	11784.3428	4.[illegible]E+00	2.836	1.224	1.479
14	11827.3405	8.214086E+00	0.706	2.349	-5.849
15	11834.4034	-3.209311E-09	0.000	0.000	0.000
16	12575.8348	4.[illegible]E+00	-8.421	0.715	5.534
17	12952.4416	7.[illegible]E-01	-1.[illegible]	-1.492	0.231
18	13952.5732	3.675845E-11	0.000	0.000	0.000
19	14220.0474	-1.[illegible]E-11	0.000	0.000	0.000
20	14314.8945	-3.[illegible]E-01	-0.312	-1.[illegible]	0.267
21	14464.0410	-1.[illegible]E-11	0.000	0.000	0.000
22	14869.8909	7.792263E-12	0.000	0.000	0.000
23	14929.8547	1.687265E-01	-0.337	0.187	0.088
24	15548.9861	7.[illegible]E-12	0.000	0.000	0.000
25	16447.4853	3.[illegible]E-11	0.000	0.000	0.000
26	16795.7514	-9.603149E+00	-4.929	23.197	6.542
27	16993.0608	1.767244E-09	0.000	0.000	0.000
28	16997.4620	-4.[illegible]E+00	7.328	-6.208	1.945
29	17838.0283	1.[illegible]E+00	0.[illegible]	-1.[illegible]	-0.978
30	18091.9781	-4.104418E-11	0.000	0.000	0.000
31	18377.3672	2.161170E-10	0.000	0.000	0.000
32	18396.8821	-8.[illegible]E+00	3.002	-1.891	-1.596
33	18512.4999	-2.[illegible]E+00	1.786	-3.111	1.345
34	18966.2883	2.[illegible]E-08	0.000	0.000	0.000
35	18987.4758	-1.[illegible]E+01	-0.174	2.562	-2.327
36	18988.3451	-8.[illegible]E+00	0.714	-3.[illegible]	1.777
37	19982.4040	-5.[illegible]E-11	0.000	0.000	0.000
38	20118.9672	-4.820047E-11	0.000	0.000	0.000
39	20228.9986	1.250447E-12	0.000	0.000	0.000
40	20441.2134	7.[illegible]E+00	3.267	1.021	1.887
41	20894.0888	1.[illegible]E+00	-0.168	-0.[illegible]	-0.597
42	21073.9388	5.320817E-11	0.000	0.000	0.000
43	21118.2038	-2.[illegible]E+00	0.705	-0.213	-1.580
44	21282.1832	1.[illegible]E+00	-0.202	-0.227	-0.041
45	21385.6983	-4.[illegible]E-11	0.000	0.000	0.000
46	21440.7917	-1.384306E-11	0.000	0.000	0.000
47	21770.8801	-5.[illegible]E-12	0.000	0.000	0.000
48	21849.5806	-5.[illegible]E-11	0.000	0.000	0.000

1Load Case (31) Load Modal Participation Factors
0

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode: Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
49	21873.7909	2.040389E+00	-0.237	1.251	-0.518
50	22122.[illegible]	-3.[illegible]E-11	0.000	0.000	0.000
51	22459.[illegible]	8.[illegible]E-11	0.000	0.000	0.000
52	22485.3742	4.213[illegible]E-01	0.184	0.414	0.032
53	23458.9008	1.[illegible]E+00	-0.172	-0.559	1.244
54	23479.0857	-3.[illegible]E-01	-0.[illegible]	-0.132	-0.[illegible]
55	23636.9192	-1.520147E-10	0.000	0.000	0.000

* IMPD03-LOAD.TAB;2 DISK6:[KPOOL]

56	23851.5910	-3.667957E-11	0.000	0.000	0.000
57	24154.0112	9.355174E-11	0.000	0.000	0.000
58	24613.8192	-1.021881E+00	-0.348	-0.243	-1.207
59	24705.4333	-9.701890E+00	-3.152	2.262	-4.928
60	24973.2988	-6.773123E+00	-2.399	-2.278	-0.662
61	25213.8434	-1.193171E-10	0.000	0.000	0.000
62	25411.5261	-2.388872E+00	2.468	2.050	2.257
63	25846.2899	2.879346E+00	1.213	2.130	-0.820
64	25884.7305	-3.209302E-10	0.000	0.000	0.000
65	25971.4296	-1.640840E-11	0.000	0.000	0.000
66	26182.9187	4.941708E-11	0.000	0.000	0.000
67	26269.7446	-1.137880E-01	-0.013	0.017	-0.067
68	26461.0156	-7.998657E-11	0.000	0.000	0.000
69	26737.2059	-1.194188E+00	0.727	-0.453	-0.945
70	26786.8482	-2.147951E+00	-1.747	-3.705	0.715
71	26999.0584	-1.136617E-10	0.000	0.000	0.000
72	27351.6660	8.375718E+00	-10.547	-0.339	8.953
73	27822.3949	-1.001346E-10	0.000	0.000	0.000
74	27886.2645	-1.942496E-11	0.000	0.000	0.000
75	27973.9175	-4.458664E+00	5.272	1.091	-2.750
76	28066.8451	-9.723823E-11	0.000	0.000	0.000
77	28168.4204	-9.409085E-01	0.786	-0.429	-0.388
78	28567.4597	1.891047E-11	0.000	0.000	0.000
79	28635.4558	-6.079262E+00	-3.096	-4.235	1.479
80	28656.3417	-9.036515E-11	0.000	0.000	0.000
81	28947.6102	-1.517148E+00	2.078	-0.318	-0.886
82	29515.6775	-1.599665E+00	0.537	2.022	0.127
83	29613.5861	1.768188E-10	0.000	0.000	0.000
84	29799.0351	4.325748E-11	0.000	0.000	0.000
85	29958.2241	4.368022E-11	0.000	0.000	0.000
86	30041.7236	-3.828256E+00	-0.456	-1.938	-1.221
87	30205.5364	4.073134E+00	-3.010	1.337	-1.415
88	30215.2579	8.723657E-10	0.000	0.000	0.000
89	30718.7320	1.049209E-10	0.000	0.000	0.000
90	30760.9109	2.411738E-01	0.145	0.122	0.026
91	30936.3633	-2.712272E-11	0.000	0.000	0.000
92	31017.5194	4.318654E+00	0.761	-0.421	0.586
93	31186.3878	5.348756E-11	0.000	0.000	0.000
94	31219.1357	-2.589591E+00	0.295	2.404	0.220
95	31337.8369	5.522119E-11	0.000	0.000	0.000
96	31453.1486	-1.349203E+00	-1.480	-0.925	0.569

1Load Case (31) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
97	31886.4818	-3.524544E+00	1.916	1.576	-0.995
98	31859.6627	4.644602E+00	1.014	-1.792	-1.572
99	31996.8426	1.341361E-10	0.000	0.000	0.000
100	32149.5738	-5.662259E-11	0.000	0.000	0.000
101	32267.7877	1.539715E+00	-0.528	0.844	2.094
102	32327.1828	5.280289E+00	5.837	-1.828	0.681
103	32373.9583	-1.342411E-10	0.000	0.000	0.000
104	32631.9218	3.082642E+00	0.590	2.018	-0.383

* IMPD03-LOAD.TAB;2 DISK6:[KPOOL]

105	32986.4943	-3.024789E+00	1.418	-0.922	0.501
106	33012.2717	1.538512E-11	0.000	0.000	0.000
107	33130.5488	8.887728E-11	0.000	0.000	0.000
108	33285.9096	-1.521448E-11	0.000	0.000	0.000
109	33406.8530	2.247439E+00	-3.524	1.993	-0.500
110	33586.2301	-1.111923E+01	10.820	7.180	8.774
111	33808.2365	-2.316163E-09	0.000	0.000	0.000
112	33848.1156	1.361998E+00	-0.584	0.872	0.510
113	33965.7183	-2.021229E-10	0.000	0.000	0.000
114	34008.3175	-9.585131E-10	0.000	0.000	0.000
115	34018.3479	-1.004063E+01	15.448	3.308	-1.740
116	34287.8902	-1.526417E-10	0.000	0.000	0.000
117	34559.0369	-1.883026E+00	-1.352	0.472	0.278
118	34697.2522	-1.728462E-10	0.000	0.000	0.000
119	35008.3703	2.188232E+00	-0.917	-0.413	-1.038
120	35017.8251	1.252506E-10	0.000	0.000	0.000
121	35129.9877	3.747152E+00	-1.287	0.173	-3.060
122	35526.9375	1.520913E-11	0.000	0.000	0.000
123	35552.5518	-1.248430E+00	-1.718	-0.231	-0.857
124	35931.3069	8.684085E-11	0.000	0.000	0.000
125	35987.9786	-1.094270E-10	0.000	0.000	0.000
126	36083.6119	-3.823455E-01	0.187	-0.102	-0.043
127	36321.6573	4.282015E+00	0.435	0.876	-1.478
128	36500.2374	3.765942E-11	0.000	0.000	0.000
129	36592.2129	7.769232E+00	-0.303	-0.852	2.910
130	36648.6406	-3.159140E-10	0.000	0.000	0.000
131	36900.2809	6.732921E-12	0.000	0.000	0.000
132	36986.5875	2.400180E+00	-1.943	0.502	-1.130
133	37328.9177	-3.136326E+00	-1.895	0.570	-1.240
134	37619.3414	-6.482188E-11	0.000	0.000	0.000
135	37645.8084	5.289048E-11	0.000	0.000	0.000
136	37714.2389	2.998298E+00	2.483	-0.273	0.463
137	37918.6451	3.999454E+00	-1.573	-0.507	0.500
138	38110.6894	-6.488891E+00	2.245	3.470	3.281
139	38141.4341	1.034600E-09	0.000	0.000	0.000
140	38214.3872	3.477402E+00	-0.580	-0.051	-1.178
141	38455.6499	4.427098E+00	0.077	-2.884	-1.909
142	38505.8261	1.978233E-09	0.000	0.000	0.000
143	38929.3651	3.571250E-10	0.000	0.000	0.000
144	39003.2065	4.884362E-01	-0.290	0.197	-0.405

1Load Case (31) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
145	39212.0229	5.662107E+00	-3.546	1.453	0.308
146	39229.2573	9.910648E-09	0.000	0.000	0.000
147	39320.9892	4.409265E-09	0.000	0.000	0.000
148	39446.4942	-4.978478E+00	1.380	-3.883	5.284
149	39532.4159	3.038995E-09	0.000	0.000	0.000
150	39648.3728	4.188319E-09	0.000	0.000	0.000
151	39752.5185	-3.630147E+00	0.990	0.871	-0.305
152	39858.5932	-2.943369E-10	0.000	0.000	0.000
153	40008.7386	-6.490702E+00	-1.171	-1.147	1.239

154	40276.3210	-4.335102E+00	0.248	-0.154	-0.906
155	40293.8963	6.695174E-08	0.000	0.000	0.000
156	40415.7783	-5.053391E+00	2.858	-1.788	-10.519
157	40578.4486	4.070185E+00	-2.635	-0.806	-1.353
158	40690.0691	-3.332668E+00	-0.017	-0.029	0.479
159	40881.8302	3.322622E+00	0.000	0.000	0.000
160	40947.6858	-1.693288E-10	0.000	0.000	0.000
161	40978.6387	-1.077763E-08	0.000	0.000	0.000
162	41199.2420	3.224884E-08	0.000	0.000	0.000
163	41281.0262	4.480041E+00	2.082	-0.847	1.548
164	41341.4451	5.182477E-08	0.000	0.000	0.000
165	41356.1824	9.513267E+00	8.427	2.346	-15.321
166	41634.8702	7.605540E+00	-0.813	5.238	0.063
167	41847.3490	-3.041216E-08	0.000	0.000	0.000
168	42225.3819	4.626820E-08	0.000	0.000	0.000
169	42284.5521	5.284477E+00	-3.122	-1.439	1.605
170	42436.4401	2.102942E+00	-1.261	0.383	-1.765
171	42443.3823	3.513468E-08	0.000	0.000	0.000
172	42517.6411	-2.578275E-08	0.000	0.000	0.000
173	42873.5276	2.696628E-08	0.000	0.000	0.000
174	43049.7492	-3.841263E+00	1.956	0.802	-2.326
175	43153.3581	1.429019E-07	0.000	0.000	0.000
176	43182.0767	-6.218542E-07	0.000	0.000	0.000
177	43260.0832	1.093422E+00	-0.252	-0.006	-0.068
178	43414.7486	5.043067E-08	0.000	0.000	0.000
179	43660.8389	2.125208E-08	0.000	0.000	0.000
180	43813.0804	-2.483088E+00	-0.780	0.678	2.190
181	43822.3742	3.041067E-08	0.000	0.000	0.000
182	43928.8836	2.163200E-08	0.000	0.000	0.000
183	44081.3161	-2.727884E+00	0.885	0.814	0.814
184	44361.0384	-1.689208E-08	0.000	0.000	0.000
185	44426.5369	1.894089E+00	-1.370	0.914	0.456
186	44493.4098	-9.685572E-04	0.000	0.000	0.000
187	44705.1053	-4.611404E+00	2.488	-0.735	0.888
188	44713.4082	1.384787E+00	-0.923	-0.263	0.658
189	44796.4593	-9.728649E-08	0.000	0.000	0.000
190	44839.2945	-6.418443E+00	-2.988	2.912	-7.909
191	44872.1034	-3.221117E-01	0.278	0.026	-0.017
192	45005.5440	5.080708E-05	0.000	0.000	0.000

1Load Case (31) Load Modal Participation Factors

0 /------- Physical Load in Each Mode -------/

Mode Number	Frequency	Participation Factor	Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
193	45079.0141	-5.054981E+00	5.235	-3.246	0.837
194	45137.9279	-3.083502E-08	0.000	0.000	0.000
195	45249.5767	-4.268358E-08	0.000	0.000	0.000
196	45373.0696	5.026590E+00	-2.940	0.970	3.169
197	45420.3768	5.575246E-08	0.000	0.000	0.000
198	45491.7138	-4.041328E+00	-1.449	-2.289	0.982
199	45883.7934	-2.812546E+00	-0.414	0.812	1.121
200	45703.0905	5.061689E-08	0.000	0.000	0.000
201	45826.4220	5.856003E+00	1.706	0.882	0.267
202	45890.8488	-8.525252E+00	0.885	-0.883	-0.318

203	46012.0484	7.873222E-04	0.000	0.000	0.000
204	46113.4221	-2.887554E+00	-1.810	0.824	0.847
205	46236.2843	1.063190E-08	0.000	0.000	0.000
206	46320.8018	-6.842781E+00	2.068	-4.758	-1.221
207	46386.3678	-2.854462E-08	0.000	0.000	0.000
208	46448.0849	-1.473404E+00	-0.116	-0.449	0.188
209	46845.3859	6.381028E+00	2.326	0.194	4.411
210	46585.4835	-1.690000E-04	0.000	0.000	0.000
211	46695.9479	1.139883E-04	0.000	0.000	0.000
212	46830.2945	-1.090518E-03	0.000	0.000	0.000
213	46883.6310	5.906129E+00	0.988	-2.026	-3.884
214	47124.4595	-3.043167E-04	0.000	0.000	0.000
215	47248.6260	-1.210683E+01	8.490	-6.173	0.846
216	47477.4131	2.845788E+00	0.551	1.462	-0.838
217	47516.2502	6.631113E-04	0.000	0.000	0.000
218	47597.1295	-3.906348E+00	1.703	-0.288	0.980
219	47819.7419	1.768183E-04	0.000	0.000	0.000
220	47886.2218	-2.870288E+00	-0.888	1.028	-0.861
221	47899.5702	-1.078000E+00	-0.883	-0.426	-0.881
222	48126.4640	-7.812260E-04	0.000	0.000	0.000
223	48166.3311	-5.572001E+00	-2.202	-0.849	-0.334
224	48382.5307	1.801116E+00	-0.802	-0.184	-0.178
225	48412.7807	8.000000E-04	0.000	0.000	0.000
226	48627.4962	2.800657E+00	0.029	-0.124	-0.186
227	48653.9824	-5.075446E-01	0.014	-0.298	-0.071
228	48828.4441	-5.800000E-04	0.000	0.000	0.000
229	48972.2100	-4.516277E+00	-1.516	4.772	2.282
230	49072.5226	-2.463488E-04	0.000	0.000	0.000
231	49238.1777	-1.464813E+00	-0.208	0.388	0.515
232	49386.5370	8.000129E-04	0.000	0.000	0.000
233	49443.9488	5.000129E-04	0.000	0.000	0.000
234	49510.3261	-7.882273E+00	0.760	0.000	-2.976
235	49778.4751	3.112372E+00	1.743	0.442	-1.731
236	49796.5898	-2.547796E-04	0.000	0.000	0.000
237	49846.7658	-3.926411E+00	1.068	-0.811	-1.765
238	63479.6642	6.381229E-04	0.000	0.000	0.000
239	65881.8086	-3.186923E+01	3.903	-3.978	-3.222
240	65905.2180	1.041072E-01	0.014	0.001	-0.001

1Load Case (31) Load Modal Participation Factors

0 /------- Physical Load in Each Mode -------/

Mode Number	Frequency	Participation Factor	Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
241	67508.5292	4.244071E+01	1.101	8.192	8.001
242	67866.8736	-2.597618E-04	0.002	-0.005	0.000
243	68783.0935	6.971824E+00	0.761	-0.811	-0.000
244	68783.9709	2.338371E-01	-0.017	0.039	-0.008
245	68788.9865	-7.850653E+00	0.010	0.471	0.000
			-----	-----	-----
0	Sum of Modal Physical Loads		28.227	28.800	-9.543
	Resultant of Applied Load		28.196	27.788	-10.464
	Unscaled Applied Load		2.979476E-01	2.778706E-01	-1.046488E-01

1Load Case (32) Load Modal Participation Factors

0 /------- Physical Load in Each Mode -------/

Mode Number	Frequency	Participation Factor	Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
1	1822.6353	4.101223E-15	0.000	0.000	0.000
2	2240.4186	-2.782243E-13	0.000	0.000	0.000
3	3626.7726	5.678081E+00	-1.489	-0.514	-20.883
4	4100.8064	2.271942E+00	-0.245	0.184	-4.355
5	5075.9308	8.358900E-12	0.000	0.000	0.000
6	7844.4050	-2.849853E-12	0.000	0.000	0.000
7	8065.0623	1.201018E-11	0.000	0.000	0.000
8	8851.5289	-2.900544E-11	0.000	0.000	0.000
9	9727.9954	8.883131E+00	3.974	17.188	8.782
10	9941.8618	-1.855041E-10	0.000	0.000	0.000
11	9954.7979	3.031016E+00	-1.766	2.148	-1.048
12	10539.5981	4.881104E+00	6.093	-2.281	6.347
13	11184.3428	8.291178E+00	4.738	2.044	2.471
14	11827.3465	-4.947731E+00	-0.426	-1.415	2.523
15	11934.4054	2.224127E-09	0.000	0.000	0.000
16	12576.8349	2.785675E+00	-5.489	0.464	3.789
17	12852.4416	-4.582940E+00	8.667	9.494	-1.489
18	13852.5732	1.394733E-12	0.000	0.000	0.000
19	14220.0474	3.536620E-11	0.000	0.000	0.000
20	14374.8945	2.484311E+00	1.983	6.845	-2.328
21	14453.0410	1.565104E-11	0.000	0.000	0.000
22	14588.8809	1.804815E-11	0.000	0.000	0.000
23	15219.1547	-4.677142E-01	0.934	-0.518	-0.276
24	15548.9861	2.862385E-11	0.000	0.000	0.000
25	16447.4653	-2.557371E-12	0.000	0.000	0.000
26	16705.7514	6.443118E+00	3.307	-15.584	-4.389
27	16983.0808	3.011522E-09	0.000	0.000	0.000
28	16987.4620	-7.892060E+00	12.242	-10.370	3.290
29	17838.0283	-2.616099E-01	-0.065	0.242	0.174
30	18061.8781	2.238487E-11	0.000	0.000	0.000
31	18377.3672	-1.878155E-11	0.000	0.000	0.000
32	18396.8821	8.709666E-01	-0.508	0.286	0.265
33	18512.4999	-7.902117E+00	6.822	-11.622	5.110
34	18966.2883	2.021772E-08	0.000	0.000	0.000
35	18967.4758	-8.778782E+00	-0.146	2.142	-1.996
36	19006.3451	1.006589E+01	-0.814	3.527	-2.924
37	19982.4040	-8.577806E-12	0.000	0.000	0.000
38	20118.4672	-3.158828E-11	0.000	0.000	0.000
39	20228.9986	-6.800511E-12	0.000	0.000	0.000
40	20441.2134	1.515714E+00	0.688	0.215	0.357
41	20894.0888	3.042603E+00	-0.497	-0.087	-1.498
42	21073.9388	-1.615304E-12	0.000	0.000	0.000
43	21118.2038	-1.898548E+00	0.521	-0.187	-1.767
44	21262.1832	-8.604621E+00	0.710	0.706	0.149
45	21345.6983	5.000331E-11	0.000	0.000	0.000
46	21440.7217	5.353018E-11	0.000	0.000	0.000
47	21740.8801	-2.861420E-11	0.000	0.000	0.000
48	21849.5806	-1.310548E-11	0.000	0.000	0.000

1Load Case (32) Load Modal Participation Factors
0 /------- Physical Load in Each Mode -------/

Mode	Participation	Global X Direction	Global Y Direction	Global Z Direction

Mode Number	Frequency	Participation Factor	Direction X 1.0E+02	Direction X 1.0E+02	Direction X 1.0E+02
49	21873.7909	-6.712612E-01	0.078	-0.412	0.170
50	22122.6883	-1.253571E-11	0.000	0.000	0.000
51	22459.5346	5.811222E-10	0.000	0.000	0.000
52	22486.3742	3.626828E+00	1.148	2.578	0.201
53	23458.9006	-6.384588E-01	0.056	0.190	-0.401
54	23479.0857	3.597875E+00	0.325	1.221	0.052
55	23529.8192	8.851880E-11	0.000	0.000	0.000
56	23851.5910	1.107289E-11	0.000	0.000	0.000
57	24154.0112	-9.406033E-13	0.000	0.000	0.000
58	24613.6132	-9.134824E+00	-1.947	-1.388	-8.788
59	24706.4333	1.373171E+00	-0.446	-0.135	-0.844
60	24973.2888	-4.513613E-01	-0.160	-0.152	-0.044
61	25213.9434	5.852237E-11	0.000	0.000	0.000
62	25411.5261	-5.367327E+00	5.580	4.696	5.104
63	25446.2899	2.852852E+00	1.118	1.883	-0.705
64	25484.7505	-3.734970E-10	0.000	0.000	0.000
65	25971.4296	3.882262E-11	0.000	0.000	0.000
66	26182.9187	-2.833823E-10	0.000	0.000	0.000
67	26268.7446	-8.445845E+00	-0.724	0.826	-3.361
68	26481.0156	2.181161E-11	0.000	0.000	0.000
69	26737.2059	-4.591145E-01	0.287	-0.179	-0.013
70	26786.8432	2.973809E+00	2.418	5.129	-0.880
71	26891.0844	3.824888E-11	0.000	0.000	0.000
72	27351.6880	-1.103881E+00	1.380	0.045	-1.116
73	27822.3949	1.821388E-10	0.000	0.000	0.000
74	27865.2845	1.257343E-10	0.000	0.000	0.000
75	27870.8175	8.936686E+00	-8.205	-1.888	4.286
76	28006.8451	2.787512E-10	0.000	0.000	0.000
77	28166.4304	-6.243723E+00	5.068	-2.784	-3.880
78	28567.4687	-8.740256E-11	0.000	0.000	0.000
79	28836.6653	-1.508425E+00	-0.788	-1.051	0.867
80	28865.3417	-5.968631E-11	0.000	0.000	0.000
81	28947.6102	2.316806E+00	-3.173	0.487	1.047
82	29015.8776	-1.008810E+00	0.348	1.309	0.062
83	29033.5881	9.281172E-11	0.000	0.000	0.000
84	29788.0351	9.288118E-12	0.000	0.000	0.000
85	29958.2241	-2.062896E-11	0.000	0.000	0.000
86	30041.7226	4.177412E+00	0.486	2.114	1.332
87	30206.5364	3.817036E+00	-2.821	1.263	-1.332
88	30215.2578	7.362140E-10	0.000	0.000	0.000
89	30718.7320	-3.143071E-11	0.000	0.000	0.000
90	30750.9109	-4.481744E+00	-2.888	-2.263	-0.431
91	30835.2633	5.530148E-11	0.000	0.000	0.000
92	31011.5184	-1.176539E+00	-0.206	0.114	-0.768
93	31186.3978	6.078840E-11	0.000	0.000	0.000
94	31219.1357	1.310773E+00	-0.105	-1.228	-0.112
95	31327.8369	-8.140943E-11	0.000	0.000	0.000
96	31483.1466	3.902441E+00	4.171	2.808	-1.868

1Load Case (32) Load Modal Participation Factors
0 /------- Physical Load in Each Mode -------/

Mode	Participation	Global X Direction	Global Y Direction	Global Z Direction

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Number	Frequency	Factor	X 1.0E+02	X 1.0E+02	X 1.0E+02
97	31686.4818	-1.751321E+00	0.952	0.783	-0.494
98	31859.8827	7.109399E+00	1.552	-2.743	-2.407
99	31996.9426	1.748347E-10	0.000	0.000	0.000
100	32149.5738	-4.352088E-10	0.000	0.000	0.000
101	32257.7877	-6.[illegible]E+00	2.069	-3.306	-1.210
102	32327.1828	-1.338177E+00	-1.479	0.463	-0.147
103	32373.9583	2.498424E-10	0.000	0.000	0.000
104	32831.9218	-5.[illegible]E+00	-1.073	-3.869	0.[illegible]
105	32995.4943	-3.381754E+00	1.585	-1.031	0.[illegible]
106	33012.3717	5.175870E-12	0.000	0.000	0.000
107	33130.5488	1.181848E-10	0.000	0.000	0.000
108	33285.9096	1.212104E-10	0.000	0.000	0.000
109	33406.8630	-9.791134E+00	15.364	-8.684	2.177
110	33595.2301	-6.566539E+00	8.390	4.240	6.772
111	33808.2365	-1.482875E-09	0.000	0.000	0.000
112	33848.1155	-5.417299E+00	2.322	-3.468	-2.027
113	33986.7183	-3.819187E-11	0.000	0.000	0.000
114	34008.3175	2.330495E-10	0.000	0.000	0.000
115	34018.3679	2.547095E+00	-3.919	-0.839	0.441
116	34287.8902	-2.852735E-12	0.000	0.000	0.000
117	34559.0389	-3.[illegible]E+00	-2.296	0.801	0.[illegible]
118	34697.2522	-2.381417E-10	0.000	0.000	0.000
119	35008.3703	-2.409855E+00	1.019	0.459	1.153
120	35017.8251	-1.636010E-10	0.000	0.000	0.000
121	35129.9877	-6.315[illegible]E+00	2.170	-0.291	5.141
122	35526.9375	-2.715943E-11	0.000	0.000	0.000
123	35552.5518	3.060055E+00	4.213	0.586	1.812
124	35831.3059	-7.608327E-11	0.000	0.000	0.000
125	35987.9796	-2.108018E-12	0.000	0.000	0.000
126	36083.6119	3.670890E+00	-1.583	0.950	0.405
127	36321.8573	-2.440130E+00	-0.249	-0.503	0.846
128	36500.2374	1.307713E-10	0.000	0.000	0.000
129	36592.2129	3.798597E+00	-0.148	-0.417	1.424
130	36849.8406	-1.926704E-10	0.000	0.000	0.000
131	36900.2809	3.060055E-11	0.000	0.000	0.000
132	36986.5875	3.947545E+00	-3.196	0.826	-1.858
133	37328.9177	-1.158675E+00	-0.699	0.210	-0.457
134	37619.3414	1.367183E-11	0.000	0.000	0.000
135	37645.6084	-3.771632E-11	0.000	0.000	0.000
136	37714.2369	-2.271805E+00	-1.881	0.207	-0.351
137	37918.6451	-4.008887E+00	1.576	0.506	-0.801
138	38110.6994	-1.580676E+00	0.639	0.833	0.783
139	38141.4341	1.530882E-09	0.000	0.000	0.000
140	38214.3872	3.805180E+00	-0.835	-0.056	-1.289
141	38455.6499	3.530785E+00	0.081	-2.116	-1.[illegible]
142	38505.8281	1.045036E-09	0.000	0.000	0.000
143	38929.3651	8.407574E-10	0.000	0.000	0.000
144	39003.2085	6.530803E+00	-4.048	2.744	-5.851

1Load Case (32) Load Modal Participation Factors
0

Mode Number	Frequency	Participation Factor	/------- Physical Load in Each Mode: Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02 -------/

145	39212.0229	1.305002E+00	-0.817	0.330	0.071
146	39229.2573	4.[illegible]E-09	0.000	0.000	0.000
147	39320.9892	4.[illegible]E-09	0.000	0.000	0.000
148	39446.4942	6.810262E+00	-1.901	4.989	-7.884
149	39532.4159	1.887010E-10	0.000	0.000	0.000
150	39648.3726	1.978850E-09	0.000	0.000	0.000
151	39752.5185	-3.934277E+00	1.073	0.944	-0.331
152	39858.5332	-6.085364E-11	0.000	0.000	0.000
153	40008.7386	3.157[illegible]E+00	0.570	0.558	-0.[illegible]
154	40276.3210	1.[illegible]E-01	-0.773	0.451	2.[illegible]
155	40293.8063	-2.032008E-08	0.000	0.000	0.000
156	40415.7783	-3.082287E+00	1.804	-0.834	-0.430
157	40576.4485	2.[illegible]E+00	-1.807	-0.[illegible]	-0.[illegible]
158	40680.0891	3.[illegible]E-01	0.002	0.003	-0.[illegible]
159	40681.8302	-5.[illegible]E-09	0.000	0.000	0.000
160	40947.6838	1.291878E-09	0.000	0.000	0.000
161	40978.[illegible]	4.[illegible]E-10	0.000	0.000	0.000
162	41199.3420	-2.141[illegible]E-09	0.000	0.000	0.000
163	41291.0252	3.855101E+00	1.850	-0.672	1.226
164	41341.4451	-2.080773E-09	0.000	0.000	0.000
165	41358.1824	-5.[illegible]E+00	-3.[illegible]	-1.335	8.719
166	41634.8702	[illegible]E+00	-0.[illegible]	6.[illegible]	0.[illegible]
167	41847.3430	-2.[illegible]E-09	0.000	0.000	0.000
168	42225.2819	-3.[illegible]E-10	0.000	0.000	0.000
169	42284.5521	-1.[illegible]E+00	0.849	0.381	-0.409
170	42435.4401	5.71[illegible]E-01	-0.319	0.[illegible]	-0.449
171	42443.3823	1.[illegible]E-09	0.000	0.000	0.000
172	42587.8411	1.[illegible]E-08	0.000	0.000	0.000
173	42873.5275	-1.[illegible]E-09	0.000	0.000	0.000
174	43049.7482	-3.[illegible]E-01	0.184	0.770	-0.[illegible]
175	43153.3591	-8.[illegible]E-08	0.000	0.000	0.000
176	43192.0757	4.912270E-07	0.000	0.000	0.000
177	43280.0832	3.[illegible]E+00	-0.802	-0.[illegible]	-0.341
178	43414.7486	-3.[illegible]E-08	0.000	0.000	0.000
179	43650.8399	-1.43[illegible]E-05	0.000	0.000	0.000
180	43683.0804	-2.48[illegible]E+00	-0.730	0.575	2.102
181	43822.3742	-2.0[illegible]E-05	0.000	0.000	0.000
182	43828.6836	-2.012181E-05	0.000	0.000	0.000
183	44081.3161	2.881406E+00	-1.000	-0.[illegible]	-0.849
184	44361.0394	7.174551E-04	0.000	0.000	0.000
185	44426.5369	4.461871E+00	-3.[illegible]	1.447	1.0[illegible]
186	44493.4098	4.[illegible]E-04	0.000	0.000	0.000
187	44705.1063	6.[illegible]E+00	-3.[illegible]	1.048	-1.391
188	44713.4062	-1.[illegible]E+00	1.[illegible]	0.278	-0.[illegible]
189	44796.[illegible]	-2.1[illegible]E-05	0.000	0.000	0.000
190	44838.[illegible]	-3.617440E+00	-1.706	1.7[illegible]	-4.[illegible]
191	44972.1034	-8.[illegible]E-02	0.0[illegible]	0.0[illegible]	-0.0[illegible]
192	45005.6440	1.131314E-04	0.000	0.000	0.000

1Load Case (32) Load Modal Participation Factors
0

Mode Number	Frequency	Participation Factor	/------- Physical Load in Each Mode: Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02 -------/

193	45079.0141	5.912846E-01	-0.612	0.380	-0.075
194	45137.9279	-7.110610E-05	0.000	0.000	0.000
195	45249.5757	-8.688995E-05	0.000	0.000	0.000
196	45373.0696	-4.730324E+00	2.767	-0.913	-2.982
197	45420.3768	1.265197E-04	0.000	0.000	0.000
198	45491.7138	-4.434505E+00	-1.590	-2.709	1.078
199	45683.7934	-1.072712E+00	-0.158	0.310	0.427
200	45703.0905	1.540691E-06	0.000	0.000	0.000
201	45926.4220	-5.143670E-02	-0.016	-0.008	-0.002
202	45990.6498	-1.097032E+00	0.115	-0.162	-0.054
203	46012.0464	1.921472E-03	0.000	0.000	0.000
204	46113.4228	-3.399713E-01	-0.204	0.117	0.082
205	46235.2532	2.294698E-03	0.000	0.000	0.000
206	46320.8098	-2.104975E+00	0.652	-1.508	-0.387
207	46365.3678	2.026772E-05	0.000	0.000	0.000
208	46449.0939	-4.550000E+00	-0.358	-1.381	0.611
209	46545.3896	6.337570E+00	2.314	0.890	4.390
210	46585.4825	-3.748579E-04	0.000	0.000	0.000
211	46695.9479	1.968634E-04	0.000	0.000	0.000
212	46830.2985	-2.255250E-03	0.000	0.001	0.000
213	46863.9310	-1.150844E+01	-0.074	3.985	5.250
214	47124.4595	-7.032612E-04	0.000	0.000	0.000
215	47246.6260	-1.103252E+00	0.774	-0.563	0.086
216	47477.4131	-1.169894E+01	-2.305	-5.764	3.596
217	47516.2502	1.658994E-03	0.000	0.000	0.000
218	47597.1265	-3.714894E+00	1.837	-0.281	0.371
219	47819.7419	3.534808E-04	0.000	0.000	0.000
220	47886.2288	-1.156186E+00	0.280	-0.419	0.116
221	47999.5792	9.622195E+00	-9.109	3.148	0.486
222	48126.4540	-1.941100E-03	0.000	0.001	0.000
223	48156.3311	-1.669522E+00	-0.668	-0.197	-0.098
224	48382.6807	-1.377719E+00	0.461	0.142	0.161
225	48412.7807	1.813944E-03	0.000	0.000	0.000
226	48627.4952	-8.970303E-01	-0.010	0.042	0.056
227	48653.9824	-2.946223E+00	0.134	-2.553	-0.684
228	48828.4441	-7.696446E-04	0.000	0.000	0.000
229	48972.2100	5.688098E+00	1.303	-3.673	-1.982
230	49072.5236	-4.860700E-04	0.000	0.000	0.000
231	49338.1777	1.167276E+00	0.165	-0.920	-0.413
232	49385.8370	1.261162E-03	0.000	0.000	0.000
233	49442.9498	5.820361E-04	0.000	0.000	0.000
234	49510.3251	-2.350847E+00	0.229	0.018	-0.726
235	49778.4761	8.106328E+00	4.538	1.256	-4.507
236	49796.5998	-3.445578E-04	0.000	0.000	0.000
237	49946.7558	8.697965E+00	-2.859	1.676	4.625
238	63479.6542	-1.199498E-03	0.000	0.000	0.000
239	65861.8086	-2.452600E+01	3.023	-2.849	-2.496
240	65905.2180	7.083337E-02	0.009	0.000	-0.001

1Load Case (32) Load Modal Participation Factors

0 /------- Physical Load in Each Mode -------/

Mode Number	Frequency	Participation Factor	Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
241	67608.5292	-9.886080E+00	-0.251	-2.093	-2.185

242	67886.8736	8.454204E-04	0.000	0.000	0.000
243	68783.0925	-4.788642E+01	-6.389	5.140	-0.888
244	69783.9709	-2.344600E-01	0.017	-0.039	0.006
245	69769.9985	7.919913E+00	-0.010	-0.470	-0.050
	Sum of Modal Physical Loads		37.188	8.845	-19.293
0	Resultant of Applied Load		39.771	9.638	-16.940
	Unscaled Applied Load		3.97272E-01	9.63771E-02	-1.69404E-01

1Load Case (33) Load Modal Participation Factors

0 /------- Physical Load in Each Mode -------/

Mode Number	Frequency	Participation Factor	Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
1	1822.8363	-1.952010E-13	0.000	0.000	0.000
2	2249.4185	-1.025534E-13	0.000	0.000	0.000
3	3945.7726	6.066216E+00	-1.601	-0.549	-22.290
4	4100.8984	-2.524281E+00	0.274	-0.182	4.893
5	5075.8308	6.511084E-12	0.000	0.000	0.000
6	7894.4050	1.031623E-13	0.000	0.000	0.000
7	8093.0523	7.400508E-12	0.000	0.000	0.000
8	8831.5289	1.555783E-12	0.000	0.000	0.000
9	9727.9264	4.478877E+00	2.584	11.161	5.671
10	9931.8538	-1.851449E-09	0.000	0.000	0.000
11	9945.8979	8.215950E+00	-12.611	5.689	-13.381
12	10639.5981	3.033942E+00	3.995	-1.491	4.131
13	11784.3428	-1.089369E+01	-6.221	-2.684	-3.245
14	11827.3406	3.353807E-01	0.029	0.096	-0.239
15	11834.4034	-4.427451E-10	0.000	0.000	0.000
16	12575.8349	9.031666E-01	-1.773	0.151	1.228
17	12852.4416	-4.338146E+00	8.195	8.987	-1.390
18	13962.5732	1.704010E-11	0.000	0.000	0.000
19	14220.0474	3.571951E-11	0.000	0.000	0.000
20	14374.8945	2.093940E+00	1.671	5.770	-1.988
21	14453.0410	4.862329E-12	0.000	0.000	0.000
22	14869.8809	-1.551012E-11	0.000	0.000	0.000
23	14929.8547	6.519319E-01	-1.301	0.721	0.379
24	15548.9861	2.852843E-11	0.000	0.000	0.000
25	16447.4863	3.017416E-11	0.000	0.000	0.000
26	16795.7614	-3.217671E+00	-1.651	7.773	2.192
27	16983.0608	3.235698E-09	0.000	0.000	0.000
28	16987.4820	-8.528403E+00	13.229	-11.206	3.513
29	17838.0283	-1.174431E+00	-0.292	1.086	0.783
30	18091.9781	1.266617E-11	0.000	0.000	0.000
31	18377.3672	1.284153E-10	0.000	0.000	0.000
32	18396.8821	-1.638302E+00	0.956	-0.538	-0.492
33	18512.4999	-6.381993E+00	5.727	-9.924	4.290
34	18966.2883	-3.644830E-08	0.000	0.000	0.000
35	18987.4758	1.602719E+01	0.266	-3.910	3.562
36	19086.3451	-5.335219E-01	0.043	-0.187	0.107
37	19882.4040	-2.197884E-11	0.000	0.000	0.000
38	20118.8872	1.724988E-11	0.000	0.000	0.000
39	20228.9885	-4.743087E-11	0.000	0.000	0.000
40	20441.2134	3.211085E+00	1.458	0.456	0.757
41	20884.0888	-1.841264E+00	0.301	0.062	0.906

42	21073.9388	8.981110E-12	0.000	0.000	0.000
43	21118.2038	3.186071E-01	-0.083	0.025	0.187
44	21282.1832	3.648952E-01	-0.039	-0.044	-0.008
45	21385.6993	5.813776E-12	0.000	0.000	0.000
46	21440.7917	1.873618E-11	0.000	0.000	0.000
47	21770.8801	-1.536806E-11	0.000	0.000	0.000
48	21845.5806	3.332502E-11	0.000	0.000	0.000

1Load Case (33) Load Modal Participation Factors
0 /------- Physical Load in Each Mode -------/

Mode Number	Frequency	Participation Factor	Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
49	21873.7809	-1.733002E+00	0.201	-1.083	0.440
50	22122.6863	3.776010E-12	0.000	0.000	0.000
51	22459.5346	7.689684E-10	0.000	0.000	0.000
52	22485.3742	3.496375E+00	1.527	3.432	0.268
53	23456.9006	-3.855526E+00	0.336	1.088	-2.422
54	23479.0957	-2.992140E+00	-0.272	-1.024	-0.049
55	23536.9192	2.427942E-10	0.000	0.000	0.000
56	23851.5910	4.424954E-11	0.000	0.000	0.000
57	24154.0112	7.037754E-11	0.000	0.000	0.000
58	24613.6132	-5.053622E+00	-1.077	-0.756	-3.780
59	24705.4333	-6.825715E+00	-2.217	1.592	-3.467
60	24973.2988	-4.175744E+00	-1.479	-1.404	-0.408
61	25213.9434	-1.602358E-11	0.000	0.000	0.000
62	25411.5261	-6.659578E+00	6.937	5.762	6.344
63	25846.2899	5.607580E+00	2.362	4.148	-1.596
64	25884.7305	-6.915784E-10	0.000	0.000	0.000
65	25971.4286	3.977357E-11	0.000	0.000	0.000
66	26162.9167	-1.453170E-10	0.000	0.000	0.000
67	26269.7446	-3.045679E+00	-0.342	0.461	-1.536
68	26461.0166	-9.284779E-12	0.000	0.000	0.000
69	26737.2059	2.194011E+00	-1.379	0.854	0.985
70	26786.8492	-4.090023E+00	-3.326	-1.054	1.362
71	26999.0584	-1.346840E-11	0.000	0.000	0.000
72	27351.6860	1.052459E-01	-0.133	-0.004	0.112
73	27822.3948	8.866431E-11	0.000	0.000	0.000
74	27865.2645	-3.602643E-12	0.000	0.000	0.000
75	27973.9176	3.448039E+00	-4.077	-0.843	2.126
76	28065.8451	5.847240E-11	0.000	0.000	0.000
77	28168.4294	2.872439E+00	-2.177	1.182	1.134
78	28567.4597	1.153471E-10	0.000	0.000	0.000
79	28635.4558	1.007128E+01	5.129	7.016	-2.451
80	28656.3417	2.036491E-10	0.000	0.000	0.000
81	28947.6102	-6.263000E+00	8.578	-1.315	-2.830
82	29515.6776	-4.708596E+00	1.611	6.085	0.380
83	29613.5861	2.563147E-10	0.000	0.000	0.000
84	29799.0351	1.349068E-11	0.000	0.000	0.000
85	29858.2241	7.561253E-12	0.000	0.000	0.000
86	30041.7236	5.406830E-01	0.064	0.274	0.172
87	30205.5364	-6.874516E+00	5.081	-2.257	2.388
88	30215.2579	-1.481710E-09	0.000	0.000	0.000
89	30718.7320	9.978452E-14	0.000	0.000	0.000
90	30750.9109	1.701270E+00	1.024	0.859	0.183

91	30935.3633	3.862199E-12	0.000	0.000	0.000
92	31017.5194	1.971285E+00	0.347	-0.182	0.298
93	31166.3978	9.172428E-11	0.000	0.000	0.000
94	31219.1357	-2.996848E+00	0.239	2.802	0.257
95	31337.8369	-3.941059E-11	0.000	0.000	0.000
96	31453.1466	2.923217E+00	3.207	2.005	-1.232

1Load Case (33) Load Modal Participation Factors
0 /------- Physical Load in Each Mode -------/

Mode Number	Frequency	Participation Factor	Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
97	31686.4818	-1.054111E+00	0.573	0.471	-0.298
98	31859.8827	6.275828E-01	0.137	-0.242	-0.212
99	31996.9426	1.407332E-10	0.000	0.000	0.000
100	32149.5738	-6.472879E-10	0.000	0.000	0.000
101	32267.7877	-6.252501E+00	2.143	-3.426	-8.501
102	32327.1828	4.240285E+00	4.890	-1.468	0.467
103	32373.8583	1.574372E-10	0.000	0.000	0.000
104	32631.9218	5.533380E+00	1.089	3.854	-0.894
105	32896.4943	3.102078E+00	-1.454	0.946	-0.514
106	33012.3717	4.378021E-11	0.000	0.000	0.000
107	33130.5488	-2.085184E-10	0.000	0.000	0.000
108	33285.9096	1.006158E-10	0.000	0.000	0.000
109	33406.8530	-1.288818E+00	1.991	-1.126	0.282
110	33585.2391	-1.017758E+01	10.099	6.201	8.122
111	33608.2386	-2.223772E-09	0.000	0.000	0.000
112	33848.1158	-6.956131E+00	2.881	-4.453	-2.603
113	33966.7183	-7.501532E-11	0.000	0.000	0.000
114	34008.3175	1.485343E-10	0.000	0.000	0.000
115	34018.3879	1.120370E+00	-1.724	-0.369	0.184
116	34287.8902	4.074401E-12	0.000	0.000	0.000
117	34559.0369	-6.045902E+00	-3.441	1.201	0.703
118	34697.2522	-3.583102E-10	0.000	0.000	0.000
119	35008.3703	-7.030400E-01	0.297	0.134	0.356
120	35017.8251	-8.698491E-11	0.000	0.000	0.000
121	35129.9877	-3.763653E+00	1.293	-0.174	3.064
122	35526.8375	-6.188934E-11	0.000	0.000	0.000
123	35552.5518	-5.851269E+00	-8.067	-1.084	-3.086
124	35831.3059	-2.291472E-10	0.000	0.000	0.000
125	35987.9786	-3.782452E-11	0.000	0.000	0.000
126	36083.6119	4.545259E+00	-1.936	1.176	0.502
127	36321.6673	4.542181E+00	0.483	0.937	-1.576
128	36500.2374	-1.333767E-10	0.000	0.000	0.000
129	36592.2129	-8.406115E-01	0.033	0.092	-0.315
130	36649.6406	4.579880E-12	0.000	0.000	0.000
131	36900.2809	1.039241E-10	0.000	0.000	0.000
132	36986.5875	2.318718E+00	-1.876	0.485	-1.091
133	37329.9177	4.692407E+00	2.838	-0.852	1.856
134	37518.3414	1.871711E-10	0.000	0.000	0.000
135	37645.6044	1.328377E-10	0.000	0.000	0.000
136	37714.2389	-6.911177E+00	-6.723	0.830	-1.068
137	37918.6451	3.362025E+00	-1.318	-0.425	0.419
138	38110.6894	1.484373E+00	-0.506	-0.787	-0.735
139	38141.4341	1.270128E-09	0.000	0.000	0.000

140	38214.3872	3.042270E+00	-0.508	-0.045	-1.031
141	38455.6499	2.826607E+00	0.048	-1.684	-1.219
142	38505.8261	1.462889E-10	0.000	0.000	0.000
143	38929.3651	-1.414826E-09	0.000	0.000	0.000
144	39003.2065	-8.162668E+00	5.057	-3.430	7.084

(Load Case (33) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode: Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
145	39212.0229	-4.477185E+00	2.804	-1.133	-0.243
146	39229.2573	-1.023993E-08	0.000	0.000	0.000
147	39320.9892	-7.141355E-09	0.000	0.000	0.000
148	39446.4942	-6.606373E+00	1.844	-4.820	7.647
149	39532.4159	-9.352599E-10	0.000	0.000	0.000
150	39648.3726	-2.547324E-09	0.000	0.000	0.000
151	39752.5185	-4.327058E+00	-1.180	-1.039	0.364
152	39858.5332	1.850886E-10	0.000	0.000	0.000
153	40008.7386	5.851492E+00	1.056	1.034	-1.117
154	40276.3210	2.871858E+00	-0.164	0.102	0.601
155	40293.8063	-5.296782E-09	0.000	0.000	0.000
156	40415.7783	-1.769967E+00	1.030	-0.476	-0.240
157	40576.4465	-9.389197E+00	6.076	1.168	2.891
158	40680.0891	3.527707E+00	0.018	0.030	-0.507
159	40681.8302	-3.319961E-08	0.000	0.000	0.000
160	40947.6838	-1.488220E-09	0.000	0.000	0.000
161	40978.6367	-3.947964E-10	0.000	0.000	0.000
162	41199.3420	-1.792811E-09	0.000	0.000	0.000
163	41291.0252	5.096447E+00	2.358	-0.960	1.752
164	41341.4451	1.811020E-08	0.000	0.000	0.000
165	41356.1824	5.690479E+00	3.845	1.403	-9.164
166	41634.6702	-7.157037E+00	0.736	-4.734	-0.048
167	41847.3430	2.944150E-08	0.000	0.000	0.000
168	42225.3818	-1.079785E-09	0.000	0.000	0.000
169	42284.5521	-2.319399E+00	1.370	0.632	-0.660
170	42436.4401	1.798834E-01	-0.107	0.033	-0.150
171	42443.3823	2.187595E-09	0.000	0.000	0.000
172	42587.8411	-3.266109E-08	0.000	0.000	0.000
173	42873.5275	3.547960E-08	0.000	0.000	0.000
174	43049.7492	1.089101E+00	-0.469	-0.228	0.659
175	43153.3591	1.844487E-07	0.000	0.000	0.000
176	43192.0757	-8.684988E-07	0.000	0.000	0.000
177	43260.0832	5.348833E+00	-1.196	-0.032	-0.509
178	43414.7486	6.706961E-06	0.000	0.000	0.000
179	43650.8389	2.723624E-05	0.000	0.000	0.000
180	43883.0604	4.600964E+00	1.351	-1.085	-3.890
181	43922.3742	3.813194E-05	0.000	0.000	0.000
182	43928.6836	3.071534E-05	0.000	0.000	0.000
183	44081.3161	3.048848E+00	-1.068	-0.910	-0.687
184	44361.0394	-1.619715E-03	0.000	0.000	0.000
185	44426.5369	5.157975E+00	-3.730	1.673	1.241
186	44493.4098	-8.928462E-04	0.000	0.000	0.000
187	44705.1053	5.494784E+00	-2.979	0.874	-1.076
188	44713.4062	4.521636E-01	-0.306	-0.081	0.082

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189	44796.4593	-2.535337E-05	0.000	0.000	0.000
190	44839.2645	-1.109116E+00	-0.496	0.503	-1.297
191	44972.1034	-1.718695E+00	1.470	0.136	-0.089
192	45006.5440	1.308245E-04	0.000	0.000	0.000

(Load Case (33) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode: Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
193	45079.0141	1.206334E-01	-0.125	0.077	-0.016
194	45137.9279	-8.193386E-05	0.000	0.000	0.000
195	45249.5757	-1.111654E-04	0.000	0.000	0.000
196	45373.0696	1.084362E+00	-0.634	0.209	0.684
197	45420.3768	1.485763E-04	0.000	0.000	0.000
198	45491.7138	7.848942E+00	2.814	4.786	-1.908
199	45683.7934	-8.851583E+00	-1.303	2.556	3.527
200	45703.0905	1.286136E-05	0.000	0.000	0.000
201	45926.4220	6.878607E+00	2.116	1.092	0.318
202	45990.6498	-3.571788E+00	0.375	-0.527	-0.175
203	46012.0484	2.205187E-03	0.000	0.000	0.000
204	46113.4228	-3.031366E+00	-1.816	1.042	0.730
205	46235.2632	2.882788E-03	0.000	0.000	0.000
206	46320.8098	-1.043988E+01	3.236	-7.479	-1.820
207	46366.3678	-5.422637E-06	0.000	0.000	0.000
208	46449.0939	-6.284893E-01	-0.042	-0.180	0.071
209	46545.3896	-1.312339E+01	-4.791	-1.843	-9.090
210	46585.4825	-3.929405E-04	0.000	0.000	0.000
211	46695.9479	2.968347E-04	0.000	0.000	0.000
212	46830.2985	-2.662301E-03	0.000	0.001	0.000
213	46863.9310	6.030568E+00	0.032	-1.742	-2.295
214	47124.4596	-8.112389E-04	0.000	0.000	0.000
215	47246.8280	-1.984247E+00	1.391	-1.012	0.155
216	47477.4131	-2.839455E+00	-0.580	-1.388	0.873
217	47516.2502	1.707123E-03	0.000	0.000	0.000
218	47597.1295	2.075487E+00	-1.026	0.157	-0.207
219	47819.7419	3.978302E-04	0.000	0.000	0.000
220	47886.2288	-8.958136E-01	0.210	-0.314	0.086
221	47999.5792	2.316485E+00	-2.193	0.758	0.112
222	48126.4540	-2.203278E-03	0.000	0.001	0.000
223	48156.3311	-3.457777E+00	-1.384	-0.408	-0.204
224	48382.6807	-4.175795E+00	1.398	0.430	0.487
225	48412.7807	2.128930E-03	0.000	0.000	0.000
226	48627.4962	-3.874885E+00	-0.043	0.181	0.243
227	48653.9824	2.482331E+00	-0.113	2.151	0.576
228	48828.4441	-6.370133E-04	0.000	0.000	0.000
229	48972.2100	4.145882E+00	0.950	-2.877	-1.430
230	49072.5236	-6.554763E-04	0.000	0.000	0.000
231	49338.1777	8.485237E+00	1.203	-2.323	-3.005
232	49385.8370	1.387382E-03	0.000	0.000	0.000
233	49442.9498	2.422610E-04	0.000	0.000	0.000
234	49510.3251	5.939503E+00	-0.579	-0.047	1.834
235	49778.4761	-9.981387E+00	-5.589	-1.547	6.550
236	49796.5998	-1.125828E-03	0.000	0.000	0.000
237	49946.7559	5.372767E+00	-1.788	1.036	2.857

238	63479.8642	-1.771600E-04	0.000	0.000	0.000
239	65861.8086	1.951514E+01	-2.405	2.267	1.886
240	65905.2180	-6.414957E-02	-0.009	0.000	0.001

Load Case (33) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
241	67508.5292	8.378901E+00	0.212	1.774	1.852
242	67686.8736	-9.133896E-03	0.001	-0.002	0.000
243	68783.0925	-1.930636E+01	-2.591	2.081	-0.278
244	69763.9709	1.410064E+00	-0.102	0.236	-0.036
245	69769.9985	-4.864538E+01	0.060	2.888	0.309
	Sum of Modal Physical Loads		39.655	24.108	-16.439
	Resultant of Applied Load		38.685	21.155	-17.823
	Unscaled Applied Load		3.868851E-01	2.115455E-01	-1.782286E-01

Load Case 34 Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
1	1822.6353	1.242238E-13	0.000	0.000	0.000
2	2249.4185	-4.081135E-13	0.000	0.000	0.000
3	3945.7726	2.578542E+00	-0.681	-0.233	-9.476
4	4100.8064	5.917382E+00	-0.842	0.427	-11.280
5	5075.8308	7.063068E-12	0.000	0.000	0.000
6	7894.4050	-2.728283E-12	0.000	0.000	0.000
7	8093.0523	1.485071E-11	0.000	0.000	0.000
8	8831.5289	-4.615097E-11	0.000	0.000	0.000
9	9727.9254	6.966442E+00	4.019	17.361	8.821
10	9931.8538	1.119840E-08	0.000	0.000	0.000
11	9945.8979	-5.458496E+00	8.378	-3.780	8.890
12	10639.5981	3.254981E+00	4.264	-1.600	4.432
13	11784.3428	4.310727E-01	0.245	0.106	0.128
14	11827.3405	1.114121E+01	0.958	3.185	-7.933
15	11834.4034	-4.485957E-09	0.000	0.000	0.000
16	12576.8349	-3.360669E+00	6.598	-0.580	-4.571
17	12852.4416	-2.396329E+00	4.527	4.964	-0.788
18	13952.5732	-1.943367E-11	0.000	0.000	0.000
19	14220.0474	3.152246E-11	0.000	0.000	0.000
20	14374.8945	1.861383E+00	1.486	5.129	-1.751
21	14453.0410	1.678766E-11	0.000	0.000	0.000
22	14869.8609	3.283864E-11	0.000	0.000	0.000
23	14920.8647	-1.171938E+00	2.339	-1.297	-0.881
24	15548.9861	-8.582092E-13	0.000	0.000	0.000
25	16447.4553	-4.464918E-11	0.000	0.000	0.000
26	16795.7514	1.036326E+01	5.319	-25.034	-7.060
27	16983.0608	1.408141E-08	0.000	0.000	0.000
28	16987.4620	-3.683410E+00	5.683	-4.814	1.509
29	17838.0283	2.346179E-01	0.058	-0.217	-0.156
30	18091.8781	-9.115755E-12	0.000	0.000	0.000
31	18377.3672	-1.748229E-10	0.000	0.000	0.000

32	18396.8821	2.975628E+00	-1.736	0.977	0.905
33	18512.4999	1.776994E+00	-1.595	2.763	-1.194
34	18966.2883	-6.454917E-10	0.000	0.000	0.000
35	18967.4758	1.034732E-01	0.002	-0.026	0.023
36	19086.3451	-1.600271E+01	1.293	-5.607	3.218
37	19882.4040	1.161049E-12	0.000	0.000	0.000
38	20118.8672	1.869128E-11	0.000	0.000	0.000
39	20228.9885	1.602640E-11	0.000	0.000	0.000
40	20441.2134	1.147075E+00	0.521	0.183	0.270
41	20894.0888	1.318494E+00	-0.215	-0.037	-0.847
42	21073.8988	-4.456459E-11	0.000	0.000	0.000
43	21118.2038	4.814968E-01	-0.126	0.038	0.283
44	21282.1832	-9.730288E-01	0.105	0.117	0.021
45	21385.6893	-1.094305E-11	0.000	0.000	0.000
46	21440.7917	1.154498E-11	0.000	0.000	0.000
47	21770.8601	-1.570447E-11	0.000	0.000	0.000
48	21849.5606	-2.818565E-11	0.000	0.000	0.000

Load Case (34) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
49	21873.7909	1.068388E+00	-0.123	0.649	-0.269
50	22122.8883	-1.918562E-11	0.000	0.000	0.000
51	22459.5346	8.895332E-10	0.000	0.000	0.000
52	22485.3742	3.658604E+00	1.729	3.886	0.303
53	23456.9006	2.450158E+00	-0.213	-0.892	1.539
54	23479.0957	-2.089188E+00	-0.190	-0.715	-0.034
55	23536.8192	-2.175564E-10	0.000	0.000	0.000
56	23951.5910	1.274719E-11	0.000	0.000	0.000
57	24154.0112	-2.922718E-11	0.000	0.000	0.000
58	24613.6132	-5.461436E+00	-1.184	-0.817	-4.083
59	24705.4333	8.038254E+00	2.611	-1.874	4.083
60	24973.2988	4.812585E+00	1.705	1.619	0.470
61	25213.9434	1.391641E-10	0.000	0.000	0.000
62	25411.5261	-2.841788E+00	2.980	2.459	2.707
63	25846.2898	-2.262958E-01	-0.096	-0.167	0.064
64	25884.7306	-2.871147E-11	0.000	0.000	0.000
65	25971.4296	4.281341E-11	0.000	0.000	0.000
66	26162.9167	-3.467007E-10	0.000	0.000	0.000
67	26269.7446	-7.830345E+00	-0.881	1.186	-3.854
68	26481.0156	7.400642E-11	0.000	0.000	0.000
69	26737.2059	5.521848E+00	-3.449	2.150	0.214
70	26786.8482	6.483396E+00	4.459	8.457	-1.826
71	26899.0584	1.281588E-11	0.000	0.000	0.000
72	27361.8080	-3.697823E+00	4.666	0.150	-3.853
73	27822.3949	-7.382276E-11	0.000	0.000	0.000
74	27865.2645	-1.162130E-10	0.000	0.000	0.000
75	27873.9176	-2.206907E+00	2.808	0.540	-1.381
76	28065.8451	-1.878018E-10	0.000	0.000	0.000
77	28188.4204	6.883127E+00	-5.591	3.081	2.913
78	28567.4597	4.361673E-11	0.000	0.000	0.000
79	28635.4558	-3.005728E+00	-1.531	-2.094	0.731
80	28656.3417	-8.897891E-12	0.000	0.000	0.000

81	28947.6102	-2.409720E+00	3.300	-0.506	-1.089
82	29515.6775	-6.484227E+00	2.176	8.186	0.514
83	29613.5861	5.190572E-10	0.000	0.000	0.000
84	29799.0351	1.676452E-11	0.000	0.000	0.000
85	29958.2241	1.521422E-10	0.000	0.000	0.000
86	30041.7236	-8.751743E+00	-1.942	-4.429	-2.791
87	30205.5354	-1.336302E+00	0.987	-0.438	0.484
88	30215.2579	-2.727984E-10	0.000	0.000	0.000
89	30718.7320	-3.555284E-11	0.000	0.000	0.000
90	30750.9109	-1.532530E+00	-0.923	-0.774	-0.165
91	30936.3633	6.433241E-11	0.000	0.000	0.000
92	31017.5194	6.537862E-01	0.115	-0.064	0.089
93	31166.3978	6.636947E-11	0.000	0.000	0.000
94	31218.1357	4.147682E+00	-0.331	-3.880	-0.365
95	31337.8369	-8.012978E-11	0.000	0.000	0.000
96	31453.1466	1.036723E+00	1.137	0.711	-0.437

(Load Case (34) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
97	31666.4818	3.246028E+00	-1.764	-1.452	0.916
98	31859.6627	8.865236E+00	1.935	-3.421	-3.001
99	31996.9426	8.906581E-11	0.000	0.000	0.000
100	32149.5738	5.119788E-12	0.000	0.000	0.000
101	32267.7877	-6.901952E-01	0.237	-0.378	-0.838
102	32327.1828	-3.103422E-01	-0.343	0.107	-0.034
103	32373.9583	4.188151E-11	0.000	0.000	0.000
104	32631.9218	-2.652283E+00	-0.508	-1.736	0.330
105	32906.4943	3.866786E+00	-1.812	1.179	-0.841
106	33012.3717	-2.055666E-11	0.000	0.000	0.000
107	33130.5488	-1.684343E-10	0.000	0.000	0.000
108	33285.9086	8.077224E-11	0.000	0.000	0.000
109	33406.8530	-5.388498E+00	8.486	-4.788	1.200
110	33595.2301	3.130503E+00	-3.046	-2.021	-2.752
111	33608.2365	5.833389E-10	0.000	0.000	0.000
112	33848.1156	7.420327E-01	-0.318	0.475	0.278
113	33965.7183	1.374015E-10	0.000	0.000	0.000
114	34008.3175	6.004098E-10	0.000	0.000	0.000
115	34018.3679	5.706278E+00	-8.780	-1.880	0.989
116	34287.8902	6.171756E-11	0.000	0.000	0.000
117	34559.0369	-4.381849E+00	-2.988	1.043	0.611
118	34697.2522	-2.488932E-10	0.000	0.000	0.000
119	35008.3703	-1.022877E+01	4.326	1.946	4.895
120	35017.8251	-4.544142E-10	0.000	0.000	0.000
121	35129.9877	3.806778E+00	-1.308	0.175	-3.099
122	35526.9375	4.411242E-11	0.000	0.000	0.000
123	35552.5518	2.484162E+00	3.425	0.460	1.310
124	35831.3058	-1.149867E-10	0.000	0.000	0.000
125	35987.9786	8.484456E-13	0.000	0.000	0.000
126	36083.6119	3.344729E+00	-1.424	0.866	0.369
127	36321.6573	-5.832453E-01	-0.059	-0.120	0.202
128	36500.2374	-1.730416E-10	0.000	0.000	0.000
129	36592.2129	-3.099738E+00	0.121	0.340	-1.162

130	36649.6406	2.104038E-10	0.000	0.000	0.000
131	36900.2809	-8.828184E-11	0.000	0.000	0.000
132	36986.5875	-9.796838E+00	7.933	-2.050	4.613
133	37328.9177	-4.298697E+00	-2.698	0.781	-1.700
134	37619.3414	4.776558E-10	0.000	0.000	0.000
135	37645.6084	-2.572103E-10	0.000	0.000	0.000
136	37714.2389	-3.335045E+00	-2.782	0.304	-0.515
137	37918.6451	1.225359E+00	-0.482	-0.155	0.153
138	38110.6994	-1.901559E+00	0.622	0.962	0.904
139	38141.4341	2.859826E-09	0.000	0.000	0.000
140	38214.3872	5.449036E+00	-0.910	-0.080	-1.846
141	38455.6499	-2.880998E+00	-0.050	1.727	1.242
142	38506.8261	-1.859258E-09	0.000	0.000	0.000
143	38929.3651	-4.285146E-10	0.000	0.000	0.000
144	39003.2065	-5.001607E+00	3.098	-2.101	4.328

(Load Case (34) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
145	39212.0229	6.512507E+00	-4.078	1.848	0.354
146	39229.2673	1.178311E-08	0.000	0.000	0.000
147	39320.9892	5.676953E-09	0.000	0.000	0.000
148	39446.4942	-3.831540E-02	0.010	-0.026	0.042
149	39532.4159	2.365947E-08	0.000	0.000	0.000
150	39648.3726	2.572788E-08	0.000	0.000	0.000
151	39752.5185	-1.074702E+00	0.293	0.268	-0.090
152	39858.5332	2.509854E-09	0.000	0.000	0.000
153	40008.7386	-8.841050E-01	-0.180	-0.166	0.168
154	40276.3210	-1.576410E+00	0.080	-0.066	-0.330
155	40293.8063	1.428667E-09	0.000	0.000	0.000
156	40415.7783	-1.126440E+01	6.650	-3.076	-1.548
157	40576.4485	-9.898396E-01	0.828	0.121	0.299
158	40680.0181	-6.348362E+00	-0.033	-0.065	0.918
159	40681.8302	6.561125E-09	0.000	0.000	0.000
160	40947.6838	-5.719809E-10	0.000	0.000	0.000
161	40978.6367	1.093744E-10	0.000	0.000	0.000
162	41199.3420	3.645824E-09	0.000	0.000	0.000
163	41291.0252	-6.208631E+00	-2.873	1.189	-2.133
164	41341.4451	1.506420E-08	0.000	0.000	0.000
165	41356.1824	3.831948E+00	2.459	0.897	-5.880
166	41634.6702	-2.676825E+00	0.276	-1.771	-0.018
167	41847.3430	-1.102648E-10	0.000	0.000	0.000
168	42225.3819	2.972403E-09	0.000	0.000	0.000
169	42284.5521	4.763079E+00	-2.814	-1.297	1.358
170	42436.4401	6.168345E+00	-3.662	1.122	-5.137
171	42443.3823	1.365322E-08	0.000	0.000	0.000
172	42587.8411	-7.414312E-09	0.000	0.000	0.000
173	42873.5275	1.691200E-08	0.000	0.000	0.000
174	43049.7492	6.112838E+00	-2.635	-1.777	3.901
175	43153.3691	-5.678145E-09	0.000	0.000	0.000
176	43192.0757	-2.006817E-07	0.000	0.000	0.000
177	43260.0832	2.348541E+00	-0.526	-0.014	-0.223
178	43414.7486	1.246518E-08	0.000	0.000	0.000

179	43650.8398	4.2087725E-06	0.000	0.000	0.000
180	43663.0904	-1.9390265E+00	-0.570	0.449	1.840
181	43822.3742	4.8761655E-06	0.000	0.000	0.000
182	43928.6836	1.3163195E-06	0.000	0.000	0.000
183	44081.3181	1.1910205E+00	-0.417	-0.355	-0.288
184	44361.0384	-2.8588015E-04	0.000	0.000	0.000
185	44376.8389	-6.3987045E-01	0.882	-0.172	-0.128
186	44493.4098	-1.7027650E-04	0.000	0.000	0.000
187	44706.1053	-1.9254125E+00	1.041	-0.306	0.377
188	44713.4082	3.2125725E+00	-2.172	-0.572	0.884
189	44796.4893	2.7857305E-06	0.000	0.000	0.000
190	44839.2645	4.9390805E+00	2.208	-2.242	5.775
191	44972.1034	-2.2472995E+00	1.822	0.177	-0.116
192	45005.5440	-1.4008885E-05	0.000	0.000	0.000

1Load Case (34) Load Modal Participation Factors

0 /------- Physical Load in Each Mode -------/

Mode Number	Frequency	Participation Factor	Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
193	45079.0141	3.3440845E+00	-3.463	2.148	-0.421
194	45137.8279	8.6101865E-06	0.000	0.000	0.000
195	45249.5757	1.2539695E-06	0.000	0.000	0.000
196	45373.0695	2.9208445E+00	-1.709	0.564	1.841
197	45420.3768	-1.8390615E-05	0.000	0.000	0.000
198	45481.7138	-1.4887065E+00	-0.527	-0.897	0.357
199	45683.7824	1.8979875E+00	0.274	-0.537	-0.731
200	45703.0905	-3.9252435E-06	0.000	0.000	0.000
201	45926.4220	2.4209795E-01	0.074	0.038	0.011
202	45990.8488	2.8935175E+00	-0.314	0.442	0.146
203	46012.0484	-1.6551655E-04	0.000	0.000	0.000
204	46113.4228	1.3628955E+00	0.816	-0.468	-0.328
205	46235.2532	-2.5204835E-04	0.000	0.000	0.000
206	46320.8098	-5.8415485E+00	1.810	-4.185	-1.074
207	46386.3578	-8.3888855E-05	0.000	0.000	0.000
208	46449.0939	-1.9168855E+01	-1.506	-5.816	2.574
209	46545.3898	3.0602695E+00	1.117	0.430	2.120
210	46585.4825	-7.2251185E-06	0.000	0.000	0.000
211	46698.8479	-1.9734155E-06	0.000	0.000	0.000
212	46830.2985	2.1625095E-04	0.000	0.000	0.000
213	46863.9310	5.8230975E-01	0.004	-0.202	-0.886
214	47124.4585	6.9528105E-06	0.000	0.000	0.000
215	47246.6260	3.5118095E+00	-2.483	1.791	-0.274
216	47477.4131	1.1578315E+00	0.228	0.570	-0.356
217	47616.2502	-2.0070815E-04	0.000	0.000	0.000
218	47687.1285	3.9704515E+00	-1.863	0.300	-0.387
219	47819.7419	-4.0248845E-06	0.000	0.000	0.000
220	47886.2288	4.8514275E+00	-1.176	1.757	-0.482
221	47999.5792	-1.2038595E-01	0.114	-0.039	-0.006
222	48126.4540	2.7855685E-04	0.000	0.000	0.000
223	48156.3311	-1.1330101E+00	-0.532	-0.157	-0.078
224	48382.6807	2.1950815E+00	-0.736	-0.226	-0.256
225	48412.7807	-2.1750675E-04	0.000	0.000	0.000
226	48627.4962	-6.4324285E+00	-0.072	0.301	0.403
227	48663.9824	1.6913445E+00	-0.077	1.486	0.392

228	48828.4441	9.5802205E-05	0.000	0.000	0.000
229	48872.2100	-4.8377725E+00	-1.105	3.124	1.888
230	49072.5236	2.7164375E-05	0.000	0.000	0.000
231	49338.1777	5.7893675E+00	0.821	-1.585	-2.050
232	49385.8370	-7.5307895E-06	0.000	0.000	0.000
233	49442.9488	-7.7501575E-06	0.000	0.000	0.000
234	49510.3251	-6.9374045E-01	0.068	0.006	-0.214
235	49778.4751	4.8901835E+00	2.738	0.758	-2.719
236	49796.5898	2.3910125E-04	0.000	0.000	0.000
237	49946.7558	-1.0122725E+01	3.328	-1.951	-5.383
238	63479.6542	2.0475035E-03	0.000	0.000	0.000
239	65861.8066	3.3872155E+01	-4.150	3.911	3.428
240	65905.2180	-9.8552415E-02	-0.013	-0.001	0.001

1Load Case (34) Load Modal Participation Factors

0 /------- Physical Load in Each Mode -------/

Mode Number	Frequency	Participation Factor	Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
241	67608.5292	3.1882215E+01	0.811	6.772	7.069
242	67886.8736	-1.6883845E-02	0.001	-0.003	0.000
243	68763.0815	-1.8890845E+01	-2.832	2.113	-0.283
244	69763.9709	-7.6914855E-01	0.085	-0.128	0.019
245	69789.9985	2.6398255E+01	-0.032	-1.567	-0.168
	Sum of Modal Physical Loads		40.521	3.016	-12.855
0	Resultant of Applied Load		44.080	-1.022	-17.825
	Unscaled Applied Load		4.40802E-01	-1.02203E-02	-1.78248E-01

1 MODAL TRUNCATION VECTORS - LOAD PARTICIPATION FACTORS
1ST DEGENERATE DOUBLE MODEL (SINE AND COSINE)

OLoad Case (27) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
1	2108.7861	1.8089126E+00	1.524	0.291	12.882
2	2108.7861	-2.8402116E+00	0.237	-2.883	-12.070
3	4206.7368	-4.9878653E+00	-13.580	38.121	-2.976
4	4206.7368	1.9196584E+00	13.812	2.628	0.433
5	6703.5051	-1.2134467E+00	0.087	-0.281	-1.480
6	6703.5051	-4.8317533E+00	-0.439	-0.662	2.830
7	7745.5701	3.4884405E+00	3.347	-5.476	-17.400
8	7745.5701	-5.3149488E-01	-0.033	-0.775	1.587
9	8115.8478	4.1352810E+00	-7.812	-14.988	2.780
10	8115.8478	-7.2303560E-01	-1.778	-1.588	0.229
11	9277.8146	-9.8849078E-01	0.286	0.059	-0.568
12	9277.8146	-6.7545048E+00	-2.946	-4.179	-0.303
13	10498.2463	-1.4888756E+00	-4.616	-1.405	-0.087
14	10498.2463	-5.6910178E-01	-0.254	-0.271	0.073
15	11846.3506	7.4618188E-01	0.596	0.272	-0.588
16	11846.3506	1.7587806E+00	1.142	1.079	0.803
17	13167.1228	3.3015177E-01	-0.014	-0.107	0.803
18	13167.1228	-4.8178246E+00	2.054	-1.414	16.783
19	13714.6429	1.5726746E+00	-0.339	-0.959	-0.893
20	13714.6429	3.9804999E+00	-1.508	0.716	-3.121
21	13985.8388	2.1764786E+00	0.359	0.922	-1.141
22	13985.8388	-8.7018836E+00	-0.080	0.384	-4.249
23	15803.7063	-1.7320636E-01	0.042	-0.042	0.044
24	15803.7063	6.2959286E-01	0.163	-0.016	0.386
25	17348.7043	5.7955786E+00	-1.001	2.326	-4.954
26	17348.7043	5.8657126E+00	-3.951	0.559	0.610
27	17723.4712	4.4387816E+00	9.542	-8.084	6.442
28	17723.4712	-1.7939856E+00	-1.990	-1.184	1.496
29	17844.1355	-9.8852036E-01	-0.417	-0.031	0.550
30	17844.1355	-1.1620166E+00	0.049	0.422	-0.747
31	18360.8346	5.0574196E+00	-1.406	0.301	-1.506
32	18360.8346	5.1189196E+00	-0.842	0.447	-1.257
33	18888.0196	-1.8890186E+00	0.324	1.132	-2.492
34	18888.0196	1.7295116E+00	-0.746	-0.112	1.597
35	19046.4985	-3.5934336E+00	5.943	-5.298	-7.559
36	19046.4985	3.8417646E+00	-6.274	-3.544	3.195
37	19811.8222	-8.9718886E-01	0.810	0.780	0.544
38	19811.8222	-1.9151786E+00	2.531	2.324	2.027
39	19947.6711	2.8833866E-01	-0.153	0.177	0.027
40	19947.6711	-2.4906326E+00	2.485	0.850	1.378
41	20413.9234	-7.8472896E-01	-0.012	0.103	0.336
42	20413.9234	-7.2265736E+00	1.886	0.748	-2.229
43	20804.2238	-2.1582446E+00	-0.252	0.290	0.151
44	20804.2238	-6.1753146E+00	0.080	0.025	-0.787
45	21137.2761	-2.4388286E+00	0.001	-0.041	-1.987
46	21137.2761	-1.2764856E+00	-0.821	-0.378	-0.574

47	21403.3027	6.0137186E+00	1.272	1.883	-1.535
48	21403.3027	6.2850836E+00	2.818	-1.201	-0.815

1Load Case (27) Load Modal Participation Factors
0

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
49	22128.6713	1.4895066E+00	1.394	-0.553	-1.422
50	22128.6713	1.9405216E+00	0.873	1.366	0.866
51	22657.8837	2.7861036E+00	-1.468	-0.187	0.176
52	22657.8837	-5.6379336E-01	-0.108	0.204	-0.039
53	22966.9970	3.3124866E+00	3.283	-0.328	-1.491
54	22966.9970	-9.7856696E-01	-0.283	0.328	-0.570
55	23166.9038	-4.7736176E+00	3.308	-0.804	-4.315
56	23166.9038	1.2240666E+00	-0.384	-0.691	-0.882
57	23670.6022	2.7884706E+00	-0.833	0.102	4.539
58	23670.6022	-4.3137176E+00	0.788	-2.088	4.015
59	24290.3622	-1.7858886E+00	0.764	-0.888	-0.336
60	24290.3622	-3.2134816E+00	1.120	1.106	-1.104
61	24697.6459	-5.6981916E+00	2.258	-1.121	0.447
62	24697.6459	-1.8348886E+00	-0.024	0.863	-0.843
63	24911.6805	-1.8837216E+00	0.184	-0.838	-0.063
64	24911.6805	7.4887716E-02	0.039	0.012	0.006
65	25014.3813	-8.4850006E-02	-0.023	0.011	0.041
66	25014.3813	3.8341146E+00	0.355	0.838	0.195
67	25229.1127	1.6856446E-01	-0.002	-0.008	0.028
68	25229.1127	1.3780446E+00	0.179	-0.339	-0.519
69	25369.5374	-5.0460106E+00	2.008	1.217	-2.207
70	25369.5374	1.4858336E+00	-0.707	0.578	-0.491
71	25737.9852	-2.6788206E+00	-3.328	0.859	0.336
72	25737.9852	-6.0887206E+00	-0.091	7.974	-1.233
73	27154.7875	8.5348286E-02	0.004	-0.015	0.049
74	27154.7875	-1.1838876E+00	-0.087	-0.008	0.006
75	27736.6385	1.3887746E+00	-0.808	0.278	0.214
76	27736.6385	2.4447866E+00	0.127	1.431	0.209
77	28017.9851	3.8322116E+00	5.190	2.776	0.844
78	28017.9851	-2.1870146E-01	0.296	-0.312	-0.092
79	28237.2856	-7.1074886E-01	1.287	-0.532	-0.166
80	28237.2856	7.5858606E-02	0.027	0.105	0.006
81	28828.7957	1.1764486E+00	0.484	0.248	-0.288
82	28828.7957	5.3256286E-01	-0.118	0.250	0.184
83	29132.8701	1.2415486E+00	-0.242	0.445	0.173
84	29132.8701	-4.8003186E-01	0.198	0.039	0.067
85	29427.9851	8.0872326E-01	0.484	-0.296	-0.465
86	29427.9851	1.8406146E+00	0.067	0.711	-0.412
87	29761.8522	9.1585806E-01	-0.237	0.765	0.138
88	29761.8522	3.7974126E+00	-2.387	0.855	1.743
89	29994.8239	-4.1994516E-01	-0.040	-0.107	-0.292
90	29994.8239	-4.2948536E+00	2.569	-0.848	-0.183
91	30107.3079	1.5369306E+00	-1.080	-0.848	-0.183
92	30107.3079	1.2981326E+00	-0.532	-0.167	-0.217
93	30492.9854	1.9848426E+00	-0.849	1.108	-0.661
94	30492.9854	-1.3412866E+00	-2.215	0.329	0.534
95	30681.7471	1.6940386E-01	0.088	-0.088	0.004

96	30881.7471	2.331294E-01	0.056	0.171	0.067

1Load Case (27) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
97	31099.4621	2.211757E+00	-0.630	0.078	-0.114
98	31099.4621	-7.879206E-02	-0.024	0.019	0.025
99	31271.7721	-1.552711E+00	0.039	0.183	0.179
100	31271.7721	-2.054134E+00	0.111	0.166	0.135
101	31825.2777	1.733214E-02	-0.007	0.008	0.006
102	31825.2780	-1.797787E+00	0.233	-0.830	-0.524
103	31971.4483	2.240405E+00	0.068	-0.078	-0.180
104	31971.4491	-1.729766E+00	0.287	0.424	0.201
105	43040.6589	-2.088963E+01	-0.835	2.803	1.706
106	43040.6785	-2.521247E+01	1.351	5.809	4.646
107	44806.0073	2.082765E+01	1.067	0.503	-0.487
108	44806.1258	3.194590E+01	2.134	-1.084	-0.451
109	45788.6728	1.500165E+01	-0.284	-1.554	-0.736
110	45788.7998	-1.619146E+01	0.715	0.241	-0.044
111	47748.8967	5.331180E+00	0.838	-1.423	-0.185
112	47749.2386	-2.053804E+01	5.578	3.411	-0.594
	Sum of Modal Physical Loads		22.214	23.690	-11.326
0	Resultant of Applied Load		23.795	27.788	-16.459
	Unscaled Applied Load		2.978475E-01	2.778768E-01	-1.645695E-01

1Load Case (28) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
1	2108.7961	1.938823E-01	0.155	0.030	1.306
2	2108.7961	-3.534348E+00	0.285	-3.430	-14.509
3	4206.7368	-3.401003E+00	-9.302	26.152	-2.042
4	4206.7368	4.049547E+00	28.184	5.554	0.915
5	6703.5061	-1.597681E+00	0.198	-0.260	-1.894
6	6703.5061	4.071638E+00	0.438	0.660	-2.121
7	7745.5701	2.366891E+00	2.283	-3.736	-11.889
8	7745.5701	-2.742348E+00	-0.189	-4.001	8.191
9	9115.8478	5.736252E+00	-10.559	-20.624	3.856
10	9115.8478	1.767724E+00	4.341	3.748	-0.590
11	9277.8146	3.397662E+00	-0.985	-0.203	1.956
12	9277.8146	4.023197E+00	1.755	2.489	0.180
13	10488.2463	-1.281317E+00	-3.826	-1.210	-0.076
14	10488.2463	5.880416E-01	0.282	0.270	-0.073
15	11846.3505	4.376454E-01	0.350	0.159	-0.345
16	11846.3505	5.883000E-01	0.382	0.361	0.299
17	13167.1228	-2.888732E+00	0.114	0.878	-4.890
18	13167.1228	-3.256981E+00	1.678	-1.165	13.291
19	13714.6429	-3.727309E+00	0.804	1.583	2.117
20	13714.6429	-4.486591E+00	1.692	-0.804	3.502
21	13985.8388	-1.436636E+00	-0.237	-0.014	0.763
22	13985.8388	-8.343791E+00	-0.087	0.253	-4.074

23	15803.7063	3.300083E-01	-0.080	0.080	-0.084
24	15803.7063	2.358341E+00	0.610	-0.080	1.447
25	17348.7043	-2.487584E+00	0.428	-0.887	2.104
26	17348.7043	-1.018685E+01	8.572	-0.972	-1.061
27	17723.4712	2.806348E-01	0.603	-0.511	0.407
28	17723.4712	-9.023084E-02	-0.100	-0.058	0.075
29	17944.1365	3.148970E+00	1.987	0.101	-1.781
30	17944.1365	4.062670E-01	-0.017	-0.185	0.086
31	18380.8348	1.015439E+00	-0.282	0.080	-0.302
32	18380.8348	5.886110E+00	-0.600	0.515	-1.442
33	18888.0196	-1.878888E+00	0.322	1.125	-2.476
34	18888.0196	-1.150984E+00	0.498	0.076	-1.067
35	19046.4885	-1.129697E+00	1.898	-1.664	-2.374
36	19046.4885	-2.158135E+00	3.700	2.101	-1.894
37	19611.8222	-2.116739E+00	1.928	-1.883	1.283
38	19611.8222	-2.914639E+00	3.851	3.536	3.085
39	19847.6711	-1.981016E+00	1.062	-1.214	-0.183
40	19847.6711	-1.185109E+00	1.212	0.414	0.872
41	20413.9234	-4.483160E+00	-0.073	0.804	1.884
42	20413.9234	-4.080810E+00	1.060	0.421	-1.249
43	20804.2238	5.854778E-02	0.007	-0.006	-0.004
44	20804.2238	5.165018E+00	-0.198	-0.033	1.038
45	21137.2761	-2.357350E+00	0.001	0.040	-1.032
46	21137.2761	-2.788958E+00	-1.786	-0.827	-1.284
47	21403.3027	-5.882428E+00	-1.204	-1.674	1.453
48	21403.3027	-7.840768E-01	-0.352	0.237	0.114

1Load Case (28) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
49	22128.6713	6.014008E+00	5.690	-2.233	-5.743
50	22128.6713	1.284380E+00	0.568	0.883	0.557
51	22657.8837	-3.358647E+00	1.782	0.927	-0.912
52	22657.8837	-4.420452E-02	-0.009	0.016	-0.003
53	22986.9970	3.626328E+00	3.486	-0.357	-1.837
54	22986.9970	-1.583548E+00	-0.412	1.287	-0.833
55	23155.8038	2.649071E+00	-1.636	0.802	2.384
56	23155.8038	5.657703E+00	-1.744	-4.041	-3.140
57	23570.6022	-7.614621E-01	0.172	-0.028	-1.232
58	23570.6022	2.278858E+00	-0.288	1.103	-2.121
59	24230.3622	4.002488E+00	-1.748	1.280	0.748
60	24230.3622	2.690028E+00	-1.022	-1.008	1.007
61	24587.8469	1.834044E+00	-0.780	0.387	-0.155
62	24587.8469	1.087834E+00	0.014	-0.847	0.388
63	24811.8905	-1.342424E+00	0.111	-0.481	-0.398
64	24811.8905	1.722108E+00	0.892	0.283	0.113
65	26014.3613	2.175847E+00	0.598	-0.280	-1.088
66	26014.3613	-2.462888E+00	-0.281	-0.816	-0.871
67	26229.1127	4.005882E+00	-1.982	-0.178	0.897
68	26229.1127	6.902228E-01	0.082	-0.165	-0.238
69	26369.5374	5.419452E+00	-2.181	-1.910	2.378
70	26369.5374	2.880484E+00	-1.246	1.126	-0.861
71	26737.8882	4.538868E+00	5.842	-1.184	-0.803

72	26737.9862	-8.277823E-01	-0.009	0.829	-0.128
73	27154.7876	-1.088296E+00	-0.053	0.189	-0.829
74	27154.7876	3.080728E+00	0.231	0.092	-0.017
75	27736.6385	1.403396E+00	-0.811	0.280	0.214
76	27736.6385	2.067056E+00	0.108	1.204	0.176
77	28017.9851	-1.012367E+00	-1.371	-0.733	-0.248
78	28017.9851	1.176191E+00	-1.592	1.680	0.170
79	28237.2558	1.282943E+00	-2.271	0.945	0.300
80	28237.2558	4.529441E+00	1.610	6.292	0.349
81	28428.7857	1.134738E+00	0.449	0.237	-0.390
82	28428.7857	-1.897078E+00	-0.888	-0.885	-0.630
83	29132.9701	4.183937E-01	-0.082	0.148	0.059
84	29132.9701	-1.342365E+00	0.549	0.110	0.190
85	29427.9851	-2.807559E+00	-1.485	0.954	1.478
86	29427.9851	-1.081618E+00	-0.056	-0.480	0.265
87	29761.8522	2.388322E-01	-0.062	0.197	0.036
88	29761.8522	-2.868843E+00	1.804	-0.852	-1.317
89	29884.8338	1.282811E+00	0.118	0.321	0.880
90	29884.8338	-3.781988E+00	2.262	-0.745	-0.134
91	30107.3079	1.233609E-01	-0.085	-0.013	-0.017
92	30107.3079	-5.512739E-01	0.224	-0.474	0.036
93	30482.9864	1.588171E+00	-0.788	0.282	0.418
94	30482.9864	2.040482E+00	3.469	-1.341	0.538
95	30861.7471	-4.919926E+00	-2.553	2.899	-0.108
96	30861.7471	1.298956E+00	0.312	0.955	0.484

1Load Case (28) Load Modal Participation Factors

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Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
97	31099.4621	-2.571052E+00	0.733	-0.090	0.132
98	31099.4621	6.966701E-01	0.209	-0.170	-0.218
99	31271.7721	4.836448E+00	-0.123	-0.519	-0.588
100	31271.7721	4.070037E+00	-0.222	-0.343	-0.250
101	31825.2777	7.947970E-01	-0.318	0.396	0.228
102	31825.2780	-3.633150E+00	0.471	-1.677	-1.068
103	31871.4463	-4.037413E+00	-0.105	0.140	0.324
104	31871.4472	-8.132901E-01	0.162	0.241	0.115
105	43040.5589	-1.476163E+01	-0.588	1.833	1.201
106	43040.6765	-8.316616E+00	0.446	1.916	1.633
107	44806.0973	2.338781E+01	1.199	0.565	-0.559
108	44806.1258	1.008379E+01	0.674	-0.343	-0.196
109	45788.6728	-1.238107E+01	0.234	1.282	0.807
110	45788.7998	3.880466E+00	-1.826	-0.615	0.112
111	47748.8867	8.886440E+00	1.367	-2.321	-0.270
112	47749.2386	2.806403E+01	-7.822	-4.681	0.811
	Sum of Modal Physical Loads		39.918	8.485	-16.090
0	Resultant of Applied Load		39.727	8.313	-16.616
	Unscaled Applied Load		3.97272E-01	9.31337E-02	-1.66160E-01

1Load Case (29) Load Modal Participation Factors

0

Mode	Participation	Physical Load in Each Mode — Global X Direction	Global Y Direction	Global Z Direction

Number	Frequency	Factor	X 1.0E+02	X 1.0E+02	X 1.0E+02
1	2108.7981	1.137673E+00	0.909	0.174	7.669
2	2108.7981	-3.632904E+00	0.293	-3.525	-14.814
3	4206.7368	-4.777880E+00	-13.068	35.739	-2.868
4	4206.7368	3.311485E+00	29.885	4.541	0.748
5	6703.5061	-5.642684E+00	0.388	-1.328	-6.761
6	6703.5061	-4.163888E+01	-0.038	-0.056	0.244
7	7745.5701	3.015099E+00	2.908	-4.760	-15.126
8	7745.5701	-1.907555E+00	-0.123	-2.914	5.988
9	9115.8478	5.642883E+00	-10.838	-21.366	3.894
10	9115.8478	-2.075137E-01	-0.510	-0.440	0.086
11	9277.8146	-5.591361E+00	1.621	0.333	-3.219
12	9277.8146	2.372682E+00	1.036	1.468	0.196
13	10488.3463	-1.240078E+00	-3.818	-1.162	-0.072
14	10488.3463	-7.890291E-01	-0.365	-0.378	0.101
15	11946.3605	1.011661E+00	0.809	0.368	-0.788
16	11946.3605	1.388673E+00	0.857	0.839	0.824
17	13167.1228	-5.600377E-01	0.023	0.178	-1.005
18	13167.1228	-3.329228E+00	1.420	-0.977	11.220
19	13714.6429	-8.535043E+00	1.409	2.739	3.711
20	13714.6429	5.228184E+00	-2.171	1.031	-4.491
21	13885.9388	5.441488E-01	0.090	0.006	-0.286
22	13885.9388	9.136066E+00	0.085	-0.277	4.461
23	15803.7053	-1.219078E+00	0.293	-0.283	0.310
24	15803.7053	5.673124E-02	0.015	-0.001	0.036
25	17348.7043	-3.332208E+00	0.579	-1.336	2.827
26	17348.7043	1.088944E+00	-0.736	0.104	0.113
27	17723.4712	-7.461763E-01	-1.602	1.357	-1.082
28	17723.4712	2.087283E+00	2.283	1.341	-1.711
29	17844.1355	3.042253E+00	1.312	0.088	-1.732
30	17844.1355	-9.283673E-01	0.038	0.353	-0.197
31	18360.8346	-4.729536E+00	1.315	-0.281	1.408
32	18360.8346	6.447385E+00	1.080	0.583	-1.583
33	19688.0196	-6.243422E+00	1.071	3.741	-8.238
34	19688.0196	5.188891E+00	-2.248	-0.343	4.807
35	19946.4985	-1.892221E+00	2.799	-2.496	-3.580
36	19946.4985	1.304638E-01	-0.226	-0.127	0.114
37	19911.8222	-4.389885E+00	3.849	-3.844	2.881
38	19911.8222	-1.817159E+00	2.401	-2.206	1.833
39	19947.6711	-1.452228E-02	0.006	-0.008	-0.001
40	19947.6711	4.010428E+00	-4.101	-1.403	-2.277
41	20413.9294	1.542857E+00	0.026	-0.209	-0.678
42	20413.9294	5.106147E+00	-1.339	-0.529	1.571
43	20804.2238	4.336417E+00	0.507	-0.833	-0.303
44	20804.2238	1.385853E+00	-0.018	-0.266	0.173
45	21137.2781	4.764239E-01	0.000	-0.000	0.807
46	21137.2781	3.881916E+00	2.562	1.180	-1.789
47	21403.3027	3.038192E+00	0.843	0.840	-0.776
48	21403.3027	8.132626E+00	3.847	-2.480	-1.183

1Load Case (29) Load Modal Participation Factors

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Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02

48	22128.6713	5.8284805E+00	5.457	-2.184	-5.596
50	22128.6713	1.0477068E-01	0.047	0.073	0.048
51	22667.8837	-2.7694365E+00	1.470	0.187	-0.176
52	22667.8837	-9.4901398E-01	-0.183	0.344	-0.066
53	22866.9870	1.6898421E+00	1.662	-0.201	-0.891
54	22866.9870	-2.6808476E+00	-0.618	2.185	-1.552
55	23155.8038	-4.3229106E-01	0.300	-0.082	-0.381
56	23155.8038	-1.7962416E+00	0.564	1.306	1.015
57	23570.5022	-1.7393726E+00	0.398	-0.094	-2.851
58	23570.5022	-2.2634345E+00	0.297	-1.096	2.108
59	24230.3622	6.6449046E+00	-2.901	2.091	1.238
60	24230.3622	-3.2726396E+00	1.141	1.126	-1.125
61	24697.6459	-3.7261856E+00	1.503	-0.746	0.299
62	24697.6459	1.0130046E+00	0.013	-0.534	0.359
63	24911.9906	-5.1535416E+00	0.426	-1.784	-1.529
64	24911.9906	2.9562096E+00	1.531	0.486	0.194
65	26014.3613	-4.7748316E+00	-1.315	0.615	2.281
66	26014.3613	1.2112086E+00	0.129	0.304	0.430
67	26229.1127	2.3728176E+00	-0.901	-0.086	0.406
68	26229.1127	1.6673466E+00	0.217	-0.410	-0.829
69	26369.5374	2.6856126E+00	-1.071	-0.850	1.178
70	26369.5374	-1.1848116E+00	0.576	-0.472	0.400
71	26737.9662	3.2793726E+00	4.323	-0.856	-0.436
72	26737.9662	-5.6857616E+00	-0.089	7.774	-1.202
73	27154.7876	-4.0583586E+00	-0.196	0.899	-2.324
74	27154.7876	3.0586906E+00	0.249	0.026	-0.020
75	27736.6385	4.0574846E-02	0.273	0.008	0.008
76	27736.6385	-3.8907086E-01	-0.020	-0.228	-0.033
77	28017.9851	2.2892206E+00	3.113	1.665	0.586
78	28017.9851	3.4801286E-01	-0.468	0.494	0.050
79	28237.2556	-1.8927916E+00	3.350	-1.393	-0.442
80	28237.2556	2.1903886E+00	0.779	3.043	0.169
81	28428.7857	-3.8341026E-01	-0.151	-0.080	0.088
82	28428.7857	2.3867486E+00	-0.844	1.119	-0.744
83	29132.8701	1.9891126E+00	-0.391	0.709	0.277
84	29132.8701	-3.4899856E-01	0.143	0.029	0.042
85	29427.9851	1.1873326E+00	0.667	-0.435	-0.873
86	29427.9851	-1.1402216E+00	-0.651	-0.494	0.286
87	29761.8522	3.9844976E+00	-1.004	3.194	0.576
88	29761.8522	1.7961446E+00	-1.129	0.408	0.825
89	29894.8338	-2.8820176E+00	-0.271	-0.727	-2.018
90	29894.8338	-6.5225546E+00	3.901	-1.285	-0.292
91	30107.3079	-3.0679636E+00	2.112	0.333	0.433
92	30107.3079	-2.4373906E+00	0.991	-2.097	0.164
93	30482.9854	1.3308276E+00	-0.880	0.219	0.350
94	30482.9854	-1.0307446E+00	-1.702	0.878	-0.772
95	30861.7471	1.0250136E+00	0.532	-0.598	0.023
96	30861.7471	-7.8276876E-01	-0.188	-0.576	-0.292

1Load Case (29) Load Modal Participation Factors

0

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02

97	31098.4821	2.4850416E+00	-0.703	0.086	-0.127
98	31098.4821	-5.6228436E-01	-0.188	0.137	0.126
99	31271.7721	-1.5168186E+00	0.038	0.169	0.176
100	31271.7721	3.0888746E+00	-0.169	-0.253	-0.190
101	31825.2777	1.7066856E+00	-0.683	0.787	0.490
102	31825.2780	-2.0562436E+00	0.267	-0.949	-0.599
103	31971.4483	-3.5086506E+00	-0.099	0.132	0.306
104	31971.4474	-1.2129176E+00	0.188	0.298	0.142
105	43040.5569	-2.9782116E+01	-1.186	3.897	2.422
106	43040.6765	-1.1220106E+01	0.891	2.535	2.065
107	44806.0073	-2.5878106E+01	-1.331	-0.827	0.850
108	44806.1258	-1.8734836E+01	-1.118	0.686	0.241
109	45788.6728	-2.8111436E+01	0.532	2.811	1.378
110	45788.7288	-9.3184416E-02	0.004	0.001	0.000
111	47748.8887	2.6191526E+01	4.118	-6.892	-0.813
112	47749.2386	-1.6364956E+01	4.442	2.717	-0.473
	Sum of Modal Physical Loads		45.714	25.277	-15.204
0	Resultant of Applied Load		58.696	21.165	-17.825
	Unscaled Applied Load		3.8886TE-01	2.11545E-01	-1.78228E-01

1Load Case (30) Load Modal Participation Factors

0

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
1	2108.7861	-8.2710686E-01	-0.681	-0.126	-5.575
2	2108.7861	-3.6774956E+00	0.295	-3.568	-15.097
3	4206.7388	-2.3298716E+00	-8.373	17.916	-1.399
4	4206.7388	5.1673426E+00	37.166	7.073	1.165
5	6703.5061	4.4453736E+00	-0.319	1.066	5.422
6	6703.5061	3.0588666E+00	0.278	0.412	-1.789
7	7745.5701	1.8984176E+00	1.820	-2.978	-8.484
8	7745.5701	-3.3650976E+00	-0.208	-4.909	10.951
9	9115.8478	4.1834206E+00	-7.718	-15.077	2.519
10	9115.8478	3.8597956E+00	9.478	8.185	-1.223
11	9277.8146	2.2810126E+00	-0.858	-0.135	1.902
12	9277.8146	-5.8218826E+00	-2.552	-3.884	-0.295
13	10498.2483	-9.1430486E-01	-2.198	-0.670	-0.021
14	10498.2483	2.8854186E-01	0.134	0.138	-0.037
15	11848.3505	8.8498876E-01	0.707	0.322	-0.698
16	11848.3505	-8.1487486E-01	-0.529	-0.560	-0.332
17	13167.1228	-3.3078526E+00	0.142	1.098	-6.163
18	13167.1228	-2.4342606E+00	1.033	-0.711	8.182
19	13714.8429	2.3688836E+00	-0.511	-0.983	-1.348
20	13714.8429	-8.1868476E+00	2.348	-1.115	4.861
21	13995.9388	5.2116856E+00	0.961	0.063	-2.733
22	13995.9388	9.2237646E+00	0.088	-0.280	4.604
23	15803.7063	8.1888296E-01	-0.198	0.187	-0.209
24	15803.7063	8.7515886E-01	0.175	-0.017	0.414
25	17348.7043	3.9768776E+00	-0.647	1.954	-2.884
26	17348.7043	-4.3009886E-02	0.029	-0.004	-0.004
27	17723.4712	3.3871616E+00	7.228	-8.132	4.887
28	17723.4712	-1.7998476E+00	-1.593	-1.136	1.436
29	17842.1355	-4.4370586E+00	-1.913	-0.143	2.528

30	17944.1365	-2.280015E+00	0.093	0.861	-0.481
31	18360.8346	-6.382038E-01	0.177	-0.038	0.190
32	18360.8346	-5.979627E+00	0.983	-0.523	1.468
33	19688.0196	-4.054104E-01	0.070	0.243	-0.536
34	19688.0196	-2.573005E+00	1.114	0.170	-2.384
35	19046.4985	-4.146239E+00	6.857	-6.114	-8.722
36	19046.4985	-7.248073E+00	12.487	7.054	-6.358
37	19611.8222	-2.493897E+00	2.273	-2.196	1.513
38	19611.8222	1.081113E+00	-1.402	-1.287	-1.123
39	19947.6711	-2.879482E+00	1.581	-1.825	-0.276
40	19947.6711	-4.831029E+00	5.042	1.725	2.795
41	20413.9234	2.348336E+00	0.038	-0.317	-1.033
42	20413.9234	3.236413E+00	-0.844	-0.335	0.995
43	20804.2238	-9.845896E-01	-0.115	0.132	0.069
44	20804.2238	-7.509074E+00	0.098	0.031	-0.957
45	21137.2761	-4.812946E+00	0.003	0.082	-2.106
46	21137.2761	-2.547863E+00	-1.839	-0.755	-1.145
47	21403.3027	-4.898828E+00	-1.057	-1.382	1.276
48	21403.3027	-4.801027E+00	-2.153	1.452	0.899

1Load Case (30) Load Modal Participation Factors
0

Mode Number	Frequency	Participation Factor	/------- Physical Load in Each Mode -------/ Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
49	22128.8713	-1.721017E+00	-1.611	0.639	1.644
50	22128.8713	1.072555E+00	0.483	0.749	0.472
51	22657.8837	1.349156E+00	-0.716	-0.091	0.085
52	22657.8837	1.358727E+00	0.261	-0.492	0.095
53	22986.9970	3.987910E+00	3.952	-0.404	-1.795
54	22986.9970	-4.317692E+00	-1.116	3.614	-2.518
55	23155.8038	-3.727358E+00	2.583	-0.706	-3.369
56	23155.8038	3.655083E+00	-1.147	-2.858	-2.065
57	23570.5022	2.286339E+00	-0.523	0.094	3.748
58	23570.5022	-3.518377E-01	0.046	-0.170	0.327
59	24230.3522	-2.523699E+00	1.102	-0.794	-0.470
60	24230.3522	-2.228876E-01	0.078	0.077	-0.077
61	24897.8459	1.844484E+00	-0.744	0.369	-0.147
62	24897.8459	-2.984220E+00	-0.039	1.694	-1.062
63	24911.9906	2.593083E+00	-0.215	0.888	0.769
64	24911.9906	-7.374700E-01	-0.382	-0.121	-0.048
65	26014.3813	3.978275E+00	1.096	-0.512	-1.899
66	26014.3813	1.986441E+00	0.211	0.498	0.705
67	26229.1127	4.353698E+00	-1.653	-0.159	0.743
68	26229.1127	-1.096449E+00	-0.142	0.270	0.413
69	26369.5374	2.787911E+00	-1.112	-0.674	1.222
70	26369.5374	9.402821E+00	-4.573	3.748	-3.177
71	26737.9862	-2.560883E+00	-3.377	0.689	0.341
72	26737.9862	2.019932E+00	0.030	-2.889	0.412
73	27154.7875	3.548241E+00	0.171	-0.611	2.032
74	27154.7875	3.385584E-01	0.025	0.002	-0.002
75	27736.6385	3.259225E+00	-1.883	0.650	0.498
76	27736.6385	1.989774E+00	0.097	1.094	0.160
77	28017.9851	-8.563761E-01	-1.180	-0.620	-0.211
78	28017.9851	2.627007E+00	-3.556	3.763	0.381

79	28237.2556	2.362957E+00	-4.182	1.740	0.552
80	28237.2556	1.145321E+00	0.407	1.591	0.088
81	28828.7957	4.017645E+00	1.586	0.838	-0.918
82	28828.7957	-2.849376E+00	1.008	-1.336	-0.876
83	29132.8701	-1.821967E+00	0.358	-0.650	-0.264
84	29132.8701	-2.573097E+00	1.053	0.210	0.306
85	29427.9851	-1.114310E+00	-0.626	0.408	0.632
86	29427.9851	-1.189790E-01	-0.006	-0.052	0.030
87	29761.8522	-3.665497E+00	0.952	-3.030	-0.546
88	29761.8522	-1.178920E+00	0.741	-0.288	-0.541
89	29994.8339	-9.243962E-01	-0.087	-0.236	-0.852
90	29994.8339	-9.191736E-02	0.066	-0.018	-0.003
91	30107.3079	-3.532898E+00	2.432	0.383	0.498
92	30107.3079	-2.693018E+00	1.096	-2.317	0.170
93	30492.9864	1.828450E+00	-0.906	0.301	0.480
94	30492.9864	3.236780E+00	5.343	-2.127	0.852
95	30881.7471	-5.445141E+00	-2.826	3.176	-0.120
96	30881.7471	1.699049E+00	0.409	1.260	0.633

1Load Case (30) Load Modal Participation Factors
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Mode Number	Frequency	Participation Factor	/------- Physical Load in Each Mode -------/ Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
97	31099.4621	-3.329766E+00	0.949	-0.117	0.172
98	31099.4621	-2.507861E-01	-0.075	0.061	0.079
99	31271.7721	1.700044E+00	-0.042	-0.179	-0.196
100	31271.7721	-2.886701E-01	0.016	0.024	0.018
101	31825.2777	-8.460443E-02	0.094	-0.039	-0.024
102	31825.2780	7.996573E-01	-0.103	0.306	0.231
103	31971.4463	-1.217112E+00	-0.032	0.042	0.098
104	31971.4474	-2.882097E-01	0.041	0.066	0.031
105	43040.5569	-3.180188E+01	-1.287	3.948	2.586
106	43040.8706	4.109843E+00	-0.220	-0.947	-0.757
107	44806.0073	-2.654769E+01	-1.390	-0.641	0.634
108	44806.1258	4.583284E+00	0.306	-0.155	-0.066
109	45788.6728	2.224940E+01	-0.421	-2.304	-1.090
110	45788.7998	-1.331715E+01	0.627	0.211	-0.038
111	47748.8967	-1.273223E+01	-2.002	3.399	0.395
112	47749.2396	3.304819E+01	-8.976	-5.489	0.966
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	Sum of Modal Physical Loads		39.496	-1.367	-17.278
0	Resultant of Applied Load		44.080	-0.366	-18.491
	Unscaled Applied Load		4.408025E-01	-3.555366E-03	-1.849136E-01

1Load Case (31) Load Modal Participation Factors
0

Mode Number	Frequency	Participation Factor	/------- Physical Load in Each Mode -------/ Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
1	2108.7981	-2.940215E+00	-2.349	-0.449	-19.819
2	2108.7981	-1.806012E+00	0.164	-1.851	-7.833
3	4206.7368	1.816584E+00	5.242	-14.737	1.151
4	4206.7368	4.957853E+00	35.728	6.799	1.120
5	6703.5051	4.837233E+00	-0.347	1.159	5.900

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6	6703.5051	-1.213467E+00	-0.110	-0.164	0.710
7	7745.5701	-5.314944E-01	-0.513	0.439	2.886
8	7745.5701	-3.488406E+00	-0.214	-5.060	10.359
9	9115.8478	7.239360E-01	-1.333	-2.903	0.487
10	9115.8478	4.135280E+00	10.154	8.709	-1.310
11	9277.8146	-8.764504E+00	1.959	0.403	-3.889
12	9277.8146	9.662907E-01	0.490	0.810	0.044
13	10498.2483	-5.891017E-01	-1.762	-0.833	-0.033
14	10498.2483	1.498976E+00	0.694	0.715	-0.183
15	11846.3505	1.758740E+00	1.406	0.940	-1.387
16	11846.3505	-7.481918E-01	-0.494	-0.458	-0.341
17	13167.1228	-4.817824E+00	0.203	1.568	-8.802
18	13167.1228	-3.301517E-01	0.141	-0.097	1.112
19	13714.6429	3.890489E+00	-0.859	-1.669	-2.261
20	13714.6429	-1.572874E+00	0.595	-0.283	1.233
21	13965.9388	-8.701883E+00	-1.438	-0.086	4.584
22	13965.9388	-2.175479E+00	-0.023	0.066	-1.062
23	15803.7063	5.265828E-01	-0.152	0.152	-0.181
24	15803.7063	1.732063E-01	0.045	-0.004	0.106
25	17348.7043	-5.855712E+00	1.018	-2.348	5.003
26	17348.7043	5.799579E+00	-3.912	0.553	0.804
27	17723.4712	1.793855E+00	3.857	-3.267	2.804
28	17723.4712	4.438781E+00	4.923	2.880	-3.875
29	17944.1355	1.162016E+00	0.501	0.037	-0.661
30	17944.1355	-9.665203E-01	0.040	0.368	-0.205
31	18360.8346	-5.118815E+00	1.424	-0.304	1.524
32	18360.8346	5.067419E+00	-0.832	0.442	-1.241
33	18688.0196	1.723511E+00	-0.296	-1.033	2.274
34	18688.0196	1.889018E+00	-0.818	-0.125	1.751
35	19046.4885	-3.941754E+00	6.023	-5.971	-7.881
36	19046.4885	-3.593433E+00	6.191	3.497	-3.162
37	19611.8222	1.915176E+00	-1.745	1.686	-1.182
38	19611.8222	-8.971989E-01	1.186	1.089	0.950
39	19947.6711	2.430532E+00	-1.290	1.489	0.225
40	19947.6711	2.893386E-01	-0.295	-0.101	-0.163
41	20413.9234	-7.226573E+00	-0.118	0.977	3.179
42	20413.9234	7.647290E-01	-0.200	-0.079	0.235
43	20804.2238	6.175314E+00	0.722	-0.831	-0.431
44	20804.2238	-2.158244E+00	0.028	0.009	-0.776
45	21137.2781	1.278485E+00	-0.001	-0.022	0.559
46	21137.2781	-2.438829E+00	-1.589	-0.723	-1.096
47	21403.3027	5.265093E+00	1.330	1.738	-1.804
48	21403.3027	-6.013718E+00	-2.897	1.819	0.875

1Load Case (31) Load Modal Participation Factors
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Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
49	22128.6713	-1.940821E+00	-1.817	0.721	1.853
50	22128.6713	1.485606E+00	0.670	1.041	0.855
51	22857.8837	5.637933E-01	-0.299	-0.038	0.036
52	22857.8837	2.766103E+00	0.532	-1.001	0.184
53	22986.9870	-1.765585E-01	-0.068	0.099	-0.449
54	22986.9870	-3.312488E+00	-0.856	2.896	-1.832

55	23155.8038	-1.224886E+00	0.849	-0.232	-1.107
56	23155.8038	-4.773587E+00	1.498	3.471	2.887
57	23570.5022	-4.313717E+00	0.986	-0.158	-7.072
58	23570.5022	-2.768470E+00	0.363	-1.340	2.577
59	24230.3522	3.212481E+00	-1.403	1.011	0.599
60	24230.3522	-1.795858E+00	0.626	0.618	-0.617
61	24897.6459	1.824883E+00	-0.736	0.385	-0.146
62	24897.6459	-5.596191E+00	-0.074	2.953	-1.988
63	24911.9905	7.482376E-02	-0.006	0.026	0.022
64	24911.9905	1.852288E+00	0.984	0.306	0.122
65	25014.3819	-3.336140E+00	-0.919	0.430	1.586
66	25014.3819	-9.453000E-02	-0.009	-0.021	-0.030
67	25229.1127	-1.278044E+00	0.523	0.060	-0.226
68	25229.1127	1.851164E-01	0.021	-0.040	0.083
69	25369.6374	1.451653E+00	-0.580	-0.362	0.637
70	25369.6374	5.026010E+00	-2.448	2.007	-1.701
71	25737.9862	-6.036728E+00	-7.990	1.576	0.803
72	25737.9862	2.522640E+00	0.038	-3.333	0.515
73	27154.7876	1.165687E+00	0.066	-0.200	0.688
74	27154.7876	8.534823E-02	0.006	0.001	0.000
75	27736.6385	2.444798E+00	-1.412	0.488	0.379
76	27736.6385	-1.386774E+00	-0.072	-0.819	-0.120
77	28017.9851	2.197014E-01	0.296	0.158	0.062
78	28017.9851	3.832211E+00	-5.188	5.474	0.585
79	28237.2556	7.555880E-02	-0.134	0.058	0.019
80	28237.2556	-7.100488E-01	0.253	0.217	0.053
81	28828.7957	-6.342423E-01	-0.210	-0.111	0.122
82	28828.7957	1.176448E+00	-0.416	0.551	0.361
83	29132.8701	4.800316E-01	-0.094	0.171	0.067
84	29132.8701	1.241344E+00	-0.505	-0.102	-0.145
85	29427.9851	-1.640614E+00	-0.922	0.600	-0.890
86	29427.9851	8.087232E-01	0.043	0.351	-0.203
87	29761.6522	-3.797412E+00	0.986	-3.139	-0.586
88	29761.6522	9.136372E-01	-0.574	0.208	0.413
89	29964.8339	4.294958E+00	0.406	1.060	3.021
90	29964.8339	-4.199461E-01	0.251	-0.083	-0.016
91	30107.3079	1.285139E+00	-0.885	-0.139	-0.181
92	30107.3079	-1.538983E+00	0.626	-1.328	0.987
93	30492.9854	-1.341240E+00	0.666	-0.221	-0.364
94	30492.9854	-1.994844E+00	-3.294	1.511	-0.538
95	30861.7471	2.331168E-01	0.121	-0.136	0.006
96	30861.7471	-1.694317E-01	-0.041	-0.126	-0.069

1Load Case (31) Load Modal Participation Factors
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Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
97	31099.4821	-7.887189E-02	0.022	-0.003	0.004
98	31099.4821	-2.211804E+00	-0.861	0.540	0.884
99	31271.7721	2.034006E+00	-0.051	-0.214	-0.224
100	31271.7721	-1.553770E+00	0.065	0.127	0.065
101	31825.2777	-1.797756E+00	0.719	-0.829	-0.517
102	31825.2777	-1.760914E-02	0.002	-0.008	-0.006
103	31971.4483	1.728210E+00	0.045	-0.060	-0.139

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104	31971.4474	2.240536E+00	-0.347	-0.550	-0.281
105	43040.5568	-2.520370E+01	-1.004	3.130	2.060
106	43040.5795	2.097061E+01	-1.124	-4.831	-3.886
107	44806.0073	3.194783E+01	1.637	0.771	-0.783
108	44806.1258	-2.082424E+01	-1.391	0.707	0.300
109	45788.8728	-1.518650E+01	0.288	1.574	0.745
110	45788.7998	-1.500958E+01	0.706	0.238	-0.043
111	47748.8967	-2.063716E+01	-3.229	5.482	0.637
112	47749.2386	-5.329815E+00	1.448	0.885	-0.154
	Sum of Modal Physical Loads		36.746	18.967	-18.202
0	Resultant of Applied Load		29.795	27.788	-16.458
	Unscaled Applied Load		2.97947E-01	2.77878E-01	-1.64595E-01

1Load Case (32) Load Modal Participation Factors

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Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
1	2108.7961	-3.534346E+00	-2.823	-0.540	-23.824
2	2108.7961	-1.936923E-01	0.016	-0.188	-0.795
3	4206.7368	4.049547E+00	11.076	-31.138	2.431
4	4206.7389	3.401003E+00	24.510	4.664	0.788
5	6703.5061	-4.821839E+00	0.346	-1.155	-5.881
6	6703.5061	-1.503591E+00	-0.137	-0.203	0.880
7	7745.5701	-2.742348E+00	-2.646	4.330	13.757
8	7745.5701	-2.366981E+00	-0.146	-3.452	7.087
9	9115.8478	-1.767724E+00	3.254	6.356	-1.188
10	9115.8478	5.736252E+00	14.085	12.184	-1.817
11	9277.8146	4.023197E+00	-1.187	-0.240	2.316
12	9277.8146	-3.397582E+00	-1.482	-2.102	-0.152
13	10498.2463	5.660416E-01	1.743	0.531	0.033
14	10498.2463	1.291317E+00	0.598	0.616	-0.186
15	11846.3505	5.883000E-01	0.470	0.214	-0.494
16	11846.3505	-4.376454E-01	-0.294	-0.289	-0.200
17	13167.1228	-3.935661E+00	0.166	1.291	-7.190
18	13167.1228	2.898732E+00	-1.150	0.792	-9.093
19	13714.6429	-4.498581E+00	0.963	1.873	2.537
20	13714.6429	3.727309E+00	-1.412	0.671	-2.892
21	13965.9388	-9.343791E+00	-1.379	-0.083	4.376
22	13965.9388	1.426636E+00	0.015	-0.044	0.702
23	15803.7063	2.368341E+00	-0.569	0.568	-0.802
24	15803.7063	-3.300083E-01	-0.085	0.008	-0.202
25	17348.7043	1.018685E+01	-1.771	4.084	-8.702
26	17348.7043	-2.482564E+00	1.861	-0.235	-0.257
27	17723.4712	9.028084E-02	0.194	-0.184	0.131
28	17723.4712	2.968348E-01	0.311	0.182	-0.232
29	17944.1355	-4.062670E-01	-0.175	-0.013	0.231
30	17944.1355	3.146920E+00	-0.129	-1.198	0.669
31	18380.8346	-5.896316E+00	1.840	-0.351	1.756
32	18380.8346	1.015436E+00	-0.167	0.089	-0.249
33	18688.0196	-1.150994E+00	0.197	0.690	-1.518
34	18688.0196	1.876898E+00	-0.813	-0.124	1.739
35	18046.4985	2.159136E+00	-3.571	3.184	-4.542
36	19046.4985	-1.128597E+00	1.944	1.098	-0.990

37	19811.8222	2.914839E+00	-2.956	2.586	-1.769
38	19811.8222	-2.115739E+00	2.706	2.567	2.239
39	19847.6711	1.185109E+00	-0.629	0.726	0.110
40	19847.6711	-1.981016E+00	2.028	0.693	1.123
41	20413.8234	-4.080810E+00	-0.066	0.549	1.786
42	20413.8234	4.493209E+00	-1.165	-0.462	1.373
43	20804.2238	-8.148016E+00	-0.952	1.096	0.569
44	20804.2238	5.954795E-02	-0.001	0.000	0.007
45	21137.2761	2.788858E+00	-0.002	-0.047	1.221
46	21137.2761	-2.357330E+00	-1.517	-0.698	-1.069
47	21403.3027	-7.840763E-01	-0.166	-0.217	0.260
48	21403.3027	5.692429E+00	2.553	-1.722	-0.828

1Load Case (32) Load Modal Participation Factors

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Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
49	22128.8713	-1.284380E+00	-1.184	0.489	1.207
50	22128.8713	8.014009E+00	2.706	4.202	2.649
51	22857.8837	4.490452E-02	-0.023	-0.003	0.003
52	22857.8837	-3.788417E+00	-0.846	1.218	-0.236
53	22958.9970	-1.199218E+00	-1.578	0.162	0.717
54	22958.9970	-3.098888E+00	-0.912	2.870	-2.057
55	23165.9038	-5.887703E+00	3.851	-1.052	-5.024
56	23165.9038	2.648871E+00	-0.831	-1.926	-1.467
57	23670.5022	2.278853E+00	-0.521	0.044	3.736
58	23670.5022	7.514621E-01	-0.099	0.384	-0.699
59	24230.3622	-2.990028E+00	1.278	-0.922	-0.646
60	24230.3622	4.002468E+00	-1.398	-1.177	1.178
61	24697.8459	-1.031934E+00	0.419	-0.208	0.083
62	24697.8459	1.934004E+00	0.026	-1.020	0.686
63	24911.9905	1.722162E+00	-0.142	0.590	0.511
64	24911.9905	1.340446E+00	0.897	0.221	0.088
65	26014.3613	2.452555E+00	0.675	-0.316	-1.171
66	26014.3613	2.173463E+00	0.231	0.546	0.772
67	26229.1127	-6.302255E-01	0.239	0.023	-0.108
68	26229.1127	4.903912E+00	0.637	-1.207	-1.849
69	26369.5374	2.850464E+00	-1.137	-0.688	1.248
70	26369.5374	-5.419452E+00	2.636	-2.190	1.831
71	26737.9662	-6.277823E-01	-0.828	0.184	0.084
72	26737.9662	-4.538858E+00	-0.068	0.992	-0.328
73	27154.7875	-3.080728E+00	-0.149	0.532	-1.770
74	27154.7875	-1.088288E+00	-0.082	-0.008	0.008
75	27736.6385	2.067053E+00	-1.188	0.410	0.314
76	27736.6385	-1.402396E+00	-0.073	-0.821	-0.120
77	28017.9851	-1.176171E+00	-1.593	-0.852	-0.280
78	28017.9851	-1.012357E+00	1.370	-1.446	-0.147
79	28237.2886	4.529441E+00	-8.014	3.334	1.057
80	28237.2886	-1.262843E+00	-0.458	-1.312	-0.089
81	28828.7857	1.897078E+00	0.746	0.383	-0.431
82	28828.7857	1.136738E+00	-0.402	0.633	0.349
83	29132.8701	1.342385E+00	-0.284	0.478	0.187
84	29132.8701	4.163437E-01	-0.179	-0.094	-0.060
85	29427.5861	1.061518E+00	0.596	-0.388	-0.602

86	29427.9851	-2.607559E+00	-0.138	-1.131	0.654
87	29761.8522	2.869643E+00	-0.745	2.372	0.427
88	29761.8522	2.389321E-01	-0.160	0.054	0.110
89	29994.8339	3.781968E+00	0.358	0.980	2.666
90	29994.8339	1.282911E+00	-0.765	0.249	0.045
91	30107.3079	-5.512701E-01	0.380	0.080	0.078
92	30107.3079	-1.233847E-01	0.050	-0.106	0.008
93	30492.9954	2.040497E+00	-1.012	0.336	0.536
94	30492.9954	-1.589183E+00	-2.624	1.045	-0.419
95	30861.7471	1.288836E+00	0.674	-0.757	0.029
96	30861.7471	4.919018E+00	1.183	3.618	1.833

1Load Case (32) Load Modal Participation Factors

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Mode Number	Frequency	Participation Factor	Physical Load in Each Mode - Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
97	31099.4621	6.965507E-01	-0.198	0.024	-0.036
98	31099.4621	2.571017E+00	0.769	-0.628	-0.807
99	31271.7721	-4.070044E+00	0.102	0.428	0.469
100	31271.7721	4.936467E+00	-0.270	-0.404	-0.303
101	31825.2777	-3.633402E+00	1.454	-1.675	-1.044
102	31825.2780	-7.945730E-01	0.103	-0.367	-0.231
103	31971.4463	9.834126E-01	0.025	-0.034	-0.079
104	31971.4474	-4.036530E+00	0.626	0.991	0.471
105	43040.5569	-8.317915E+00	-0.331	1.033	0.876
106	43040.6765	1.476122E+01	-0.791	-3.401	-2.720
107	44806.0073	1.009577E+01	0.517	0.244	-0.241
108	44806.1258	-2.340191E+01	-1.563	0.794	0.337
109	45788.6728	3.880130E+01	-0.734	-4.019	-1.902
110	45788.7998	1.238023E+01	-0.583	-0.196	0.036
111	47748.9967	2.806407E+01	4.412	-7.492	-0.871
112	47749.2386	-8.697945E+00	2.362	1.445	-0.251
	Sum of Modal Physical Loads		40.972	6.780	-18.779
	Resultant of Applied Load		39.727	9.313	-16.616
	Unscaled Applied Load		3.972726-01	9.313376-02	-1.661606-01

1Load Case (33) Load Modal Participation Factors

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Mode Number	Frequency	Participation Factor	Physical Load in Each Mode - Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
1	2108.7961	-3.632904E+00	-2.902	-0.555	-24.489
2	2108.7961	-1.137673E+00	0.092	-1.104	-4.670
3	4206.7388	3.311465E+00	9.057	-25.483	1.988
4	4206.7388	4.777880E+00	34.433	6.552	1.080
5	6703.5051	4.163686E-01	-0.030	0.100	0.508
6	6703.5051	-5.542984E+00	-0.503	-0.747	3.243
7	7745.5701	-1.997555E+00	-1.927	3.154	10.021
8	7745.5701	-3.015098E+00	-0.186	-4.399	9.006
9	9115.8478	2.076137E-01	-0.382	-0.746	0.139
10	9115.8478	5.942683E+00	14.592	12.601	-1.882
11	9277.8146	2.372682E+00	-0.688	-0.141	1.396
12	9277.8146	5.591361E+00	2.439	3.480	0.251

13	10498.2463	-7.880291E-01	-2.428	-0.739	-0.046
14	10498.2463	1.240078E+00	0.574	0.592	-0.159
15	11646.3605	1.366573E+00	1.092	0.498	-1.077
16	11646.3606	-1.011851E+00	-0.657	-0.621	-0.462
17	13167.1228	-3.329926E+00	0.140	1.083	-6.083
18	13167.1228	5.500377E-01	-0.234	0.181	-1.853
19	13714.6429	5.728164E+00	-1.236	-2.402	-3.254
20	13714.6429	6.533043E+00	-2.476	1.176	-5.122
21	13985.9388	9.136096E+00	1.509	0.091	-4.791
22	13985.9388	-5.441283E-01	-0.006	0.017	-0.286
23	15903.7063	6.873123E-02	-0.014	0.014	-0.015
24	15903.7063	1.215075E+00	0.314	-0.031	0.745
25	17348.7043	-1.089944E+00	0.189	-0.437	0.930
26	17348.7043	-3.332208E+00	2.248	-0.318	-0.347
27	17723.4712	-2.087283E+00	-4.444	3.766	-3.000
28	17723.4712	-7.451753E-01	-0.826	-0.483	0.617
29	17944.1355	9.263673E-01	0.399	0.030	-0.527
30	17944.1355	3.042253E+00	-0.125	-1.158	0.847
31	18360.8346	6.447388E+00	-1.783	0.383	-1.920
32	18360.8345	-4.729536E+00	0.778	-0.413	1.161
33	18688.0196	5.188891E+00	-0.889	-3.108	6.842
34	18688.0196	6.243422E+00	-2.703	-0.412	5.788
35	19046.4985	-1.304838E-01	0.218	-0.192	-0.276
36	19046.4985	-1.892221E+00	2.915	1.647	-1.485
37	19611.8222	1.811158E+00	-1.656	1.600	-1.102
38	19611.8222	-4.368985E+00	5.774	5.302	4.825
39	19947.6711	-4.010429E+00	2.129	-2.457	-0.371
40	19947.6711	-1.452228E-02	0.015	0.005	0.008
41	20413.9234	5.106147E+00	0.083	-0.890	-2.248
42	20413.9234	-1.542557E+00	0.403	0.180	-0.475
43	20804.2238	-1.356653E+00	-0.159	0.182	0.095
44	20804.2238	4.336417E+00	-0.057	-0.018	0.552
45	21137.2761	-3.981915E+00	0.002	0.068	-1.742
46	21137.2761	4.724423E-01	0.304	0.140	0.212
47	21403.3027	8.132620E+00	1.720	2.249	-2.076
48	21403.3027	-3.036192E+00	-1.362	0.918	0.442

1Load Case (33) Load Modal Participation Factors

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Mode Number	Frequency	Participation Factor	Physical Load in Each Mode - Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
49	22128.6713	-1.047708E-01	-0.098	0.038	0.100
50	22128.6713	5.828490E+00	2.822	4.072	2.567
51	22657.8837	9.490139E-01	-0.504	-0.084	0.080
52	22657.8837	-2.789439E+00	-0.533	1.003	-0.194
53	22986.9970	-2.680876E+00	-2.837	0.270	1.197
54	22986.9970	-1.980821E+00	-0.512	1.612	-1.165
55	23155.8038	1.798241E+00	-1.245	0.340	1.624
56	23155.8038	-4.322810E-01	0.136	0.314	0.244
57	23570.5022	-2.264348E+00	0.518	-0.083	-3.112
58	23570.5022	1.739372E+00	-0.228	0.842	-1.819
59	24230.3622	3.272639E+00	-1.429	1.030	0.610
60	24230.3622	6.644804E+00	-2.317	-2.286	2.284
61	24697.8459	-1.013004E+00	0.409	-0.203	0.081

82	24897.8459	-3.726185E+00	-0.049	1.986	-1.322
83	24911.9905	2.956209E+00	-0.245	1.012	0.877
84	24911.9905	6.153541E+00	2.689	0.847	0.358
85	26014.3613	-1.211209E+00	-0.333	0.156	0.579
86	26014.3613	-4.774831E+00	-0.507	-1.199	-1.695
87	26228.1127	-1.867346E+00	0.633	0.061	-0.284
88	26228.1127	2.378417E+00	0.308	-0.584	-0.886
89	26369.5374	-1.184811E+00	0.473	0.286	-0.519
70	26369.5374	-2.899612E+00	1.306	-1.071	0.908
71	26737.9862	-5.885781E+00	-7.751	1.537	0.783
72	26737.9862	-3.278372E+00	-0.049	4.330	-0.888
73	27154.7875	-3.656980E+00	-0.176	0.630	-2.094
74	27154.7875	-4.059359E+00	-0.304	-0.029	0.022
75	27736.8386	-3.890708E-01	0.225	-0.078	-0.069
76	27736.8386	-4.057484E-02	-0.002	-0.024	-0.003
77	28017.9851	-3.460128E-01	-0.469	-0.251	-0.085
78	28017.9851	2.299929E+00	-3.112	3.284	0.333
79	28237.2556	2.190388E+00	-3.877	1.613	0.511
80	28237.2556	1.892781E+00	0.673	2.650	0.146
81	28828.7957	-2.386746E+00	-0.942	-0.498	0.545
82	28828.7957	-3.834102E-01	0.136	-0.180	-0.118
83	29132.8701	3.489985E-01	-0.069	0.124	0.049
84	29132.8701	1.989112E+00	-0.814	-0.165	-0.237
85	29427.9851	1.140221E+00	0.641	-0.417	-0.646
86	29427.9851	1.187332E+00	0.063	0.515	-0.298
87	29761.8522	-1.796144E+00	0.467	-1.485	-0.267
88	29761.8522	3.884497E+00	-2.430	0.878	1.774
89	29994.8339	6.522554E+00	0.617	1.956	4.599
90	29994.8339	-2.862017E+00	1.712	-0.584	-0.102
91	30107.3079	-2.437385E+00	-1.878	0.284	0.344
92	30107.3079	3.067954E+00	-1.247	2.640	-0.184
93	30492.9954	-1.030722E+00	0.511	-0.170	-0.271
94	30492.9954	-1.330626E+00	-2.197	0.876	-0.351
95	30861.7471	-7.827672E-01	-0.406	0.456	-0.017
96	30861.7471	-1.026049E+00	-0.247	-0.754	-0.382

!Load Case (33) Load Modal Participation Factors

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Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
97	31098.4621	-5.823699E-01	0.180	-0.020	0.029
98	31098.4621	-2.485287E+00	-0.737	0.802	0.774
99	31271.7721	-3.088793E+00	0.077	0.325	0.356
100	31271.7721	-1.516970E+00	0.083	0.124	0.093
101	31825.2777	-2.057372E+00	0.823	-0.948	-0.591
102	31825.2780	-1.708196E+00	0.222	-0.788	-0.498
103	31971.4463	1.215365E+00	0.031	-0.042	-0.098
104	31971.4474	-3.813168E+00	0.590	0.936	0.445
105	43040.5569	-1.122067E+01	-0.447	1.393	0.913
106	43040.6785	2.977985E+01	-1.596	-6.881	-5.488
107	44806.0073	-1.673507E+01	-0.858	-0.404	0.399
108	44806.1258	2.597314E+01	1.735	-0.881	-0.374
109	45788.6728	-8.010080E-02	0.002	0.008	0.004
110	45788.7998	2.811090E+01	-1.323	-0.445	0.081

111	47748.8987	-1.835761E+01	-2.572	4.367	0.508
112	47749.2386	-2.619483E+01	7.114	4.361	-0.757
	Sum of Modal Physical Loads		38.102	26.212	-20.293
0	Resultant of Applied Load		38.685	21.155	-17.823
	Unscaled Applied Load		3.88851E-01	2.11545E-01	-1.78228E-01

!Load Case (34) Load Modal Participation Factors

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Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
1	2108.7981	-3.677495E+00	-2.937	-0.581	-24.789
2	2108.7981	8.271098E-01	-0.067	0.803	3.396
3	4206.7368	5.157342E+00	14.106	-39.867	3.008
4	4206.7368	2.329971E+00	16.791	3.196	0.526
5	6703.5061	-3.062686E+00	0.220	-0.733	-3.731
6	6703.5061	4.445373E+00	0.404	0.588	-2.801
7	7745.5701	-3.386097E+00	-3.247	5.313	16.882
8	7745.5701	-1.894417E+00	-0.117	-2.752	5.634
9	9115.8478	-3.859795E+00	7.105	13.877	-2.594
10	9115.8478	4.184420E+00	10.297	8.892	-1.228
11	9277.8146	-5.821685E+00	1.717	0.353	-3.408
12	9277.8146	-2.281012E+00	-0.988	-1.399	-0.101
13	10498.2463	4.898411E-01	0.892	0.271	0.017
14	10498.2463	1.145048E+00	0.331	0.341	-0.092
15	11648.3605	-8.149748E-01	-0.851	-0.287	0.842
16	11648.3605	-8.849887E-01	-0.575	-0.643	-0.404
17	13187.1228	-2.424260E+00	0.102	0.789	-4.429
18	13187.1228	3.367052E+00	-1.436	0.888	-11.348
19	13714.6429	-6.198847E+00	1.337	2.598	3.520
20	13714.6429	-2.388883E+00	0.898	-0.426	1.857
21	13965.9388	9.223784E+00	1.524	0.092	-4.838
22	13965.9388	-5.211065E+00	-0.054	0.158	-2.545
23	15803.7063	6.761834E-01	-0.183	0.183	-0.193
24	15803.7063	-8.188829E-01	-0.212	0.021	-0.502
25	17348.7043	4.300868E-02	-0.007	0.017	-0.037
26	17348.7043	3.398878E+00	-2.276	0.322	0.362
27	17723.4712	1.733987E+00	3.728	-3.158	2.517
28	17723.4712	3.367161E+00	3.734	2.184	-2.788
29	17944.1365	2.290015E+00	0.974	0.073	-1.286
30	17944.1365	-4.477036E+00	0.182	1.890	-0.843
31	18360.8346	5.978627E+00	-1.883	0.984	-1.781
32	18360.8346	-6.362038E-01	0.106	-0.068	0.187
33	18688.0196	-2.573006E+00	0.441	1.542	-3.384
34	18688.0196	4.054104E-01	-0.178	-0.027	0.326
35	19048.4895	1.248073E+00	-11.947	10.889	15.247
36	19048.4895	-4.148239E+00	7.143	4.035	-3.837
37	19811.8222	-1.081113E+00	0.987	-0.894	0.844
38	19811.8222	-2.483807E+00	3.206	3.028	2.536
39	19847.6711	4.831029E+00	-2.617	3.021	0.487
40	19847.6711	-2.979492E+00	3.047	1.042	1.689
41	20413.9234	3.296413E+00	0.053	-0.437	-1.423
42	20413.9234	-2.348335E+00	0.813	0.243	-0.722
43	20804.2238	7.606074E+00	0.878	-1.010	-0.524

44	20804.2238	-9.8458896E-01	0.013	0.004	-0.125
45	21137.2761	2.5478634E+00	-0.092	-0.043	1.115
46	21137.2761	-4.8119420E+00	-3.096	-1.426	-2.163
47	21403.3027	-4.8910277E+00	-1.016	-1.328	1.225
48	21403.3027	4.9988826E+00	2.242	-1.512	-0.727

1Load Case (34) Load Modal Participation Factors

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Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
49	22128.6713	-1.0725555E+00	-1.004	0.398	1.024
50	22128.6713	-1.7210117E+00	-0.774	-1.202	-0.758
51	22867.8837	-1.3587277E+00	0.721	0.092	-0.085
52	22867.8837	1.3491568E+00	0.260	-0.488	0.084
53	22966.9970	-4.3176922E+00	-4.279	0.438	1.943
54	22966.9970	-3.9879106E+00	-1.031	3.246	-2.326
55	23155.8038	-3.8550838E+00	2.533	-0.892	-3.304
56	23155.8038	-3.7273568E+00	1.170	2.710	2.106
57	23570.5022	-3.5183777E-01	0.080	-0.013	-0.577
58	23570.5022	-2.2863398E+00	0.300	-1.107	2.128
59	24230.3522	2.2288778E-01	-0.097	0.070	0.042
60	24230.3522	-2.5235698E+00	0.880	0.988	-0.888
61	24697.8459	2.9842206E+00	-1.196	0.594	-0.237
62	24697.8459	1.8444844E+00	0.024	-0.973	0.654
63	24811.8905	-7.3747006E-01	0.061	-0.252	-0.219
64	24911.9905	-2.5530836E+00	-1.943	-0.426	-0.170
65	26014.3613	-1.9854416E+00	-0.547	0.256	0.948
66	26014.3613	3.9762756E+00	0.422	0.998	1.412
67	26229.1127	1.0964486E+00	-0.416	-0.940	0.187
68	26229.1127	4.3536866E+00	0.566	-1.071	-1.841
69	26369.5374	9.4028216E+00	-3.750	-2.273	4.122
70	26369.5374	-2.7879116E+00	1.366	-1.111	0.942
71	26737.9862	2.0189326E+00	2.864	-0.527	-0.269
72	26737.9862	2.5608136E+00	0.039	-3.383	0.523
73	27154.7875	-3.3855846E-01	-0.016	0.058	-0.194
74	27154.7875	3.5482416E+00	0.265	0.026	-0.019
75	27736.6385	1.8887746E+00	-1.080	0.373	0.205
76	27736.6385	-3.2592256E+00	-0.169	-1.908	-0.279
77	28017.9851	-2.6270076E+00	-3.558	-1.903	-0.647
78	28017.9851	-8.5637616E-01	1.159	-1.223	-0.124
79	28237.2556	1.1453216E+00	-2.027	0.843	0.267
80	28237.2556	-2.3828576E+00	-0.840	-3.283	-0.182
81	28828.7957	2.8493756E+00	1.125	0.594	-0.651
82	28828.7957	4.0176456E+00	-1.421	1.884	1.235
83	29132.8701	2.5730876E+00	-0.506	0.918	0.358
84	29132.8701	-1.8219576E+00	0.746	0.149	0.217
85	29427.9851	1.1897906E-01	0.067	-0.044	-0.067
86	29427.9851	-1.1143106E+00	-0.059	-0.483	0.280
87	29761.8522	1.1789216E+00	-0.306	0.974	0.175
88	29761.8522	-3.6884976E+00	2.304	-0.833	-1.583
89	29994.8339	9.1914366E-02	0.009	0.023	0.065
90	29994.8339	-9.2439226E-01	0.553	-0.182	-0.033
91	30107.3079	-2.6830976E+00	1.854	0.292	0.380
92	30107.3079	3.5328966E+00	-1.436	3.040	-0.223

93	30492.9954	3.2357576E+00	-1.804	0.533	0.851
94	30492.9954	-1.8284696E+00	-3.018	1.201	-0.441
95	30861.7471	1.6880306E+00	0.882	-0.991	0.037
96	30861.7471	5.4451726E+00	1.310	4.005	2.029

1Load Case (34) Load Modal Participation Factors

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Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
97	31099.4621	-2.5088046E-01	0.071	-0.009	0.013
98	31099.4621	3.3299496E+00	0.996	-0.814	-1.045
99	31271.7721	2.8878246E-01	-0.007	-0.090	-0.033
100	31271.7721	1.7000116E+00	-0.083	-0.139	-0.104
101	31825.2777	7.9258916E-01	-0.319	0.385	0.228
102	31825.2780	8.4835136E-02	-0.011	0.039	0.025
103	31971.4483	2.6870236E-01	0.007	-0.009	-0.022
104	31971.4474	-1.2175026E+00	0.189	0.289	0.142
105	43040.5569	4.1080866E+00	0.164	-0.510	-0.334
106	43040.6765	3.1801426E+01	-1.704	-7.327	-5.861
107	44806.0073	4.5812776E+00	0.234	0.110	-0.109
108	44806.1258	2.1552046E+01	1.774	-0.991	-0.383
109	45788.8728	-1.3315086E+01	0.252	1.379	0.853
110	45788.7998	-2.2244486E+01	1.047	0.352	-0.084
111	47748.8987	3.3049776E+01	5.196	-8.823	-1.026
112	47749.2386	1.2730706E+01	-3.458	-2.116	0.348
	Sum of Modal Physical Loads		45.083	-7.582	-20.734
0	Resultant of Applied Load		44.080	-1.022	-17.825
	Unscaled Applied Load		4.408026E-01	-1.022036E-02	-1.782488E-01

MODAL TRUNCATION VECTORS - LOAD PARTICIPATION FACTORS
2ND DEGENERATE DOUBLE MODEL (SINE AND COSINE)

0Load Case (27) Load Modal Participation Factors
0

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode - Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
1	2882.1226	5.2340805E-01	-0.193	-0.133	-2.586
2	2882.1227	3.8958715E+00	0.503	0.071	12.385
3	5389.7988	-7.8467915E-02	0.026	-0.006	0.198
4	5389.7988	-4.8489805E+00	0.306	0.204	-3.332
5	7634.7190	4.3851208E-01	0.412	2.186	0.243
6	7634.7190	8.0606510E+00	-30.012	0.485	-14.391
7	9764.7032	1.0222877E+00	-0.519	3.366	-0.606
8	9764.7032	6.7884768E-01	2.096	0.306	-2.145
9	10618.8782	6.0625638E-01	0.105	-0.130	-0.611
10	10618.8782	-6.4102097E+00	0.748	1.738	-1.928
11	11036.6335	2.3028018E+00	-2.408	-2.913	2.488
12	11036.6335	-3.2599928E+00	-0.817	-0.445	2.244
13	11819.9385	-4.8228680E+00	-0.285	0.898	-8.310
14	11819.9385	-3.3869911E+00	-3.479	5.481	0.002
15	12083.1289	-4.4306880E-01	1.039	-0.977	0.119
16	12083.1289	7.3377006E-01	0.534	0.593	0.316
17	12883.4254	-2.8128277E+00	0.356	-0.574	-1.868
18	12883.4254	7.4135696E+00	0.999	-3.527	-2.177
19	13376.1488	-4.5196532E-01	-0.160	-1.598	0.023
20	13376.1488	5.5321826E+00	5.598	1.717	4.525
21	14857.0548	4.5054346E-01	-0.380	-0.581	-0.082
22	14857.0548	2.0670736E+00	-0.423	2.472	0.123
23	15395.3482	-9.9073906E-01	-0.223	-0.811	-1.842
24	15395.3482	-3.0892936E+00	-1.589	-2.553	4.625
25	16340.0113	1.3512006E-01	-0.010	0.243	0.007
26	16340.0113	4.3378926E+00	-9.608	-2.738	2.990
27	17880.1679	-1.8438436E+00	-0.036	0.272	-0.663
28	17880.1679	1.1852826E+00	-0.109	1.600	-0.859
29	18685.9195	5.9784466E+00	4.137	-0.208	-3.318
30	18685.9195	-2.2688716E+00	0.283	-0.340	-0.531
31	18776.9321	4.5563716E+00	-0.768	1.208	2.033
32	18776.9321	-1.1784886E+01	0.600	1.214	-2.166
33	19240.4923	-1.9818356E+00	-1.465	0.474	0.856
34	19240.4923	2.5253186E+00	-2.180	3.447	1.082
35	19748.9190	-2.0744866E+00	-6.832	-1.204	-0.096
36	19748.9190	-5.2915226E-01	-0.864	0.392	0.083
37	20485.2283	-1.7196186E+00	2.489	0.783	1.099
38	20485.2283	2.7121326E+00	4.160	2.020	2.181
39	20700.9547	1.3840666E+00	-0.903	-0.564	-0.268
40	20700.9547	-6.5582386E+00	5.226	3.060	8.441
41	20837.8322	-3.1468126E+00	-2.493	-0.500	0.713
42	20837.8322	-2.0670066E+00	-0.523	0.004	-1.567
43	21107.7206	-2.1739046E+00	1.651	-0.237	-1.090
44	21107.7206	3.1360096E+00	-2.397	-1.852	-0.242
45	21584.5447	-1.2210796E+00	0.753	-1.405	-0.820
46	21584.5447	3.5485186E+00	1.072	1.019	-1.077

47	22013.9056	-6.8283016E-01	-0.832	-0.180	1.126
48	22013.9056	4.1701486E+00	-2.181	2.008	-1.003

1Load Case (27) Load Modal Participation Factors
0

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode - Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
49	22545.5320	-2.9340106E+00	2.195	1.906	-0.708
50	22545.5320	-1.1816716E+00	1.871	-1.342	0.984
51	23063.2813	-4.0284086E+00	-1.314	-0.404	-3.856
52	23063.2813	-2.2858406E+00	-0.009	-0.545	-1.251
53	23586.0039	1.1853996E+00	0.746	0.147	-0.982
54	23586.0039	1.4215566E+00	0.132	0.427	-0.200
55	24016.6034	-1.6405886E+00	0.064	-0.597	1.203
56	24016.6034	-3.3707826E+00	4.313	-1.123	-0.906
57	24611.1870	-3.8783846E+00	0.892	0.416	-0.776
58	24611.1870	-1.8420806E+00	0.422	-0.010	0.263
59	24778.8283	2.6482196E+00	-1.132	1.401	1.024
60	24778.8283	8.3407426E+00	2.911	2.180	1.847
61	25125.3250	-6.4475696E-01	-0.744	0.016	0.133
62	25125.3250	-1.2188486E+00	0.813	-0.995	-0.522
63	25531.3284	-3.4881646E+00	0.208	-0.022	0.335
64	25531.3284	3.8834126E+00	3.433	-2.719	-1.413
65	26048.2342	8.5089016E-01	0.642	-0.395	-0.228
66	26048.2342	4.2098016E+00	1.434	-2.032	0.504
67	26532.3401	2.6827096E+00	-1.047	1.103	0.940
68	26532.3401	3.3028226E+00	-1.929	-1.847	0.387
69	27512.7029	-1.6833696E+00	0.587	-0.870	-0.051
70	27512.7029	-3.9860506E+00	-1.852	0.914	1.208
71	27851.7870	2.0136506E+00	-0.103	-0.783	3.905
72	27851.7870	1.8400656E+00	-0.088	-0.479	0.224
73	28010.1810	2.4940576E+00	1.935	0.892	-0.006
74	28010.1810	-8.8887556E-01	-0.402	-0.042	0.487
75	28346.6721	-3.4701446E+00	5.190	-0.703	5.148
76	28346.6721	-1.9806506E+00	1.515	0.209	-0.423
77	28832.9905	2.5952896E+00	-1.287	0.066	-1.731
78	28832.9905	2.4027056E+00	1.526	-0.717	1.889
79	29172.0119	1.9823286E+00	-1.813	1.288	-1.111
80	29172.0119	3.3892446E+00	2.485	1.277	-0.289
81	29447.8676	1.4801546E+00	1.088	0.102	-0.478
82	29447.8676	3.0708856E+00	1.890	-1.075	-0.825
83	29857.1444	-1.1136286E+00	-0.287	-0.214	-0.670
84	29857.1444	8.0824246E-01	0.144	-0.068	0.538
85	29861.7678	-1.1406576E+00	-0.994	0.597	-1.471
86	29861.7678	1.8068866E+00	1.885	0.744	-1.588
87	30204.0813	2.2282426E+00	0.488	0.430	-2.268
88	30204.0813	2.5737606E+00	-1.163	0.424	0.193
89	30871.7676	6.4631656E-01	0.457	0.146	-0.288
90	30871.7676	1.1371326E+00	-0.095	0.298	-0.850
91	31021.8218	-4.0311806E+00	-1.592	0.527	-0.510
92	31021.8220	3.0316546E+00	0.780	1.045	-2.806
93	31129.1064	2.5780536E+00	0.780	-0.203	0.102
94	31129.1065	-2.9218046E+00	0.438	-0.416	1.436
95	31571.8339	1.0782896E+00	0.199	0.083	0.470

96	31571.9339	1.914365E+00	-0.387	-0.399	1.757

1Load Case (27) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
97	31927.5859	-1.186280E+00	-0.463	0.818	0.226
98	31927.5880	1.940391E+00	-0.902	0.309	-0.118
99	44205.8137	-2.477836E+01	13.541	-0.012	-10.273
100	44205.8714	2.126888E+01	1.453	5.362	-4.430
101	45810.7731	-3.286963E+01	16.090	4.973	0.187
102	45810.7910	-1.512863E+01	-2.251	-3.306	3.708
103	46366.3063	2.988472E+01	7.284	5.905	2.223
104	46366.4829	3.800598E+00	0.061	0.019	-0.719
105	47783.8305	1.066547E+01	2.925	-1.781	1.216
106	47783.8551	-6.031816E+00	-1.375	0.028	0.816
	Sum of Modal Physical Loads		22.482	28.985	-12.379
0	Resultant of Applied Load		29.795	27.788	-16.458
	Unscaled Applied Load		2.97947E-01	2.77876E-01	-1.64585E-01

1Load Case (28) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
1	2682.1226	3.963815E+00	-0.710	-0.916	-17.761
2	2682.1227	1.616339E+00	0.214	0.030	5.250
3	5389.7898	4.184011E+00	-1.345	0.281	-10.408
4	5389.7898	2.001551E+00	-0.131	-0.088	1.496
5	7634.7190	5.721244E+00	5.371	28.955	3.171
6	7634.7190	2.170298E+00	-10.712	0.193	-5.137
7	8754.7032	1.158121E-01	-0.059	0.381	-0.089
8	8754.7032	1.781743E+00	5.486	0.796	-5.583
9	10518.8792	-6.396020E+00	-1.104	1.371	6.445
10	10518.8792	2.271142E+00	-0.282	-0.609	0.676
11	11036.6336	2.951868E-03	-0.003	-0.004	0.003
12	11036.6336	-1.284001E-01	-0.032	-0.018	0.089
13	11919.9365	3.125378E+00	0.180	-0.567	5.244
14	11919.9365	-4.645045E-01	-0.475	1.293	0.000
15	12013.1289	-4.569021E+00	10.710	-10.070	1.222
16	12013.1289	4.400074E+00	3.204	3.564	1.884
17	12993.4254	5.060000E+00	-0.689	1.112	3.619
18	12993.4254	6.269509E+00	0.844	-2.982	-1.841
19	13376.1488	-4.624574E+00	-1.538	-16.260	0.232
20	13376.1488	2.417222E+00	2.476	0.760	2.002
21	14957.0648	-2.418881E+00	2.096	3.121	0.438
22	14957.0648	2.484232E-01	-0.041	0.298	0.017
23	15396.3482	3.124780E+00	0.704	2.558	5.809
24	15396.3482	-1.111422E+00	-0.564	-0.918	1.664
25	16340.0113	3.040478E+00	-0.230	5.484	0.149
26	16340.0113	-4.201210E+00	9.306	2.651	-2.896
27	17880.1879	2.709818E+00	0.053	-0.400	0.975
28	17880.1879	-1.620698E+00	0.149	-2.188	0.901

29	18685.9195	5.784817E+00	4.003	-0.202	-3.210
30	18685.9195	-1.082274E+01	1.190	-1.598	-2.498
31	18776.9321	2.280838E-01	-0.038	0.080	0.101
32	18776.9321	6.243377E+00	-0.318	-0.643	1.148
33	19240.4923	-1.316344E+00	-0.983	0.318	0.574
34	19240.4923	-1.111816E+00	0.961	-1.509	-0.428
35	19746.9190	5.782771E-01	1.852	0.336	0.027
36	19746.9190	-1.807452E+00	-2.266	1.340	0.286
37	20485.2293	-4.540524E+00	6.598	2.068	2.902
38	20485.2293	-4.418878E+00	-8.778	-3.281	-3.520
39	20700.8547	2.234488E-01	-0.148	-0.082	-0.044
40	20700.8547	-2.716652E-01	0.216	0.126	0.350
41	20937.8322	-6.847776E+00	-5.296	-1.057	1.506
42	20937.8322	-2.851098E+00	-0.681	0.004	-1.881
43	21107.7206	-2.380636E+00	1.805	-0.280	-1.193
44	21107.7206	-2.215899E+00	1.694	1.308	0.171
45	21584.8447	-1.493034E+00	0.820	-1.717	-0.758
46	21584.8447	-2.565182E+00	-0.778	-0.738	0.778
47	22013.6066	2.987760E+00	2.648	0.670	-4.716
48	22013.6066	-2.389239E+00	1.238	-1.150	0.575

1Load Case (28) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
49	22545.5320	2.412588E+00	-1.805	-1.588	0.582
50	22545.5320	-1.853628E+00	2.622	-2.105	1.512
51	23063.2613	-1.165770E+00	-0.387	-0.119	-1.135
52	23063.2613	3.845167E+00	0.016	0.625	-2.023
53	23686.0039	2.398170E+00	1.509	0.297	-1.988
54	23686.0039	-2.458925E-01	-0.023	-0.074	0.052
55	24016.6034	-1.693834E+00	0.059	-0.849	1.307
56	24016.6034	-8.048643E+00	10.295	-2.891	-1.924
57	24611.1870	-1.352468E+00	0.325	0.145	-0.270
58	24611.1870	1.838236E+00	-0.528	0.012	-0.282
59	24778.8283	5.144336E-01	-0.220	0.272	0.203
60	24778.8283	-5.155981E+00	-1.428	-1.348	-1.142
61	25125.3250	1.842728E+00	2.126	-0.048	-0.480
62	25125.3250	-1.203628E+00	0.803	-0.953	-0.615
63	25531.3284	-3.096076E+00	0.188	-0.020	0.292
64	25531.3284	8.738115E-02	0.002	-0.023	-0.008
65	28049.2342	-3.644498E+00	-2.971	1.528	1.046
66	28049.2342	-4.919025E-01	-0.184	0.233	-0.058
67	28532.3401	-6.954066E+00	2.783	-2.913	-2.481
68	28532.3401	-2.842308E+00	1.712	-1.528	-0.343
69	27612.7029	3.307888E+00	-1.128	1.331	0.100
70	27612.7029	2.882951E+00	1.711	-0.801	-1.057
71	27951.7870	1.273106E+00	-0.045	-0.320	1.706
72	27951.7870	-8.244811E-01	0.000	0.162	-0.078
73	28010.1810	3.689258E+00	2.769	1.277	-0.007
74	28010.1810	9.442874E-01	0.427	0.044	-0.517
75	28348.6721	-7.742441E-01	1.145	-0.157	1.149
76	28348.6721	-3.910518E+00	2.977	0.411	-0.831
77	28832.6805	-9.172888E-01	0.455	-0.023	0.612

78	28932.9806	-7.393741E-02	-0.047	0.022	-0.058
79	29172.0119	-7.331723E-01	0.887	-0.486	0.409
80	29172.0119	8.123473E-01	0.801	0.309	-0.070
81	29447.9876	-3.834757E-01	-0.025	-0.027	0.125
82	29447.9876	-2.892062E+00	-1.696	1.013	0.871
83	29857.1444	1.028820E-02	0.002	0.001	0.003
84	29857.1444	-4.808818E+00	-0.859	0.206	-3.208
85	29881.7678	-1.105440E+00	-0.382	0.579	-1.425
86	29881.7678	2.381988E+00	2.745	1.100	-2.365
87	30204.0613	-2.001420E-01	-0.044	-0.038	0.204
88	30204.0613	3.974149E+00	-1.848	0.710	0.324
89	30871.7576	4.661087E+00	3.298	1.052	-2.069
90	30871.7676	-8.277670E-01	0.069	-0.208	-0.481
91	31021.9219	5.830918E-01	0.200	-0.086	0.094
92	31021.9220	-1.084464E+00	-0.275	-0.379	1.017
93	31129.1084	2.981263E+00	0.913	-0.235	0.118
94	31129.1085	2.482408E+00	-0.373	0.364	-1.222
95	31571.9339	-2.614637E+00	-0.483	-0.226	-1.141
96	31571.9339	4.801201E+00	-0.970	-1.000	4.407

1Load Case (28) Load Modal Participation Factors
0

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
97	31927.5658	3.811725E+00	1.512	-2.874	-0.740
98	31927.5680	4.186044E+00	-1.722	0.664	-0.253
99	44206.8137	8.902039E+00	-4.966	0.004	3.691
100	44206.8714	1.992389E+01	1.361	5.023	-4.149
101	45810.7731	-2.370857E+01	11.606	3.587	0.135
102	45810.7910	-1.804788E+01	-2.685	-3.944	4.424
103	46366.3063	-3.516206E+01	-8.538	-6.922	-2.606
104	46366.4829	-9.729329E+00	-0.156	-0.048	1.840
105	47783.8305	-2.381801E+01	-6.595	3.897	-2.730
106	47783.8551	-1.408499E+01	-3.212	0.066	1.439
	Sum of Modal Physical Loads		40.204	8.725	-17.993
0	Resultant of Applied Load		39.727	9.313	-16.816
	Unscaled Applied Load		3.97272E-01	9.31337E-02	-1.68160E-01

1Load Case (29) Load Modal Participation Factors
0

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
1	2682.1226	2.668032E+00	-0.517	-0.887	-12.934
2	2682.1227	3.376836E+00	0.446	0.053	10.895
3	5389.7988	4.305878E+00	-1.384	0.269	-10.708
4	5389.7988	-2.885387E+00	0.189	0.127	-2.069
5	7634.7180	4.116781E+00	2.885	20.619	2.282
6	7634.7180	5.111217E+00	-25.228	0.407	-12.087
7	9754.7032	8.154039E-01	-0.312	2.026	-0.365
8	9754.7032	1.294050E+00	4.007	0.585	-4.101
9	10518.8782	3.525781E+00	0.898	-0.756	-3.553
10	10518.8782	5.329713E+00	-0.615	-1.429	1.586

11	11036.6335	1.271606E+00	-1.330	-1.609	1.374
12	11036.6335	-3.518057E+00	-0.882	-0.480	2.422
13	11919.9365	-2.458183E+00	-0.141	0.446	-4.134
14	11919.9365	-5.098984E+00	-5.217	14.187	0.003
15	12083.1289	-6.363283E+00	14.916	-14.025	1.702
16	12083.1289	1.073833E+00	0.782	0.867	0.692
17	12983.4254	-2.901877E+00	0.345	-0.638	-2.076
18	12983.4254	-7.791584E+00	-1.049	3.706	2.268
19	13376.1488	-2.856738E+00	-1.012	-10.100	0.143
20	13376.1488	4.007119E+00	4.055	1.244	3.278
21	14857.0648	-2.320158E+00	2.011	2.894	0.421
22	14857.0648	1.178803E+00	-0.197	1.417	0.082
23	15396.3482	2.156204E+00	0.486	1.767	4.014
24	15396.3482	-3.048533E+00	-1.547	-2.517	4.581
25	16340.0113	3.281178E+00	-0.249	5.909	0.161
26	16340.0113	1.662686E-01	-0.368	-0.105	0.115
27	17880.1678	1.330702E+00	0.026	-0.197	0.478
28	17880.1678	2.551443E+00	-0.234	3.444	-1.418
29	18885.9196	-7.760623E+00	-5.983	0.270	4.301
30	18885.9196	9.342977E+00	-1.052	1.412	2.206
31	18778.9321	-2.240378E+00	0.378	-0.584	-1.000
32	18778.9321	3.181208E+00	-0.181	-0.328	0.581
33	19240.4923	-4.780498E+00	-3.576	1.168	2.088
34	19240.4923	-3.877077E+00	3.318	-5.281	-1.881
35	19748.8190	2.589387E+00	8.309	1.508	0.121
36	19748.8190	-5.810988E-01	-1.230	0.728	0.155
37	20485.2283	-4.638723E+00	6.583	2.068	2.800
38	20485.2283	-6.688438E+00	-8.734	-4.240	-4.600
39	20700.8647	1.833286E+00	-1.214	-0.758	-0.380
40	20700.8647	-3.150267E+00	2.510	1.486	0.765
41	20837.8322	6.178506E+00	4.089	0.893	4.065
42	20837.8322	-2.249520E+00	-0.443	0.004	-1.172
43	21107.7206	-3.758525E+00	2.854	-0.410	-1.328
44	21107.7206	1.065400E+00	-0.838	-0.847	-0.884
45	21564.5447	-3.537671E+00	2.181	-4.070	-1.797
46	21564.5447	1.793824E+00	0.543	0.515	-0.544
47	22013.6056	-1.591884E+00	-1.474	-0.373	2.825
48	22013.6056	2.977415E+00	-1.543	1.434	-0.716

1Load Case (29) Load Modal Participation Factors
0

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
49	22545.5320	2.024200E-01	-0.151	-0.132	0.049
50	22545.5320	-2.495080E+00	3.529	-2.833	2.036
51	23063.2813	-3.149378E+00	-1.027	-0.316	-3.014
52	23063.2813	2.504862E+00	0.010	0.603	1.383
53	23568.0039	2.884880E+00	1.815	0.357	-2.389
54	23568.0039	3.478884E-01	0.032	0.104	-0.273
55	24016.6034	-2.816844E+00	0.098	-1.095	2.198
56	24016.6034	-6.574286E+00	7.132	-1.867	-1.352
57	24611.1870	1.106066E+00	-0.285	-0.119	0.221
58	24611.1870	-3.118886E+00	0.893	-0.020	0.478
59	24778.6283	3.182588E+00	-1.351	1.672	1.247

60	24778.6283	4.369578E+00	1.210	1.142	0.997
61	26126.3250	5.587186E+00	6.447	-0.139	-1.153
62	26126.3250	-3.110635E+00	2.074	-2.462	-1.331
63	26531.3284	-5.493295E+00	0.334	-0.036	0.519
64	26531.3284	-1.220410E+00	-1.288	1.020	0.530
65	26949.2342	3.868914E+00	2.836	-1.745	-1.000
66	26949.2342	-3.496365E+00	-1.191	1.688	-0.418
67	26532.3401	-7.524067E-01	0.299	-0.315	-0.288
68	26532.3401	-5.936842E+00	3.575	3.423	-0.717
69	27612.7029	-3.084237E-01	0.100	-0.125	-0.008
70	27612.7029	-2.808882E+00	-1.678	0.785	1.037
71	27951.7870	-2.268072E+00	0.080	0.571	-3.040
72	27951.7870	3.406439E-01	-0.016	-0.089	0.042
73	28010.1810	2.781122E+00	2.158	0.895	-0.005
74	28010.1810	5.392281E-01	0.244	0.025	-0.295
75	28346.6721	-2.042635E+00	3.019	-0.414	3.031
76	28346.6721	-2.240320E+00	1.706	0.235	-0.476
77	28832.6805	-8.013423E-01	0.397	-0.021	0.534
78	28832.6805	4.501160E+00	2.859	-1.343	3.539
79	29172.0119	-2.515712E+00	2.289	-1.588	1.403
80	29172.0119	9.589444E-01	0.710	0.365	-0.092
81	29447.8876	-1.878822E+00	-0.123	-0.131	0.815
82	29447.8876	-4.041246E+00	-2.388	1.426	1.227
83	29657.1444	-1.872184E-01	-0.031	-0.023	-0.062
84	29657.1444	3.878498E+00	0.693	-0.327	2.588
85	29861.7578	3.385628E+00	1.189	-1.773	4.365
86	29861.7578	5.906339E+00	6.805	2.728	-5.863
87	30204.0613	4.719518E-01	0.104	0.089	-0.481
88	30204.0613	1.414353E+00	-0.693	0.253	0.115
89	30871.7576	4.328754E-01	0.306	0.098	-0.192
90	30871.7576	1.688616E+00	-0.141	0.424	0.980
91	31021.9219	9.119752E-01	0.313	-0.104	0.100
92	31021.9220	6.120535E+00	1.534	2.110	-5.865
93	31129.1084	4.958918E+00	1.519	-0.391	0.186
94	31129.1085	-6.131476E-02	0.009	-0.009	0.030
95	31571.9339	-3.156535E+00	-0.583	-0.273	-1.378
96	31571.9339	-5.419867E+00	1.095	1.129	-4.976

1Load Case (29) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
97	31927.5869	7.581889E-01	0.301	-0.532	-0.147
98	31927.5880	-2.034477E+00	0.841	-0.324	0.124
99	44205.8137	1.334051E-01	-0.073	0.000	0.055
100	44205.8714	3.142484E+01	2.146	7.923	-8.544
101	45810.7731	1.782718E+01	-8.727	-2.697	-0.101
102	45810.7910	-4.518890E+00	-0.672	-0.988	1.108
103	46366.3053	-1.084393E+01	-2.570	-2.084	-0.784
104	46366.4829	-2.776337E+01	-0.444	-0.137	5.251
105	47783.8306	2.944081E+01	8.091	-4.920	3.360
106	47783.8551	2.541368E+01	5.795	-0.119	-2.597
	Sum of Modal Physical Loads		47.810	21.944	-18.295

0	Resultant of Applied Load		38.685	21.155	-17.823
	Unscaled Applied Load		3.888E-01	2.115E-01	-1.782E-01

1Load Case (30) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
1	2882.1226	4.120755E+00	-0.798	-1.030	-18.977
2	2882.1227	-4.802431E-01	-0.081	-0.009	-1.495
3	5389.7998	2.785526E-01	-0.090	0.017	-0.695
4	5389.7998	4.831683E+00	-0.317	-0.212	3.464
5	7834.7190	6.826552E+00	6.408	34.186	3.783
6	7834.7190	-1.017852E+00	5.024	-0.081	2.409
7	9764.7032	-2.627840E-01	0.133	-0.885	0.186
8	9764.7032	7.193200E-01	2.218	0.324	-2.270
9	10518.8782	2.473051E+00	0.427	-0.550	-2.492
10	10518.8782	-6.244841E+00	0.720	1.574	-1.891
11	11036.6335	-1.083842E+00	1.134	1.311	-1.111
12	11036.6335	-4.746052E-01	-0.119	-0.085	0.327
13	11819.9365	5.809473E+00	0.340	-1.072	9.915
14	11819.9365	4.221244E+00	4.321	-11.750	-0.003
15	12083.1289	-3.725188E+00	8.732	-8.210	0.998
16	12083.1289	2.973145E+00	2.196	2.401	1.290
17	12993.4264	-8.470067E+00	1.153	-1.882	-8.067
18	12993.4264	-1.414884E+00	-0.191	0.673	0.415
19	13376.1488	-4.238536E+00	-1.501	-14.985	-0.219
20	13376.1488	-1.217584E+00	-1.232	-0.378	-0.896
21	14957.0648	-2.806940E-01	0.252	0.376	0.095
22	14957.0648	-1.405187E+00	0.265	-1.781	-0.102
23	15396.3482	5.705210E+00	1.172	4.291	9.877
24	15396.3482	9.501385E-02	0.048	0.079	-0.142
25	16340.0113	-1.498341E+00	0.112	-2.671	-0.073
26	16340.0113	-4.408117E+00	8.784	2.712	-3.038
27	17880.1679	-5.636701E-01	-0.011	0.083	-0.209
28	17880.1679	-3.088189E+00	0.284	-4.189	1.716
29	18885.9195	-1.501792E+00	-1.039	0.062	0.833
30	18885.9195	3.212006E+00	-0.300	0.435	0.782
31	18776.9321	-4.188830E+00	0.708	-1.113	-1.875
32	18776.9321	-1.064419E+00	0.537	1.096	-1.833
33	19240.4923	7.713495E+00	5.769	-1.884	-3.384
34	19240.4923	-1.010785E+00	0.895	-1.335	-0.455
35	19746.9190	2.714417E+00	8.978	1.576	0.128
36	19746.9190	-3.739281E+00	-4.889	2.773	0.850
37	20485.2283	3.473737E+00	-5.048	-1.592	-3.220
38	20485.2283	5.419618E-01	0.831	0.404	-0.436
39	20700.9547	5.531450E+00	-3.884	-2.288	-1.006
40	20700.9547	-1.340342E+00	1.068	0.623	1.728
41	20937.8322	7.443622E-01	0.590	0.118	-0.169
42	20937.8322	3.838317E-02	0.006	0.000	0.031
43	21107.7206	2.[illegible]E+00	-1.862	0.780	1.388
44	21107.7206	-2.[illegible]E-01	0.186	0.161	0.020
45	21584.5447	4.360170E-01	-0.288	0.500	0.221
46	21584.5447	-5.[illegible]E+00	-1.417	-1.899	-1.722
47	22013.8056	4.364347E+00	4.031	1.020	-7.181

48	22013.8056	7.701388E-01	-0.399	0.371	-0.185

1Load Case (30) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode: Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
49	22545.5320	4.688542E-01	-0.351	-0.305	0.113
50	22545.5320	-2.[illegible]E-01	0.389	-0.208	0.213
51	24011.4813	2.[illegible]E+00	0.810	0.240	2.870
52	24011.4813	1.[illegible]E+00	0.005	0.295	0.676
53	23686.0039	2.111186E+00	1.328	0.281	-1.748
54	23686.0039	-2.617749E+00	-0.243	-0.786	0.552
55	24016.8034	2.710853E+00	-0.094	1.045	-2.104
56	24016.8034	-3.[illegible]E+00	5.105	-1.130	-0.954
57	24611.1870	-2.604764E+00	0.673	0.301	-0.581
58	24611.1870	-2.438219E+00	0.698	-0.016	0.375
59	24778.8283	-5.[illegible]E+00	2.138	-2.847	-1.873
60	24778.8283	-6.[illegible]E+00	-1.907	-1.769	-1.524
61	25125.3250	4.363691E-01	0.504	-0.011	-0.090
62	25125.3250	4.193331E+00	-2.796	3.320	1.794
63	25531.3284	-5.[illegible]E+00	0.364	-0.039	0.595
64	25531.3284	-6.234837E-01	-0.058	0.521	0.271
65	26049.2342	5.683376E-01	0.432	-0.295	-0.152
66	26049.2342	6.413357E+00	2.185	-3.097	0.767
67	26532.3401	1.[illegible]E+00	-0.775	0.817	0.896
68	26532.3401	2.470142E-01	-0.149	-0.142	0.090
69	27512.7029	3.940725E+00	-1.310	1.546	0.117
70	27512.7029	4.772987E+00	2.853	-1.335	-1.783
71	27951.7870	1.[illegible]E+00	-0.042	-0.292	-1.591
72	27951.7870	-5.[illegible]E+00	0.274	1.484	-0.696
73	28010.1810	1.310306E+00	1.017	0.469	-0.002
74	28010.1810	-1.084178E+00	-0.490	-0.051	0.594
75	28346.8721	-2.[illegible]E-01	0.302	-0.041	0.303
76	28346.8721	-4.[illegible]E+00	3.273	0.452	-0.914
77	28832.8906	-5.334103E-01	0.264	-0.014	0.356
78	28832.8906	-1.450626E+00	-0.921	0.433	-1.140
79	29172.0119	8.[illegible]E-01	-0.783	0.547	-0.480
80	29172.0119	-3.[illegible]E+00	-2.239	-1.151	0.980
81	29447.8676	-1.[illegible]E+00	-0.101	-0.108	0.606
82	29447.8676	2.126609E+00	1.246	-0.744	-0.840
83	29857.1444	-1.[illegible]E+00	-0.223	-0.186	-0.442
84	29857.1444	4.[illegible]E+00	0.715	-0.338	2.670
85	29881.7578	-2.774521E+00	-0.958	1.453	-3.577
86	29881.7578	3.526168E+00	4.083	1.629	-3.500
87	30204.0613	2.[illegible]E+00	0.485	0.400	-2.158
88	30204.0613	1.[illegible]E+00	-0.637	0.232	0.106
89	30871.7676	5.095721E+00	3.606	1.151	-2.262
90	30871.7676	3.847880E+00	-0.322	0.987	2.234
91	31021.9220	8.[illegible]E-01	0.291	-0.096	0.093
92	31021.9220	1.[illegible]E-01	0.046	0.063	-0.170
93	31129.1064	-1.001144E+00	-0.307	0.079	-0.039
94	31129.1065	6.[illegible]E+00	-1.006	0.955	-3.298
95	31571.8339	1.[illegible]E+00	0.283	0.139	-0.989
96	31571.8339	-1.[illegible]E+00	0.278	0.287	-1.283

1Load Case (30) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode: Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
97	31927.5859	-9.241336E-01	-0.367	0.648	0.179
98	31927.5860	-8.[illegible]E-01	0.365	-0.137	0.062
99	44205.8137	2.[illegible]E+01	-15.352	0.013	11.847
100	44205.8214	8.[illegible]E+00	0.594	2.181	-1.810
101	45810.7731	1.[illegible]E+01	-8.909	-2.783	-0.104
102	45810.7910	-2.740288E+01	-4.077	-6.989	6.717
103	46366.3063	1.[illegible]E+01	2.545	2.084	0.777
104	46366.4128	1.[illegible]E+01	0.270	0.084	-3.195
105	47783.8506	2.[illegible]E+01	5.719	-3.482	2.378
106	47783.8551	-3.008824E+01	-6.863	0.141	3.076
	Sum of Modal Physical Loads		95.757	-5.012	-10.388
0	Resultant of Applied Load		44.080	-0.356	-18.491
	Unscaled Applied Load	4.40802E-01	-3.55538E-03	-1.84913E-01	

1Load Case (31) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode: Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
1	2882.1228	3.[illegible]E+00	-0.737	-0.851	-18.438
2	2882.1227	-6.[illegible]E-01	-0.071	-0.010	-1.733
3	6389.7888	-4.[illegible]E+00	1.484	-0.290	11.557
4	6389.7888	7.[illegible]E-02	-0.005	-0.003	0.057
5	7634.7180	6.[illegible]E+00	5.708	30.466	3.370
6	7634.7180	-4.385120E-01	2.164	-0.036	1.038
7	8764.7032	-6.[illegible]E-01	0.344	-2.228	0.401
8	8764.7032	1.[illegible]E+00	3.186	0.462	-3.240
9	10618.8792	6.[illegible]E+00	1.118	-1.389	-8.630
10	10618.8792	6.062563E-01	-0.070	-0.163	0.180
11	11036.8336	-3.[illegible]E+00	3.409	4.124	-3.522
12	11036.8336	-2.[illegible]E+00	-0.577	-0.314	1.585
13	11919.9385	-3.[illegible]E+00	-0.186	0.617	-5.703
14	11919.9385	4.[illegible]E+00	5.068	-13.788	-0.003
15	12083.1289	-7.337700E-01	1.720	-1.617	0.186
16	12083.1289	-6.[illegible]E-01	-0.323	-0.368	-0.181
17	12983.4284	7.[illegible]E+00	-1.008	1.629	-6.302
18	12983.4284	2.612827E+00	0.362	-1.243	-0.787
19	13376.1488	-5.[illegible]E+00	-1.980	-19.559	0.277
20	13376.1488	-4.[illegible]E-01	-0.457	-0.140	-0.320
21	14957.0648	2.[illegible]E+00	-1.783	-2.[illegible]	-0.378
22	14957.0648	-4.[illegible]E-01	0.076	-0.[illegible]	-0.031
23	15396.3482	3.[illegible]E+00	0.[illegible]	3.529	5.749
24	15396.3482	-9.[illegible]E-01	-0.[illegible]	-0.[illegible]	1.483
25	16540.0113	-4.[illegible]E+00	0.[illegible]	-1.[illegible]	-0.213
26	16540.0113	1.[illegible]E+00	-0.[illegible]	-0.[illegible]	0.083
27	17880.1678	1.[illegible]E+00	0.023	-0.176	0.428
28	17880.1678	1.[illegible]E+00	-0.[illegible]	2.[illegible]	-1.[illegible]
29	18886.8196	2.[illegible]E+00	1.583	-0.079	-1.263

30	18685.9195	5.9789488E+00	-0.670	0.900	1.406
31	18778.8321	1.1784681E+01	-1.987	3.125	5.258
32	18778.8321	4.6583711E+00	-0.232	-0.489	0.137
33	19240.4923	2.5253198E+00	1.895	-0.610	-1.101
34	19240.4923	1.0819356E+00	-1.678	2.662	0.841
35	19746.9190	5.2915226E-01	1.882	0.307	0.025
36	19746.9190	-2.0742486E+00	-2.801	1.838	0.197
37	20485.2283	2.7121328E+00	-3.941	-1.235	-1.733
38	20485.2283	1.7195618E+00	2.838	1.281	1.389
39	20700.9547	-6.5582238E+00	4.344	2.713	1.286
40	20700.9547	-1.3940658E+00	1.087	0.634	1.768
41	20937.8322	2.6579068E+00	2.105	0.423	-0.902
42	20937.8322	-3.1489128E+00	-0.619	0.006	-1.855
43	21107.7206	-3.1380098E+00	2.382	-0.342	-1.572
44	21107.7206	-2.1739048E+00	1.662	1.284	0.167
45	21564.5447	3.5486188E+00	-2.187	4.082	1.802
46	21564.5447	1.2210798E+00	0.370	0.351	-0.370
47	22013.8066	4.1701488E+00	3.861	0.877	-6.878
48	22013.8066	6.8283018E-01	-0.964	0.329	-0.164

1Load Case (31) Load Modal Participation Factors
0

Mode Number	Frequency	Participation Factor	/------- Physical Load in Each Mode -------/ Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
49	22545.5320	-1.1816716+00	0.884	0.768	-0.285
50	22545.5320	2.8340106+00	-4.150	3.332	-2.384
51	23063.2813	2.2658406+00	0.739	0.227	2.168
52	23063.2813	-4.0294086+00	-0.017	-0.870	-2.224
53	23566.0039	1.4215586+00	0.894	0.176	-1.177
54	23566.0039	-1.1853886+00	-0.116	-0.366	0.250
55	24016.6034	3.3707826+00	-0.117	1.299	-2.816
56	24016.6034	-1.5483986+00	1.982	-0.516	-0.370
57	24811.1870	1.8470806+00	-0.396	-0.177	0.329
58	24811.1870	-3.8793546+00	1.111	-0.026	0.596
59	24778.6283	-8.3407426+00	3.563	-4.411	-3.288
60	24778.6283	2.8492196+00	0.734	0.892	0.587
61	25125.3250	-1.2189586+00	-1.407	0.030	0.251
62	25125.3250	6.4476596-01	-0.430	0.510	0.276
63	25531.3284	-3.2534126+00	0.198	-0.021	0.307
64	25531.3284	-3.4381846+00	-3.628	2.873	1.493
65	26049.2342	4.2089816+00	3.262	-2.001	-1.146
66	26049.2342	-8.3058016-01	-0.283	0.401	-0.099
67	26532.3401	3.2029296+00	-1.273	1.342	1.143
68	26532.3401	-2.6342096+00	1.586	1.519	-0.318
69	27512.7029	-3.2866806+00	1.114	-1.315	-0.098
70	27512.7029	1.0639006+00	0.995	-0.488	-0.615
71	27951.7870	1.8409656+00	-0.065	-0.483	2.487
72	27951.7870	-2.9136336+00	0.140	0.758	-0.365
73	28010.1810	8.8868556-01	0.889	0.318	-0.002
74	28010.1810	2.4840676+00	1.128	0.118	-1.386
75	28346.6721	1.9906506+00	-2.942	0.403	-2.953
76	28346.6721	-3.4701446+00	2.842	0.365	-0.737
77	28832.8805	-2.4027056+00	1.191	-0.062	1.602
78	28832.8805	2.5952896+00	1.848	-0.774	2.040

79	29172.0119	3.3582486+00	-3.056	2.133	-1.873
80	29172.0119	-1.8822206+00	-1.405	-0.758	0.171
81	29447.8676	3.0705866+00	0.200	0.214	-1.005
82	29447.8676	-1.4901546+00	-0.856	0.511	0.440
83	29657.1444	8.0624246-01	0.135	0.101	0.268
84	29657.1444	1.7135286+00	0.306	-0.145	1.143
85	29861.7578	-1.8099856+00	-0.556	0.843	-2.076
86	29861.7578	-1.1406576+00	-1.314	-0.527	1.132
87	30204.0813	-2.3737606+00	-0.521	-0.448	2.418
88	30204.0813	2.2282456+00	-1.081	0.398	0.181
89	30871.7676	-1.1371386+00	-0.806	-0.287	0.506
90	30871.7676	6.4632456-01	-0.064	0.182	0.376
91	31021.9219	-3.0320846+00	-1.042	0.346	-0.334
92	31021.9220	-4.6310256+00	-1.181	-1.596	-4.286
93	31129.1084	-2.9217846+00	-0.896	0.230	-0.115
94	31129.1085	-2.5791746+00	0.387	-0.388	1.270
95	31571.9339	-1.9140876+00	-0.353	-0.185	-0.835
96	31571.9339	1.0782806+00	-0.217	-0.224	0.988

1Load Case (31) Load Modal Participation Factors
0

Mode Number	Frequency	Participation Factor	/------- Physical Load in Each Mode -------/ Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
97	31927.5859	1.9405856+00	0.770	-1.361	-0.377
98	31927.5860	1.1684486+00	-0.483	0.186	-0.071
99	44206.8137	2.1270136+01	-11.624	0.010	8.818
100	44206.8714	2.4777486+01	1.882	6.247	-5.160
101	45810.7731	-1.5127846+01	7.406	2.289	0.066
102	45810.7810	-3.2672586+01	4.881	7.194	-8.058
103	46366.3053	-3.7066536+00	-0.922	-0.747	-0.281
104	46366.4829	2.9983196+01	0.480	0.148	-5.673
105	47783.8306	6.0299826+00	1.665	-1.008	0.688
106	47783.8551	1.0865886+01	2.430	-0.060	-1.088
	Sum of Modal Physical Loads		30.423	22.944	-21.576
0	Resultant of Applied Load		29.795	22.788	-19.458
	Unscaled Applied Load		2.979476-01	2.778786-01	-1.845856-01

1Load Case (32) Load Modal Participation Factors
0

Mode Number	Frequency	Participation Factor	/------- Physical Load in Each Mode -------/ Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
1	2682.1226	1.6163396+00	-0.313	-0.404	-7.536
2	2682.1227	-1.8831616+00	-0.484	-0.068	-11.901
3	5389.7898	2.0015516+00	-0.643	0.125	-4.678
4	5389.7898	-4.1849116+00	0.276	0.184	-9.001
5	7634.7190	2.1702886+00	2.037	10.870	1.203
6	7634.7190	-5.7212446+00	28.239	-0.456	13.541
7	8764.7032	-1.7811436+00	0.884	-5.800	1.045
8	8764.7032	1.1581216-01	0.358	0.052	-0.386
9	10618.8792	-2.2711426+00	-0.382	0.487	2.288
10	10618.8792	-6.3890206+00	0.738	1.715	-1.803
11	11098.6336	-1.2940016-01	0.136	0.184	-0.140

12	11036.6335	-2.951970E-03	-0.001	0.000	0.002
13	11818.9385	-4.945046E-01	-0.027	0.084	-0.779
14	11818.9385	-3.195478E+00	-3.199	8.700	0.001
15	12083.1289	-4.400074E+00	10.314	-9.888	1.177
16	12083.1289	-4.569021E+00	-3.327	-3.690	-1.997
17	12883.4264	6.285508E+00	-0.884	1.378	4.413
18	12883.4264	-5.060000E+00	-0.892	2.407	1.496
19	13376.1488	-2.447232E+00	-0.887	-8.852	0.123
20	13376.1488	-4.624574E+00	-4.880	-1.436	-3.783
21	14867.0848	2.444232E-01	-0.215	-0.321	-0.045
22	14867.0848	2.418811E+00	-0.403	2.906	0.188
23	15396.3482	1.111222E+00	0.260	0.910	2.066
24	15396.3482	3.124780E+00	1.587	2.582	-4.678
25	16340.0113	4.201210E+00	-0.318	7.550	0.206
26	16340.0113	3.040478E+00	-5.734	-1.919	2.096
27	17880.1679	-1.820688E+00	-0.032	0.239	-0.583
28	17880.1679	-2.709919E+00	0.249	-3.658	1.506
29	18685.9195	1.982274E+01	7.350	-0.370	-5.895
30	18685.9195	5.784817E+00	-0.848	0.871	1.380
31	18776.9321	-6.243377E+00	1.063	-1.655	-2.786
32	18776.9321	2.260937E-01	-0.012	-0.023	0.042
33	19240.4923	-1.111816E+00	-0.830	0.269	0.485
34	19240.4923	1.316344E+00	-1.126	1.786	0.584
35	19746.9190	1.807452E+00	5.778	1.049	0.084
36	19746.9190	5.792771E-01	0.726	-0.430	-0.091
37	20485.2283	-4.418978E+00	6.432	2.013	2.824
38	20485.2283	4.540421E+00	6.965	3.381	3.885
39	20700.9547	-2.716534E-01	0.180	0.112	0.063
40	20700.9547	-2.234488E-01	0.178	0.104	0.288
41	20937.8322	2.851098E+00	2.258	0.453	-0.846
42	20937.8322	-6.847775E+00	-1.308	0.010	-3.919
43	21107.7206	2.215899E+00	-1.883	0.242	1.111
44	21107.7206	-2.380636E+00	1.820	1.406	0.183
45	21584.5447	-2.586162E+00	1.581	-2.951	-1.303
46	21584.5447	1.493034E+00	0.452	0.429	-0.453
47	22013.9066	-2.389239E+00	-2.212	-0.590	3.940
48	22013.9066	-2.859760E+00	1.482	-1.377	0.888

1Load Case (32) Load Modal Participation Factors

0 /------- Physical Load in Each Mode -------/

Mode Number	Frequency	Participation Factor	Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
49	22545.5320	-1.853526E+00	1.386	1.204	-0.447
50	22545.5320	-2.412698E+00	3.412	-2.740	1.988
51	23083.2613	-3.845187E+00	-1.254	-0.386	-3.679
52	23083.2613	-1.195770E+00	-0.005	-0.285	-0.865
53	23566.0039	-2.458925E-01	-0.155	-0.030	0.204
54	23566.0039	-2.398170E+00	-0.222	-0.720	0.506
55	24016.8034	8.048843E+00	-0.280	3.101	-6.246
56	24016.8034	-1.853152E+00	2.164	-0.561	-0.403
57	24611.1870	-1.838236E+00	0.441	0.197	-0.368
58	24611.1870	-1.362498E+00	0.387	-0.009	0.208
59	24778.6283	5.155841E+00	-2.202	2.727	2.033
60	24778.6283	5.144536E-01	0.143	0.134	0.114

61	25125.3250	-1.203526E+00	-1.389	0.030	0.248
62	25125.3250	-1.842726E+00	1.228	-1.459	-0.789
63	25531.3284	-8.731115E-02	0.006	-0.001	0.008
64	25531.3284	-3.098075E+00	-3.267	2.588	1.345
65	26049.2342	-4.818025E-01	-0.372	0.229	0.131
66	26049.2342	3.844488E+00	1.310	-1.867	0.490
67	26532.3401	-2.842300E+00	1.129	-1.191	-1.014
68	26532.3401	6.854098E+00	-4.188	-4.011	0.839
69	27512.7029	2.882851E+00	-0.976	1.152	0.087
70	27512.7029	-3.307855E+00	-1.877	0.926	1.222
71	27951.7870	-6.248411E-01	0.022	0.157	-0.837
72	27951.7870	-1.273106E+00	0.061	0.331	-0.165
73	28010.1810	-9.442874E-01	-0.733	-0.338	0.002
74	28010.1810	3.582266E+00	1.814	0.188	-1.865
75	28346.6721	3.910815E+00	-5.781	0.782	-5.802
76	28346.6721	-7.742411E-01	0.589	0.081	-0.165
77	28832.8805	7.393741E-02	-0.037	0.002	-0.049
78	28832.8805	-9.172885E-01	-0.583	0.274	-0.721
79	29172.0119	8.125473E-01	-0.739	0.616	-0.453
80	29172.0119	7.331723E-01	0.643	0.279	-0.083
81	29447.8878	-2.852082E+00	-0.189	-0.202	0.948
82	29447.8878	3.634787E-01	0.225	-0.134	-0.116
83	29857.1444	-4.998818E+00	-0.868	-0.802	-1.800
84	29857.1444	-1.028004E-02	-0.002	0.001	-0.007
85	29861.7578	-2.381888E+00	-0.822	1.248	-3.071
86	29861.7578	-1.105440E+00	-1.274	-0.511	1.067
87	30204.0613	-3.974148E+00	-0.872	-0.751	4.048
88	30204.0613	-2.001414E-01	0.098	-0.036	-0.018
89	30871.7576	8.277798E-01	0.586	0.187	-0.387
90	30871.7576	4.881078E+00	-0.340	1.172	2.705
91	31021.9219	1.098858E+00	0.378	-0.126	0.121
92	31021.9220	5.826503E-01	0.146	0.201	-0.539
93	31129.1084	2.482547E+00	0.780	-0.196	0.098
94	31129.1085	-2.881002E+00	0.447	-0.426	1.457
95	31571.9339	-4.801312E+00	-0.886	-0.415	-2.088
96	31571.9339	-2.814371E+00	0.528	0.545	-2.400

1Load Case (32) Load Modal Participation Factors

0 /------- Physical Load in Each Mode -------/

Mode Number	Frequency	Participation Factor	Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
97	31827.5869	4.185011E+00	1.852	-2.822	-0.806
98	31827.5880	-3.812972E+00	1.577	-0.606	0.232
99	44205.8137	1.992628E+01	-10.889	0.009	8.231
100	44206.8714	-8.902451E+00	-0.008	-2.044	1.884
101	45810.7731	-1.804598E+01	8.158	2.731	0.103
102	45810.7810	2.370374E+01	3.527	5.180	-5.810
103	46366.3053	9.731982E+00	2.383	1.916	0.721
104	46366.4829	-3.518212E+01	-0.552	-0.174	8.651
105	47783.8506	1.408868E+01	3.886	-2.364	1.808
106	47783.8551	-2.391788E+01	-5.484	0.112	2.444
	Sum of Modal Physical Loads		42.836	11.813	-9.289
0	Resultant of Applied Load		39.727	9.313	-16.816

Unscaled Applied Load 3.97272E-01 9.31337E-02 -1.66160E-01

1Load Case (33) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode: Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
1	2682.1226	3.375836E+00	-0.654	-0.844	-16.386
2	2682.1227	-2.668032E+00	-0.363	-0.050	-8.666
3	5389.7998	-2.885387E+00	0.928	-0.180	7.176
4	5389.7998	-4.306879E+00	0.283	0.169	-3.087
5	7634.7190	5.111217E+00	4.798	25.800	2.833
6	7634.7190	-4.116781E+00	20.320	-0.328	9.743
7	9754.7032	-1.294060E+00	0.857	-4.261	0.768
8	9754.7032	8.154039E-01	1.906	0.278	-1.960
9	10518.8792	-5.329713E+00	-0.920	1.143	5.370
10	10518.8792	3.825781E+00	-0.407	-0.945	1.049
11	11036.6335	-3.518067E+00	3.679	4.451	-3.801
12	11036.6335	-1.271606E+00	-0.319	-0.174	0.876
13	11919.9365	-5.096984E+00	-0.293	0.925	-8.552
14	11919.9365	2.458183E+00	2.516	-6.842	-0.002
15	12083.1289	-1.073833E+00	2.517	-2.367	0.287
16	12083.1289	-6.383283E+00	-4.834	-5.139	-2.740
17	12993.4264	-7.781584E+00	1.061	-1.712	-5.572
18	12993.4264	2.901877E+00	0.391	-1.380	-0.852
19	13378.1488	-4.907119E+00	-1.419	-14.187	0.201
20	13378.1488	-2.896738E+00	-2.891	-0.887	-2.337
21	14957.0648	1.176893E+00	-1.022	-1.522	-0.214
22	14957.0648	2.320159E+00	-0.387	2.788	0.161
23	15396.3482	3.046533E+00	0.686	2.494	5.884
24	15396.3482	2.159204E+00	1.087	1.982	-3.223
25	16340.0113	-1.862686E-01	0.013	-0.299	-0.008
26	16340.0113	3.288179E+00	-7.283	-2.075	2.286
27	17880.1679	2.551443E+00	0.050	-0.377	0.918
28	17880.1679	-1.390702E+00	0.122	-1.705	0.740
29	18685.9195	-9.392977E+00	-6.492	0.327	5.207
30	18685.9195	-7.750623E+00	0.869	-1.167	-1.823
31	18776.9321	-3.161208E+00	0.533	-0.838	-1.411
32	18776.9321	-2.240376E+00	0.114	0.231	-0.412
33	19240.4923	-3.877077E+00	-2.894	0.937	1.891
34	19240.4923	4.790438E+00	-4.067	6.500	2.053
35	19746.9190	9.810686E-01	3.136	0.589	-2.046
36	19746.9190	2.588887E+00	3.269	-1.997	-0.410
37	20485.2293	-5.693836E+00	8.274	2.593	3.639
38	20485.2293	4.536823E+00	6.859	3.379	3.885
39	20700.9647	-3.150267E+00	2.086	1.303	0.618
40	20700.9647	-1.833755E+00	1.481	0.853	2.380
41	20937.8322	2.249520E+00	1.782	0.358	-0.510
42	20937.8322	5.176305E+00	1.019	-0.008	3.061
43	21107.7206	-1.965890E+00	0.832	-0.120	-0.549
44	21107.7206	-3.758625E+00	2.873	2.219	0.280
45	21584.5447	1.793824E+00	-1.106	2.063	0.911
46	21584.5447	3.537971E+00	1.071	1.016	-1.073
47	22013.6066	2.977415E+00	2.756	0.698	-4.811
48	22013.6066	1.591864E+00	-0.825	0.767	-0.383

1Load Case (33) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode: Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
49	22545.5320	-2.486090E+00	1.888	1.621	-0.602
50	22545.5320	-2.024200E-01	0.266	-0.220	0.185
51	23063.2613	-2.804892E+00	-0.817	-0.261	-2.397
52	23063.2613	-3.148578E+00	-0.013	-0.958	-1.739
53	23606.0038	3.478884E-01	0.219	0.043	-0.288
54	23606.0038	-2.884880E+00	-0.287	-0.967	0.908
55	24016.8034	5.674298E+00	-0.194	2.148	-4.327
56	24016.8034	-2.818644E+00	3.903	-0.939	-0.872
57	24811.1870	3.119928E+00	-0.749	-0.894	0.824
58	24811.1870	1.106066E+00	-0.317	0.007	-0.170
59	24778.6283	-4.389578E+00	1.886	-2.311	-1.723
60	24778.6283	3.152648E+00	0.538	0.827	0.700
61	25125.3250	-3.110833E+00	-3.549	0.077	0.642
62	25125.3250	-5.587198E+00	3.728	-4.423	-2.391
63	25531.3284	1.220410E+00	-0.074	0.008	-0.115
64	25531.3284	-5.462388E+00	-5.787	4.591	2.386
65	26049.2342	-3.485388E+00	-2.701	1.662	0.852
66	26049.2342	-3.669914E+00	-1.261	1.772	-0.439
67	26532.3401	-5.956842E+00	2.359	-2.486	-2.118
68	26532.3401	7.524057E-01	-0.463	-0.434	0.091
69	27512.7029	-2.808892E+00	0.957	-1.130	-0.085
70	27512.7029	3.084237E-01	0.185	-0.027	-0.114
71	27951.7870	3.406439E-01	-0.012	-0.008	0.458
72	27951.7870	2.268072E+00	-0.108	-0.580	0.276
73	28010.1810	-5.392281E-01	-0.418	-0.193	0.001
74	28010.1810	2.781122E+00	1.257	0.131	-1.523
75	28346.6721	2.240320E+00	-3.312	0.464	-3.324
76	28346.6721	-2.042835E+00	1.955	0.215	-0.434
77	28832.8806	-4.501160E+00	2.232	-0.115	3.001
78	28832.8806	-8.013423E-01	-0.509	0.239	-0.630
79	29172.0119	9.589444E-01	-0.873	0.609	-0.536
80	29172.0119	2.515712E+00	1.882	0.957	-0.218
81	29447.8676	-4.072248E+00	-0.265	-0.284	1.493
82	29447.8676	1.878822E+00	1.102	-0.858	-0.668
83	29857.1444	3.878498E+00	0.850	0.483	1.200
84	29857.1444	1.872184E-01	0.033	-0.015	0.128
85	29881.7678	-5.906319E+00	-2.089	3.060	-7.515
86	29881.7678	3.386828E+00	3.901	1.884	-3.361
87	30204.0813	-1.414353E+00	-0.310	-0.287	1.441
88	30204.0813	4.718620E-01	-0.231	0.094	0.038
89	30671.7676	-1.688811E+00	-1.185	-0.381	0.760
90	30671.7676	4.328798E-01	-0.036	0.109	0.251
91	31021.9219	-6.120484E+00	-2.104	0.888	-0.674
92	31021.9220	8.130187E-01	0.229	0.314	-0.844
93	31129.1064	-6.128472E-02	-0.018	0.006	-0.002
94	31129.1065	-4.668956E+00	0.744	-0.707	0.002
95	31571.9239	5.419844E+00	1.001	0.489	2.441
96	31571.9239	-3.154547E+00	0.582	0.852	-2.900

1Load Case (33) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
97	31927.5859	-2.0330805E+00	-0.806	1.426	0.385
98	31927.5860	-7.5732805E-01	0.313	-0.121	0.026
99	44206.8137	3.1423785E+01	-17.172	0.015	13.028
100	44206.8714	-1.3226195E-01	-0.009	-0.023	0.028
101	45810.7731	-4.5185305E+00	2.211	0.863	0.026
102	45810.7810	-1.7631915E+01	-2.863	-3.897	4.971
103	46386.3053	2.7764265E+01	6.742	5.466	2.068
104	46386.4829	-1.0682325E+01	-0.169	-0.062	2.002
105	47783.8305	-2.8411435E+01	-6.975	4.247	-2.801
106	47783.8551	2.0439835E+01	6.714	-0.138	-3.008
	Sum of Modal Physical Loads		33.741	26.944	-11.107
0	Resultant of Applied Load		38.885	21.165	-17.823
	Unscaled Applied Load		3.86851E-01	2.11545E-01	-1.78228E-01

1Load Case (34) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
1	2682.1226	-4.6024315E-01	0.089	0.115	2.231
2	2682.1227	-4.1207655E+00	-0.545	-0.077	-13.385
3	5389.7998	4.8318835E+00	-1.553	0.302	-12.016
4	5389.7998	-2.7855295E-01	0.018	0.012	-0.200
5	7634.7190	-1.0170525E+00	-0.956	-5.096	-0.564
6	7634.7190	-6.8288525E+00	33.690	-0.244	16.154
7	9754.7032	-7.1832005E-01	0.364	-2.358	0.425
8	9764.7032	-2.6279405E-01	-0.814	-0.119	0.833
9	10518.8782	6.2449415E+00	1.078	-1.338	-6.283
10	10518.8782	2.4730615E+00	-0.285	-0.883	0.498
11	11036.6335	-4.7480525E-01	0.496	0.600	-0.738
12	11036.6335	1.0839545E+00	0.272	0.148	-0.746
13	11819.9365	4.2212345E+00	0.243	-0.206	7.083
14	11819.9365	-5.9084795E+00	-6.049	16.449	0.004
15	12083.1289	-2.9731435E+00	6.989	-6.553	0.795
16	12083.1289	-3.7251655E+00	-2.713	-3.008	-1.604
17	12883.4254	-1.4148845E+00	0.193	-0.311	-1.012
18	12883.4254	8.4700875E+00	1.141	-4.029	-2.487
19	13376.1488	1.2175945E+00	0.431	4.305	-0.081
20	13376.1488	-4.2385355E+00	-4.289	-1.316	-3.467
21	14957.0648	-1.4858785E+00	1.271	1.892	0.286
22	14957.0648	2.9068405E-01	-0.048	0.349	0.090
23	15395.3482	-9.5013855E-02	-0.021	-0.078	-0.177
24	15395.3482	5.2062705E+00	2.644	4.301	-7.793
25	16340.0113	4.4085175E+00	-0.334	7.923	0.218
26	16340.0113	-1.4885415E+00	3.282	0.938	-1.024
27	17880.1679	-3.0881895E+00	-0.065	0.458	-1.111
28	17880.1679	5.6367015E-01	-0.052	0.781	-0.313
29	18885.9195	-3.2120095E+00	-2.222	0.112	1.782
30	18885.9195	-1.5017825E+00	0.188	-0.226	-0.353

Mode Number	Frequency	Participation Factor	Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
31	18776.8321	1.0544195E+01	-1.778	2.798	4.705
32	18776.8321	-4.1865305E+00	0.216	0.432	-0.771
33	19240.4823	-1.0107885E+00	-0.766	0.244	0.441
34	19240.4823	-7.7134965E+00	6.597	-10.467	-3.306
35	19746.9190	3.7392615E+00	11.954	2.170	0.174
36	19746.9190	2.7144875E+00	3.404	-2.013	-0.428
37	20485.2283	5.4199195E-01	-0.788	-0.247	-0.348
38	20485.2283	-3.4737375E+00	-5.329	-2.587	-2.806
39	20700.9547	-1.3403425E+00	0.888	0.554	0.263
40	20700.9547	-5.5314505E+00	4.408	2.573	7.120
41	20837.8322	-3.8345335E-02	-0.030	-0.006	0.009
42	20837.8322	7.4436225E-01	0.146	-0.001	0.439
43	21107.7206	2.5508415E-01	-0.184	0.028	0.128
44	21107.7206	2.5988585E+00	-1.885	-1.517	-0.188
45	21584.5447	-5.8728885E+00	3.498	-6.528	-2.882
46	21584.5447	-4.3501705E-01	-0.132	-0.125	0.132
47	22013.6056	7.7013865E-01	0.713	0.180	-1.270
48	22013.6056	-4.3643475E+00	2.268	-2.087	1.947

1Load Case (34) Load Modal Participation Factors

Mode Number	Frequency	Participation Factor	Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
49	22545.5320	-2.8085525E-01	0.195	0.170	-0.063
50	22545.5320	-4.6885435E-01	0.863	-0.532	0.382
51	23063.2613	-1.9248665E+00	-0.399	-0.123	-1.172
52	23063.2613	2.7882825E+00	0.012	0.671	1.540
53	23586.0039	-2.8177495E+00	-1.647	-0.324	2.188
54	23586.0039	-2.1111885E+00	-0.186	-0.834	0.445
55	24016.6034	3.8886525E+00	-0.139	1.538	-3.087
56	24016.6034	2.7106935E+00	-3.488	0.903	0.848
57	24611.1870	2.4382185E+00	-0.585	-0.281	0.488
58	24611.1870	-2.8047545E+00	0.803	-0.018	0.431
59	24778.6283	6.8921145E+00	-2.940	3.859	2.713
60	24778.6283	-5.0063975E+00	-1.387	-1.308	-1.109
61	25125.3250	4.1933315E+00	4.839	-0.104	-0.885
62	25125.3250	-4.3836915E-01	0.291	-0.345	-0.187
63	25431.3284	6.2348375E-01	-0.038	0.002	-0.059
64	25531.3284	-5.9941975E+00	-6.325	5.010	2.903
65	26049.2342	6.4133675E+00	4.956	-3.049	-1.747
66	26049.2342	-5.5433765E-01	-0.180	0.270	-0.087
67	26532.3401	2.4701425E-01	-0.088	0.103	0.088
68	26532.3401	-1.9494845E+00	1.174	1.124	-0.226
69	27512.7029	4.7729875E+00	-1.628	1.921	0.145
70	27512.7029	-3.8407265E+00	-2.286	1.014	1.419
71	27961.7870	-5.7078855E+00	0.324	1.498	-7.860
72	27961.7870	-1.1871275E+00	0.067	0.309	-0.145
73	28010.1810	1.0841785E+00	0.841	0.388	-0.002
74	28010.1810	1.3103085E+00	0.592	0.062	-0.718
75	28346.6721	4.2486005E+00	-6.368	0.171	-6.378
76	28346.6721	-2.0483225E-01	0.156	0.021	-0.043
77	28832.8605	1.4506265E+00	-0.719	0.037	-0.887
78	28832.8605	-5.3341035E-01	-0.339	0.159	-0.419
79	28172.0119	-3.0255755E+00	2.763	-1.822	1.688

80	29172.0119	-8.6044106E-01	-0.637	-0.327	0.074
81	29447.8676	2.1258096E+00	0.139	0.148	-0.695
82	29447.8676	1.5486536E+00	0.907	-0.542	-0.485
83	29657.1444	4.0008682E+00	0.670	0.501	1.331
84	29657.1444	1.3297045E+00	0.238	-0.112	0.887
85	29861.7578	-3.5261856E+00	-1.217	1.847	-0.546
86	29861.7578	-2.7746521E+00	-3.197	-1.281	2.752
87	30204.0613	-1.2994856E+00	-0.285	-0.245	1.324
88	30204.0613	2.1192896E+00	-1.038	0.378	0.172
89	30871.7576	-3.8478066E+00	-2.723	-0.869	1.708
90	30871.7576	5.0857177E+00	-0.427	1.281	2.868
91	31021.9219	-1.8363866E-01	-0.063	0.021	-0.020
92	31021.9220	8.4873426E-01	0.212	0.292	-0.784
93	31129.1084	6.6885626E+00	2.062	-0.528	0.284
94	31129.1085	1.0010276E+00	-0.150	0.143	-0.493
95	31571.9339	1.3762176E+00	0.264	0.119	0.800
96	31571.9339	1.5333836E+00	-0.310	-0.319	1.408

1Load Case (34) Load Modal Participation Factors

0

Mode Number	Frequency	Participation Factor	Physical Load in Each Mode — Global X Direction X 1.0E+02	Global Y Direction X 1.0E+02	Global Z Direction X 1.0E+02
97	31927.5659	-8.5833346E-01	-0.340	0.602	0.167
98	31927.5680	9.2290166E-01	-0.382	0.147	-0.056
99	44205.8137	8.8891016E+00	-4.748	0.004	3.802
100	44205.8714	-2.8083806E+01	-1.919	-7.083	5.851
101	45810.7731	-2.7403446E+01	13.415	4.146	0.156
102	45810.7910	-1.8197756E+01	-2.708	-3.977	4.461
103	46306.3053	-1.8881646E+01	-4.101	-3.326	-1.252
104	46386.4829	1.0481726E+01	0.188	0.062	-1.884
105	47783.8305	3.0096546E+01	8.280	-5.029	3.436
106	47783.8551	2.0838876E+01	4.752	-0.088	-2.129
	Sum of Modal Physical Loads		51.133	-7.398	-11.583
0	Resultant of Applied Load		44.080	-1.022	-17.826
	Unscaled Applied Load		4.40802E-01	-1.02203E-02	-1.78248E-01

Appendix F

PERIODIC RESPONSE ANALYSIS (PRA) SOURCE CODE

```
      *DECK BCDIN
      SUBROUTINE BCDIN
C
C  READ IN PROPER DATA SETS.
C
      IMPLICIT DOUBLE PRECISION (A-H,O-Z)
      CHARACTER*24      CFIL,CFOUT
      CHARACTER*12      CNAM
      CHARACTER*7       CNF
      DIMENSION         CNF(3),INF(3)
      DIMENSION         X1(2),X2(3),X3(3),X4(2)
      COMMON /BCDOUC/   CFOUT
      COMMON /BCDOUI/   IXS8(8),AUX(4),X(10),IXS3(3)
      COMMON /CONSTS/   IP,  NSTEPS,NLDTV, NLOADS,
                        MXIP,MXSTEP,MXLDTV,MXLOAD
      COMMON /INBCDF/   LUNIT
      EQUIVALENCE       (AUX(1),AUX1),(AUX(2),AUX2),(AUX(3),AUX3),
                        (AUX(4),AUX4),
                        (X(1),X1),(X(3),X2),(X(6),X3),(X(9),X4)
      DATA CNF          /'EV.RV  ','LTH.CRM','LMPF.RV'/
      DATA NINF         / 3/
C
C
      LUNIT=8
      DO 20 I=1,NINF
      INF(I)=0
   20 CONTINUE
C
C  READ IN FILES
C
      OPEN (LUNIT,FORM='FORMATTED',STATUS='OLD')
C
  100 READ (LUNIT,1000,END=200)  CFIL,MFOR,MSEQ,MLEV,MLNG,MNRC,
                                 MIGR,MITY,MIAX
 1000 FORMAT (1X,A24,8I6)
C
C  READ AUXILIARY VALUES (2 LINES)
C
      READ (LUNIT,1020,END=300)  AUX1,AUX2,AUX3,AUX4
      READ (LUNIT,1040,END=300)  X1,X2,X3,X4
 1020 FORMAT(1X,4E13.6)
 1040 FORMAT(1X,10A4)
C
C  READ IN FORMATING
C
      READ (LUNIT,1060,END=300)  IC,IEXT,NWD
 1060 FORMAT(1X,2I2,I10)
C
C  CHECK FILE NAME.
C
      I1=INDEX(CFIL,']')
      I2=INDEX(CFIL,'.')
      CNAM=CFIL(I1+1:I2-1)
C
      IF(CNAM.EQ.'EV.RV')  THEN
```



```
        INF(1)=INF(1)+1
        IF(IP.EQ.  0)  IP=MIAX
        IF(IP.EQ.MIAX)  GO TO 120
        CALL EV2 (IP,MIAX)
        CALL EL2 ('E',
             'THE NUMBER OF MODES, $I, PREVIOUSLY DETERMINED DOES NOT',
             'EQUAL THE NUMBER IN THE EIGENVALUES FILE $I.')
  120   CALL EVRM (IC,IEXT,NWD)
C
      ELSEIF(CNAM.EQ.'LTH.CRM')  THEN
        INF(2)=INF(2)+1
        IF(MSEQ.LE.NLDTV)  GO TO 140
        NLDTV=MSEQ
        IF(NLDTV.LE.MXLDTV)  GO TO 140
        CALL EV2 (NLDTV,MXLDTV)
        CALL EL2 ('E',
             'THE NUMBER OF LOAD TIME VECTORS, $I, EXCEEDS THE MAXIMUM',
             'ALLOWABLE $I.')
        NLDTV=MXLDTV
        MSEQ=1
  140   NRS=MLNG/2
        CALL LTHCRM (IC,IEXT,NRS,MSEQ)
C
      ELSEIF(CNAM.EQ.'LMPF.RV')  THEN
        INF(3)=INF(3)+1
        IF(MSEQ.LT.NLOADS)  GO TO 160
        NLOADS=MSEQ
        IF(NLOADS.LE.MXLOAD)  GO TO 160
        CALL EC2 (NLOADS,MXLOAD)
        CALL EL2 ('W',
             'THE LOAD CASE INPUT, $I, EXCEEDS THE ALLOWABLE NUMBER OF',
             'LOAD CASES $I.')
        MSEQ=1
        NLOADS=MXLOAD
  160   IF(IP.EQ.  0)  IP=NWD
        IF(IP.EQ.NWD)  GO TO 180
        CALL EV2 (IP,NWD)
        CALL EL2 ('E',
          'THE NUMBER OF MODES, $I, PREVIOUSLY DETERMINED DOES NOT',
          'EQUAL THE NUMBER IN THE LMPF.RV FILE $I.')
  180   CALL LMPFRV (IC,IEXT,NWD,MSEQ)
        IF(INF(3).EQ.1)  THEN
        CFOUT=CFIL
        IXS8(1)=MFOR
        IXS8(2)=MSEQ
        IXS8(3)=MLEV
        IXS8(4)=MLNG
        IXS8(5)=MNRC
        IXS8(6)=MIGR
        IXS8(7)=MITY
        IXS8(8)=MIAX
        IXS3(1)=IC
        IXS3(2)=IEXT
        IXS3(3)=NWD
        END IF
```

```
111             ELSE
112               CALL EC1 (CFIL)
113               CALL EL1 ('F'
114                    'THE FILE $C IS NOT RECOGNIZED.  EXECUTION TERMINATED.')
115               CALL ERROR
116             END IF
117             GO TO 100
118       C
119         200 DO 220 I=1,NINF
120             IF(INF(I).NE.0)  GO TO 220
121             CALL EC1 (CNF(I))
122             CALL EL1 ('E'
123                  'THE INPUT FILE $C WAS NOT ON THE BCDOUT FILE.')
124         220 CONTINUE
125             IF(INF(3).EQ.NLOADS)  GO TO 240
126             CALL EV2 (INF(3),NLOADS)
127             CALL EL2 ('E'
128                  'THE NUMBER OF LOAD CASES INPUT, $I, DOES NOT EQUAL THE',
129                  'MAXIMUM LOAD CASE $I ')
130         240 IF(IP.LE.MXIP)  GO TO 320
131             CALL EV2 (IP,MXIP)
132             CALL EL2 ('E'
133                  'THE NUMBER OF MODES INPUT, $I, EXCEEDS THE MAXIMUM',
134                  'ALLOWABLE $I.')
135             GO TO 320
136       C
137         300 CALL EL1 ('E'
138             'END OF FILE ENCOUNTERED BEFORE EXPECTED.  EXECUTION TERMINATED.')
139         320 CALL ERROR
140             CLOSE (LUNIT)
141             RETURN
142       C
143             END
144       *DECK BCDOUT
145             SUBROUTINE BCDOUT (GR,FT,IP,NSTEPS)
146       C
147       C  BCDOUT THE GENERLIZED RESPONSE AND TIME POINTS
148       C
149             IMPLICIT DOUBLE PRECISION (A-H,O-Z)
150             CHARACTER*24      CFIL
151             DIMENSION         GR(IP,NSTEPS),FT(2,NSTEPS)
152             COMMON /ARRYS/    WN(500),DAMP(500),TLVEC(103,10),
153                               GF(500,200),R1X(2,200),R2X(500,200)
154             COMMON /BCDOUC/   CFIL
155             COMMON /BCDOUI/   MFOR,MSEQ,MLEV,MLNG,MNRC,
156                               MIGR,MITY,MIAX,
157                               AUX1,AUX2,AUX3,AUX4,
158                               X1(2),X2(3),X3(3),X4(2),
159                               IC,IEXT,NWD
160             COMMON /IO/       I1X,IOUT
161       C
162       C
163             LUNIT=9
164             OPEN (LUNIT,FORM='FORMATTED',STATUS='NEW')
165             LOC=INDEX(CFIL,']')
```



```
166       C
167       C  GENREALIZED RESPONSE.  LOOP OVER TIME POINTS, SET AUX2 = TO TIME OF
168       C  RESPONSE.
169       C
170             CFIL(LOC+1:LOC+12)='GR.RV        '
171             MIGR=IP
172       C
173             DO 100 NS=1,NSTEPS
174             AUX2=FT(1,NS)
175       C
176             WRITE (LUNIT,1000)  CFIL,MFOR,NS,MLEV,MLNG,MNRC
177                                 MIGR,MITY,MIAX
178        1000 FORMAT (1X,A24,8I8)
179       C
180             WRITE (LUNIT,1020)  AUX1,AUX2,AUX3,AUX4
181        1020 FORMAT (1X,4E13.6)
182       C
183             WRITE (LUNIT,1040)  X1,X2,X3,X4
184        1040 FORMAT (1X,10A4)
185       C
186             WRITE (LUNIT,1060)  IC,IEXT,NWD
187        1060 FORMAT (1X,2I2,I10)
188       C
189             WRITE (LUNIT,1080)  (GR(I,NS),I=1,IP)
190        1080 FORMAT (1X,4E17.10)
191       C
192         100 CONTINUE
193       C
194       C  TIME POINTS VECTOR.
195       C
196             CFIL(LOC+1:LOC+12)='TIME.RV      '
197             NS=0
198             MLNG=NSTEPS
199             AUX2=0.0
200             MIGR=0
201             WRITE (LUNIT,1000)  CFIL,MFOR,NS,MLEV,MLNG,MNRC,
202                                 MIGR,MITY,MIAX
203             WRITE (LUNIT,1020)  AUX1,AUX2,AUX3,AUX4
204             WRITE (LUNIT,1040)  X1,X2,X3,X4
205             WRITE (LUNIT,1060)  IC,IEXT,MLNG
206             WRITE (LUNIT,1080)  (FT(1,I),I=1,NSTEPS)
207       C
208             CLOSE (LUNIT)
209       C
210       C  OUTPUT CORNERS OF GENERALIZED RESPONSE AND TIMES.
211       C
212             WRITE (IOUT,2200)
213             IP1=1
214             IP2=IP1
215             IF(IP.GT.1)  IP2=2
216             IP3=IP2
217             IF(IP.GT.3)  IP3=IP-1
218             IP4=IP
219             DN1=DAMP(IP1)
220             DN2=DAMP(IP2)
```

```
      DN3=DAMP(IP3)
      DN4=DAMP(IP4)
      TWPI=0.125D+00/ATAN(1.00+00)
      FN1=WN(IP1)*TWPI
      FN2=WN(IP2)*TWPI
      FN3=WN(IP3)*TWPI
      FN4=WN(IP4)*TWPI
      WRITE (IOUT,2000)  IP1,IP2,IP3,IP4
      WRITE (IOUT,2020)  DN1,DN2,DN3,DN4
      WRITE (IOUT,2040)  FN1,FN2,FN3,FN4
      WRITE (IOUT,2080)
      DO 120 N=1,4
      NS=N
      IF(N.GT.2)  NS=NSTEPS-1
      IF(N.EQ.4)  NS=NSTEPS
      IF(N.EQ.3)  WRITE (IOUT,2120)
      WRITE (IOUT,2100)  NS,FT(1,NS),GF(IP1,NS),GF(IP2,NS),
                                     GF(IP3,NS),GF(IP4,NS)
  120 CONTINUE
C
      WRITE (IOUT,2000)  IP1,IP2,IP3,IP4
      WRITE (IOUT,2020)  DN1,DN2,DN3,DN4
      WRITE (IOUT,2040)  FN1,FN2,FN3,FN4
      WRITE (IOUT,2080)
      DO 140 N=1,4
      NS=N
      IF(N.GT.2)  NS=NSTEPS-1
      IF(N.EQ.4)  NS=NSTEPS
      IF(N.EQ.3)  WRITE (IOUT,2120)
      WRITE (IOUT,2100)  NS,FT(1,NS),GR(IP1,NS),GR(IP2,NS),
                                     GR(IP3,NS),GR(IP4,NS)
  140 CONTINUE
C
C
      RETURN
 2000 FORMAT (3(1X,/),' MODE                ',2I15,5X,2I15)
 2020 FORMAT (        ' DAMPING             ',2F15.4,5X,2F15.4)
 2040 FORMAT (        ' FREQUENCY (CPS)     ',2F15.4,5X,2F15.4)
 2080 FORMAT (' STEP          TIME',2(5X,'MODAL LOAD'),5X,
     2(5X,'MODAL LOAD'),/,1X)
 2080 FORMAT (' STEP          TIME',2(5X,'MODAL DISP'),5X,
     2(5X,'MODAL DISP'),/,1X)
 2100 FORMAT (I5,1P3E15.8,5X,1P2E15.8)
 2120 FORMAT ( 2 (2X,5X,3(7X,' ',7X),5X,2(7X,' ',7X),/ )
     2X,5X,3(7X,' ',7X),5X,2(7X,' ',7X)' )
 2200 FORMAT ('1')
      END
*DECK BNNRPG
      SUBROUTINE BNNRPG
C
C  WRITE   P R A   BANNER
C
      IMPLICIT DOUBLE PRECISION (A-H,O-Z)
      CHARACTER       C180X*180,VER*30
      COMMON /HEADRC/  C180X,VER
```



```
      COMMON /IO/      IOIN,IOUT
C
C
      WRITE (IOUT,1000)
 1000 FORMAT ('1',1(/)
     24X,'XXXXXXXXXX  ',3X,'XXXXXXXXXX  ',3X,' XXXXXXXXX ',/,
     23X,'XXXXXXXXXXX ',3X,'XXXXXXXXXXX ',3X,'XXXXXXXXXXX',/,
     22X,'XXXX    XXXX ',3X,'XXXX    XXXX ',3X,'XXXX    XXXX',/,
     21X,'XXXX    XXXX ',3X,'XXXX    XXXX ',3X,'XXXX    XXXX',/,
     20X,'XXXXXXXXXXX ',3X,'XXXXXXXXXXX ',3X,'XXXX    XXXX',/,
     19X,'XXXXXXXXXX  ',3X,'XXXXXXXXXX  ',3X,'XXXXXXXXXX ',/,
     18X,'XXXX        ',3X,'XXXX  XXXX   ',3X,'XXXXXXXXXXX',/,
     17X,'XXXX        ',3X,'XXXX  XXXX   ',3X,'XXXX    XXXX',/,
     16X,'XXXX        ',3X,'XXXX    XXXX ',3X,'XXXX    XXXX',/,
     15X,'XXXX        ',3X,'XXXX    XXXX',3X,'XXXX    XXXX')
C
      VER='VERSION  1.1X-- 20SEP88       '
      WRITE (IOUT,1100)
 1100 FORMAT (/20X,'PERIODIC RESPONSE ANALYSIS   VERSION  1.1X',/,
     /20X,'P------- R------- A-------    20 SEP 1988',/)
C
      WRITE (IOUT,1200)
 1200 FORMAT (1X,/
     20X,'       BY     JOHN M. DICKENS, PH.D.      ')
C
C
      RETURN
      END
*DECK ERROR
      SUBROUTINE ERROR
C
C  GENERAL ROUTINE FOR ERROR MESSAGES
C
C    1  SET CHARACTER VARIABLES IN ERROR MESSAGE
C       CALL ECN (C1,C2,...,CN)       (1 .LE. N .LE. 5)
C
C    2  SET INTEGER/REAL VARIABLES IN ERROR MESSAGES
C       CALL EVN (I1,I2,...,IN)       (1 .LE. N .LE. 5)
C
C    3  WRITE OUT ERROR LINES
C       CALL ELN (KOD,L1,L2,...,LN)  (1 .LE. N .LE. 5)
C      KOD = 'E'  ERROR
C          = 'W'  WARNING
C          = ' '  CONTINUES ON WITH PREVIOUS MESSAGE
C          = 'F'  STOPS WITH MESSAGE TO SEE PROGRAM DEVELOPERS
C
C  ALL PARAMETERS ARE SIZED FOR A MAXIMUM OF 5 VARIABLES (I.E. FOR ALL
C  LINES 5 INTERIOR $(S) )
C
C  *LINE*    A) PRINT INPUT RECORD (80)   (GOVERNS)
C            B) 63 COLUMNS  8-70 FOR  *LINE*   (AFTER A
C            QUOTE IN COLUMN 7 AND A QUOTE,COMMA IN 71,72)
C  *VARCHR*  MAXIMUM IS 5(13)=65  (GOVEREND BY 1PE13.5)
C  *CHR*     IS SIZED FOR 5 VARIABLES OF 20 CHARACTERS
C
```

```
      C
            IMPLICIT DOUBLE PRECISION (A-H,O-Z)
            REAL              RS,RI
            CHARACTER*1       KOD,KOD1,KOD2,KOD3,KOD4,KOD5,C,CLP,CRP
            CHARACTER*(*)     CHR1,CHR2,CHR3,CHR4,CHR5
                              LINE1,LINE2,LINE3,LINE4,LINE5
            CHARACTER         LINE*80,VARCHR*85,CHR*100
            CHARACTER         HED1*4,C4X*4,HED2*7,HEDI*7
      C
            DIMENSION         I1(2),I2(2),I3(2),I4(2),I5(2)
            DIMENSION         HEDI(3)
            DIMENSION         LC(2,6),LV(2,6)
            DIMENSION         R(5),RI(5)
            EQUIVALENCE       (R,RS),(I,RI)
            COMMON /ERRECN/   VARCHR,CHR
            COMMON /ERRCSZ/   ICR(2,6)
            COMMON /ERREVN/   I(5),RS(2,5)
            COMMON /ERRTOT/   NERROR,MAXERR,NRWDS
            COMMON /IO/       IIX,IOUT
      C
            DATA C4X          /'    '/
            DATA CLP,CRP      /'(',')'/
            DATA HEDI         /'ERROR  ','WARNING',       '/
      C
      CCC   STOP EXECUTION IF ANY ERRORS
      C
            IF(NERROR.EQ.0)  RETURN
         40 WRITE (IOUT,2100) NERROR
            KKOD=0
         60 CONTINUE
      CCC   60 CALL ENDIT
            IF(KKOD.EQ.0)  STOP
            ADUMP=-1.D+00
            ADUMP=SQRT(ADUMP)
            IF(ADUMP.NE.1.D+00) STOP
      C
      CCC   ENTRIES TO SET/SAVE CHARACTER VARIABLE(S) FOR ERROR LINE(S)
      C
            ENTRY EC1 (CHR1)
            ICR(2,2)=0
            GO TO 110
            ENTRY EC2 (CHR1,CHR2)
            ICR(2,3)=0
            GO TO 120
            ENTRY EC3 (CHR1,CHR2,CHR3)
            ICR(2,4)=0
            GO TO 130
            ENTRY EC4 (CHR1,CHR2,CHR3,CHR4)
            ICR(2,5)=0
            GO TO 140
            ENTRY EC5 (CHR1,CHR2,CHR3,CHR4,CHR5)
            ICR(2,6)=0
      C
            ICR(1,5)=ICR(2,6)+1
```



```
            ICR(2,5)=ICR(2,6)+LEN(CHR5)
            CHR(ICR(1,5):ICR(2,5))=CHR5
     140    ICR(1,4)=ICR(2,5)+1
            ICR(2,4)=ICR(2,5)+LEN(CHR4)
            CHR(ICR(1,4):ICR(2,4))=CHR4
     130    ICR(1,3)=ICR(2,4)+1
            ICR(2,3)=ICR(2,4)+LEN(CHR3)
            CHR(ICR(1,3):ICR(2,3))=CHR3
     120    ICR(1,2)=ICR(2,3)+1
            ICR(2,2)=ICR(2,3)+LEN(CHR2)
            CHR(ICR(1,2):ICR(2,2))=CHR2
     110    ICR(1,1)=ICR(2,2)+1
            ICR(2,1)=ICR(2,2)+LEN(CHR1)
            CHR(ICR(1,1):ICR(2,1))=CHR1
            RETURN
      C
      CCC   ENTRIES FOR SET/SAVE INTEGER/REAL VARIABLES FOR ERROR LINE(S)
      C
            ENTRY EV5 (R1,R2,R3,R4,R5)
            IEV=5
            GO TO 250
            ENTRY EV4 (R1,R2,R3,R4)
            IEV=4
            GO TO 240
            ENTRY EV3 (R1,R2,R3)
            IEV=3
            GO TO 230
            ENTRY EV2 (R1,R2)
            IEV=2
            GO TO 220
            ENTRY EV1 (R1)
            IEV=1
            GO TO 210
      C
     250    R(5)=R5
     240    R(4)=R4
     230    R(3)=R3
     220    R(2)=R2
     210    R(1)=R1
            IF(NRWDS.EQ.1)  THEN
              DO 280 IV=1,IEV
              RI(IV)=R(IV)
     280      CONTINUE
            ELSE
              DO 290 IV=1,IEV
              RI(IV)=RS(1,IV)
     290      CONTINUE
            END IF
            RETURN
      C
      CCC   ENTRIES FOR PRINTING ERROR LINE(S) AFTER ANY VARIABLES HAVE BEEN
      CCC     INITIALIZED.  A DOLLAR CHARACTER ($I  $R  $C ) PRINTS A VARIABLE
      CCC     (TYPE DECLARED BY CHARACTER FOLLOWING $) IN THE MESSAGE LINE
      CCC     WITH THE VARIABLE DISPLAYED IN PARENTHESIS
      C
```

```
441             ENTRY EL1 (KOD,LINE1)
442               NLINE=1
443               GO TO 300
444             ENTRY EL2 (KOD,LINE1,LINE2)
445               NLINE=2
446               GO TO 300
447             ENTRY EL3 (KOD,LINE1,LINE2,LINE3)
448               NLINE=3
449               GO TO 300
450             ENTRY EL4 (KOD,LINE1,LINE2,LINE3,LINE4)
451               NLINE=4
452               GO TO 300
453             ENTRY EL5 (KOD,LINE1,LINE2,LINE3,LINE4,LINE5)
454               NLINE=5
455         C
456           300 IF(KOD.EQ.' ')  THEN
457               IKOD=0
458               HED1=C4X
459               HED2=HEDI(3)
460             ELSE
461               IF(KOD.EQ.'W')  THEN
462                 IKOD=2
463               ELSE
464                 IKOD=1
465                 NERROR=NERROR+1
466               ENDIF
467               WRITE (IOUT,2060)
468               HED1=' ***'
469               HED2=HEDI(IKOD)
470             END IF
471         C
472             NIR=0
473             NCW=0
474             DO 500 LIN=1,NLINE
475         C
476             GO TO (310,320,330,340,350),LIN
477           310 NCL=LEN(LINE1)
478               LINE=LINE1
479               GO TO 390
480           320 NCL=LEN(LINE2)
481               LINE=LINE2
482               GO TO 390
483           330 NCL=LEN(LINE3)
484               LINE=LINE3
485               GO TO 390
486           340 NCL=LEN(LINE4)
487               LINE=LINE4
488               GO TO 390
489           350 NCL=LEN(LINE5)
490               LINE=LINE5
491         C
492           390 ND=0
493               LC(1,1)=1
494               LV(1,1)=1
495               DO 420 N=1,NCL
```



```
496               IF(LINE(N:N).NE.'$')  GO TO 420
497               ND=ND+1
498               C=LINE(N+1:N+1)
499         C
500               IF(C.EQ.'I')  THEN
501                 NIR=NIR+1
502                 WRITE  ( VARCHR(LV(1,ND):),2010)  I(NIR)
503                 NN=5
504               ELSE IF(C.EQ.'R') THEN
505                 NIR=NIR+1
506                 WRITE  ( VARCHR(LV(1,ND):),2020)  R(NIR)
507                 NN=12
508               ELSE IF(C.EQ.'C') THEN
509                 NCW=NCW+1
510                 WRITE  ( VARCHR(LV(1,ND)),2030)  CHR(ICR(1,NCW):ICR(2,NCW))
511                 NN=ICR(2,NCW)-ICR(1,NCW)
512               ELSE
513                 STOP
514               END IF
515         C
516               ND1=ND+1
517               LC(2,ND)=N-1
518               LC(1,ND1)=N+2
519               LV(2,ND)=LV(1,ND)+NN
520               LV(1,ND1)=LV(2,ND)+1
521           420 CONTINUE
522         C
523               IF(ND.EQ.0)  THEN
524                 WRITE (IOUT,2040)  HED1,HED2,LINE(1:NCL)
525                 ELSE
526                 LC(2,ND1)=NCL
527                 WRITE (IOUT,2000)  HED1,HED2,(LINE(LC(1,N):LC(2,N)),CLP,
528                                    VARCHR(LV(1,N):LV(2,N)),CRP,N=1,ND),
529                                    LINE(LC(1,ND1):LC(2,ND1))
530               END IF
531               HED1=C4X
532               HED2=HEDI(3)
533           500 CONTINUE
534         C
535               IF(KOD.EQ.'F')  GO TO 540
536               IF(NERROR.GE.MAXERR)  GO TO 40
537               RETURN
538         C
539           540 KKOD=1
540               WRITE (IOUT,2120)
541               GO TO 80
542         C
543         C
544          2000 FORMAT (A4,A7,1X,10(A,A1,A,A1),A)
545          2010 FORMAT (I6)
546          2020 FORMAT (1PE13.5)
547          2030 FORMAT (A)
548          2040 FORMAT (A4,A7,1X,A)
549          2060 FORMAT (1X)
550          2100 FORMAT (1X,/,' ***(',I2,') FATAL ERRORS DETECTED ',/,
```

```
      /  9X,'EXECUTION TERMINATED.')
 2120 FORMAT (12X,'SEE PROGRAM DEVELOPERS')
C
      END
*DECK INTPLD
      SUBROUTINE INTPLD
C
C  INTERPLOATE LOADS.
C
      IMPLICIT DOUBLE PRECISION (A-H,O-Z)
      COMMON /CONSTS/  IP,NSTEPS,NLDTV,NLOADS
      COMMON /ARRYS/   WN(500),DAMP(500),ILVEC(103,10),TLVEC(103,10),
                       GF(500,200),FT(2,200),PFL(500,200)
C
C
C  FIND MAXIMUM TIMES
C
      TMAX=0.0D+00
      DO 100 NL=1,NLDTV
      DO 40  K=1,100
      IF(ILVEC(K,NL).EQ.0)  GO TO 60
      KK=K
   40 CONTINUE
      CALL EV1 (NL)
      CALL EL1 ('W'
     .         ,'FOR LOAD TIME HISTORY $I, LAST LOAD CASE WAS AT 100')
   60 ILVEC(103,NL)=KK
      TLVEC(103,NL)=TLVEC(KK,NL)
      TMAX=MAX(TMAX,TLVEC(KK,NL))
C
      IF(TLVEC(1,NL).EQ.0.0D+00)  GO TO 100
      CALL EV3 (NL,TLVEC(1,NL),ILVEC(1,NL))
      CALL EL2 ('W'
     .         ,'FOR LOAD TIME HISTORY $I, THE INITIAL TIME IS $R.'
     .         ,'FOR TIME ZERO  THE LOAD CASE IS SET TO $I.')
      L=KK
      DO 80 K=1,KK
      ILVEC(L+1,NL)=ILVEC(L,NL)
      TLVEC(L+1,NL)=TLVEC(L,NL)
      L=L-1
   80 CONTINUE
      KK=KK+1
      ILVEC(103,NL)=KK
      TLVEC(  1,NL)=0.0D+00
C
  100 CONTINUE
C
C  FIX ALL TABLES AT MAXIMUM TIME.
C
      DO 200 NL=1,NLDTV
      KK =ILVEC(103,NL)
      TNL=TLVEC(103,NL)
      IF(TNL.EQ.TMAX)  GO TO 160
      CALL EV3 (NL,TNL,TMAX)
      CALL EL3 ('W'
```



```
     .         ,'LOAD TIME CASE $I.  MAXIMUM TIME IS $R AND'
     .         ,'MAXIMUM TIME FOR ALL LOAD TIME CASES IS $R.'
     .         ,'ADDED AN ADDITIONAL TIME POINT.')
      KK=KK+1
      ILVEC(103,NL)=KK
      ILVEC(KK,NL)=ILVEC(KK-1,NL)
      TLVEC(KK,NL)=TMAX
C
  160 IF(ILVEC(1,NL).EQ.ILVEC(KK,NL))  GO TO 200
      CALL EV4 (NL,TLVEC(1,NL),KK,ILVEC(KK,NL))
      CALL EL2 ('E'
     .,'LOAD CASE $I, AT TIME=0.  LOAD VECTOR IS $I AND AT THE LAST',
     .,'TIME STEP $I, THE LOAD VECTOR IS $I WHICH MUST BE EQUAL.')
  200 CONTINUE
C
C  INTERPOLATE FOR GERALIZED LOADS
C
      CALL ERROR
      DT=TMAX/(NSTEPS-1)
      T=0.0D+00
      DO 260 NS=1,NSTEPS
      FT(1,NS)=T
      FT(2,NS)=0.0D+00
      T=T+DT
      DO 240 I=1,IP
      GF(I,NS)=0.0D+00
  240 CONTINUE
  260 CONTINUE
      FT(1,NSTEPS)=TMAX
C
      DO 360 NL=1,NLDTV
      II=1
      IL1=ILVEC(II,NL)
      TL1=TLVEC(II,NL)
      II=II+1
      IL2=ILVEC(II,NL)
      TL2=TLVEC(II,NL)
      DO 340 NS=1,NSTEPS
      T=FT(1,NS)
  280 IF(T.LE.TL2)  GO TO 300
      IL1=ILVEC(II,NL)
      TL1=TLVEC(II,NL)
      II=II+1
      IL2=ILVEC(II,NL)
      TL2=TLVEC(II,NL)
      GO TO 280
  300 TT=(T-TL1)/(TL2-TL1)
      DO 320 I=1,IP
      GF(I,NS)=GF(I,NS) + PFL(I,IL1) + (PFL(I,IL2)-PFL(I,IL1))*TT
  320 CONTINUE
  340 CONTINUE
  360 CONTINUE
C
C  FINAL REDUNDANT CHECK
C
```

```
      DO 400 I=1,IP
      IF(GF(I,1).EQ.GF(I,NSTEPS))  GO TO 400
      CALL EV3 (I,GF(I,1),GF(I,NSTEPS))
      CALL EL2 ('E'
     *     'FOR MODE $I, THE INITIAL LOAD, $R, DOES',
     *     ' NOT EQUAL THE FINAL  LOAD, $R,')
  400 CONTINUE
C
C
      CALL ERROR
      RETURN
      END
*DECK PRA
      PROGRAM PRA
C
C  PROGRAM TO CXALCULATE THE PERIODIC RESPONSE (IN THE TIME DOMAIN) FOR
C  AN APPLIED PERIODIC TIME DOMAIN LOADING.  PROGRAM COMPUTES THE
C  GENERALIZED RESPONSE ONLY.
C
C  THERE IS NO INPUT TO THE PROGRAM EXCEPT THE *BCDIN* FILE "FORTRAN
C  UNIT 8" (VAX=FOR008.DAT).  NUMBER OF STEPS IS CONTROLLED BY SETTING
C  "NSTEPS" BELOW.  THE NSTEPS MUST INCLUDE THE FIRST AND LAST POINTS OF
C  THE LOADING TIME PERIOD (THERE ARE CHECKS TO SEE THAT THE FIRST TIME
C  POINT LOADING AND LAST TIME POINT LOADING ARE THE SAME).  EVERTHING
C  ELSE SHOULD BE SET BY "BCDIN" FILE.
C
C  OUTPUT IS A LITTLE PRINT-OUT BUT REALLY IS *BCDOUT* FILE "FORTRAN
C  UNIT 9" (VAX=FOR009.DAT)
C
C  THIS IS A VAX DOUBLE PRECISION VERSION.  TO CREATE A SINGLE PRECISION
C  (PRONOUNCED CRAY) IN THE EDITOR:
C                 "S/D+00//W" AND
C                 "S/C     IMPLICIT DOUBL/      IMPLICIT DOUBL/W"
C  THIS HASN'T BEEN DONE SO WOULD ALSO HAVE TO DEBUG.
C
C                                                    JMD  9/18/88
      IMPLICIT DOUBLE PRECISION (A-H,O-Z)
      COMMON /CONSTS/  IP    NSTEPS,NLDTV  NLOADS,
                       MXIP MXSTEP MXLDTV MXLOAD
      COMMON /ARRYS/   WN(500) DAMP(500) ILVEC(103,10) TLVEC(103,10),
                       GF(500,200),FT(2,200),GR(500,200)
C
      COMMON /ERRCSZ/  ICR(2,6)
      COMMON /ERREVN/  I(5) RS(2,5)
      COMMON /ERRTOT/  NERROR,MAXERR,NRWDS
      COMMON /IO/      IIX,IOUT
C
C
      IOUT=6
      MAXERR=50
      CALL PRCPRS (NRWDS)
      CALL BNNRPG
C
      IP    =0
```



```
      MXIP  =500
      NSTEPS= 72 + 1
      MXSTEP=200
      NLDTV =0
      MXLDTV=10
      NLOADS=0
      MXLOAD=200
C
C  TEST PROGRAM
C
      ITEST=0
      IF(ITEST.EQ.0)  GO TO 20
      CALL TESTRA
      GO TO 120
C
C  INPUT DIAL BCDOUT DATA SETS.
C
   20 CALL BCDIN
      CALL INTPLD
C
C  SET DAMPING.
C
      DO 80 N=1,IP
      DAMP(N)=0.001D+00
   80 CONTINUE
C
C  EVALUATE PERIODIC RESPONSE
C
      CALL PRESPA (WN,DAMP,GF,FT,GR
     *             NSTEPS,IP,NSTEPS)
C
C  OUTPUT GENERALIZED RESPONSE AND TIMES.
C
  120 CALL BCDOUT (GR,FT,IP,NSTEPS)
C
      END
*DECK PRCPRS
      SUBROUTINE PRCPRS (NPR)
C
C  THIS ROUTINE WILL SET THE PRECISION OF A PROCESSOR (IF IT IS CALLED
C  PROPERLY).  *NPR* IS RETURNED AND GIVES THE NUMBER OF PHYSICAL WORDS
C  PER "LOGICAL" REAL WORDS OF A PROCESSOR.  IT IS ASSUMED THAT IF THE
C  PROGAMMER WANTS A DOUBLE PRECISION PROCESSOR, HE/SHE HAS PUT
C  "      IMPLICIT DOUBLE PRECISION (A-H,O-Z)" IN ALL ROUTINES!!
C
      IMPLICIT DOUBLE PRECISION (A-H,O-Z)
      DIMENSION       R(2),ISD(3)
      EQUIVALENCE     (R,ISD),(IPR,R(2))
      DATA ISD        / 0,1,2/
C
      NPR=IPR
      RETURN
      END
*DECK PRESPA
      SUBROUTINE PRESPA (FQ,DAM,PTF,PA,X,
```

```
                                NTIME,NM,NPTS)
C
C  DRIVER ROUTINE FOR SOLUTION OF PERIODIC RESPONSE IN THE TIME DOMAIN.
C
      IMPLICIT DOUBLE PRECISION (A-H,O-Z)
      DIMENSION       FQ(NM),DAM(NM),PTF(500,1),X(NM,NTIME),PA(2,1)
C
C
      DDT=(PA(1,NPTS)-PA(1,1))/(NTIME-1)
      DO 200 M=1,NM
      W=FQ(M)
      DAMP=DAM(M)
      WW=W*W
      ZW=DAMP*W
      TZW=2.0D+00*ZW
      WD=W*SQRT(1.0D+00-DAMP**2)
      FB=TZW/(WW*WW)
      FA=ZW/WW
      FV=ZW*WW
      FVD=WW*(2.0D+00*DAMP**2-1.0D+00)
      FBB=(2.0D+00*DAMP**2-1.0D+00)/WW
C
      V0=0.0D+00
      VD0=0.0D+00
      DO 20 NS=1,NPTS
      PA(2,NS)=PTF(M,NS)
   20 CONTINUE
      CALL PRESPB (W,DAMP,PA,NPTS,V0,VD0,IRES)
C
      IF(IRES.EQ.0.0D+00)  GO TO 60
      CALL EV1 (M)
      CALL EL2 ('E'
     *  'RESONANCE IN MODE $I   SOLUTION FOR THIS MODE IS UNDEFINED.',
     *  'RESET DAMPING TO A LARGER VALUE AND RERUN.')
      DO 40 I=1,NTIME
      X(M,I)=0.0D+00
   40 CONTINUE
      GO TO 200
C
   60 L=1
      II=1
      X(M,1)=V0
C
   80 B=(PTF(M,II+1)-PTF(M,II))/(PA(1,II+1)-PA(1,II))
      A=PTF(M,II)
      DELT=PA(1,II+1)-PA(1,II)
C
  120 EX=EXP(-ZW*DELT)
      FT=WD*DELT
      CS=COS(FT)
      SN=SIN(FT)
      VT=(VD0+ZW*V0-FA*A+FBB*B)*SN/WD
      VT=VT+(V0-A/WW+FB*B)*CS
      VT=VT*EX+A/WW-FB*B+B*DELT/WW
      VDT=(A-WW*V0-ZW*(VD0+B/WW))*SN/WD
```



```
      VDT=EX*((VD0-B/WW)*CS+VDT)+B/WW
      VDDT=(B+FV*V0+FVD-ZW*A)/WD
      VDDT=EX*((A-WW*V0-TZW*VD0)*CS+VDDT*SN)
      V0=VT
      VD0=VDT
C
      II=II+1
      L=L+1
      X(M,L)=VT
      IF(L.LT.NPTS)  GO TO 80
  200 CONTINUE
C
      RETURN
      END
*DECK PRESPB
      SUBROUTINE PRESPB (W,DAMP,PA,NPTS,GO,
                         GDO,IRES)
C
C  DETERMINE PREIODIC RESPONSE INITIAL CONDITIONS.
C
      IMPLICIT DOUBLE PRECISION (A-H,O-Z)
      DIMENSION       PA(2,NPTS)
C
C
      WW=W*W
      ZW=DAMP*W
      WD=W*SQRT(1.0D+00-DAMP**2)
      TZW=2.0D+00*DAMP/W
C
C  1   ZERO INITIAL CONDITIONS
C
      DO 10 I=2,NPTS
      DT=PA(1,I)-PA(1,I-1)
      A1=(PA(2,I)-PA(2,I-1))/WW/DT
      A0=PA(2,I-1)/WW-TZW*A1
      A2=G0-A0
      A3=(GDO+ZW*A2-A1)/WD
      TEMP=EXP(-ZW*DT)
      WDOT=WD*DT
      EXPCOS=TEMP*COS(WDOT)
      EXPSIN=TEMP*SIN(WDOT)
      G0=A0+A1*DT+A2*EXPCOS+A3*EXPSIN
      GDO=A1+(WD*A3-ZW*A2)*EXPCOS-(WD*A2+ZW*A3)*EXPSIN
   10 CONTINUE
C
C  2   INFLUENCE DUE TO UNIT INITIAL DISPLACEMENT AND VELOCITY
C
      DT=PA(1,NPTS)-PA(1,1)
      WDOT=WD*DT
      TEMP=EXP(-ZW*DT)
      EXPCOS=TEMP*COS(WDOT)
      EXPSIN=TEMP*SIN(WDOT)
      A3=ZW*EXPSIN/WD
      G11=EXPCOS+A3
      G21=-WD*EXPSIN-ZW*A3
```

```
881             G12=EXPSIN/WD
882             G22=EXPCOS-A3
883       C
884       C  3.  SOLVE FOR BOUNDARY CONDITIONS.
885       C      RESONANCE DEFINED AS 10(10) MAGNIFICATION FACTOR.
886       C
887             IRES=1
888             RES=10.0D+00**(-10)
889             G11=G11-1.0D+00
890             G22=G22-1.0D+00
891             IF(ABS(G11).LT.RES .OR. ABS(G22).LT.RES)  GO TO 100
892             TEMP=G21/G11
893             G22=G22-TEMP*G12
894             GD0=(-GD0+TEMP*G0)/G22
895             G0=(-G0-G12*GD0)/G11
896             IRES=0
897       C
898       C
899         100 RETURN
900             END
901       *DECK READIT
902             SUBROUTINE READIT
903       C
904       C  READ IN APPRORPRIATE FILE.
905       C
906             IMPLICIT DOUBLE PRECISION (A-H,O-Z)
907             CHARACTER*69     LINE
908             COMMON /CONSTS/  IP,NSTEPS,NLDTV,NLOADS
909             COMMON /ARRYS/   WN(500),DAMP(500),ILVEC(103,10),TLVEC(103,10),
910                              GF(500,200),FT(2,200),PFL(500,200)
911             COMMON /INBCDF/  LUN
912       C
913       C
914             ENTRY EVRM (IC,IEXT,NWD1)
915             INRTY=1
916             DO 120 I=1,NWD1,4
917             READ (LUN,1010,END=900) LINE
918             I1=I
919             IF(I1.GT.IP)  GO TO 120
920             I2=MIN(IP,I1+3)
921             READ (LINE,1000,END=900)  (WN(J),J=I1,I2)
922         120 CONTINUE
923             DO 140 I=1,IP
924             WN(I)=SQRT(WN(I))
925         140 CONTINUE
926             RETURN
927        1000 FORMAT (1X,4E17.10)
928        1010 FORMAT (A69)
929       C
930             ENTRY LTHCRM (IC,IEXT,NRS,NL)
931             INRTY=2
932             DO 220 I=1,NRS
933             IF(I.NE.1)
934             READ (LUN,1020,END=900)  IC,IEXT,NWD2
935             IF(I.EQ.NRS)  GO TO 240
```



```
936             READ (LUN,1040,END=900)  ILVEC(I,NL)
937             READ (LUN,1020,END=900)  IC,IEXT,NWD2
938             READ (LUN,1000,END=900)  TLVEC(I,NL)
939         220 CONTINUE
940         240 READ (LUN,1040,END=900)  IC1,IC2
941             IF(IC1.EQ.1.AND.IC2.EQ.2)  GO TO 260
942             CALL EV2 (NL,IC1,IC2)
943             CALL EL2 ('E',
944                  'THE LAST RECORD OF THE LTH CRM, SEQUENCE NUMBER $I, IS'
945                  ,' $I, $I AND SHOULD BE (1), (2).')
946         260 RETURN
947        1020 FORMAT(1X,2I2,I10)
948        1040 FORMAT (1X,2I7)
949       C
950             ENTRY LMPFRV (IC,IEXT,NWD3,NLD)
951             INRTY=3
952             READ (LUN,1000,END=900)  (PFL(J,NLD),J=1,NWD3)
953             RETURN
954       C
955         900 CALL EV1 (IENTRY)
956             CALL EL1 ('E','READIT ENTRY $I, UNEXPECTED END OF FILE ')
957             CALL ERROR
958             RETURN
959             END
960       *DECK TESTRA
961             SUBROUTINE TESTRA
962       C
963       C  SUBROUTINE TO TEST *PRA* PROGRAM.
964       C
965             IMPLICIT DOUBLE PRECISION (A-H,O-Z)
966             COMMON /CONSTS/  IP,NSTEPS
967             COMMON /ARRYS/   WN(500),DAMP(500),ILVEC(103,10),TLVEC(103,10),
968                              GF(500,200),FT(2,200),GR(100000)
969       C
970             COMMON /IO/      I1X,IOUT
971       C
972       C
973       C  31 STEPS AT .1 DAMPING OF A COSINE LOAD WITH PERIOD 2.0
974       C
975             IP=5
976             D0=.1D+00
977             NSTEPS=31
978             T=2.0D+00
979       C
980             DO 40 N=1,IP
981             DAMP(N)=D0
982             RN=FLOAT(N)
983             IF(N.EQ.5)  RN=10.0D+00*RN
984             WN(N)=RN
985             RN2=RN**2
986             DO 20 NS=1,NSTEPS
987             GF(N,NS)=RN2
988         20  CONTINUE
989         40  CONTINUE
990             W=8.0D+00*ATAN(1.0D+00)/T
```

```
      DT=T/(NSTEPS-1)
      T=0.00+00
      DO 80 NS=1,NSTEPS
      FT(1,NS)=T
      FT(2,NS)=0.00+00
      CSWT=COS(W*T)
      DO 60 N=1,IP
      GF(N,NS)=GF(N,NS)*CSWT
   60 CONTINUE
      T=T+DT
   80 CONTINUE
      DO 100 N=1,IP
      GF(N,NSTEPS)=GF(N,1)
  100 CONTINUE
C
C  EVALUATE PERIODIC RESPONSE.
C
      CALL PRESPA (WN,DAMP,GF,FT,GR,
     1             NSTEPS,IP,NSTEPS)
C
C  OUTPUT GENERALIZED RESPONSE AND TIMES.
C
      WRITE (IOUT,2000)  DO W
      WRITE (IOUT,2020)  (I,I=1,IP)
      WRITE (IOUT,2040)  (WN(J),J=1,IP)
      IL=1
      IH=IP
      DO 120 N=1,NSTEPS
      WRITE (IOUT,2060)  N,FT(1,N),(GR(I),I=IL,IH)
      IL=IL+IP
      IH=IH+IP
  120 CONTINUE
C
      RETURN
C
C
 2000 FORMAT ('1DAMPING =',1PE11.3,/,1X,/
     1        ,' WF     =',1PE11.3)
 2020 FORMAT (1X,/,' TIME                ',5(9X,'MODE',I2))
 2040 FORMAT (' STEP            TIME',5(6X,'WN =',0PF5.2),/,1X)
 2060 FORMAT (I5,1P6E15.6)
      END
```

Appendix G

DYNAMIC ANALYSIS POST-PROCESSING RUNSTREAMS

TABLE of CONTENTS

Directory [FONG.SSME.IMP.OUT] Device SAM_DISK

File	Type	Version	Date	Time
DCYC	JOB	1	14-NOV-1988	11:28:10
VAR1	JOB	1	14-NOV-1988	11:27:33
TIME	JOB	1	22-NOV-1988	06:51:00

```
# USER=fong PW=mingsf1
# QSUB -lM 10000000w
# QSUB -lm 10000000w
# QSUB -lT 60
# QSUB -r DCYC
# QSUB -s /bin/sh
set -x
mkdir /usr/tmp/$LOGNAME$$
cd /usr/tmp/$LOGNAME$$
ja
fetch FIL002 -t 'DISKL:[CAT]IMPD03.FL2' -f TR
fetch FIL003 -t 'DISKL:[CAT]IMPD1.FL2' -f TR
fetch FIL004 -t 'DISKL:[CAT]IMPD2.FL2' -f TR
fetch FIL005 -t 'DISKL:[CAT]IMPLLR.FL2-0' -f TR
fetch SCOPEX -t 'DISKB:[MURPHY.CEXL3DX]SCOPE.UEX' -f TR
chmod +x SCOPEX
cat > data << \!
$ SCOPEX PROCESSOR
START   -1
PRINT   OFF PRIN SUMM

TOC
COPY    TIME RV 0 0 [5]

SET     SYNTAX ON
DO .10 &I=1,73

DSET    [2]D 0 &I 11            # SYMMETRY-ANTISYMMETRY
DSET    [3]D 0 &I 21            # 1ST DEGENERATE COSINE-SINE
DSET    [4]D 0 &I 31            # 2ND DEGENERATE COSINE-SINE
DPRINT  9 11 12 13 21 22 23 31 32 33 NODE 4880 11948

DCYCL   1 1 6 3 11 21 31        # FIRST SEGMENT - X
DCYCL   2 1 6 3 12 22 32        # FIRST SEGMENT - Y
DCYCL   3 1 6 3 13 23 33        # FIRST SEGMENT - Z
DPRINT  3 1 2 3 NODE 4880 11948
DCOPY   [5]D1 0 &I

.10     NOP
SET     SYNTAX OFF

TOC

STOP
!
SCOPEX < data
dispose FIL005 -t 'DISK6:[FONG]IMPLLR.FL2' -f TR
ja -s
cd
rm -r $LOGNAME$$
```

```
# USER=fong PW=mingsf1
# QSUB -lM 1500000w
# QSUB -lm 1500000w
# QSUB -lT 8600
# QSUB -q deferred
# QSUB -r VAR1
# QSUB -s /bin/sh
set -x
mkdir /usr/tmp/$LOGNAME$$
cd /usr/tmp/$LOGNAME$$
ja
fetch FIL002 -t 'DISK6:[FONG]IMPLLR.FL2-1' -f TR
fetch FIL003 -t 'DISK6:[FONG]IMPLLR.FL2-0' -f TR
fetch SOLVE -t 'DIAL$UNICOS:SOLVE.UEX' -f TR
chmod +x SOLVE
cat > data << \!
$ SOLVEL3
START  -1
ASSIGN  ISEQ=1
SET     SYNTAX ON
DO ,LOOP &I=1 73 1
INIT    0 D1 &I
VAR     1
SAVE    S 0 S1
SOLVE
,LOOP CONTINUE
STOP
!
SOLVE < data
fetch SCOPEX -t 'DISK8:[MURPHY.CEXL3DX]SCOPE.UEX' -f TR
chmod +x SCOPEX
cat > data << \!
$ SCOPEX PROCESSOR
START  -1

COPY    TIME.RV 0 0 [3]

PRINT   OFF.PRIN.LIST
SET     SYNTAX ON

DO ,LOOP &I=1 73 1

SSET    S1 0 &I
DFROMS  1 21 S0 0 MESH=1T21
DCOPY   [3]DEFF.NV 0 &I 1 1
DPRINT  1 1 MESH=1T21

;LOOP   CONTINUE

STOP
!
SCOPEX < data
dispose FIL003 -t 'DISK6:[FONG]IMPLLR.FL2-2' -f TR
dispose FIL002 -t 'DISK1:[FONG]IMPLLR.FL2-2S' -f TR
ja -s
```



```
cd
rm -r $LOGNAME$$
```

```
# USER=fong PW=mingsf1
# QSUB -lM 1000000w
# QSUB -lm 1000000w
# QSUB -lT 30
# QSUB -r TIME
# QSUB -s /bin/sh
set -x
mkdir /usr/tmp/$LOGNAME$$
cd /usr/tmp/$LOGNAME$$
ja
fetch FIL002 -t 'DISK1:[FONG]IMPLLR-DEFF2.FL2' -f TR
fetch SCOPE -t 'DIAL$UNICOS:SCOPE.UEX' -f TR
chmod +x SCOPE
cat > data << \!
$ SCOPE
START   500000
set syntax on
:101 format '(' Error - Reduced vector file not found - if =' ,i5)
:102 format '(' Error - System vector file not found - if =' ,i5)
let &ift = %ifl("TIME.RV",0,0)
if &ift +1 :err1 +1
let &lft = %lfm(&ift,1)
do :10 &i=1,73
   let &ifn = %ifl("DEFF.NV",0,&i)
   if &ifn +1 :err2 +1
   let &t = %fbc1(&lft,&i)
   let &dum = %afm(&ifn,2,&t)
:10 continue
goto :unlk
:err1 continue
write 6 ,101 &ift
goto :end
:err2 continue
write 6 ,102 &ift
:unlk continue
let &dum = %rfm(&ift,1 0 &lft)
:end continue
set syntax off
STOP
!
SCOPE < data
dispose FIL002 -t 'DISK6:[FONG]IMPLLR-DEFF2.FL2' -f TR
ja -s
cd
rm -r $LOGNAME$$
```

DATE: 22 NOV 88 AT 08:56:23

DEPARTMENT: CRAY*

JOB ID: 188 REPORT NO. 10

FILE ID:

INPUT PROCESSING TIME: 00:00:06

OUTPUT PROCESSING TIME: 00:00:11

REPORT COMPLETION CODE: 4

PAGES TO BIN:	11
PAGES TO TRAY:	0
PAPER PATH HOLES:	0
LINES PRINTED:	239
TAPE MOUNTS:	1
BLOCKS READ:	5
BLOCKS SKIPPED:	0
RECORDS READ:	212
DJDE RECORDS READ:	5
MAXIMUM COPY COUNT:	1
OVERPRINTS:	0
COLLATE:	YES
SF/MF:	MULTI
SIMPLEX/DUPLEX:	DUPLEX

JDE,JDL USED: QL,V

ACCTINFO: FONG

INITIAL FONT LIST: QLAND

INITIAL FORM LIST: LQUAD

(DJDE MODIFIED)

INITIAL CME LIST: -NONE