1 of 3

Piping Benchmark Problems for the General Electric Advanced Boiling Water Reactor

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ABSTRACT

To satisfy the need for verification of the computer programs and modeling techniques that will be used to perform the final piping analyses for the General Electric Advanced Boiling Water Reactor (ABWR), three benchmark problems were developed. The problems are representative piping systems subjected to representative dynamic loads with solutions developed using the methods being proposed for analysis for the ABWR standard design. It will be required that the combined license licensees demonstrate that their solutions to these problems are in agreement with the benchmark problem set.

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EXECUTIVE SUMMARY

The NRC staff has identified piping and pipe support design as one technical area where engineering information in sufficient detail can not be provided for the General Electric Advanced Boiling Water Reactor (ABWR) standard design to allow the staff to make a final safety decision under the rules of 10 CFR, Part 52. For this and similar areas the staff will use design acceptance criteria (DAC) verified by inspections, tests, analyses, and acceptance criteria (ITAAC) to enable the final safety determination. One element of the piping DAC requires the combined license (COL) licensee to verify the sufficiency of the computer codes and modeling techniques to be used to complete its piping stress analyses. To provide the basis for this verification, the staff developed an ABWR specific piping benchmark program. The COL licensee will be required to develop solutions to the benchmark problems and to demonstrate that those solutions meet the acceptance criteria specified in this benchmark program report.

The benchmark program consists of three piping problems involving two piping systems representative of the ABWR. One system represents one loop of the feedwater piping system while the other represents one safety/relief valve discharge line (SRVDL). The problems provide analytical benchmarks for three analysis methods, the uniform support motion response spectrum method, the independent support motion response spectrum method, and the direct integration time history analysis method. Response of the feedwater piping is developed using the response spectrum methods while the time history method is applied to the SRVDL. In all analyses the excitation functions are representative for the ABWR. This report presents the benchmark problems and includes all the information needed by the COL licensee to perform the analyses and evaluate the results. Acceptable analysis methods will estimate natural frequencies to within 2%, maximum pipe moments to within 5%, and support reactions and maximum displacements to within 10% of the benchmark results. A COL licensee having demonstrated this level of accuracy may use the benchmarked analysis method without further review. In instances where some deviations from the acceptance criteria occur, the results and justification for such deviations shall be documented and submitted to the staff for review and approval before initiating piping qualification analyses.

1.0 INTRODUCTION

1.1 Purpose

This report describes the NRC benchmark program for the verification of computer programs that will be used by combined license (COL) licensees to complete the design and analysis of piping systems in the General Electric (GE) Advanced Boiling Water Reactor (ABWR). It provides detailed descriptions of the benchmark problems including geometries, material properties, analytical methods, input loads and solutions. The report also provides the acceptance criteria which must be met to demonstrate that the COL licensee's solutions to the benchmark problems are acceptable to NRC.

1.2 Background

In reviewing the design certification application for the GE ABWR under the rules of 10 CFR Part 52, Reference 1, the NRC staff identified a number of technical areas in which the applicant did not provide design and engineering information in sufficient detail to make a final safety decision. One of these areas was piping and pipe support design where GE did not have the as-built or as-procured information to complete the final design. To resolve this issue, the staff developed an alternate approach using design acceptance criteria (DAC). The DAC are a set of prescribed limits, parameters, procedures, and attributes upon which the NRC relies in making a final safety determination to support a design certification. The DAC are objective (measurable, testable, or subject to analysis using pre-approved methods), and must be verified as a part of the inspections, tests, analyses, and acceptance criteria (ITAAC) used to demonstrate that the as-built facility conforms to the certified design. The combined license (COL) licensee will use the DAC to demonstrate conformance with the ABWR standard design during construction. This will enable the NRC staff to make a final safety determination through the review of the COL licensee's satisfactory implementation and verification of the ITAAC.

The NRC staff's evaluation of GE's proposed DAC approach for the ABWR piping design was documented in their final safety evaluation report. In that document the staff provided their evaluation of the GE certified design commitments and corresponding ITAAC for the ABWR piping design. One of these commitments was to verify the piping

analysis modeling and the computer code to be used by the COL licensee to complete its piping stress analysis. The COL licensee will verify the sufficiency of the computer code and modeling techniques in conjunction with the DAC. The NRC found this commitment acceptable provided that the computer program and the modeling techniques will be evaluated using the NRC benchmark program. The staff concluded that once the COL licensee successfully completes the DAC verifying that the piping benchmark results are within the acceptable range of values specified in the benchmark program, there is reasonable assurance that the computer code and analytical modeling techniques to be used to complete the ABWR piping design and analyses are adequate.

1.3 Benchmark Program Overview

The benchmark program requires the COL licensee to construct mathematical models and perform dynamic analyses of specified representative ABWR piping systems using his own computer program. When the analyses are completed, the COL licensee will compare his results to those of the benchmark problems given in this report to ensure that the results meet the range of acceptable values. Any deviations from these values, as well as, the justification for such deviations, shall be documented and submitted to the NRC staff for review and approval before initiating final certified piping analyses. This benchmarking will provide assurance that the computer program used to complete the ABWR piping design and analyses will produce results that are consistent with results considered acceptable to the NRC staff.

This report presents the benchmark problems and gives all information needed by the COL licensee to perform the analyses and evaluate the results. The Brookhaven National Laboratory (BNL), under contract with the NRC staff, developed these problems based on representative piping system design information provided by GE during the NRC technical review and evaluation of the ABWR. The benchmark problems represent one loop of the ABWR feedwater piping system inside containment and a safety-relief valve (SRV) discharge line inside the suppression pool wetwell area. Although the piping benchmark problems are considered representative ABWR piping configurations and loadings, they are not intended to be final designs. BNL constructed mathematical models of these two piping systems using the PSAFE2 piping analysis program.

This report provides a complete description of the input parameters for each problem including piping dimensions, material properties, weights, support stiffnesses and locations, load definitions and damping values. The dynamic analysis methods benchmarked include the uniform support motion response spectrum method, the independent support motion response spectrum method, and the direct integration time-history analysis method. The BNL solutions to each problem are presented in this report. Specific guidelines for comparing COL licensee results to these published results and acceptance criteria to be satisfied in order to demonstrate acceptability are also given.

2.0 PROJECT BACKGROUND

The PSAFE2 program is a full feature, elastic piping analysis code based on the finite element method. The program, a modified version of the general purpose computer program SAP IV, Reference 2, was developed by BNL to analyze piping systems subjected to both static and dynamic loading. Dynamic analysis capabilities include both response spectrum and time history analysis for systems subjected to either uniform or independent support motions.

The PSAFE2 program and its precursor EPIPE, Reference 3, have been extensively tested and verified against other piping programs and against physical test results. The programs have been applied to develop earlier NRC benchmark problem solutions to confirm the adequacy of programs used by nuclear power plant license applicants (References 4 and 5).

This report presents the solutions to piping benchmark problems with configurations that are representative of GE ABWR piping systems. The solution methods that were applied were not in their entirety included in earlier NRC benchmark studies. They include the uniform response spectrum method with high frequency mode responses, the independent support motion response spectrum method with high frequency mode responses, and the direct integration time history analysis method. The following section provides a brief description of the analytical methods.

2.1 Mathematical Background

Since elastic piping analysis is a well established procedure, only a brief outline of the theoretical considerations used in obtaining the dynamic solutions will be presented. A more detailed description of the analysis methods and solution schemes is given in Reference 2.

The analysis of a piping system is carried out by use of the stiffness matrix method, in which the piping is represented by a network of basic elements, straight and curved beams, and one-dimensional elements interconnected at the nodes. The dynamic response of the network is described mathematically by the equation of motion:

$$M\ddot{u} + C\dot{u} + Ku = R(t)$$

where M is the mass matrix, C is the damping matrix, and K is the stiffness matrix of the element assemblage. The vectors u , $\dot{u}$, and $\ddot{u}$ are the nodal displacements, velocities, and accelerations, respectively. $R(t)$ can be a vector of time varying loads or of effective loads which result from ground motion. The PSAFE2 program can carry out time history or response spectrum analysis for the solution of this equation. A brief description of the methods used in these benchmark problem solutions is provided below.

2.1.1 Uniform Support Motion Response Spectrum Analysis

In the case of ground motion, if it is assumed that the piping system is uniformly subjected to the ground acceleration, $\ddot{u}_g$, the equations of motion can be expressed as follows:

$$M\ddot{u}_r + C\dot{u}_r + Ku_r = -M\ddot{u}_g$$

where u_r is the relative displacement of the system with respect to the ground, $u_r = u - u_g$.

The equations are then expanded in terms of the system modal matrix and generalized coordinates:

$$[M] \{\ddot{q}\} + [C] \{\dot{q}\} + [K] \{q\} = -[M] \{\ddot{u}_g\}$$

where:

$$[\phi] = \text{normalized modal matrix } [\phi]^T [M] [\phi] = I$$

$$q = \text{generalized coordinates vector.}$$

Multiplication by the transpose of the modal matrix yields:

$$\{\ddot{q}\} + [\Delta] \{\dot{q}\} + [\omega^2] \{q\} = -[\phi]^T [M] \{\ddot{u}_g\}$$

where:

$$\begin{aligned} [\omega^2] &= \text{diagonal matrix of eigen-values} \\ [\Delta] &= \text{diagonal matrix of modal damping coefficients, where the damping is assumed to satisfy the modal orthogonality condition. This results in } n \text{ uncoupled equations for the generalized coordinates.} \end{aligned}$$

GE-ABWR

The equation set can be solved for the maximum modal response for each system degree of freedom corresponding to excitation in each spatial direction as follows:

$$u_{m,n,i} = \frac{S_{n,i}}{\omega_n^2} \phi_{m,n} L_{n,i}$$

where:

- $u_{m,n,i}$ = maximum displacement of nth degree of freedom in the nth mode due to excitation in the ith spatial direction
- $S_{n,i}$ = value of spectral acceleration corresponding to frequency ω_n , and the i-th spatial direction input response spectrum
- $L_{n,i}$ = modal participation factor for nth mode and ith spatial direction
- ω_n = nth system natural frequency
- $\phi_{m,n}$ = modal deflection of degree of freedom m in nth mode
- m = degree of freedom index
- n = modal index
- i = spatial index

For the final solution, the maximum modal responses are combined over the first n modes up to the cutoff frequency (the lower frequency nodes) at which the spectral acceleration roughly returns to the zero period acceleration (ZPA). For the benchmark problems given in this report, the modal combinations were performed in accordance with either the grouping method or the double sum method as described in Sections 1.2.1 and 1.2.3 of Regulatory Guide 1.92, Reference 6, respectively.

In some piping systems the responses of modes above the cutoff frequency (the high frequency modes) may have a significant effect on the total response, especially on support reactions. In order to ensure that these high frequency mode effects are accounted for, an additional calculational procedure based on the methodology described in Appendix A

to Section 3.7.2 of the Standard Review Plan, Reference 7, was implemented. This procedure is as follows:

For each degree of freedom (DOF) included in the dynamic analysis, the fraction of DOF mass, d_i , included in the summation of all of the modes up to the cutoff frequency was calculated for each DOF as follows:

$$d_i = \sum_{n=1}^N L_n \times \phi_{n,i}$$

where:

- n is order of the mode under consideration,
- N is the number of modes included in Step 1,
- $\phi_{n,i}$ is the nth natural mode of the system, and
- L_n is the participation factor given by:

$$L_n = \frac{\{\phi_n\}^T \{1\}}{\{\phi_n\}^T [M] \{\phi_n\}}$$

The fraction of DOF mass not included in the summation of these modes, e_i , was then calculated as:

$$e_i = d_i - \delta_{ij}$$

where δ_{ij} is the Kronecker delta, which is one if DOF i is in the direction of the earthquake motion and zero if DOF i is a rotation or not in the direction of the earthquake input motion.

Since higher modes can be assumed to respond in phase with the ZPA and thus, with each other, these modes should be combined algebraically. This is equivalent to pseudostatic response to the inertial forces from these higher modes excited at the ZPA. These pseudostatic inertial forces for all higher modes for each DOF i are given by:

$$P_i = \text{ZPA} \times M_i \times e_i$$

where:

P_i is the force or moment to be applied to DOF i.

M_i is the mass or mass moment of inertia associated with DOF i .

In order to determine the maximum responses associated with the high frequency modes, a static analysis is performed by applying this set of pseudostatic inertial forces to all of the degrees of freedom in the model. The total high frequency mode responses are then combined by the square-root-of-sum-of-squares method with the total combined response from the lower-frequency modes to determine the overall piping system peak responses.

2.1.2 Independent Support Motion Response Spectrum Analysis

For a piping system that is supported at multiple locations that are subjected to different seismic motions, the independent support motion (ISM) response spectrum method of analysis may provide more realistic results. The governing equations of motion for this type of analysis may be expressed as follows:

$$\begin{bmatrix} M_P & 0 \\ 0 & 0 \end{bmatrix} \begin{Bmatrix} \ddot{X} \\ \ddot{Z} \end{Bmatrix} + \begin{bmatrix} C_P & C_{PB} \\ C_{BP} & C_B \end{bmatrix} \begin{Bmatrix} \dot{X} \\ \dot{Z} \end{Bmatrix} + \begin{bmatrix} K_P & K_{PB} \\ K_{BP} & K_B \end{bmatrix} \begin{Bmatrix} X \\ Z \end{Bmatrix} = \begin{Bmatrix} 0 \\ F_B \end{Bmatrix}$$

where:

- M_P = Pipe mass matrix
- C_P = Pipe damping matrix
- K_P = Pipe stiffness matrix
- C_B = Support damping matrix
- K_B = Support stiffness matrix
- C_{PB} or C_{BP} = Pipe support coupling damping matrix
- K_{PB} or K_{BP} = Pipe support coupling stiffness matrix
- F_B = Support force vector
- X = Pipe response vector
- Z = Support response vector

The above equation assumes that no masses are being placed at the ends of the supports where they connect to the ground and that all the external forces on the piping system are being transmitted through the supports.

The piping system response can be separated into two components, one due to the inertia or dynamic effects of pipe masses (X_D) and the other, termed the pseudo-static response, due to the differential motions of the support points (X_S). Hence,

$$X = X_D + X_S$$

After substituting these response components into the above equation of motion and neglecting the support damping effects, the governing equations for the two response components can be written as follows:

For inertia or dynamic response:

$$M_P \ddot{X}_D + C_P \dot{X}_D + K_P X_D = M_P K_P^{-1} K_{PB} Z$$

$$K_{BP} X_D = F_{BD}$$

For pseudostatic response:

$$K_P X_S + K_{PB} Z = 0$$

$$K_{PB} X_S + K_B Z = F_{BS}$$

In each case, the upper equation governs the motion and the lower equation defines the support reaction forces. The equation for inertia response is identical to the conventional structural dynamic equation except that the modal participation factors derived from it differ from those derived for uniform support motion.

The inertia component of response is obtained by using the modal solution approach:

$$\text{Let } X_D = \phi q$$

where ϕ = modal matrix
 q = modal response vector

The modal equation for dynamic response reduces to:

$$\ddot{q} + 2\xi\omega\dot{q} + \omega^2q = \phi^T M_P K_P^{-1} K_{PB} \ddot{Z}$$

In component form it can be rewritten as:

$$\ddot{q}_{ij}^k + 2\xi_i\omega_i\dot{q}_{ij}^k + \omega_i^2q_{ij}^k = L_{ij}^k \ddot{Z}_j^k$$

where:

- ξ_i = modal damping coefficient
 ω_i = modal frequency
 i = 1, 2, ...NF
 j = 1, 2, 3, (corresponding to the three spatial directions)
 k = 1, 2, ...NG

Here NF and NG correspond to the number of frequencies and number of support points, or support groups, in the piping system. Thus, there exists one individual set of modal equations for each support group.

The modified modal participation factors are given as:

$$L = \phi^T M_P K_P^{-1} K_{PB}$$

To determine the modified modal participation factors it is necessary to invert the stiffness matrix K_P . One approach to obtain this from the available modal solutions is to use the properties of the stiffness matrix with the modal frequencies and their mode shapes. That is using the relations,

$$\Phi^T K_P \Phi = \omega^2$$

and taking the inverse on both sides one derives

$$K_P^{-1} = \Phi (\omega^2)^{-1} \Phi^T$$

Using this relation the equation for the modal participation factors can be expressed as:

$$L_{ij}^k = \sum_{s=1}^n \frac{\phi_{is} (K_{PB})_{sj}^k}{\omega_s^2}$$

where n = number of equations representing the piping model. This equation can be used to evaluate the participation factors, without any loss of generality, from the modal solutions, even if the

actual modal solution has been truncated to a finite number of modes.

The response spectra values $S_j^k(\omega_i)$ at frequency ω_i , for the k th group, in the j th direction of excitation, are obtained by solving the equation for a single degree of freedom system subjected to an acceleration of $Z_j(k)$, using the Duhamel integral, and is given by:

$$S_j^k(\omega_i) = \left| \frac{1}{\omega_i \sqrt{1 - \xi_i^2}} \int_0^t \ddot{Z}_j^k(\tau) e^{-\xi_i \omega_i (t-\tau)} A |_{\max} \right|$$

where:

$$A = \sin \sqrt{1 - \xi_i^2} \omega_i (t - \tau) d\tau$$

This represents the peak possible modal response obtained by multiplying response spectra value by the corresponding modal participation factor L_{ij}^k providing:

$$(q_{ij}^k)_{\max} = L_{ij}^k S_j^k(\omega_i)$$

It should be noted that during the solution process the phasing between the individual support excitations is lost and only the peak responses due to each support excitation is obtained from the above equation. Thus, a set of modal solution vectors is obtained for each support excitation in each spatial direction. Other parameters, such as pipe displacements, accelerations, pipe forces or moments and the support forces, are obtained from these modal responses. Again, as with the uniform response spectrum method, the maximum modal responses are only obtained for the first m modes up to the cutoff frequency.

To obtain the final inertial response it is necessary to combine the group modal responses, make corrections to account for modes above the cutoff frequency, combine between group responses and combine overall directional inputs. Although various methods and sequences for performing these combinations are possible, the following specific and acceptable methodology was followed in the benchmark solutions. The combination of group modal responses is first performed in accordance

with either the grouping method or the double sum method as described in Regulatory Guide 1.92. The resulting group responses are next combined using the SRSS method to provide the combined modal response for all flexible modes. In separate calculations, the contribution of high frequency modes for each group are computed in accordance with the method described in the section above. These group rigid mode contributions are then combined by the SRSS method to provide the combined rigid mode response. Next, the flexible mode response is combined with the rigid mode response by the SRSS method to provide the total inertial response for the given direction of excitation.

In the general case, an additional combination over the three directions of excitation would be made using the SRSS method to provide the total inertial response. In the benchmarks this was not done since only excitation in a single direction were considered. Finally, in the general case a further combination would be made between the inertial response and the seismic anchor movement response to provide an estimate of total response.

2.1.3 Direct Integration Time History Analysis

In this solution mode the equation of motion is solved directly by numerical integration. Eigen value evaluations are not made and no simplification associated with eigen vector orthogonality properties is used. As such, no approximation associated with a modal assumption is introduced. The method is a basic approach and is described in any reference on numerical methods. References 2 and 3 are particularly applicable.

In the PSAFE2 program the Wilson θ method is used to perform the numerical integration. The advantage of this method is that it is unconditionally stable. In the method Rayleigh damping, $C = \alpha M + \beta K$, is assumed with the coefficients α and β user selected to simulate the damping characteristics for the specific problem. Further, as a matter of good practice, the time step used in the solution should be essentially 1/10 the shortest period of interest.

2.2 Input-Output Format

To facilitate proper use of the enclosed data a brief summary of the PSAFE2 input-output data lists will be presented. For a basic description of element properties, coordinates, etc., reference can be made to the earlier benchmark reports, References 4, 5, and 8.

The first page of each problem shows a table listing the significant parameters for the problem and the analysis options activated for the analysis. The number of element types is the number of boundary-spring element and pipe element groups used to define the model. The number of frequencies is the number of frequencies solved for in the eigen value routine and used in the subsequent response spectrum analyses. The interpretation of the various option flags is obvious, although not all of the options are used in the benchmark problems.

The next pages show the nodal point list. The column labeled old node is the label assigned the nodal point in the finite element model. The column labeled new mode is the sequential label assigned to the node within the program and used in all program algorithms. The boundary condition codes define the constraints imposed at the node, a "1" signifying that the degree of freedom is completely restrained while "0" or ("-0") signifies complete freedom. As indicated, each mode potentially has six degrees of freedom, "X" signifying displacement in the X global direction and "XX" signifying rotation about the X global axis. The following nodal coordinates define the location of the node in the global coordinate system and are in inches. The last column designated "T" is the nodal temperature.

The next blocks of input information are the input element data lists. Since the system may be subdivided into groups of elements this data is entered group by group. The possible element types are spring elements, anchor movement elements, snubber elements, and pipe (either tangent or bend) elements. A single group is comprised of all pipe elements or all spring elements as intermixing element types within a group is not allowed.

For a typical pipe element group, the first page lists control information for the group, i.e., type of element, number of elements, etc. This is followed by a material properties table where on each line of this table are specified, the material identification number, the temperature for which the data applies and the corresponding modulus of elasticity, Poisson ratio and coefficient of thermal expansion. For cases where the variation of material properties with temperature are considered, the element temperature is the average of its bounding nodal temperatures and a linear variation of the input material properties data with temperature is assumed. Following this is the section properties

table where all data entries are clearly labeled. Next, if appropriate, is a branch point list specifying the nodes where pipe runs intersect, followed on the same page by entries entitled, "Load Case Multipliers." These only apply to static analysis runs and may be ignored herein. The last and largest list in the group data is the element definition and connectivity table. Again, the columns in this table are clearly labeled. For the bend elements, two lines are shown. The pressure indicated on the first line is the value of pressure used in computation of the bend flexibility. The entries on the second lines are the bend radius, third point declarer and the X, Y, Z coordinates of the third point. If the third point declarer is "TT" the coordinates of the bend tangent intercept are listed, if "CC," the coordinates of the bend center of curvature are listed. The columns entitled direction cosines, wall fraction and input tag may be ignored.

The group data list for boundary or spring elements is somewhat simpler. There is the element control information followed by element load case multipliers which again may be ignored. The element definition and connectivity list follows and is clearly labeled. The interpretation of the pertinent information in this table is as follows: support group number NG designates the excitation group to which the spring belongs; code KD and KR are spring type declarers where KD=1 signifies a linear spring while KR=1 signifies a rotational spring. The direction cosines listed define the line direction along or about which the spring acts in relation to the global axis. The specified displacement - rotation columns relate to imposed displacements and can be ignored. The last column lists the element spring rate in lb. per inch or inch lb. per radian.

The next table of input is labeled nodal loads. For the dynamic cases the table is a listing of all the concentrated masses, and the nodes at which they are located, acting on the system. A complete absence of this table indicates that there are no concentrated loads. The total mass used in each analysis is the sum of these quantities plus any distributed mass developed in the pipe elements. Distributed mass is developed in the pipe elements only if quantities appear in the columns entitled weight/unit length - mass/unit length in the pipe element section property tables.

The remaining input data describes the input response spectra or the time history forcing function,

if appropriate. For the response spectrum cases the input spectra appear immediately after the output list of frequencies and model participation factors. If the case is independent support motion, the output participation factors and the listed spectra are for the specific support group. This data includes the direction weighting factors, a descriptive title and a table of the spectrum values given in "g's". If only one spectrum is provided it applies to all three directions as modified by the weighting factors. If two spectra are provided, the first applied only to the X direction while the second applies to the Y and Z directions. Intermediate values between data points are obtained by linear interpolation.

For the time history case the nodal load table is followed by a page summarizing control information unique to the time history analysis. This includes a definition of the number of solution time steps, time step size and the values of the damping parameters α and β . The next table provides the definition of the points of application of the forcing functions, the degree of freedom they act in, function number and arrival (start) time declarers and the function multiplier. Regarding the function multiplier, it is the amount by which the forcing function is amplified for the listed nodal point, the amplification being constant for the duration of the forcing function. Two further listings complete the input. The first is a listing of the arrival times, with an arrival time of 0.0. connotating forcing function application at time equal 0.0, and the second, the listing of forcing functions. The forcing function listing includes the time and corresponding function value for each point of the function definition. The function value for intermediate times is derived by linear interpolation.

The output provides listings of all the pertinent results. For the response spectrum solutions these include the system natural frequencies, modal participation factors, global displacements/rotations of all nodal points and element forces/moments for the amplified lower frequency modes. The sign convention for output pipe element forces/moment is shown in Figure 1. With the independent support motion option these results are first provided at the group level, and then again, following SRSS combination between the group results. Two sets of group displacement and force output results are in fact provided, one corresponding to modal combination by the grouping method and the second corresponding to modal combination by the double

sum method. These results are followed by the contributions to group response from the high frequency modes developed by static analyses. Two sets of final or total results are then provided corresponding to the SRSS combination of the response due to the lower frequency modes with the response due to higher frequency modes for, first, the grouping method of modal combination, and second, the double sum method of modal combination. These last listings will be the bases for the result comparisons to be made in the benchmarking effort.

The time history output is simpler. It consists of three tables of maxima listed with their corresponding time at maxima. The first table is for nodal displacements with six displacement components for each node. The displacement component declarers have the following interpretation: 1, 2, and 3 are the translations of the node in the X, Y, and Z directions respectively while 4, 5, and 6 are the rotations of the node about the X, Y, and Z axis respectively. The next table provides the spring/boundary element force (labeled stress) maxima. A component declarer equal to one in this table indicates a force while the declarer equal to two indicates a moment. The last table provides the maxima for pipe element force components (labeled stress). For each element twelve components of force are listed; the first six corresponding to the i and the remaining six to the j end. The component declarers in this table have the following interpretations: 1, 2, and 3 / 7, 8, and 9 are the i end / j end forces in the element X, Y, and Z axes respectively while 4, 5, and 6 / 10, 11, and 12 are the i end / j end moments about the element X, Y, and Z axis respectively.

Straight Pipe Element

Where V_y, V_z - Shear Forces
 N_x - Normal Force
 M_y, M_z - Bending Moment
 M_t - Torsion Moment

Bend Pipe Element

FIG. 1
 Sign Convention for Forces and Moments

3.0 DESCRIPTION OF PIPING BENCHMARK PROBLEMS

For the Advanced Boiling Water Reactor (ABWR) design three piping benchmark problems involving two representative piping systems were developed. The first piping system represents one loop of the feedwater piping system, while the second represents one safety/relief valve discharge line (SRVDL). These two systems were selected from three provided in sample analyses to demonstrate the analysis methodology proposed for design analysis of piping in the ABWR. The solutions represent analytical benchmarks for three analysis methods, the uniform support motion response spectrum method, the independent support motion response spectrum method and the direct integration time history analysis method. Each of these methods is proposed for use in the design of piping in the ABWR and were demonstrated in the sample analyses. The COL licensee having demonstrated that the results he develops for these problems are in agreement with the benchmark results will be entitled to use these methods in design analysis.

The computational options used in the benchmarks are considered acceptable. For the response spectrum method clustering between closely spaced modes in accordance with R.G. 1.92 and the contribution of high frequency modes per SRP 3.7.2, Appendix A, must be considered. Interspatial and, for the independent support motion response spectrum method, intergroup combinations may be made using the SRSS method. Any sequence in performing the combinations is acceptable.

For the response spectrum benchmarks modal combination was performed first using the grouping and then the double sum method; next, if appropriate, the combination between group combinations was made using SRSS, and finally corrections were made to account for high frequency contributions to response. If more than one directional input had been considered, the interspatial combination would have been performed last using the SRSS combination method.

No definition of acceptable combination procedures are required for the time history method. Instead, good practice would require that the time step used be sufficiently small to provide good estimates of system response. One tenth the smallest period of interest is a recognized rule for

time step size. In any case, having selected a time step, its adequacy should be demonstrated by showing that a reduction of time step size by a factor of two does not change the predicted response by more than 10%. This sensitivity to time step check was made in the time history benchmark.

The listing of the output results for each problem is relatively complete. The greatest omission is the deletion of the predicted mode shape information for each response spectrum problem. The inclusion of this data would have resulted in a five fold increase in the size of this report. Further omissions are the calculations for high frequency effects. These are simple static analyses which can be performed various ways. A full description of the format of the output is provided in the preceding section.

3.1 Benchmark Problem 1

The first ABWR piping benchmark is a uniform support motion response spectrum solution for one loop of the feedwater piping subjected to chugging loads in the X coordinate direction. The piping system, shown in Figure 2, extends from the reactor pressure vessel to the containment penetration. It consists of a 22 inch (56 cm) outer diameter header and three 12 inch (30 cm) outer diameter branch lines of ASME SA-333 carbon steel pipe. The header extends from an anchor at the containment wall penetration to the branch lines. The branch lines extend from the header to three anchors at the reactor vessel nozzles. Pipe supports include snubbers, designated AS, one spring hanger, designated AH, and one guide at the valve pair. Pipe mounted equipment consists of a check valve and a gate valve and their operators. The anchor at the penetration is through a pipe sleeve and head fitting with the anchorage to the sleeve. Nominal temperature and pressure for the line are 420°F (216°C) and 1099 psig (7577 kPa) respectively.

The finite element model for the system is shown in Figure 3 (numbering corresponds to new node numbers). It consists of 76 pipe elements and 77 nodes. Anchors exist at node 1, the penetration sleeve, and nodes 56, 74, and 95, the reactor vessel nozzles. Snubbers exist at nodes 19, 25, 27, and 32 and the guide exists at node 9. The one spring hanger in the system does not resist dynamic loads and is deleted from the system. In the analyses, the anchors are modeled as stiff linear springs ($K \approx 1E + 12$) in the six degrees of freedom directions. The snubbers and guide are also

FIG. 2

FEEDWATER PIPING

FIG. 3

modeled as linear springs with spring constants consistent with their properties. The penetration head fitting at the containment wall is modeled with an assemblage of piping elements to simulate the actual geometry and stiffness properties. Finally, the valves are modeled with pipe elements and concentrated masses chosen to simulate valve properties. All parameters relating to the model are specified in the included input list.

In the analyses a cutoff frequency of 66 Hz was used. A listing of the first 10 natural frequencies for this problem are presented in Table 1. As stated, the loading function was the chugging load in the X coordinate direction. The spectra for this load is shown in Figure 4. The digital discretization of this spectra is presented in the input list. Further details of the input and the complete output are provided in the included copies of the analysis results for Benchmark Problem 1.

3.2 Benchmark Problem 2

The second ABWR piping benchmark is a independent support motion response spectrum solution for the feedwater piping subjected to safe shutdown seismic loads in the Z coordinate direction. The piping system and finite element model are identical to those used in Benchmark Problem 1 and Figures 2 and 3 and the preceding section should be referred to.

In the analysis, the supports were segregated into three support groups and a cutoff frequency of 35 Hz was used. The first support group consisted of the penetration anchor, node 1. The second support group consisted of the guide, node 3, and all snubbers, nodes 19, 25, 27, and 32. The third and last group consisted of the reactor pressure vessel nozzles, nodes 56, 74, and 95. The input spectra, the SSE in the Z coordinate direction, are shown in Figure 5. The digital discretization of the spectra are listed in the input list for each support group.

Results for this problem are provided at both the group level and at the combined level. The group level results include the support group modal participation factors and the group response components. This data is provided for information and should be very useful in the debugging phases of analysis. The actual benchmark comparisons should be made to the combined results which are provided at the end of the solution.

3.3 Benchmark Problem 3

The third ABWR piping benchmark is a time history solution for the wetwell section of one safety relief valve discharge line subjected to the loading induced by the quencher discharge of an adjacent line. The line, Figure 6, extends from an anchor at the diaphragm floor penetration to anchors at the X-quencher in the suppression pool. The piping system consists of 10 inch (25 cm) and 12 inch (30 cm) diameter ASME SA 403 TP 316 stainless steel. The pipe, 10 inch (25 cm) at the diaphragm floor, expands to 12 inch (30 cm) pipe at a reducer in the upper region. The 12 inch (30 cm) pipe extends down and connects to the X-quencher which is anchored to the quencher basemat on the wetwell floor. The lower portion of the piping system and the quencher are submerged in water. A number of struts attached to both the 10 inch (25 cm) and 12 inch (30 cm) pipes provide additional support. There are no snubbers, spring hangers or valves in the system. Nominal temperature and pressure for the line are 350°F (177°C) and 200 psig (1379 kPa).

The finite element model for the line is shown in Figure 7. It consists of 60 pipe elements and 61 nodes. Anchors exist at node 1, the diaphragm floor penetration sleeve, and node 61, the quencher basemat. Supports exist at nodes 7, 11, and 27. Dummy supports, (i.e. supports with negligible stiffness) exist at nodes 6, 10, 15, and 28. Again, the anchors are modeled with relatively stiff linear springs in the six degrees of freedom, while the intermediate supports are modeled with linear springs with spring constants consistent with their properties. The penetration sleeve/head fittings and the quencher are all modeled with pipe element assemblies selected to simulate the geometry and stiffness properties of the true components. All pertinent parameters are specified in the included input list. A listing of the first ten natural frequencies for the system are provided in Table 2 for model check purposes.

The solution is developed using the direct integration time history method of analysis. The basic loading function is the time history trace shown in Figure 8. This load is an air clearing load produced by an active quencher and it causes a pressure pulse to act on the submerged sections of this adjacent piping. Weighting factors to define both directional and strength factor of the load on the various nodes is provided in the input list.

RESPONSE SPECTRUM CHUG X, FEEDWATER PIPING

FIG. 4

RESPONSE SPECTRA SSE Z DIRECTION FEEDWATER PIPING

FIG. 5

SRVDL WETWELL PIPING

FIG. 6

FINITE ELEMENT MODEL SRVDL WETWELL PIPING

FIG. 7

FORCE TIME HISTORY AT NODE 60
Z QUENCHER LOAD, WETWELL PIPING

FIG. 8

TABLE 1
FEEDWATER PIPING MODAL ANALYSIS RESULTS

MODE NO.	FREQUENCY (CPS)	MODE DOMINANT DIRECTION
1	8.17	X
2	10.87	Y
3	11.56	Y
4	11.84	Y
5	13.03	X
6	15.28	X
7	15.81	Y
8	18.00	X
9	19.90	X
10	21.60	X

TABLE 2**SRVDL WETWELL PIPING MODAL ANALYSIS RESULTS**

MODE NO.	FREQUENCY (CPS)	MODE DOMINANT DIRECTION
1	3.90	Z
2	9.26	Y
3	11.2	Y
4	11.9	X
5	12.4	Z
6	17.9	X
7	20.0	X
8	21.2	Z
9	24.9	X
10	28.4	X

GE-ABWR

The time step size used was 0.0005 sec. A reduction of time step size to 0.00025 sec. was found to change results by a factor of less than 10% verifying the adequacy of the chosen size. The Rayleigh damping coefficients were taken as $\alpha=0.16$ and $\beta=0.00016$ to be consistent with GE application. All other pertinent parameters are specified in the input list.

The output consists of the maxima and their time of occurrence for each response component. Although a more comprehensive tabulation of results would be desirable, the results provided are adequate for the benchmarking purpose. The tabulated outputs are well labeled and should be readily understood.

4.0 BENCHMARK ACCEPTANCE CRITERIA

Earlier NRC benchmark reports provided comprehensive descriptions of the benchmark problem inputs and results but did not provide any definition of the acceptance criteria used to judge adequacy. Instead, the results of a benchmarking effort were submitted to the staff for evaluation on a case-by-case basis. This procedure was followed for most of the "work horse" computer codes then used by industry to qualify piping, including PISYS, ADLPIPE, WECAN, PISTAR, NUIPIPE, SUPERPIPE, and PIPSYS.

For the ABWR standard design benchmarks it was considered to be more appropriate to specify the acceptance criteria to be met. This will allow the COL licensee to assess the adequacy of his methods as the benchmark solutions are developed; precluding the striving for "perfect" results and flagging early on, analysis methods that are deficient. When successful, the COL licensee will simply have to retain an auditable record of the benchmarking effort to verify the adequacy of the methods to be used to qualify piping.

For the acceptance criteria, maximum allowed differences, expressed as a percent, rather than specific values, are specified and a summary of the criteria as presented in Table 3. As can be seen, the criteria is different for each response parameter, ranging from 2% for every natural frequency, to 10% for maximum displacements. Comparisons are required to be made for all natural frequencies and support reaction forces, but for only the maximum displacements and pipe moments in the designated pipe segments given in Table 4. The percentage differences are given by $100 (PE-BE)/BE$ where, PE is the predicted value, and BE is the benchmark value, for a specific response.

Comparisons are required to be made for every natural frequency and every component of support reaction. Regarding natural frequencies, these are fundamental characteristics of a system, and if they are not predicted accurately there is little possibility that correct estimates of system response can be developed. Consequently, the requirement to compare all frequencies to a tight tolerance was specified. Support reactions on the other hand are not fundamental characteristics of a system, but unlike pipe moments and forces, every component of reaction is used explicitly in the design process. That is, supports and anchors are typically designed individually for the specific loads they will carry with

only a small level of conservatism. Consequently, it is important to provide reasonably accurate estimates of all reactions and the benchmarking requirement was set accordingly.

For pipe displacements and moments, only comparisons of maximum values are required. This is again consistent with the design/qualification process where only the maximum values impact on design. These comparisons are required to be made in each unique section of pipe for each problem. This was specified to assure that reasonably accurate estimates of all system responses was being made rather than good estimates for only a local region. The accuracy tolerances specified denote the relative importance assigned these parameters.

Again, reflecting design practice, some relaxation of criteria is allowed for pipe moments. Specifically, for these, if the estimates of the maximum components of moment do not meet criteria, comparisons can be made to the resultant moment at each location of maxima, and if these meet criteria, the benchmarking is acceptable. This reflects design practice in that it is only the resultant moments that enter into the qualification evaluations.

Finally, it is recognized that the benchmarking effort may not be clean cut in every application. Candidate analysis methodologies may not meet criteria for every parameter for all comparisons. In these instances, the COL licensee must interact with the staff providing additional justifications for acceptance. These applications will be assessed on a case-by-case basis.

TABLE 3

ACCEPTANCE CRITERIA

PARAMETER	CRITERIA	COMMENTS
Natural Frequencies	2%	All natural frequencies up to cutoff frequency.
Maximum Displacements	10%	Comparison to be made for maximum nodal translation* in each global coordinate direction for each segment** of piping.
Maximum Pipe Moments	5%	Comparison to be made for maximum element moment* about each local coordinate axis for each pipe segment**. Failure to meet criteria is acceptable if SRSS of three components at each point of maxima meet the criteria.
Support Reaction	10%	Comparison to be made for each component of force and moment for each support and anchor.

* Maxima for each direction not necessarily at same point.

** Pipe segments defined in Table 4.

TABLE 4

PIPING SEGMENTS

A. FEEDWATER LINE	
SEGMENT	NODE NUMBERS
1	1-9
2	9-19
3	19-25, 37-57
4	25-32, 58-75
5	32-36, 76-96
B. WETWELL PIPING	
SEGMENT	NODE NUMBERS
1	1-7
2	7-27
3	27-42
4	42-61

5.0 CONCLUSION

Three benchmark problems have been developed for the purpose of assessing the adequacy of the analysis techniques that will be used by COL licensees to qualify piping for the ABWR. If a COL licensee can demonstrate that a candidate analysis methodology provides solutions to the benchmark problems that meet all acceptance criteria, the COL licensee may use that methodology for piping design without further approval. In that instance the COL licensee must submit documentation to the staff of the benchmarking effort in sufficient detail to support the conclusion.

In the event that the benchmarking is essentially, but not wholly successful, the COL licensee may petition for staff approval on a case-by-case basis. In these instances, the documentation of the benchmarking must be augmented with additional justifications of adequacy and the use of the methodology must await staff approval.

6.0 REFERENCES

1. 10CFR, Office of Federal Register National Archives and Research Administration, "Code of Federal Regulations," Title 10, Part 52, (54 FR 15386), May 1989.
2. Bathe, J.K., Wilson, E.L., Peterson, F.E., "SAP IV-A Structural Analysis Program for Static and Dynamic Responses of Linear Systems," Report No. EERC 73-11, University of California, Berkeley, CA, 1973.
3. Subudhi, M., Bezler, P., "EPIPE, Piping Analysis Program User's Manual -Version 1981," BNL NUREG/30784, December 1981.
4. Bezler, P., Hartzman, M., Reich, M., "Piping Benchmark Problems," NUREG/CR-1677, August 1980.
5. Bezler, P., Subudhi, M., Hartzman, M., "Piping Benchmark Problems," NUREG/CR-1677, Vol. II, August 1985.
6. Regulatory Guide 1.92, "Combining Modal Responses and Spatial Components in Seismic Response Analysis," Revision 1, February 1976.
7. U.S. Nuclear Regulatory Commission, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," Section 3.7.2, 1989.
8. Bezler, P., Gardner, D., Hartzman, M., "A Dynamic Benchmark Solution for a Hypothetical Reactor System," BNL-NUREG-23645, December 1977.

APPENDIX A

UNITS OF MEASURE

The attached computer input and output data is presented in the following units of measure:

Length	-	inches (in)
Angular rotation	-	radians (rad)
Force	-	pounds (lb)
Moment	-	in-lbs.
Time	-	seconds (sec)
Pressure	-	lbs./in² (psi)
Acceleration	-	g's (in/sec²/gravitational constant)
Frequency	-	Hertz (Hz) or cycles per second, (cps)
Temperature	-	degrees Fahrenheit (°F)

BENCHMARK PROBLEM 1

**UNIFORM SUPPORT MOTION
RESPONSE SPECTRUM ANALYSIS**

GE ABWR CONFIRMATORY ANALYSIS - FEEDWATER PIPING

C O N T R O L I N F O R M A T I O N

NUMBER OF NODAL POINTS	=	77
NUMBER OF ELEMENT TYPES	=	3
NUMBER OF STATIC LOAD CASES	=	0
NUMBER OF DYNAMIC LOAD CASES	=	1
NUMBER OF ANCHOR MGMT CASES	=	0
NUMBER OF FREQUENCIES	=	50
SOLUTION MODE (MODEX)	=	0
EQ.0, EXECUTION		
EQ.1, DATA CHECK		
STRESS CALCULATION FLAG	=	0
EQ.0 NO		
EQ.1 YES		
ASME CODE EVALUATION FLAG	=	0
EQ.1 CLASS 1 PIPING		
EQ.2 CLASS2 OR CLASS 3 PIPING		
ACCELERATION DUE TO GRAVITY	=	-386.0
BANDWIDTH MINIMIZATION FLAG	=	0
EQ.0 NO		
EQ.1 YES		
ARBITRARY NODE NUMBERING FLAG	=	1
EQ.0 NO		
EQ.1 YES		
NUMBER OF SUPPORT GROUPS	=	0
FLAG FOR NODAL COORD. INPUT UNITS	=	0
EQ.0 CONSISTENT UNIT		
EQ.1 FEET TO INCHES		

LIST OF ANALYSIS TO BE PERFORMED
LOAD CASE DISK FILE ANALYSIS TYPE

1	0	UNIFORM RESPONSE SPECTRUM ANAL.
---	---	---------------------------------

63
64
65
66
67
68
69
70
71
72
73
74
75
76
77

S P R I N G E L E M E N T S

ELEMENT TYPE = 1
NUMBER OF ELEMENTS = 26

ELEMENT LOAD CASE MULTIPLIERS

CASE (A) 1.0000		CASE (B) 1.0000		CASE (C) 1.0000		CASE (D) 1.0000		SPECIFIED ROTATION	SPECIFIED DISPLACEMENT	GLOBAL AXES Z- Y- X-	SPRING RATE
ELEMENT NUMBER	NODE (N)	SUPPORT GROUP	CODE KD	CODE KR	DIRECTION X- Y- Z-	COSINES Y- X- Z-	AXES				
1	1	1	1	0	1.000	.000	.000	.000	.000	1.000E+12	
2	1	1	1	0	.000	1.000	.000	.000	.000	1.000E+12	
3	1	1	1	0	.000	.000	1.000	.000	.000	1.000E+12	
4	1	1	0	1	1.000	.000	.000	.000	.000	1.000E+12	
5	1	1	0	1	.000	1.000	.000	.000	.000	1.000E+12	
6	1	1	0	1	.000	.000	1.000	.000	.000	1.000E+12	
7	9	1	1	0	1.000	.000	.000	.000	.000	5.600E+10	
8	9	1	1	0	.000	1.000	.000	.000	.000	5.600E+10	
9	56	1	1	0	1.000	.000	.000	.000	.000	1.000E+12	
10	56	1	1	0	.000	1.000	.000	.000	.000	1.000E+12	
11	56	1	0	1	1.000	.000	.000	.000	.000	1.000E+12	
12	56	1	0	1	.000	1.000	.000	.000	.000	2.990E+09	
13	56	1	0	1	.000	.000	1.000	.000	.000	1.000E+12	
14	56	1	0	0	1.000	.000	.000	.000	.000	1.000E+12	
15	74	1	1	0	1.000	.000	.000	.000	.000	1.000E+12	
16	74	1	1	0	.000	1.000	.000	.000	.000	1.000E+12	
17	74	1	1	0	.000	.000	1.000	.000	.000	1.000E+12	
18	74	1	0	1	1.000	.000	.000	.000	.000	1.000E+12	
19	74	1	0	1	.000	1.000	.000	.000	.000	2.990E+09	
20	74	1	0	1	.000	.000	1.000	.000	.000	1.000E+12	
21	95	1	1	0	1.000	.000	.000	.000	.000	1.000E+12	
22	95	1	1	0	.000	1.000	.000	.000	.000	1.000E+12	
23	95	1	1	0	.000	.000	1.000	.000	.000	1.000E+12	
24	95	1	0	1	1.000	.000	.000	.000	.000	1.000E+12	
25	95	1	0	1	.000	1.000	.000	.000	.000	2.990E+09	
26	95	1	0	1	.000	.000	1.000	.000	.000	1.000E+12	

S N U B E R E L E M E N T S

ELEMENT TYPE 4
 NUMBER OF ELEMENTS = 5

ELEMENT LOAD CASE MULTIPLIERS

ELEMENT NUMBER	CASE (A) 1.0000	CASE (B) 1.0000	CASE (C) 1.0000	CASE (D) 1.0000	DIRECTION COSINES WRT GLOBAL AXES			SPECIFIED DISPLACEMENT	SPECIFIED ROTATION	SPRING RATE
					X-	Y-	Z-			
1	19	1	1	0	-.439	-.353	.829	.000	.000	7.5000E+05
2	25	1	1	0	-.707	-.707	.000	.000	.000	5.0000E+05
3	25	1	1	0	-.707	-.707	.000	.000	.000	7.5000E+05
4	27	1	1	0	-.766	-.643	.500	.000	.000	5.0000E+05
5	32	1	1	0	.643	-.766	.000	.000	.000	5.0000E+05

PIPE ELEMENT INPUT DATA

CONTROL INFORMATION

NUMBER OF PIPE ELEMENTS	=	76
NUMBER OF MATERIAL SETS	=	1
MAXIMUM NUMBER OF MATERIAL TEMPERATURE INPUT POINTS	=	7
NUMBER OF SECTION PROPERTY SETS	=	9
NUMBER OF BRANCH POINT NODES	=	3
MAXIMUM NUMBER OF TANGENTS COMMON TO A BRANCH POINT	=	3
FLAG FOR NEGLECTING AXIAL DEFORMATIONS IN BEND ELEMENTS (EQ.1, NEGLECT)	=	0

MATERIAL PROPERTY TABLES

MATERIAL NUMBER = (1)							
NUMBER OF		7)					
TEMPERATURE POINTS = {		ASME SA-333 GR 6 CARBON STL PIPE)					
IDENTIFICATION = {							
POINT NUMBER	TEMPERATURE	YOUNG'S MODULUS	POISSON'S RATIO	THERMAL EXPANSION			
1	.00	2.800E+07	.300	6.000E-06			
2	70.00	2.790E+07	.300	6.070E-06			
3	200.00	2.770E+07	.300	6.380E-06			
4	300.00	2.740E+07	.300	6.600E-06			
5	400.00	2.700E+07	.300	6.820E-06			
6	500.00	2.640E+07	.300	7.020E-06			
7	600.00	2.570E+07	.300	7.230E-06			

SECTION PROPERTY TABLE					D E S C R I P T I O N	
SECTION NUMBER	OUTSIDE DIAMETER	WALL THICKNESS	SHAPE FACTOR FOR SHEAR	WEIGHT/UNIT LENGTH	MASS/UNIT LENGTH	
1	38.000	1.5750	.0000	5.1667E+01	1.3385E-01	SLEEVE
2	38.000	9.3750	.0000	2.0000E+02	5.1813E-01	HDFTNG
3	22.000	1.3750	.0000	3.7822E+01	9.7984E-02	PENPIP
4	22.000	2.7480	.0000	2.0583E+00	5.3324E-03	CHKVLV
5	22.000	1.3750	.0000	3.7822E+01	9.7984E-02	22 IN
6	22.000	2.7480	.0000	2.0583E+00	5.3324E-03	GVALVE
7	12.539	.8425	.0000	1.3158E+01	3.4089E-02	12 IN
8	14.600	1.0000	.0000	1.7792E+01	4.6092E-02	NZONE3
9	20.700	4.0570	.0000	6.6208E+01	1.7152E-01	NZONE2

BRANCH POINT NODE LIST

BRANCH POINT	NODE NUMBER
1	24
2	31
3	34

ELEMENT LOAD CASE MULTIPLIERS				
	CASE A	CASE B	CASE C	CASE D
X-DIRECTION GRAVITY	.000	.000	.000	.000
Y-DIRECTION GRAVITY	-1.000	.000	.000	.000
Z-DIRECTION GRAVITY	.000	.000	.000	.000
THERMAL DISTORTION	.000	.000	1.000	.000
PRESSURE DISTORTION	.000	1.000	.000	.000

PIPE ELEMENT INPUT DATA

ELEMENT NUMBER	ELEMENT TYPE	NODE -I	NODE -J	MATL. NUMBER	SECTION NUMBER	REFERENCE TEMPERATURE (BEND RADIUS)	DESIGN PRESSURE (THIRD POINT)	PEAK PRESSURE (X3- ORDINATE)	TEST PRESSURE (Y3- ORDINATE)	END CODES END-I END-J (Z3- ORDINATE)	NOOE INCREMENT (BEND DEGREE)	INPUT TAG
1	TANGENT	1	2	1	1	70.00	1099.50	1250.00	1250.00	0 0	1	II
2	TANGENT	2	3	1	2	70.00	1099.50	1250.00	1250.00	0 0	1	II
3	TANGENT	3	301	1	3	70.00	1099.50	1250.00	1250.00	0 0	1	II
4	TANGENT	301	4	1	3	70.00	1099.50	1250.00	1250.00	0 0	1	II
5	TANGENT	4	5	1	3	70.00	1099.50	1250.00	1250.00	0 0	1	II
6	TANGENT	5	6	1	4	70.00	1099.50	1250.00	1250.00	0 0	1	II
7	TANGENT	6	7	1	4	70.00	1099.50	1250.00	1250.00	0 0	1	II
8	TANGENT	7	8	1	4	70.00	1099.50	1250.00	1250.00	0 0	1	II
9	TANGENT	8	9	1	5	70.00	1099.50	1250.00	1250.00	0 0	1	II
10	TANGENT	9	12	1	5	70.00	1099.50	1250.00	1250.00	0 0	1	II
11	TANGENT	12	13	1	6	70.00	1099.50	1250.00	1250.00	0 0	1	II
12	TANGENT	13	14	1	6	70.00	1099.50	1250.00	1250.00	0 0	1	II
13	TANGENT	14	15	1	6	70.00	1099.50	1250.00	1250.00	0 0	1	II
14	TANGENT	15	16	1	5	70.00	1099.50	1250.00	1250.00	0 0	1	II
15	BEND	16	18	1	5	(44.000)	()	110.236) (348.819) (	1250.00	0 0	1	II
16	TANGENT	18	1801	1	5	70.00	1099.50	1250.00	1250.00	0 0	1	II
17	TANGENT	1801	19	1	5	70.00	1099.50	1250.00	1250.00	0 0	1	II
18	TANGENT	19	21	1	5	70.00	1099.50	1250.00	1250.00	0 0	1	II
19	BEND	21	23	1	5	(44.000)	()	377.953) (348.819) (	1250.00	0 0	1	II
20	TANGENT	23	24	1	5	70.00	1099.50	1250.00	1250.00	0 0	1	II
21	TANGENT	24	25	1	5	70.00	1099.50	1250.00	1250.00	0 0	1	II
22	TANGENT	25	29	1	5	70.00	1099.50	1250.00	1250.00	0 0	1	II
23	TANGENT	29	31	1	5	70.00	1099.50	1250.00	1250.00	0 0	1	II
24	TANGENT	31	32	1	5	70.00	1099.50	1250.00	1250.00	0 0	1	II
25	TANGENT	32	27	1	5	70.00	1099.50	1250.00	1250.00	0 0	1	II
26	TANGENT	27	34	1	5	70.00	1099.50	1250.00	1250.00	0 0	1	II
27	TANGENT	34	35	1	5	70.00	1099.50	1250.00	1250.00	0 0	1	II
28	TANGENT	35	36	1	5	70.00	1099.50	1250.00	1250.00	0 0	1	II
29	TANGENT	36	37	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II
30	TANGENT	37	38	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II
31	BEND	38	40	1	7	(18.800)	()	349.606) (377.165) (	1250.00	0 0	1	II
32	TANGENT	40	4001	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II
33	TANGENT	4001	41	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II
34	BEND	41	43	1	7	(18.800)	()	247.411) (377.165) (	1250.00	0 0	1	II
35	TANGENT	43	4301	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II
36	TANGENT	4301	44	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II
37	BEND	44	46	1	7	(18.800)	()	118.110) (377.165) (	1250.00	0 0	1	II
38	TANGENT	46	47	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II
39	BEND	47	49	1	7	(18.800)	()	118.110) (443.450) (	1250.00	0 0	1	II

PIPE ELEMENT INPUT DATA

ELEMENT NUMBER	ELEMENT TYPE	NODE -I	NODE -J	MATL. NUMBER	SECTION NUMBER	REFERENCE TEMPERATURE (BEND RADIUS)	DESIGN PRESSURE (THIRD POINT)	PEAK PRESSURE (X3- ORDINATE)	TEST PRESSURE (Y3- ORDINATE)	END CODES END-I END-J (Z3- ORDINATE)	NODE INCREMENT (BEND DEGREE)	INPUT TAG
40	BEND	49	51	1	7	70.00 (18.800)	1099.50 ()	1250.00 115.590 (	1250.00 452.180 (	0 -200.208)	(30.0221)	I
41	BEND	51	53	1	7	70.00 (18.800)	1099.50 ()	1250.00 111.225 (	1250.00 457.220 (	0 -192.647)	(30.0179)	I
42	TANGENT	53	54	1	7	70.00	1099.50	1250.00	1250.00	0	1	II
43	TANGENT	54	55	1	8	70.00	1099.50	1250.00	1250.00	0	1	II
44	TANGENT	55	56	1	9	70.00	1099.50	1250.00	1250.00	0	1	II
45	TANGENT	56	57	1	7	70.00	1099.50	1250.00	1250.00	0	1	II
46	TANGENT	31	58	1	7	70.00	1099.50	1250.00	1250.00	0	1	II
47	TANGENT	58	59	1	7	70.00	1099.50	1250.00	1250.00	0	1	II
48	BEND	59	61	1	7	70.00 (18.800)	1099.50 ()	1250.00 349.606 (	1250.00 377.165 (	0 .000)	(45.0229)	I
49	TANGENT	61	6101	1	7	70.00	1099.50	1250.00	1250.00	0	1	II
50	TANGENT	6101	62	1	7	70.00	1099.50	1250.00	1250.00	0	1	II
51	BEND	62	64	1	7	70.00 (18.800)	1099.50 ()	1250.00 236.220 (	1250.00 377.165 (	0 .000)	(90.0305)	I
52	TANGENT	64	65	1	7	70.00	1099.50	1250.00	1250.00	0	1	II
53	BEND	65	67	1	7	70.00 (18.800)	1099.50 ()	1250.00 236.220 (	1250.00 443.450 (	0 .000)	(30.0146)	I
54	BEND	67	69	1	7	70.00 (18.800)	1099.50 ()	1250.00 231.180 (	1250.00 452.180 (	0 .000)	(30.0235)	I
55	BEND	69	71	1	7	70.00 (18.800)	1099.50 ()	1250.00 222.450 (	1250.00 457.220 (	0 .000)	(30.0157)	I
56	TANGENT	71	72	1	7	70.00	1099.50	1250.00	1250.00	0	1	II
57	TANGENT	72	73	1	8	70.00	1099.50	1250.00	1250.00	0	1	II
58	TANGENT	73	74	1	9	70.00	1099.50	1250.00	1250.00	0	1	II
59	TANGENT	74	75	1	7	70.00	1099.50	1250.00	1250.00	0	1	II
60	TANGENT	34	76	1	7	70.00	1099.50	1250.00	1250.00	0	1	II
61	TANGENT	76	77	1	7	70.00	1099.50	1250.00	1250.00	0	1	II
62	BEND	77	79	1	7	70.00 (18.800)	1099.50 ()	1250.00 349.606 (	1250.00 377.165 (	0 129.921)	(45.0229)	I
63	TANGENT	79	7901	1	7	70.00	1099.50	1250.00	1250.00	0	1	II
64	TANGENT	7901	80	1	7	70.00	1099.50	1250.00	1250.00	0	1	II
65	BEND	80	82	1	7	70.00 (18.800)	1099.50 ()	1250.00 247.411 (	1250.00 377.165 (	0 129.921)	(30.0146)	I
66	TANGENT	82	8201	1	7	70.00	1099.50	1250.00	1250.00	0	1	II
67	TANGENT	8201	83	1	7	70.00	1099.50	1250.00	1250.00	0	1	II
68	BEND	83	85	1	7	70.00 (18.800)	1099.50 ()	1250.00 118.110 (	1250.00 377.165 (	0 204.573)	(90.0307)	I
69	TANGENT	85	86	1	7	70.00	1099.50	1250.00	1250.00	0	1	II

P I P E E L E M E N T I N P U T D A T A												
ELEMENT NUMBER	ELEMENT TYPE	NODE -I	NODE -J	MATL. NUMBER	SECTION NUMBER	REFERENCE TEMPERATURE (BEND RADIUS)	DESIGN PRESSURE (THIRD POINT)	PEAK PRESSURE (X3- ORDINATE)	TEST PRESSURE (Y3- ORDINATE)	END CODES END-I END-J (Z3- ORDINATE)	NODE INCREMENT (BEND DEGREE)	INPUT TAG
70	BEND	86	88	1	7	70.00 (18.800)	1099.50 ()	1250.00 118.110 (	1250.00 443.450 (	0 0 204.573 (	(30.0146)	I
71	BEND	88	90	1	7	70.00 (18.800)	1099.50 ()	1250.00 115.590 (	1250.00 452.180 (	0 0 200.208 (	(30.0221)	I
72	BEND	90	92	1	7	70.00 (18.800)	1099.50 ()	1250.00 111.225 (	1250.00 457.220 (	0 0 192.647 (	(30.0179)	I
73	TANGENT	92	93	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II
74	TANGENT	93	94	1	8	70.00	1099.50	1250.00	1250.00	0 0	1	II
75	TANGENT	94	95	1	9	70.00	1099.50	1250.00	1250.00	0 0	1	II
76	TANGENT	95	96	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II

BRANCH POINT DATA

BRANCH POINT	NODE NUMBER	CONNECTIONS . . .
1	24	-20NT J 21NT I 29NT I
2	31	-23NT J 24NT I 46NT I
3	34	-26NT J 27NT I 60NT I

N O D A L L O A D S (S T A T I C) O R M A S S E S (D Y N A M I C)									
N O D E N U M B E R	L O A D C A S E	X - A X I S F O R C E	Y - A X I S F O R C E	Z - A X I S F O R C E	X - A X I S M O M E N T	Y - A X I S M O M E N T	Z - A X I S M O M E N T		
7	0	2.14585E+01	2.14585E+01	2.14585E+01	0.00000E+00	0.00000E+00	0.00000E+00		
14	0	2.39585E+01	2.39585E+01	2.39585E+01	0.00000E+00	0.00000E+00	0.00000E+00		
19	0	5.88083E-01	5.88083E-01	5.88083E-01	0.00000E+00	0.00000E+00	0.00000E+00		
25	0	1.11399E+00	1.11399E+00	1.11399E+00	0.00000E+00	0.00000E+00	0.00000E+00		
27	0	3.78238E-01	3.78238E-01	3.78238E-01	0.00000E+00	0.00000E+00	0.00000E+00		
32	0	3.78238E-01	3.78238E-01	3.78238E-01	0.00000E+00	0.00000E+00	0.00000E+00		

STRUCTURE LOAD CASE	ELEMENT A	LOAD B	MULTIPLIERS C	D
1. SPOT EM DURING CATEGORIC ANALYSIS - X DIR	.000	.000	.000	.000

DIRECTION FACTORS

X = 1.0000 Y = .0000 Z = .0000

INDICATOR FOR DISPLACEMENT OR ACCELERATION SPECTRUM - 2

EQ. 0 DISPLACEMENT
EQ. 1 ACCELERATION IN IN./SEC.**2
EQ. 2 ACCELERATION IN G**S

1. SPECTRA ARE ENTERED FOR CASE 1. KIND= 2

CLUSTER FACTOR, CF = .10000

SPECTRUM TABLE (ENVELOPE CHUG H - X DIRECTION)

NUMBER OF POINTS = 16
SCALE FACTOR = 1.00000E+00

INPUT POINT	PERIOD	SPECTRUM VALUE
1	1.000E-05	4.3000E-01
2	1.670E-02	4.3000E-01
3	2.100E-02	5.9500E-01
4	2.170E-02	6.0200E-01
5	2.680E-02	5.9300E-01
6	2.840E-02	5.5200E-01
7	3.010E-02	5.3800E-01
8	3.350E-02	3.4000E-01
9	3.520E-02	3.2000E-01
10	4.360E-02	3.2000E-01
11	4.520E-02	3.1000E-01
12	5.360E-02	1.2500E-01
13	5.700E-02	1.2500E-01
14	6.200E-02	9.1000E-02
15	6.370E-02	7.9000E-02
16	2.500E-01	7.9000E-02

CLUSTERING. +1 MEANS MORE I CLOSE TO I+1. -1, NOT.
-1. 1. 1.-1.-1. 1.-1.-1. 1.-1. 1. 1.-1.-1. 1.-1. 1. 1.
1. 1. 1.-1. 0.

MODAL PARTICIPATION FACTORS				
MODE	FREQ (CPS)	X-DIRECTION	Y-DIRECTION	Z-DIRECTION
1	8.165	-1.9861E+00	-2.1261E+00	-7.5679E+00
2	10.872	2.7613E+00	-5.5038E+00	1.1165E+00
3	11.556	1.2128E+00	-2.1291E+00	2.8824E-01
4	11.845	-1.2771E+00	-1.8481E+00	2.1585E+00
5	13.026	4.3912E+00	3.4843E+00	-7.4485E-01
6	15.284	2.7909E+00	5.1178E-01	-2.6224E+00
7	15.813	2.1612E-01	-8.8240E-01	-1.3801E+00
8	17.999	4.5068E+00	-3.0008E+00	-2.2824E-01
9	19.895	5.5551E+00	1.6228E+00	-2.1123E+00
10	21.602	1.6443E+00	-7.1820E-01	7.5057E-01
11	21.905	-4.1650E-01	8.4835E-01	6.5559E-01
12	23.021	-2.2598E+00	-2.0179E+00	-3.7770E-01
13	23.699	1.4133E+00	2.4846E+00	7.8897E-01
14	25.757	4.3784E-01	2.5757E-02	1.7611E+00
15	27.332	-2.6595E+00	-2.0845E+00	5.1913E-01
16	30.464	-3.1586E+00	3.7110E+00	-2.0715E+00
17	32.632	-5.7689E-01	1.5437E+00	-1.0750E+00
18	34.397	-1.1044E+00	-1.3266E+00	1.5466E+00
19	35.801	-1.8588E+00	2.2130E+00	2.9665E+00
20	36.158	-1.0792E+00	-9.6334E-01	1.6214E+00
21	38.962	3.5862E+00	1.6065E+00	2.9480E-01
22	43.333	4.0108E+00	-6.3002E-01	1.9116E+00
23	46.480	1.2618E+00	4.2959E-01	1.7854E+00
24	47.737	-7.1438E-01	7.9240E-01	1.1070E-01
25	49.581	4.8459E-02	5.7413E+00	2.1298E-02
26	50.546	9.9603E-02	4.5108E-01	-1.1245E+00
27	53.618	1.7941E+00	-5.3355E-01	2.0823E+00
28	56.512	-2.7389E-01	6.5827E-01	2.3857E+00
29	58.596	-9.0888E-01	1.0256E+00	6.1279E+00
30	65.872	-1.5893E-01	1.0870E+00	1.5279E+00

BENCHMARK PROBLEM 1

**LOWER FREQUENCY AMPLIFIED RESPONSE
GROUPING METHOD**

***** SRSS COMBINATION OF SUPPORT GROUP RESPONSES *****
 MODAL COMBINATION METHOD 2-GROUPING

N O D E N O D E N U M B E R	D I S P L A C E M E N T S / R O T A T I O N S				A C C E L E R A T I O N S I N G ' S			
	TRANSLATION	X- TRANSLATION	Y- TRANSLATION	Z- TRANSLATION	ROTATION	X- DIRECTION	Y- DIRECTION	Z- DIRECTION
1	15911E-08	10196E-08	31367E-08	31655E-08	50173E-08	30580E-07	000	000
2	33806E-04	18465E-04	39349E-04	24029E-05	35557E-05	30317E-05	003	009
3	50152E-04	29086E-04	39945E-04	25062E-05	37128E-05	30987E-05	010	032
301	16734E-02	11110E-02	13582E-03	15295E-04	22352E-04	26101E-04	171	054
4	25075E-02	17197E-02	22910E-03	53383E-05	85884E-05	49103E-04	257	058
5	23288E-02	16085E-02	24633E-03	11493E-04	17416E-04	53472E-04	238	063
6	16779E-02	11737E-02	26495E-03	19465E-04	28284E-04	58838E-04	171	074
7	23394E-02	11782E-02	41411E-03	19686E-04	28284E-04	59088E-04	171	066
8	67655E-03	49728E-03	28046E-03	24647E-04	33442E-04	59496E-04	069	070
9	70062E-07	20399E-07	29816E-03	26927E-04	30891E-04	60946E-04	000	058
12	54668E-03	52439E-03	31586E-03	28253E-04	28442E-04	63106E-04	058	077
13	13497E-02	13528E-02	33086E-03	28537E-04	28499E-04	65845E-04	127	127
14	24953E-02	13586E-02	10367E-02	29614E-04	28499E-04	65248E-04	241	127
15	21277E-02	21120E-02	33955E-03	27408E-04	29762E-04	60229E-04	121	079
16	27397E-02	26708E-02	35224E-03	27849E-04	29915E-04	53821E-04	128	081
18	34734E-02	32051E-02	78787E-03	38791E-04	27725E-04	44022E-04	144	098
1801	35623E-02	44014E-02	27919E-02	31321E-04	11366E-04	37193E-04	341	110
19	30993E-02	44953E-02	20475E-02	29162E-04	32369E-04	51549E-04	164	186
21	32014E-02	49173E-02	24155E-02	32060E-04	33781E-04	53525E-04	243	083
23	32519E-02	44542E-02	28279E-02	39630E-04	20148E-04	51067E-04	217	070
24	27669E-02	32298E-02	28391E-02	39645E-04	21831E-04	52526E-04	212	071
25	24540E-02	26408E-02	28467E-02	36004E-04	22759E-04	51653E-04	182	072
29	26624E-02	29471E-02	28591E-02	21041E-04	17801E-04	51304E-04	266	074
31	27076E-02	30704E-02	28654E-02	16052E-04	15572E-04	52022E-04	229	076
32	22984E-02	24755E-02	28738E-02	37327E-04	32597E-04	57544E-04	170	076
27	24749E-02	26864E-02	28751E-02	41423E-04	36425E-04	59223E-04	154	076
34	32244E-02	35153E-02	28765E-02	44831E-04	39844E-04	62067E-04	163	076
35	39539E-02	43193E-02	28770E-02	45631E-04	40585E-04	62067E-04	214	076
36	45711E-02	50010E-02	28772E-02	45737E-04	40681E-04	62067E-04	267	076
37	28204E-02	29114E-02	29003E-02	43395E-04	31300E-04	63666E-04	257	087
38	29973E-02	28463E-02	30319E-02	45345E-04	38393E-04	65636E-04	324	116
40	31141E-02	27955E-02	32288E-02	50127E-04	55374E-04	70932E-04	356	160
4001	31454E-02	38357E-02	46394E-02	59754E-04	55406E-04	74604E-04	354	316
41	31682E-02	61514E-02	60268E-02	74585E-04	40517E-04	59811E-04	374	353
43	31303E-02	63140E-02	61221E-02	82042E-04	46758E-04	47039E-04	372	336
44	33744E-02	45797E-02	58802E-02	96196E-04	71646E-04	49711E-04	313	162
46	44571E-02	43401E-02	65772E-02	10095E-03	70275E-04	59695E-04	289	454
47	43462E-02	47015E-02	53675E-02	95093E-04	56224E-04	67413E-04	270	410
49	38029E-02	46787E-02	21712E-02	87673E-04	62008E-04	57299E-04	597	332
51	36779E-02	45622E-02	20071E-02	76756E-04	65572E-04	39652E-04	638	332
53	32456E-02	41184E-02	18260E-02	75268E-04	69712E-04	34162E-04	595	336
54	26433E-02	33605E-02	15314E-02	76409E-04	69364E-04	36741E-04	424	288
55	48651E-03	40833E-03	28235E-03	28380E-04	32954E-04	14766E-04	094	054
56	71006E-04	10420E-04	41094E-04	14837E-05	12455E-04	78818E-06	014	008
57	48918E-09	95679E-09	46065E-09	51404E-07	12457E-04	27844E-07	000	000
58	82420E-04	44407E-06	47590E-04	51408E-07	12457E-04	27844E-07	016	009
59	29505E-02	30385E-02	28829E-02	16260E-04	36499E-04	47894E-04	241	072
61	31686E-02	31161E-02	29133E-02	18345E-04	49683E-04	45282E-04	260	073
62	30929E-02	31897E-02	31217E-02	18509E-04	80715E-04	38969E-04	271	089
64	33182E-02	30349E-02	58211E-02	35932E-04	89158E-04	42375E-04	273	234
66	3204E-02	30015E-02	89889E-02	58247E-04	68913E-04	39720E-04	273	286
67	27637E-02	30335E-02	82022E-02	96826E-04	19486E-04	44785E-04	214	352
69	30197E-02	30197E-02	39739E-02	94677E-04	24391E-04	46815E-04	073	402
71	29409E-02	29409E-02	30677E-02	80601E-04	29401E-04	48529E-04	044	201
72	26453E-02	26453E-02	23243E-02	68705E-04	37108E-04	51803E-04	014	161
73	16033E-04	21479E-04	18144E-02	58065E-04	32710E-04	52626E-04	002	319
73	40442E-05	25681E-03	35289E-03	11380E-04	20287E-04	20061E-04	000	101
73	25516E-05	64517E-05	51560E-04	47711E-06	84474E-05	10504E-05	000	003

74	.23895E-09	.12293E-07	.78037E-05	.36610E-07	.000	.000	.000
75	.23896E-09	.12293E-07	.78039E-05	.36614E-07	.000	.000	.003
76	.3491E-02	.44683E-04	.42667E-04	.71265E-04	.127	.188	.107
77	.3781E-02	.46618E-04	.45548E-04	.72333E-04	.147	.220	.141
79	.39942E-02	.50783E-04	.62857E-04	.70905E-04	.164	.255	.181
7901	.40037E-02	.58158E-02	.59718E-04	.63846E-04	.167	.265	.268
80	.40392E-02	.72623E-02	.44753E-04	.48672E-04	.169	.295	.292
82	.80352E-02	.90045E-04	.57924E-04	.43840E-04	.167	.290	.276
8201	.80700E-02	.10908E-03	.95693E-04	.54183E-04	.215	.263	.158
83	.61590E-02	.11969E-03	.98241E-04	.64642E-04	.329	.413	.312
85	.49362E-02	.12270E-03	.80782E-04	.75986E-04	.315	.453	.261
86	.50285E-02	.11067E-03	.72954E-04	.72984E-04	.447	.451	.229
88	.50083E-02	.95327E-04	.72123E-04	.61453E-04	.469	.448	.253
90	.48024E-02	.16670E-02	.69514E-04	.52064E-04	.436	.417	.246
92	.41963E-02	.15310E-02	.62101E-04	.45776E-04	.363	.347	.210
93	.33390E-02	.12829E-02	.27103E-04	.15280E-04	.068	.044	.039
94	.38515E-03	.22638E-03	.10917E-04	.78611E-06	.010	.001	.006
95	.95303E-05	.33026E-04	.10078E-04	.27216E-07	.000	.000	.000
96	.85114E-09	.33168E-09	.10079E-04	.27218E-07	.011	.000	.007
	.41907E-06	.38504E-04					

***** SRSS COMBINATION OF SUPPORT GROUP RESPONSES *****
 MODAL COMBINATION METHOD 2-GROUPING

P I E F O R C E S A N D M O M E N T S

ELEMENT NUMBER	ELEMENT TYPE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
1	TANGENT	END-I END-J	3136.800 3136.800	1019.600 1019.600	1591.170 1591.100	30579.80 30579.80	5017.30 96688.90	3165.50 63567.60
2	TANGENT	END-I END-J	3118.900 3118.900	1013.600 1013.600	1578.500 1578.500	30579.80 30579.80	96688.90 89858.60	63567.60 59182.90
3	TANGENT	END-I END-J	3102.500 3102.500	1005.200 1005.200	1561.700 1561.700	30579.80 30579.80	89858.60 26040.50	59182.90 15521.40
4	TANGENT	END-I END-J	3018.600 3018.600	559.200 559.200	760.200 760.200	30579.80 30579.80	26040.50 81061.30	15521.40 55915.10
5	TANGENT	END-I END-J	2934.700 2934.700	273.000 273.000	311.900 311.900	30579.80 30579.80	81061.30 81973.70	55915.10 58224.90
6	TANGENT	END-I END-J	2918.800 2918.800	265.100 265.100	346.700 346.700	30579.80 30579.80	81973.70 81442.80	58224.90 61650.60
7	TANGENT	END-I END-J	1424.600 1424.600	614.700 614.700	3123.300 3123.300	.00 .00	47954.60 .00	9437.40 .00
8	TANGENT	END-I END-J	2461.700 2461.700	1464.600 1464.600	3292.300 3292.300	38245.00 38245.00	81442.80 48164.00	56575.70 38554.80
9	TANGENT	END-I END-J	2440.400 2440.400	1489.200 1489.200	3332.000 3332.000	38245.00 38245.00	48164.00 92329.60	38554.80 46723.10
10	TANGENT	END-I END-J	2398.400 2398.400	904.500 904.500	1475.200 1475.300	38245.00 38245.00	92329.60 83541.30	46723.10 45977.60
11	TANGENT	END-I END-J	2374.200 2374.200	885.600 885.600	1471.000 1471.000	38245.00 38245.00	83541.30 85184.70	45977.60 54533.70
12	TANGENT	END-I END-J	1189.600 1189.600	1179.100 1179.100	2240.400 2240.400	.00 .00	67389.80 .00	35465.50 .00
13	TANGENT	END-I END-J	1657.900 1657.900	624.200 624.200	1530.400 1530.400	45852.40 45852.40	85184.70 48913.20	68753.00 52278.40
14	TANGENT	END-I END-J	1634.000 1634.000	676.100 676.100	1536.500 1536.500	45852.40 45852.40	48913.20 35124.70	52278.40 38518.60
15	BEND	END-I CENTER END-J	1563.800 1972.800 1910.500	1483.900 852.100 979.600	829.700 829.700 829.700	45852.40 28514.60 13685.80	38518.60 38722.90 35967.90	35124.70 37383.00 33098.10
16	TANGENT	END-I END-J	1613.600 1613.600	837.400 837.400	832.400 832.400	13686.50 13686.50	33098.10 70058.60	35967.50 72922.90
17	TANGENT	END-I END-J	1246.400 1246.400	583.100 583.100	741.200 741.200	13686.50 13686.50	70058.60 38704.00	72922.90 32370.10
18	TANGENT	END-I END-J	1155.300 1155.300	634.000 634.000	1102.400 1102.400	13688.20 13688.20	38704.00 21675.10	32369.40 25655.30
19	BEND	END-I CENTER END-J	1192.900 1363.700 1248.700	963.500 691.200 879.500	444.300 444.300 444.300	13686.70 15924.30 23973.00	25655.90 23400.30 19301.50	21675.10 34355.60 40652.50

20	TANGENT	END-I END-J	1152.400 1152.400	515.600 515.600	861.900 861.900	23973.00 23973.00	40652.50 47140.40	19301.50 23822.20
21	TANGENT	END-I END-J	1044.700 1044.700	796.900 796.900	1043.800 1043.800	15036.60 15036.60	43686.10 28153.70	24958.20 33923.30
22	TANGENT	END-I END-J	930.800 930.800	835.300 835.300	795.200 795.200	15036.60 15036.60	28153.70 36754.50	33923.30 52643.30
23	TANGENT	END-I END-J	837.800 837.800	392.000 392.000	508.300 508.300	15036.60 15036.60	36754.50 53193.60	52643.30 61910.80
24	TANGENT	END-I END-J	595.000 595.000	541.900 541.900	497.400 497.400	14691.00 14691.00	54689.80 33036.40	61816.10 35184.70
25	TANGENT	END-I END-J	488.300 488.300	739.900 739.900	809.000 809.000	14691.00 14691.00	33036.40 26397.00	35184.70 25095.00
26	TANGENT	END-I END-J	438.100 438.100	624.400 624.400	730.600 730.600	14691.00 14691.00	26397.00 17544.80	25095.00 15094.60
27	TANGENT	END-I END-J	84.900 84.900	289.600 289.600	254.700 254.700	.00 .00	7589.00 1586.00	8632.10 1799.50
28	TANGENT	END-I END-J	25.400 25.400	101.500 101.500	89.500 89.500	.00 .00	1586.00 .00	1799.50 .00
29	TANGENT	END-I END-J	835.800 835.800	836.300 836.300	317.500 317.500	6337.20 6337.20	16585.80 10996.70	22876.20 9765.00
30	TANGENT	END-I END-J	813.700 813.700	781.400 781.400	311.600 311.600	6337.20 6337.20	10996.70 8277.90	9765.00 10583.90
31	BEND	END-I CENTER END-J	796.000 988.600 1037.300	719.600 429.900 272.600	301.800 301.800 301.800	6336.70 5349.10 4910.20	8278.20 7322.50 5987.10	10583.90 12956.30 13173.60
32	TANGENT	END-I END-J	899.500 899.500	269.600 269.600	260.500 260.500	4910.20 4910.20	5987.20 9461.70	13173.60 9547.20
33	TANGENT	END-I END-J	688.100 688.100	242.600 242.600	153.600 153.600	4910.20 4910.20	9461.70 13324.30	9547.20 12229.40
34	BEND	END-I CENTER END-J	557.800 571.200 546.600	154.700 110.900 209.900	166.100 166.100 166.100	4910.20 3944.20 5162.90	12229.40 12856.30 12756.20	13324.30 13342.60 13409.80
35	TANGENT	END-I END-J	445.500 445.500	174.400 174.400	181.300 181.300	5161.10 5161.10	13409.80 9284.60	12756.90 10666.30
36	TANGENT	END-I END-J	300.700 300.700	211.300 211.300	192.500 192.500	5161.20 5161.20	9284.60 7783.00	10666.30 8221.10
37	BEND	END-I CENTER END-J	242.200 276.300 281.600	281.700 246.000 242.200	214.600 214.600 214.600	5161.20 3973.80 6540.30	7783.00 7048.20 4244.60	8221.10 7925.70 7481.60
38	TANGENT	END-I END-J	492.400 492.400	301.300 301.300	262.200 262.200	6539.10 6539.10	5432.90 10207.80	6003.20 13018.50
39	BEND	END-I CENTER END-J	665.200 710.200 712.100	343.300 226.400 217.400	216.000 216.000 216.000	6539.10 5628.10 4902.80	6308.20 6650.10 6733.10	15294.00 16539.40 16947.30
40	BEND	END-I	767.500	235.500	281.900	4903.00	6731.70	16947.90

41	BEVD	CENTER END-J	718.600 626.700	366.800 515.400	281.900 281.900	4629.00 4684.20	6113.40 5305.70	16329.40 14901.40
		END-I	655.500	567.800	354.200	4683.30	5306.10	14901.30
		CENTER	509.900	702.800	354.200	4725.70	4255.00	12633.90
		END-J	338.300	794.300	354.200	4835.10	3887.80	10362.30
42	TANGENT	END-I	339.500	933.300	530.600	4834.60	3889.60	10361.90
		END-J	339.500	933.300	530.600	4834.60	23379.20	35488.00
43	TANGENT	END-I	339.900	956.200	575.100	4834.30	23379.20	35488.00
		END-J	339.900	956.200	575.100	4834.30	33729.10	52509.50
44	TANGENT	END-I	340.000	956.800	580.500	4835.60	33729.10	52509.30
		END-J	340.000	956.800	580.500	4835.60	37234.40	58247.50
45	TANGENT	END-I	.000	.000	.900	.00	7.00	.00
		END-J	.000	.000	.900	.00	.00	.00
46	TANGENT	END-I	300.000	381.200	324.400	12352.10	17011.90	13328.40
		END-J	300.000	381.200	324.400	12352.10	10496.50	9497.40
47	TANGENT	END-I	257.300	340.600	322.000	12352.10	10496.50	9497.40
		END-J	257.300	340.600	322.000	12352.10	6901.60	8862.90
48	BEVD	END-I	227.700	305.600	317.900	12351.50	6902.60	8862.90
		CENTER	317.700	217.900	317.900	9347.20	8799.40	9095.90
		END-J	365.300	136.200	317.900	5946.10	9385.10	9191.90
49	TANGENT	END-I	269.600	136.200	294.200	5950.30	9382.30	9191.90
		END-J	269.600	136.200	294.200	5950.30	4068.60	6906.10
50	TANGENT	END-I	164.000	172.600	151.000	5950.30	4068.60	6906.10
		END-J	164.000	172.600	151.000	5950.30	10073.60	6768.00
51	BEVD	END-I	175.000	204.700	71.200	5950.30	10073.60	6768.00
		CENTER	259.900	71.500	71.200	2789.90	10453.50	6852.00
		END-J	204.700	175.200	71.200	8935.40	4734.60	6662.90
52	TANGENT	END-I	310.700	253.600	236.600	8933.00	6662.90	4739.30
		END-J	310.700	253.600	236.600	8933.00	8174.60	6100.90
53	BEVD	END-I	410.800	239.500	319.900	8933.00	6100.90	8174.60
		CENTER	442.400	178.800	319.900	10368.70	5205.20	8868.40
		END-J	447.700	190.000	319.900	11539.80	3997.50	9081.40
54	BEVD	END-I	478.600	208.300	339.400	11519.00	3999.50	9081.40
		CENTER	449.800	265.200	339.400	12318.70	2691.30	8694.80
		END-J	395.200	331.100	339.400	12721.40	1520.90	7872.80
55	BEVD	END-I	410.900	364.900	354.500	12721.20	1523.60	7872.80
		CENTER	327.900	436.600	354.500	12709.80	1527.30	6647.30
		END-J	238.000	487.600	354.500	12292.60	2654.30	5495.20
56	TANGENT	END-I	238.800	570.000	385.800	12293.30	2651.20	5495.20
		END-J	238.800	570.000	385.800	12293.30	13781.60	22658.80
57	TANGENT	END-I	239.000	583.600	393.600	12293.30	13781.60	22658.80
		END-J	239.000	583.600	393.600	12293.30	20934.40	33101.70
58	TANGENT	END-I	239.000	583.900	394.700	12293.30	20934.40	33101.70
		END-J	239.000	583.900	394.700	12293.30	23331.90	36610.20
59	TANGENT	END-I	.000	.000	.200	.00	1.30	.00
		END-J	.000	.000	.200	.00	.00	.00

60	TANGENT	END-I	434.500	457.900	362.000	7192.50	20613.40	14691.00
		END-J	434.500	457.900	362.000	7192.50	13832.70	8784.60
61	TANGENT	END-I	422.100	442.100	351.900	7192.50	13832.70	8784.60
		END-J	422.100	442.100	351.900	7192.50	10466.00	8387.30
62	BEND	END-I	413.200	417.300	340.100	7192.10	10466.20	8387.30
		CENTER	493.700	309.400	340.100	5963.90	9284.80	8918.90
		END-J	528.700	239.300	340.100	5896.50	7840.30	9255.90
63	TANGENT	END-I	477.300	216.900	300.500	5896.20	7840.40	9255.90
		END-J	477.300	216.900	300.500	5896.20	11261.20	10707.00
64	TANGENT	END-I	404.700	175.000	194.500	5896.20	11261.20	10707.00
		END-J	404.700	175.000	194.500	5896.20	17391.80	12228.20
65	BEND	END-I	364.600	141.300	145.300	5896.20	12228.20	17391.80
		CENTER	377.400	98.900	145.300	4519.50	12740.20	17534.00
		END-J	366.100	133.900	145.300	5181.30	12551.80	17352.80
66	TANGENT	END-I	291.200	184.600	205.000	5179.80	17352.80	12552.40
		END-J	291.200	184.600	205.000	5179.80	9180.60	10357.30
67	TANGENT	END-I	195.300	187.800	175.000	5179.80	9180.60	10357.30
		END-J	195.300	187.800	175.000	5179.80	6380.20	8360.90
68	BEND	END-I	188.700	291.300	202.200	5179.80	6380.20	8360.90
		CENTER	257.500	232.100	202.200	3671.00	6151.30	7839.00
		END-J	291.300	188.700	202.200	5368.40	4140.00	7208.70
69	TANGENT	END-I	468.300	279.100	239.300	5367.40	6173.60	5368.10
		END-J	468.300	279.100	239.300	5367.40	8020.50	12283.10
70	BEND	END-I	612.200	328.200	191.300	5367.40	5663.20	13505.30
		CENTER	643.100	252.200	191.300	5236.90	5572.40	14737.50
		END-J	637.300	266.700	191.300	5189.90	5540.60	15341.50
71	BEND	END-I	682.400	285.700	231.300	5189.60	5540.40	15341.70
		CENTER	630.100	388.600	231.300	5236.90	5323.10	15235.00
		END-J	543.600	503.400	231.300	5333.40	5270.40	14634.00
72	BEND	END-I	566.700	546.600	278.400	5332.40	5270.90	14634.20
		CENTER	447.000	650.200	278.400	5434.70	5439.80	13651.80
		END-J	326.700	718.900	278.400	5553.20	5902.20	12773.10
73	TANGENT	END-I	327.600	832.400	398.500	5553.30	5904.90	12772.10
		END-J	327.600	832.400	398.500	5553.30	19968.80	35130.30
74	TANGENT	END-I	327.700	850.800	429.200	5553.20	19968.80	35130.30
		END-J	327.700	850.800	429.200	5553.20	27548.70	49931.50
75	TANGENT	END-I	327.700	851.000	432.900	5553.80	27548.70	49931.50
		END-J	327.700	851.000	432.900	5553.80	30129.10	54963.00
76	TANGENT	END-I	.000	.000	.600	.00	5.10	.00
		END-J	.000	.000	.600	.00	.00	.00

***** SPSS COMBINATION OF SUPPORT GROUP RESPONSES *****
 MODAL COMBINATION METHOD 2-GROUPING

SUPPORT FORCES AND MOMENTS

NODE NUMBER	COMPONENT DIRECTION	FORCE/MOMENT (LOCAL)
1	FZ	1591.
1	FY	1020.
1	FZ	3137.
1	MX	3166.
1	MY	5017.
1	MZ	30580.
9	FZ	3924.
9	FY	1142.
9	FX	489.
56	FY	957.
56	FZ	461.
56	MX	51403.
56	MY	37241.
56	MZ	27841.
74	FZ	239.
74	FY	584.
74	FZ	395.
74	MX	12293.
74	MY	23333.
74	MZ	36610.
95	FZ	427.
95	FY	851.
95	FZ	332.
95	MX	48089.
95	MY	30133.
95	MZ	27216.
19	FL	1839.
25	FL-1	1520.
25	FL-2	1442.
27	FL	1115.
32	FL	1240.

BENCHMARK PROBLEM 1

**LOWER FREQUENCY AMPLIFIED RESPONSE
DOUBLE SUM METHOD**

***** SRSS COMBINATION OF SUPPORT GROUP RESPONSES *****
 MODAL COMBINATION METHOD 3-DOUBLE SUM

N O D E N O D E N U M B E R	D I S P L A C E M E N T S / R O T A T I O N S				A C C E L E R A T I O N S I N G ' S				
	X- T R A N S L A T I O N	Y- T R A N S L A T I O N	Z- T R A N S L A T I O N	X- R O T A T I O N	Y- R O T A T I O N	Z- R O T A T I O N	X- D I R E C T I O N	Y- D I R E C T I O N	Z- D I R E C T I O N
1	16069E-08	10864E-08	28985E-08	31172E-08	46798E-08	32374E-07	000	000	000
2	33067E-04	19550E-04	36361E-04	25530E-05	36180E-05	32095E-05	006	003	008
3	49764E-04	30989E-04	36912E-04	26622E-05	37772E-05	32805E-05	009	005	008
301	16985E-02	11812E-02	12560E-03	16232E-04	22772E-04	27632E-04	297	182	027
	25533E-02	18244E-02	21208E-03	56919E-05	86185E-05	51983E-04	437	274	046
4	23751E-02	17053E-02	22809E-03	12235E-04	17651E-04	56609E-04	404	254	050
5	17137E-02	12423E-02	24541E-03	20658E-04	28816E-04	62290E-04	288	182	053
6	24542E-02	12472E-02	42955E-03	20885E-04	28135E-04	63490E-04	387	183	071
7	69113E-03	52424E-03	25977E-03	28005E-04	34135E-04	62591E-04	113	074	036
8	72469E-07	20356E-07	27615E-03	28005E-04	31373E-04	63618E-04	000	000	060
12	55007E-03	54040E-03	29258E-03	28763E-04	28341E-04	65786E-04	062	062	063
13	13409E-02	13748E-02	30650E-03	28470E-04	27609E-04	68667E-04	112	136	063
14	25733E-02	13813E-02	10445E-02	29609E-04	27609E-04	72538E-04	249	137	119
15	20774E-02	21179E-02	31432E-03	26903E-04	28625E-04	62627E-04	126	172	067
16	26505E-02	26520E-02	32574E-03	27367E-04	28660E-04	55639E-04	130	173	069
18	30631E-02	30631E-02	79590E-03	40692E-04	29232E-04	44937E-04	135	093	105
1801	34368E-02	42232E-02	29314E-02	33068E-04	11502E-04	38040E-04	160	364	390
19	29682E-02	43645E-02	20904E-02	30666E-04	33549E-04	54181E-04	125	163	193
21	30890E-02	49070E-02	24270E-02	33786E-04	34777E-04	56467E-04	163	253	086
23	32158E-02	45062E-02	28216E-02	41589E-04	19253E-04	54131E-04	215	309	071
24	28260E-02	32562E-02	28328E-02	41813E-04	21007E-04	55285E-04	201	227	072
25	24927E-02	26515E-02	28408E-02	38106E-04	22625E-04	54071E-04	157	190	073
29	26474E-02	30319E-02	28537E-02	22112E-04	18388E-04	53137E-04	187	277	075
31	27264E-02	31881E-02	28604E-02	16580E-04	16530E-04	53568E-04	230	308	075
32	23763E-02	25102E-02	28698E-02	39078E-04	33907E-04	58920E-04	172	175	077
34	33343E-02	36174E-02	28731E-02	43462E-04	37785E-04	60626E-04	151	149	077
35	40678E-02	44947E-02	28737E-02	47997E-04	41084E-04	63500E-04	225	255	077
36	46988E-02	52281E-02	28738E-02	48111E-04	41943E-04	63500E-04	278	323	077
37	28928E-02	28648E-02	28991E-02	43554E-04	28592E-04	65773E-04	254	224	086
38	30753E-02	27501E-02	30278E-02	44969E-04	35188E-04	67402E-04	315	256	117
40	31932E-02	26770E-02	32189E-02	48711E-04	53335E-04	70594E-04	347	291	163
4001	32256E-02	37972E-02	44809E-02	57441E-04	51914E-04	73444E-04	355	258	310
41	32496E-02	60663E-02	56595E-02	70787E-04	36220E-04	58395E-04	362	348	348
43	62296E-02	62296E-02	56988E-02	77706E-04	43808E-04	45241E-04	359	356	329
4301	46933E-02	46933E-02	50033E-02	90243E-04	72808E-04	47101E-04	277	430	408
44	44136E-02	40507E-02	58118E-02	94475E-04	73204E-04	57868E-04	265	511	390
46	43114E-02	43895E-02	47760E-02	91179E-04	60125E-04	67526E-04	581	508	321
47	36942E-02	43686E-02	20428E-02	81117E-04	61937E-04	58089E-04	581	508	321
49	35555E-02	42626E-02	19018E-02	69503E-04	64693E-04	42148E-04	621	508	339
51	31255E-02	38529E-02	17462E-02	68531E-04	68027E-04	35562E-04	580	479	327
53	25416E-02	31480E-02	14716E-02	70642E-04	67005E-04	36011E-04	483	403	280
54	46688E-03	38483E-03	27075E-03	26600E-04	31634E-04	14028E-04	091	052	008
55	68131E-04	98261E-05	39417E-04	13942E-05	12941E-04	74456E-06	013	001	003
56	79082E-04	90396E-04	43245E-09	48335E-07	11950E-04	26257E-07	000	000	009
57	30206E-02	31732E-02	41795E-06	48338E-07	11952E-04	26260E-07	015	000	009
59	32065E-02	32314E-02	29366E-02	16624E-04	36528E-04	48328E-04	244	312	074
61	34218E-02	32525E-02	57068E-02	18483E-04	48860E-04	44938E-04	263	321	075
6101	34218E-02	31196E-02	87103E-02	18332E-04	77855E-04	38888E-04	273	316	090
64	28381E-02	32213E-02	79275E-02	35182E-04	85500E-04	43533E-04	275	221	249
65	32072E-02	31422E-02	57068E-02	35182E-04	65951E-04	41131E-04	275	308	416
67	31234E-02	29829E-02	31196E-02	56812E-04	65951E-04	41131E-04	275	380	384
69	50123E-03	32072E-02	32072E-02	93831E-04	19246E-04	46210E-04	076	378	194
71	14397E-03	31234E-02	29636E-02	91621E-04	24218E-04	48020E-04	046	373	156
72	22799E-02	28088E-02	22442E-02	77936E-04	28892E-04	49558E-04	046	344	124
73	27231E-03	27231E-03	34008E-03	66373E-04	31888E-04	53774E-04	015	284	099
	68342E-05	49685E-04	46074E-06	56073E-04	35901E-04	55891E-04	002	035	019
				10989E-04	19560E-04	21283E-04	000	001	003
				46074E-06	81410E-05	11139E-05	-000		

74	23066E-09	.11872E-07	.75205E-05	.38821E-07	.000	.000
75	.23067E-09	.29601E-06	.75208E-05	.38825E-07	.000	.003
76	.36140E-02	.37180E-02	.41572E-04	.72816E-04	.132	.110
77	.39099E-02	.39019E-02	.44614E-04	.74316E-04	.146	.143
79	.41335E-02	.43225E-02	.58934E-04	.72837E-04	.162	.180
7901	.41487E-02	.64007E-02	.56264E-04	.66206E-04	.164	.263
80	.41598E-02	.82983E-02	.41293E-04	.50082E-04	.166	.287
82	.41353E-02	.83427E-02	.55143E-04	.43749E-04	.164	.272
8201	.45540E-02	.63645E-02	.91802E-04	.54870E-04	.211	.160
83	.63977E-02	.49516E-02	.94120E-04	.66985E-04	.317	.300
85	.60524E-02	.49815E-02	.76345E-04	.77259E-04	.306	.255
86	.38885E-02	.49608E-02	.70124E-04	.73283E-04	.467	.242
88	.34318E-02	.47634E-02	.69944E-04	.61326E-04	.492	.267
90	.28522E-02	.41703E-02	.68461E-04	.52260E-04	.459	.259
92	.22674E-02	.33208E-02	.62346E-04	.45939E-04	.443	.221
93	.40390E-03	.38273E-03	.27663E-04	.15106E-04	.383	.041
94	.58749E-04	.94465E-05	.11178E-04	.77423E-06	.072	.006
95	.43786E-09	.83928E-09	.10320E-04	.26871E-07	.010	.000
96	.68288E-04	.41647E-06	.10321E-04	.26874E-07	.000	.007
					.012	

***** SRSS COMBINATION OF SUPPORT GROUP RESPONSES *****
 MODAL COMBINATION METHOD 3-DOUBLE SUM

PIPE FORCES AND MOMENTS

ELEMENT NUMBER	ELEMENT TYPE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
1	TANGENT	END-I END-J	2898.600 2898.600	1086.400 1086.400	1606.900 1606.900	32373.90 32373.90	4679.80 98015.90	3117.20 67649.30
2	TANGENT	END-I END-J	2883.400 2883.400	1080.000 1080.000	1594.800 1594.800	32373.90 32373.90	98015.90 91114.10	67649.30 62976.50
3	TANGENT	END-I END-J	2869.700 2869.700	1071.000 1071.000	1578.500 1578.500	32373.90 32373.90	91114.10 25989.90	62976.50 16557.30
4	TANGENT	END-I END-J	2798.800 2798.800	589.800 589.800	780.100 780.100	32373.90 32373.90	25989.90 82648.70	16557.30 59327.70
5	TANGENT	END-I END-J	2727.800 2727.800	271.300 271.300	303.600 303.600	32373.90 32373.90	82648.70 83813.60	59327.70 61612.90
6	TANGENT	END-I END-J	2714.300 2714.300	260.400 260.400	328.500 328.500	32373.90 32373.90	83813.60 83651.70	61612.90 64783.80
7	TANGENT	END-I END-J	1521.700 1521.700	586.700 586.700	3213.900 3213.900	.00 .00	49346.00 .00	9007.70 .00
8	TANGENT	END-I END-J	2278.600 2278.600	1556.500 1556.500	3355.900 3355.900	37836.50 37836.50	83651.70 47049.60	59365.20 37900.80
9	TANGENT	END-I END-J	2260.400 2260.400	1582.800 1582.800	3395.800 3395.800	37836.50 37836.50	47049.60 91969.40	37900.80 46233.70
10	TANGENT	END-I END-J	2224.600 2224.600	919.300 919.300	1550.800 1550.800	37836.50 37836.50	91969.40 81838.30	46233.70 46987.20
11	TANGENT	END-I END-J	2204.100 2204.100	898.800 898.800	1545.400 1545.400	37836.50 37836.50	81838.30 83286.60	46987.20 57771.30
12	TANGENT	END-I END-J	1275.800 1275.800	1106.300 1106.300	2316.100 2316.100	.00 .00	69665.60 .00	33276.00 .00
13	TANGENT	END-I END-J	1656.000 1656.000	638.900 638.900	1454.100 1454.100	48483.60 48483.60	83286.60 51049.30	72923.70 55760.30
14	TANGENT	END-I END-J	1636.000 1636.000	698.900 698.900	1456.600 1456.600	48483.60 48483.60	51049.30 37487.20	55760.30 41151.50
15	BEND	END-I CENTER END-J	1576.100 1938.300 1836.300	1405.000 891.500 1023.700	875.200 875.200 875.200	48483.60 30412.30 13938.90	41151.50 40740.10 37256.50	37487.20 38203.40 32288.70
16	TANGENT	END-I END-J	1555.300 1555.300	893.300 893.300	871.200 871.200	13939.80 13939.80	32288.70 73892.50	37256.00 77247.50
17	TANGENT	END-I END-J	1231.100 1231.100	619.800 619.800	774.800 774.800	13939.80 13939.80	73892.50 38021.10	77247.50 33028.90
18	TANGENT	END-I END-J	1138.300 1138.300	689.600 689.600	1078.000 1078.000	13942.10 13942.10	38021.10 22171.80	33028.40 25029.30
19	BEND	END-I CENTER END-J	1155.600 1318.600 1215.400	943.300 686.400 852.500	466.800 466.800 466.800	13940.50 15749.40 24119.00	25030.10 24357.60 20992.60	22171.80 34253.30 40783.40

20	TANGENT	END-I END-J	1115.100 1115.100	523.400 523.400	831.800 831.800	24118.90 24118.90	40783.40 46333.20	20992.60 24770.20
21	TANGENT	END-I END-J	1041.500 1041.500	811.400 811.400	1063.300 1063.300	16008.10 16008.10	43690.30 27343.00	25748.50 35712.10
22	TANGENT	END-I END-J	919.100 919.100	885.600 885.600	816.200 816.200	16008.10 16008.10	27343.00 37205.30	35712.10 55057.20
23	TANGENT	END-I END-J	822.700 822.700	417.900 417.900	515.700 515.700	16008.10 16008.10	37205.30 54060.90	55057.20 65435.20
24	TANGENT	END-I END-J	553.000 553.000	568.300 568.300	499.800 499.800	15276.70 15276.70	55935.90 34235.30	65338.40 37428.80
25	TANGENT	END-I END-J	447.000 447.000	767.400 767.400	812.200 812.200	15276.70 15276.70	34235.30 27267.20	37428.80 27009.60
26	TANGENT	END-I END-J	402.500 402.500	660.900 660.900	768.000 768.000	15276.70 15276.70	27267.20 16887.80	27009.60 14830.80
27	TANGENT	END-I END-J	86.000 86.000	306.900 306.900	267.200 267.200	.00 .00	7947.60 1649.40	9160.50 1916.80
28	TANGENT	END-I END-J	25.800 25.800	108.200 108.200	93.100 93.100	.00 .00	1649.40 .00	1916.80 .00
29	TANGENT	END-I END-J	824.600 824.600	788.200 788.200	322.100 322.100	5727.80 5727.80	17401.60 11388.50	22506.00 10136.00
30	TANGENT	END-I END-J	797.500 797.500	735.900 735.900	317.700 317.700	5727.80 5727.80	11388.50 8381.10	10136.00 10629.40
31	BEND	END-I CENTER END-J	775.700 956.400 997.800	679.500 411.100 272.100	308.300 308.300 308.300	5727.30 4826.40 4705.60	8381.40 7295.30 5749.70	10629.40 12686.60 12778.20
32	TANGENT	END-I END-J	865.100 865.100	271.900 271.900	267.800 267.800	4705.20 4705.20	5750.00 9378.40	12778.20 8904.80
33	TANGENT	END-I END-J	662.400 662.400	230.600 230.600	156.100 156.100	4705.20 4705.20	9378.40 13764.20	8904.80 12083.40
34	BEND	END-I CENTER END-J	538.600 551.700 527.900	149.400 103.000 197.300	157.400 157.400 157.400	4705.20 3516.80 4720.50	12083.40 12733.30 12634.10	13764.20 13813.50 13856.20
35	TANGENT	END-I END-J	429.000 429.000	169.000 169.000	176.000 176.000	4718.40 4718.40	13856.20 8990.00	12634.90 10500.70
36	TANGENT	END-I END-J	283.600 283.600	202.500 202.500	185.800 185.800	4718.40 4718.40	8990.00 7379.00	10500.70 7941.90
37	BEND	END-I CENTER END-J	236.100 274.000 270.600	270.700 237.600 236.200	197.200 197.200 197.200	4718.50 3968.50 6102.50	7379.00 6421.60 4007.20	7941.90 7495.90 7007.50
38	TANGENT	END-I END-J	465.200 465.200	279.800 279.800	249.400 249.400	6101.70 6101.70	5182.50 9860.80	5970.50 12130.60
39	BEND	END-I CENTER END-J	627.600 671.700 674.500	320.700 210.600 197.300	202.200 202.200 202.200	6101.70 5262.70 4651.00	6234.00 6496.30 6534.90	14306.90 15442.10 15793.20
40	BEND	END-I	726.700	214.800	264.800	4651.00	6533.50	15793.80

41	BEND	CENTER END-J	677.900 587.500	340.500 483.600	264.800 264.800	4410.10 4515.50	5961.60 5272.00	15198.70 13887.80
		END-I CENTER END-J	615.200 475.800 316.400	533.700 662.200 749.800	335.900 335.900 335.900	4514.80 4685.70 4827.80	5272.50 4435.70 4274.60	13887.80 11873.90 9870.60
42	TANGENT	END-I END-J	317.500 317.500	881.600 881.600	508.600 508.600	4827.50 4827.50	4276.30 22486.40	9869.90 33255.70
43	TANGENT	END-I END-J	317.900 317.900	903.500 903.500	552.200 552.200	4827.20 4827.20	22486.40 32368.50	33255.70 49388.40
44	TANGENT	END-I END-J	317.900 317.900	904.000 904.000	557.300 557.300	4829.60 4828.70	32368.50 35725.70	49388.30 54821.30
45	TANGENT	END-I END-J	.000 .000	.000 .000	.900 .900	.00 .00	6.80 .00	.00 .00
46	TANGENT	END-I END-J	296.300 296.300	372.500 372.500	311.300 311.300	11713.80 11713.80	16164.80 9994.60	13828.60 9851.40
47	TANGENT	END-I END-J	254.100 254.100	331.200 331.200	308.200 308.200	11713.80 11713.80	9994.60 6646.20	9851.40 9210.60
48	BEND	END-I CENTER END-J	224.500 308.700 353.400	296.200 213.800 135.800	303.700 303.700 303.700	11713.20 8905.80 5748.10	6647.10 8400.80 8905.30	9210.60 9453.40 9510.80
49	TANGENT	END-I END-J	259.000 259.000	141.800 141.800	280.300 280.300	5751.90 5751.90	8902.80 4069.70	9510.80 6869.20
50	TANGENT	END-I END-J	160.400 160.400	175.300 175.300	143.300 143.300	5751.90 5751.90	4069.70 9679.30	6869.20 6968.90
51	BEND	END-I CENTER END-J	170.000 250.200 195.900	195.900 73.400 170.100	71.300 71.300 71.300	5751.90 2700.20 8558.80	9679.30 10031.50 4531.30	6968.90 7118.60 6886.90
52	TANGENT	END-I END-J	317.000 317.000	244.700 244.700	228.000 228.000	8556.50 8556.50	6886.90 8666.80	4535.80 5928.00
53	BEND	END-I CENTER END-J	428.000 456.900 458.000	231.100 181.400 194.900	307.800 307.800 307.800	8556.50 9947.40 11067.50	5928.00 5077.20 3922.40	8666.80 9286.90 9395.90
54	BEND	END-I CENTER END-J	492.300 457.400 395.600	213.700 278.300 352.700	326.500 326.500 326.500	11066.70 11852.00 12255.80	3924.40 2668.90 1536.80	9395.90 8867.20 7918.20
55	BEND	END-I CENTER END-J	413.100 321.400 229.800	389.800 462.400 512.500	340.900 340.900 340.900	12255.50 12259.70 11870.90	1539.40 1497.90 2551.50	7918.20 6687.70 5601.30
56	TANGENT	END-I END-J	230.500 230.500	602.500 602.500	370.900 370.900	11871.60 11871.60	2548.50 13304.50	5601.30 24047.90
57	TANGENT	END-I END-J	230.700 230.700	617.200 617.200	378.500 378.500	11871.60 11871.60	13304.50 20180.40	24047.90 35107.30
58	TANGENT	END-I END-J	230.700 230.700	617.500 617.500	379.500 379.500	11871.60 11871.60	20180.40 22485.30	35107.30 38821.00
59	TANGENT	END-I END-J	.000 .000	.000 .000	.200 .200	.00 .00	1.20 .00	.00 .00

60	TANGENT	END-I	438.800	456.000	345.700	6904.80	20211.10	15276.70
		END-J	438.800	456.000	345.700	6904.80	13847.70	9284.80
61	TANGENT	END-I	423.300	440.300	336.900	6904.80	13847.70	9284.80
		END-J	423.300	440.300	336.900	6904.80	10649.80	8650.90
62	BEND	END-I	411.900	417.000	326.600	6904.30	10650.10	8650.90
		CENTER	492.500	312.200	326.600	5558.50	9524.80	9020.50
		END-J	526.000	252.200	326.600	5695.40	7863.70	9277.60
63	TANGENT	END-I	474.300	226.600	292.900	5694.60	7864.10	9277.60
		END-J	474.300	226.600	292.900	5694.60	10934.20	10648.60
64	TANGENT	END-I	400.500	174.500	196.300	5694.60	10934.20	10648.60
		END-J	400.500	174.500	196.300	5694.60	16711.00	12503.90
65	BEND	END-I	359.200	142.700	145.000	5694.60	12503.90	16711.00
		CENTER	374.200	99.700	145.000	4188.80	13092.10	16855.30
		END-J	365.200	127.900	145.000	5143.60	12934.40	16707.10
66	TANGENT	END-I	289.900	185.800	197.100	5141.90	16707.10	12935.00
		END-J	289.900	185.800	197.100	5141.90	8986.80	10641.60
67	TANGENT	END-I	198.900	191.500	174.500	5141.90	8986.80	10641.60
		END-J	198.900	191.500	174.500	5141.90	6426.60	8554.60
68	BEND	END-I	197.700	290.200	193.400	5142.00	6426.60	8554.60
		CENTER	264.800	235.500	193.400	3955.00	6172.50	8033.50
		END-J	290.200	197.800	193.400	5542.40	4222.50	7283.20
69	TANGENT	END-I	460.200	263.300	241.200	5541.40	6175.20	5576.80
		END-J	460.200	263.300	241.200	5541.40	8237.00	11706.20
70	BEND	END-I	603.000	305.900	193.600	5541.40	5921.70	13014.60
		CENTER	629.400	237.100	193.600	5381.10	5832.70	14115.00
		END-J	621.900	261.800	193.600	5351.90	5793.50	14572.00
71	BEND	END-I	666.200	281.500	235.800	5351.70	5793.10	14572.20
		CENTER	613.400	389.300	235.800	5421.80	5466.70	14294.50
		END-J	525.600	502.800	235.800	5529.00	5222.90	13590.10
72	BEND	END-I	548.600	545.300	286.000	5528.10	5223.60	13590.20
		CENTER	426.100	645.000	286.000	5583.30	5215.00	12583.50
		END-J	303.900	708.700	286.000	5707.10	5594.10	11755.80
73	TANGENT	END-I	304.700	820.900	414.100	5706.90	5596.30	11754.80
		END-J	304.700	820.900	414.100	5706.90	20228.80	34941.90
74	TANGENT	END-I	304.900	838.900	446.800	5706.80	20228.80	34941.90
		END-J	304.900	838.900	446.800	5706.80	28157.30	49639.80
75	TANGENT	END-I	304.900	839.200	450.700	5707.40	28157.30	49639.80
		END-J	304.900	839.200	450.700	5707.40	30852.80	54622.60
76	TANGENT	END-I	.000	.000	.600	.00	5.30	.00
		END-J	.000	.000	.600	.00	.00	.00

***** SPS COMBINATION OF SUPPORT GROUP RESPONSES *****
 MODAL COMBINATION METHOD 3-DOUBLE SUM

S U P P O R T F O R C E S A N D M O M E N T S

NODE NUMBER	COMPONENT DIRECTION	FORCE/MOMENT (LOCAL)
1	FX	1607.
1	FY	1086.
1	FZ	2899.
1	MX	3117.
1	MY	4680.
1	MZ	32374.
1	FX	4058.
9	FY	1140.
9	FZ	475.
56	FX	904.
56	FY	432.
56	FZ	48334.
56	MX	35732.
56	MY	26257.
56	MZ	231.
74	FX	618.
74	FY	379.
74	FZ	11872.
74	MX	22486.
74	MY	38821.
74	MZ	438.
95	FX	839.
95	FY	332.
95	FZ	47847.
95	MX	30857.
95	MY	26872.
95	MZ	1823.
19	FL	1519.
25	FL-1	1474.
25	FL-2	1112.
27	FL	1308.
32	FL	

BENCHMARK PROBLEM 1
HIGHER FREQUENCY RESPONSE
(RIGID RESPONSE)

STATIC ANALYSIS

LOAD C'SE 1 ABWR FW PIPING MISSING MASS - CF-X-X
DISPLACEMENTS/ROTATIONS OF UNRESTRAINED NODES

NODE NUMBER	X- TRANSLATION	Y- TRANSLATION	Z- TRANSLATION	X- ROTATION	Y- ROTATION	Z- ROTATION
1	-2.62087E-09	-6.36771E-12	7.99060E-11	-1.94157E-10	1.00753E-07	-2.11125E-09
2	-2.74746E-04	-5.72256E-07	1.00238E-06	1.50109E-10	3.16569E-06	-2.09307E-07
3	-2.62090E-04	-5.78842E-07	1.01728E-06	4.72221E-10	3.13662E-06	-2.13933E-07
301	-2.241699E-04	-2.63955E-06	3.37109E-06	-1.04855E-09	7.90437E-07	-1.80200E-06
4	-8.00098E-05	-7.22610E-08	5.43347E-06	-2.30226E-08	2.23348E-06	-3.39007E-06
5	-4.53927E-05	3.59738E-07	5.76792E-06	-5.59390E-09	1.89610E-06	-3.69171E-06
6	3.20420E-06	2.26094E-07	6.11951E-06	3.70785E-08	9.44222E-07	-4.06220E-06
7	7.39512E-05	2.33209E-07	7.77857E-06	6.31301E-08	9.44222E-07	-4.26244E-06
8	9.04764E-06	-1.88083E-07	6.17002E-06	7.94574E-09	-8.90836E-08	-3.46620E-06
9	-1.02314E-08	-2.99219E-10	6.20798E-06	-4.80973E-09	-8.09890E-07	-2.85997E-06
12	-3.05172E-05	-2.16932E-07	6.20465E-06	-2.58919E-08	-1.11839E-06	-2.24286E-06
13	-6.35420E-05	8.63422E-07	6.18028E-06	7.97502E-08	7.35643E-07	-1.64686E-06
14	-2.05860E-05	5.84839E-07	5.98659E-06	-1.88016E-08	-7.35643E-07	-1.46223E-06
15	-7.53213E-05	6.28545E-06	5.96863E-06	-2.07930E-07	2.84177E-08	-1.50574E-06
16	-6.01932E-05	1.29035E-05	5.61082E-06	-2.40949E-07	1.00507E-06	-1.32149E-06
1801	-1.40211E-05	6.48316E-07	-4.49061E-05	-4.81387E-07	9.49275E-07	-7.08139E-07
19	-1.94332E-05	9.02417E-06	-6.95417E-06	-5.01298E-07	-1.02531E-06	-9.62551E-08
21	-6.88081E-07	1.12951E-06	2.56773E-05	-1.54744E-07	2.88155E-07	-1.73530E-07
23	2.63672E-06	-2.33358E-06	6.12112E-05	-1.50106E-08	1.01318E-06	-2.44849E-07
24	1.24477E-05	-2.48168E-06	3.16415E-07	-6.42222E-08	-6.43175E-08	-3.14123E-08
25	2.33727E-06	2.57355E-07	1.07892E-06	-3.23293E-08	-1.29321E-07	-1.81406E-07
29	9.35509E-06	-2.68899E-06	-2.41484E-06	-3.95270E-08	7.41336E-08	2.94974E-07
31	9.35509E-06	-3.39991E-06	-2.31445E-06	-2.39901E-08	-1.34980E-07	2.30326E-07
32	-8.75307E-06	5.38751E-07	-4.08991E-06	-1.21885E-08	3.99484E-08	2.14164E-07
27	7.87378E-06	-6.17715E-07	-4.520E-06	3.27636E-09	3.06183E-07	1.83304E-07
34	3.33085E-07	-1.07165E-06	-4.41960E-06	6.15569E-09	3.69059E-07	1.88304E-07
35	9.49018E-06	-1.19716E-06	-4.49080E-06	4.82486E-09	3.78386E-07	1.88304E-07
36	1.62832E-05	-2.26362E-06	-4.49080E-06	4.38305E-09	3.78386E-07	1.88304E-07
37	6.50394E-06	-8.12484E-06	-2.57169E-05	-9.32792E-07	-1.18984E-06	4.50314E-07
38	1.94014E-06	-1.25262E-05	-4.70105E-05	-1.07223E-06	-1.34472E-06	4.71926E-07
40	-6.17639E-07	-1.71347E-05	-7.19267E-05	-9.67498E-07	-9.73962E-07	1.06708E-07
4001	-1.22279E-06	-1.20257E-05	-8.75216E-05	-5.81587E-07	6.66491E-07	-3.31582E-07
41	-1.66899E-06	8.26938E-06	-1.51400E-05	-1.95675E-07	2.05265E-06	-3.82278E-07
43	-7.35845E-06	1.05479E-05	5.89888E-06	-1.95675E-07	2.11373E-06	-1.41003E-07
4301	-4.75658E-05	3.55119E-06	7.65052E-05	-1.46679E-07	-5.08089E-07	5.37201E-07
44	2.16414E-05	-1.31510E-05	-4.16780E-05	4.08142E-07	-2.68493E-06	7.80971E-07
46	3.40515E-05	-7.95462E-06	-4.62550E-05	1.88861E-06	-2.16271E-06	7.03285E-07
47	-3.51246E-07	-8.26081E-06	2.14413E-05	7.26561E-07	-2.06524E-06	7.84421E-07
49	-1.15474E-05	-8.35629E-06	1.65033E-05	-5.68785E-07	-2.09234E-06	6.20183E-07
51	-2.75467E-05	-4.25229E-06	1.61878E-06	-8.32774E-07	-1.84511E-06	4.24026E-07
53	-4.10361E-05	-1.87549E-07	-9.00679E-06	-4.51079E-07	-9.19059E-07	3.90949E-07
54	3.73219E-05	4.97990E-07	-1.64027E-05	3.37883E-08	1.19351E-06	1.08149E-07
55	-6.60929E-06	2.29344E-12	1.60943E-10	-3.32591E-14	1.02018E-06	4.95034E-09
56	5.30742E-06	-5.24092E-10	3.17955E-06	-6.97939E-10	9.55807E-07	1.37891E-10
57	2.44332E-06	-1.28779E-05	-1.35218E-05	-2.18776E-07	-2.40329E-07	1.37891E-10
58	1.83587E-08	1.83587E-08	-1.74065E-05	-2.28968E-07	-4.03972E-08	3.82898E-07
59	-1.52304E-06	-9.28914E-06	-1.74065E-05	-2.28968E-07	-4.03972E-08	3.82898E-07
61	-3.26243E-06	3.13789E-05	-1.26462E-06	-1.65220E-07	2.80336E-07	-5.88268E-07
6101	-3.23765E-06	2.73036E-05	5.31956E-06	-1.65220E-07	4.46250E-07	9.88293E-07
62	-5.35218E-05	-1.52365E-05	9.68820E-06	-2.26908E-07	3.27438E-07	-1.69923E-06
64	-8.03781E-05	-1.67104E-05	-2.23024E-07	-2.26908E-07	1.87047E-07	-9.11707E-07
65	-5.68233E-05	-1.04797E-05	-2.10589E-06	-1.50903E-07	1.58630E-07	-2.59265E-06

69	-3.43482E-05	9.21990E-06	-2.40733E-06	-1.68581E-07	1.25674E-07	-2.14398E-06
71	-2.7308E-05	2.18422E-05	-1.8947E-06	-1.47164E-07	7.47748E-08	-3.76364E-07
72	-9.38403E-06	5.68795E-06	-1.76567E-07	-2.88413E-08	1.43558E-08	3.40950E-07
73	-7.48465E-07	1.87135E-07	-2.43962E-08	-1.20921E-09	4.35325E-09	2.20637E-08
74	-8.30569E-10	2.16568E-11	1.79825E-13	-3.11569E-11	3.99033E-09	7.97053E-10
75	-1.99215E-07	6.06624E-09	3.0478E-08	-3.11569E-11	3.99033E-09	7.97053E-10
76	-1.54653E-06	-2.98801E-06	8.55669E-07	-2.63044E-08	2.33242E-07	6.97936E-08
77	-1.80114E-06	3.25844E-06	6.29825E-07	-3.51259E-08	2.01407E-07	5.04393E-09
79	-1.30167E-06	-1.56514E-06	2.26980E-06	-7.50040E-08	9.68313E-08	-2.18394E-07
7901	-1.14345E-06	9.63632E-06	4.10037E-06	-1.13665E-07	-3.71070E-08	-1.75775E-07
80	-8.91248E-07	1.06769E-05	-4.62835E-07	-1.52327E-07	-1.17556E-07	1.84616E-07
82	-1.07867E-06	7.65483E-06	-1.53973E-06	-1.13785E-07	-8.04967E-08	5.01934E-07
8201	-4.58453E-07	-1.87108E-05	-1.7703E-06	-6.11875E-07	1.38638E-07	5.45785E-07
83	7.20928E-06	-4.86704E-06	9.70960E-06	-1.34224E-06	1.63704E-07	1.87316E-07
85	7.57232E-06	8.07487E-06	-1.55749E-05	-9.87595E-07	4.92302E-07	1.88854E-07
86	-5.07096E-06	7.70823E-06	-3.57603E-05	3.54543E-07	1.18650E-06	3.29322E-07
88	-1.11874E-05	9.99133E-06	-2.2399E-05	1.33647E-06	1.41452E-06	3.96044E-07
90	-2.35107E-05	1.75607E-05	-5.03681E-06	1.17807E-06	1.44725E-06	5.26691E-07
92	-3.58256E-05	2.10924E-05	5.19620E-06	3.42081E-07	8.65448E-07	7.60955E-07
93	-3.54066E-05	3.99400E-06	1.50941E-05	-1.45584E-07	1.08528E-06	2.71890E-07
94	-6.31456E-06	1.2175E-07	3.21847E-06	-1.0238E-08	-9.65512E-07	1.37877E-08
95	-5.24956E-10	1.32686E-11	-1.72352E-10	-3.99513E-10	-9.05123E-07	4.33587E-10
96	4.97220E-06	-4.28498E-09	-2.98600E-06	-3.99513E-10	-8.65946E-07	4.33587E-10

PIPE FORCES AND MOMENTS

ELEMENT NUMBER	ELEMENT TYPE	LOAD CASE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
1	TANGENT	1	END-I END-J	-79.906 -79.906	-6.368 -6.368	-1927.548 -1927.548	2111.25 2111.25	100752.75 -19553.21	-194.16 203.28
2	TANGENT	1	END-I END-J	77.946 77.946	-5.618 -5.618	1063.378 1063.378	-2111.25 -2111.25	-19553.21 -14947.72	-203.28 -178.95
3	TANGENT	1	END-I END-J	76.166 76.166	-4.908 -4.908	294.418 294.418	-2111.25 -2111.25	-14947.72 6838.01	-178.95 184.20
4	TANGENT	1	END-I END-J	66.736 66.736	3.952 3.952	-117.412 -117.412	-2111.25 -2111.25	6838.01 -1850.04	184.20 -108.25
5	TANGENT	1	END-I END-J	56.976 56.976	7.162 7.162	-173.572 -173.572	-2111.25 -2111.25	-1850.04 -4289.60	-108.25 -208.92
6	TANGENT	1	END-I END-J	55.096 55.096	7.522 7.522	-193.802 -193.802	-2111.25 -2111.25	-4289.60 -9813.74	-208.92 -423.33
7	TANGENT	1	END-I END-J	2.070 2.070	46.670 46.670	358.710 358.710	.00 .00	-5507.63 .00	716.57 .00
8	TANGENT	1	END-I END-J	7.916 7.916	5.432 5.432	151.478 151.478	3396.38 3396.38	-9813.74 -5496.02	293.24 138.40
9	TANGENT	1	END-I END-J	5.176 5.176	5.182 5.182	28.048 28.048	3396.38 3396.38	-5496.02 -5003.53	138.40 47.40
10	TANGENT	1	END-I END-J	.444 -.444	-11.574 -11.574	312.889 312.889	3396.38 3396.38	-5003.53 589.04	47.40 254.28
11	TANGENT	1	END-I END-J	-3.824 -3.824	-10.154 -10.154	157.619 157.619	3396.38 3396.38	589.04 5081.80	254.28 543.71
12	TANGENT	1	END-I END-J	-41.370 -41.370	28.450 28.450	-86.180 -86.180	.00 .00	2592.21 .00	855.75 .00
13	TANGENT	1	END-I END-J	-33.164 -33.164	31.566 31.566	40.589 40.589	804.17 804.17	5081.80 6238.74	1399.45 499.69
14	TANGENT	1	END-I END-J	-38.004 -38.064	27.716 27.716	-61.871 -61.871	804.17 804.17	6238.74 4844.22	499.69 -125.00
15	BRND	1	END-I CENTER END-J	-53.484 60.759 157.645	206.981 204.964 144.395	-9.864 -9.864 -9.864	804.17 691.70 257.64	125.00 -530.57 -1034.58	4844.22 -182.47 -4445.46
16	TANGENT	1	END-I END-J	127.084 127.084	6.836 6.836	38.711 38.711	257.68 257.68	-4445.46 -459.68	1034.57 330.72
17	TANGENT	1	END-I END-J	57.256 57.256	11.996 11.996	40.619 40.619	257.68 257.68	-459.68 3722.53	330.72 -904.40

PIPE FORCES AND MOMENTS

ELEMENT NUMBER	ELEMENT TYPE	LOAD CASE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
18	TANGENT	1	END-I END-J	-6.377 -6.377	-22.228 -22.228	-73.619 -73.619	257.91 257.91	3722.53 453.13	-904.34 82.82
19	BEND	1	END-I CENTER END-J	-43.191 -81.059 -95.771	-85.503 -51.046 -2.007	10.708 10.708 10.708	257.93 331.01 444.13	82.76 180.77 227.13	-453.13 1213.07 1860.42
20	TANGENT	1	END-I END-J	-94.741 -94.741	-2.258 -2.258	42.843 42.843	444.13 444.13	-1860.42 -185.74	227.14 315.41
21	TANGENT	1	END-I END-J	-57.968 -57.968	-.985 -.985	24.124 24.124	113.51 113.51	625.87 1385.69	-481.68 -450.66
22	TANGENT	1	END-I END-J	-52.758 -52.758	-9.866 -9.866	-31.554 -31.554	113.51 113.51	1385.69 -527.41	-450.66 147.53
23	TANGENT	1	END-I END-J	-46.228 -46.228	-3.566 -3.566	-9.534 -9.534	113.51 113.51	-527.41 -887.73	147.53 282.31
24	TANGENT	1	END-I END-J	-28.748 -28.748	2.941 2.941	22.966 22.966	-80.77 -80.77	-749.81 1058.50	96.60 -134.94
25	TANGENT	1	END-I END-J	-18.888 -18.888	-3.502 -3.502	-1.898 -1.898	-80.77 -80.77	1058.50 1021.15	-134.94 -66.00
26	TANGENT	1	END-I END-J	-13.258 -13.258	-3.449 -3.449	-16.866 -16.866	-80.77 -80.77	1021.15 489.93	-66.00 42.62
27	TANGENT	1	END-I END-J	-5.890 -5.890	.070 .070	-17.420 -17.420	.00 .00	546.14 134.65	8.03 6.38
28	TANGENT	1	END-I END-J	-1.770 -1.770	.360 .360	-7.600 -7.600	.00 .00	134.65 .00	6.38 .00
29	TANGENT	1	END-I END-J	8.588 8.588	-11.520 -11.520	34.233 34.233	-10.26 -10.26	-1137.52 -432.62	-330.62 -93.41
30	TANGENT	1	END-I END-J	8.164 8.164	-11.449 -11.449	30.473 30.473	-10.26 -10.26	-432.62 -75.92	-93.41 40.60
31	BEND	1	END-I CENTER END-J	7.860 11.447 13.289	10.932 7.090 2.167	-25.693 -25.693 -25.693	-10.26 -17.21 -95.16	75.92 -110.88 -280.78	-40.60 -108.04 -142.67
32	TANGENT	1	END-I END-J	11.268 11.268	.107 .107	10.933 10.933	-95.02 -95.02	280.82 769.34	142.67 137.91
33	TANGENT	1	END-I END-J	8.308 8.308	5.447 5.447	-14.577 -14.577	-95.02 -95.02	769.34 118.03	137.91 -105.45
34	BEND	1	END-I CENTER END-J	6.538 1.648 -3.356	-18.027 -19.105 -18.880	-3.467 -3.467 -3.467	-95.02 -121.31 -143.77	-105.45 -94.13 -76.38	-118.03 -26.08 67.98

P I P E F O R C E S A N D M O M E N T S									
ELEMENT NUMBER	ELEMENT TYPE	LOAD CASE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
35	TANGENT	1	END-I END-J	-6.395 -6.395	-183 -183	-16.893 -16.893	-143.75 -143.75	-67.98 -1127.60	-76.42 -64.91
36	TANGENT	1	END-I END-J	-11.175 -11.175	-3.463 -3.463	20.127 20.127	-143.75 -143.75	-1127.60 134.94	-64.91 152.34
37	BEND	1	END-I CENTER END-J	-14.189 -10.125 -126	-133 9.942 14.189	-5.834 -5.834 -5.834	-143.75 -38.32 25.29	134.94 119.50 34.01	152.34 75.93 -112.06
38	TANGENT	1	END-I END-J	-6.003 -6.003	17.207 17.207	-4.118 -4.118	25.27 25.27	114.05 -60.71	-26.57 -756.73
39	BEND	1	END-I CENTER END-J	-10.413 -20.180 -28.569	-39.088 -35.058 -28.637	-19.625 -19.625 -19.625	25.27 96.20 135.40	325.84 212.65 84.95	-685.68 -502.07 -344.35
40	BEND	1	END-I CENTER END-J	-41.783 -53.389 -61.352	-50.316 -37.777 -22.659	-27.351 -27.351 -27.351	135.34 135.21 90.76	85.07 -86.06 -251.32	-344.34 -126.14 23.55
41	BEND	1	END-I CENTER END-J	-84.450 -91.266 -91.855	-37.444 -14.296 9.827	-28.779 -28.779 -28.779	90.84 4.21 -119.63	-251.29 -406.36 -533.70	23.55 151.68 162.75
42	TANGENT	1	END-I END-J	-164.532 -164.532	-4.193 -4.193	9.070 9.070	-119.43 -119.43	533.70 912.65	-162.90 12.30
43	TANGENT	1	END-I END-J	-258.338 -258.338	-2.343 -2.343	-128.154 -128.154	-119.43 -119.43	912.65 -1420.81	12.29 54.96
44	TANGENT	1	END-I END-J	-336.478 -336.478	-2.293 -2.293	-260.351 -260.351	-119.43 -119.43	-1420.81 -3004.59	54.97 68.93
45	TANGENT	1	END-I END-J	10.804 10.804	.000 .000	19.212 19.212	.00 .00	-146.73 .00	.00 .00
46	TANGENT	1	END-I END-J	18.883 18.883	-12.938 -12.938	7.910 7.910	33.79 33.79	-228.84 -65.97	-194.28 72.14
47	TANGENT	1	END-I END-J	23.146 23.146	-14.091 -14.091	6.360 6.360	33.79 33.79	-65.97 8.47	72.14 237.08
48	BEND	1	END-I CENTER END-J	26.662 29.978 28.726	13.968 2.696 -8.987	-4.720 -4.720 -4.720	33.79 21.21 -8.13	-8.47 -54.74 -92.66	-237.08 -299.42 -275.89
49	TANGENT	1	END-I END-J	33.351 33.351	15.283 15.283	.600 .600	-8.08 -8.08	92.66 118.69	275.89 -387.30
50	TANGENT	1	END-I END-J	39.791 39.791	6.123 6.123	-2.950 -2.950	-8.08 -8.08	118.69 -9.32	-387.30 -653.00

PIPE FORCES AND MOMENTS									
ELEMENT NUMBER	ELEMENT TYPE	LOAD CASE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
51	BEND	1	END-I	44.681	-20.697	-1.440	-8.08	-9.32	-653.00
			CENTER	16.947	-46.233	-1.440	-20.24	-131.60	
			END-J	-20.721	-44.670	-1.440	-36.41	-18.99	576.55
52	TANGENT	1	END-I	-28.897	-870	-14.301	-36.40	-576.55	-19.01
			END-J	-28.897	-870	-14.301	-36.40	-1183.40	17.90
53	BEND	1	END-I	-35.277	-105.009	-790	-36.40	-17.90	-1183.40
			CENTER	-61.265	-92.293	-790	-40.30	-11.71	-694.82
			END-J	-83.074	-73.281	-790	-42.46	-4.72	-284.81
54	BEND	1	END-I	-109.576	-117.721	-660	-42.46	-4.73	-284.81
			CENTER	-136.328	-85.322	-660	-42.66	3.22	218.13
			END-J	-153.775	-47.099	-660	-40.80	10.94	546.14
55	BEND	1	END-I	-200.220	-76.486	-510	-40.80	10.92	546.14
			CENTER	-213.197	-22.029	-510	-36.91	18.64	790.10
			END-J	-211.629	33.930	-510	-31.15	25.07	760.63
56	TANGENT	1	END-I	-356.949	-24.657	210	-31.16	-25.07	-760.63
			END-J	-356.949	-24.657	210	-31.16	-16.30	269.53
57	TANGENT	1	END-I	-544.559	-21.737	180	-31.16	-16.30	269.53
			END-J	-544.559	-21.737	180	-31.16	-13.02	665.34
58	TANGENT	1	END-I	-700.779	-21.657	180	-31.16	-13.02	665.34
			END-J	-700.779	-21.657	180	-31.16	-11.93	797.05
59	TANGENT	1	END-I	21.610	.000	.000	.00	.00	.00
			END-J	21.610	.000	.000	.00	.00	.00
60	TANGENT	1	END-I	-1.050	-.150	1.208	-15.29	-64.21	80.77
			END-J	-1.050	-.150	1.208	-15.29	-39.33	83.86
61	TANGENT	1	END-I	-.795	.811	.718	-15.29	-39.33	83.86
			END-J	-.795	.811	.718	-15.29	-30.92	74.36
62	BEND	1	END-I	-.562	-1.808	-.278	-15.29	30.92	-74.36
			CENTER	-1.212	-1.455	-.278	-2.69	32.42	-62.15
			END-J	-1.677	-.881	-.278	9.53	22.97	-53.41
63	TANGENT	1	END-I	-2.946	3.001	-.622	9.52	-28.98	53.41
			END-J	-2.946	3.001	-.622	9.52	-56.76	-80.70
64	TANGENT	1	END-I	-4.696	1.551	1.388	9.52	-56.76	-80.70
			END-J	-4.696	1.551	1.388	9.52	5.26	-150.01
65	BEND	1	END-I	-5.666	-3.148	-1.489	9.52	150.01	5.26
			CENTER	-6.288	-1.574	-1.489	47.09	135.19	16.96
			END-J	-6.481	.108	-1.489	79.53	111.14	20.58

PIPE FORCES AND MOMENTS

ELEMENT NUMBER	ELEMENT TYPE	LOAD CASE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
66	TANGENT	1	END-I END-J	-8.654 -8.654	-5.079 -5.079	.937 .937	79.50 79.50	20.58 79.34	-111.16 207.41
67	TANGENT	1	END-I END-J	-11.942 -11.942	1.701 1.701	-2.348 -2.348	79.50 79.50	79.34 -67.91	207.41 100.68
68	BEND	1	END-I CENTER END-J	-13.878 -7.985 2.589	2.581 11.641 13.877	13.186 13.186 13.186	79.50 80.82 180.07	-67.91 71.09 168.43	100.68 -10.11 -208.90
69	TANGENT	1	END-I END-J	-7.189 -7.189	-9.518 -9.518	-2.324 -2.324	179.98 179.98	96.65 -1.96	250.39 654.30
70	BEND	1	END-I CENTER END-J	-14.419 -26.611 -36.988	-48.985 -43.581 -35.204	22.460 22.460 22.460	179.98 103.96 49.65	-325.49 -251.66 -160.66	-567.60 -338.38 -143.28
71	BEND	1	END-I CENTER END-J	-51.392 -64.280 -72.780	-56.528 -41.289 -23.231	30.387 30.387 30.387	49.71 25.89 39.29	-160.68 -20.11 121.84	-143.24 99.05 258.86
72	BEND	1	END-I CENTER END-J	-96.631 -102.870 -102.091	-36.824 -10.543 16.457	32.119 32.119 32.119	39.19 90.00 175.87	121.83 263.90 387.97	258.87 376.18 361.54
73	TANGENT	1	END-I END-J	-174.873 -174.873	-14.399 -14.399	-13.396 -13.396	175.74 175.74	-387.93 -947.61	-361.65 239.92
74	TANGENT	1	END-I END-J	-268.715 -268.715	-13.299 -13.299	123.369 123.369	175.74 175.74	-947.61 1298.73	239.92 482.06
75	TANGENT	1	END-I END-J	-346.855 -346.855	-13.269 -13.269	255.508 255.508	175.70 175.70	1298.73 2853.04	482.08 562.79
76	TANGENT	1	END-I END-J	10.804 10.804	.000 .000	-19.212 -19.212	.00 .00	146.73 .00	.00 .00

SUMMARY OF SUPPORT FORCES/MOMENTS IN GLOBAL/LOCAL SYSTEMS

BDRY- BOUNDARY ELEMENTS (SPRING)
 THAM- THERMAL ANCHOR MOTION
 SEAM- SEISMIC ANCHOR MOTION
 SNBR- SNUBBER ELEMENT

LOAD CASE		1		ABWR FW PIPING MISSING MASS - CHOG-X									
KIND OF SUPPORT	NODE NUMBER	FX	FY	GLOBAL COMPONENTS			MZ	LOCAL COMPONENTS					
				FZ	MX	MY		FL	ML				
BDRY	1	-2621.	0.	0.	0.	0.	0.	-2621.	0.	0.			
BDRY	1	0.	-6.	0.	0.	0.	0.	-6.	0.	0.			
BDRY	1	0.	0.	80.	0.	0.	0.	80.	0.	0.			
BDRY	1	0.	0.	0.	-194.	0.	0.	0.	-194.	0.			
BDRY	1	0.	0.	0.	0.	100753.	0.	0.	100753.	0.			
BDRY	1	0.	0.	0.	0.	0.	-2111.	0.	-2111.	0.			
BDRY	9	-573.	0.	0.	0.	0.	0.	-573.	0.	0.			
BDRY	9	0.	-17.	0.	0.	0.	0.	-17.	0.	0.			
BDRY	56	-524.	0.	0.	0.	0.	0.	-524.	0.	0.			
BDRY	56	0.	2.	0.	0.	0.	0.	2.	0.	0.			
BDRY	56	0.	0.	161.	0.	0.	0.	161.	0.	0.			
BDRY	56	0.	0.	0.	0.	0.	0.	0.	0.	0.			
BDRY	56	0.	0.	0.	0.	2858.	0.	0.	2858.	0.			
BDRY	56	-831.	0.	0.	0.	0.	138.	-831.	0.	138.			
BDRY	74	0.	22.	0.	0.	0.	0.	22.	0.	0.			
BDRY	74	0.	0.	0.	0.	0.	0.	0.	0.	0.			
BDRY	74	0.	0.	0.	-31.	0.	0.	0.	-31.	0.			
BDRY	74	0.	0.	0.	0.	12.	0.	0.	12.	0.			
BDRY	74	0.	0.	0.	0.	0.	797.	0.	797.	0.			
BDRY	95	-525.	0.	0.	0.	0.	0.	-525.	0.	0.			
BDRY	95	0.	13.	0.	0.	0.	0.	13.	0.	0.			
BDRY	95	0.	0.	-172.	0.	0.	0.	-172.	0.	0.			
BDRY	95	0.	0.	0.	-400.	0.	0.	0.	-400.	0.			
BDRY	95	0.	0.	0.	0.	-2706.	0.	0.	-2706.	0.			
BDRY	95	0.	0.	0.	0.	0.	434.	0.	434.	0.			
BDRY	19	-18.	-15.	35.	0.	0.	0.	42.	0.	0.			
BDRY	25	1.	1.	0.	0.	0.	0.	-1.	0.	0.			
BDRY	25	1.	-1.	0.	0.	0.	0.	1.	0.	0.			
BDRY	27	-2.	-2.	0.	0.	0.	0.	3.	0.	0.			
BDRY	32	-2.	2.	0.	0.	0.	0.	-3.	0.	0.			

BENCHMARK PROBLEM 1

TOTAL RESPONSE GROUPING METHOD

***** FINAL RESULTS - SRSS COMBINATION OF DYNAMIC RESPONSES WITH HIGH FREQUENCY MODE RESPONSES *****
 MODAL COMBINATION METHOD 2-GROUPING

MODE NUMBER	DISPLACEMENTS / ROTATIONS			ACCELERATIONS IN G'S		
	X- TRANSLATION	Y- TRANSLATION	Z- TRANSLATION	X- DIRECTION	Y- DIRECTION	Z- DIRECTION
2	30661E-08	10196E-08	31377E-08	30653E-07	10087E-06	31714E-08
3	27682E-03	18474E-04	39362E-04	30389E-05	47607E-05	24029E-05
301	26685E-03	29092E-04	39958E-04	31061E-05	48604E-05	25062E-05
4	16908E-02	11110E-02	13586E-03	26166E-04	23266E-04	15295E-04
5	25088E-02	17197E-02	22916E-03	49220E-04	88741E-05	53383E-05
6	23292E-02	16085E-02	24640E-03	53599E-04	17519E-04	11493E-04
7	16779E-02	11737E-02	26502E-03	58978E-04	28300E-04	19465E-04
8	67661E-03	49728E-03	41418E-03	60059E-04	33442E-04	26478E-04
9	70805E-07	20401E-07	28053E-03	59597E-04	30902E-04	28927E-04
12	54753E-03	52439E-03	31592E-03	63146E-04	28464E-04	28253E-04
13	13512E-02	13528E-02	33092E-03	65866E-04	28508E-04	28537E-04
14	24954E-02	13586E-02	10367E-02	69539E-04	28508E-04	29514E-04
15	21290E-02	21120E-02	33960E-03	60248E-04	29762E-04	27409E-04
16	27404E-02	26708E-02	35228E-03	53837E-04	29932E-04	27850E-04
18	34735E-02	32051E-02	78915E-03	44028E-04	27741E-04	38794E-04
1801	35623E-02	44014E-02	27919E-02	37193E-04	11412E-04	31325E-04
19	30994E-02	44953E-02	20484E-02	51549E-04	32370E-04	29162E-04
21	49173E-02	49173E-02	24156E-02	53526E-04	33796E-04	32060E-04
23	44542E-02	44542E-02	28378E-02	51067E-04	21048E-04	39630E-04
24	32298E-02	32298E-02	28391E-02	52526E-04	21834E-04	39645E-04
25	27669E-02	26404E-02	28467E-02	51653E-04	22759E-04	36004E-04
29	26624E-02	29471E-02	28591E-02	51305E-04	17041E-04	21041E-04
31	30704E-02	30704E-02	2854E-02	52023E-04	15573E-04	16052E-04
32	24755E-02	24755E-02	28738E-02	59222E-04	32597E-04	36455E-04
33	22984E-02	26664E-02	28751E-02	62067E-04	36455E-04	41423E-04
34	3244E-02	35153E-02	28765E-02	62067E-04	40587E-04	45631E-04
35	43192E-02	43192E-02	28770E-02	63668E-04	40683E-04	45737E-04
36	50010E-02	50010E-02	28772E-02	63668E-04	40683E-04	45737E-04
37	29114E-02	29114E-02	29004E-02	65638E-04	31323E-04	43405E-04
38	28463E-02	28463E-02	30323E-02	70932E-04	38417E-04	45358E-04
40	27956E-02	27956E-02	32296E-02	74605E-04	55410E-04	50136E-04
4001	31454E-02	38357E-02	46402E-02	59812E-04	40569E-04	59757E-04
41	61574E-02	61574E-02	60268E-02	47039E-04	46806E-04	74585E-04
43	63140E-02	63140E-02	61221E-02	49714E-04	46806E-04	82042E-04
4301	45797E-02	45797E-02	58807E-02	49714E-04	71648E-04	96137E-04
44	43401E-02	43401E-02	57773E-02	59700E-04	70322E-04	10096E-03
46	47015E-02	47015E-02	53677E-02	67417E-04	56266E-04	95112E-04
47	46787E-02	46787E-02	21713E-02	57304E-04	62042E-04	87676E-04
49	45622E-02	45622E-02	20072E-02	34165E-04	65605E-04	76758E-04
51	41184E-02	41184E-02	18260E-02	36743E-04	69736E-04	75273E-04
53	3305E-02	3305E-02	15314E-02	14766E-04	69370E-04	76410E-04
54	40883E-03	40883E-03	28232E-03	32976E-04	32976E-04	28380E-04
55	10420E-04	10420E-04	41235E-03	78820E-06	13526E-04	14833E-05
56	95679E-09	95679E-09	48796E-09	27841E-07	12493E-04	51404E-07
57	4407E-05	4407E-05	47696E-03	27841E-07	12493E-04	51404E-07
58	30385E-02	30385E-02	28892E-02	45283E-04	36500E-04	16261E-04
59	29505E-02	29505E-02	29133E-02	47896E-04	36500E-04	18347E-04
61	3161E-02	3161E-02	31217E-02	38976E-04	80715E-04	18510E-04
62	3035E-02	3035E-02	5821E-02	42379E-04	89158E-04	35933E-04
64	30197E-02	30197E-02	89892E-02	44817E-04	19489E-04	58242E-04
65	29409E-02	29409E-02	82022E-02	46824E-04	24392E-04	96826E-04
67	49155E-03	49155E-03	39739E-02	48598E-04	29401E-04	94677E-04
69	14294E-03	14294E-03	30677E-02	51847E-04	32718E-04	80601E-04
71	31568E-04	21480E-02	32343E-02	20627E-04	32718E-04	68703E-04
72	10218E-04	25687E-03	35289E-03	20064E-04	20287E-04	58065E-04
73	79077E-06	64544E-05	51560E-04	10506E-05	84474E-05	47711E-06

74	86426E-09	58423E-09	39457E-09	12293E-07	78037E-05	36619E-07	100	000	000
75	19921E-06	27922E-06	58613E-04	12293E-07	78039E-05	36623E-07	000	000	003
76	34981E-02	36064E-02	31084E-02	44683E-04	42668E-04	71265E-04	127	188	107
77	37819E-02	37816E-02	34116E-02	46618E-04	46548E-04	72633E-04	147	220	141
79	39942E-02	41659E-02	39143E-02	50783E-04	62857E-04	70905E-04	164	255	181
7901	40087E-02	61773E-02	58158E-02	64154E-04	59718E-04	63846E-04	167	265	268
80	40192E-02	80352E-02	72623E-02	82626E-04	44753E-04	48672E-04	169	295	292
82	39911E-02	80700E-02	72758E-02	90045E-04	57924E-04	43843E-04	167	290	276
8201	43855E-02	61590E-02	62475E-02	10908E-03	95693E-04	54186E-04	215	263	158
83	65002E-02	49362E-02	75348E-02	11970E-03	98211E-04	64642E-04	329	413	312
85	62223E-02	50285E-02	61282E-02	12270E-03	80784E-04	75986E-04	315	453	261
86	50083E-02	50083E-02	13591E-02	11067E-03	72964E-04	72985E-04	447	451	229
86	48024E-02	48024E-02	16672E-02	95336E-04	72137E-04	61454E-04	469	448	253
88	41963E-02	41963E-02	15310E-02	86786E-04	69529E-04	52067E-04	436	417	246
90	33391E-02	33391E-02	12829E-02	78570E-04	62107E-04	45782E-04	363	347	210
92	38517E-03	38517E-03	22688E-03	26973E-04	27125E-04	15282E-04	068	044	039
93	57601E-03	57601E-03	33182E-04	13800E-05	10960E-04	78623E-06	010	001	006
94	57685E-04	57685E-04	37379E-09	48091E-07	10119E-04	27219E-07	000	000	000
95	67680E-09	85124E-09	38620E-04	48095E-07	10116E-04	27221E-07	011	000	007
96	66869E-04	41909E-06							

***** FINAL RESULTS - SRSS COMBINATION OF DYNAMIC RESPONSES WITH HIGH FREQUENCY MODE RESPONSES *****
 MODAL COMBINATION METHOD 2-GROUPING

PIPE FORCES AND MOMENTS

ELEMENT NUMBER	ELEMENT TYPE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
1	TANGENT	END-I END-J	3137.818 3137.818	1019.620 1019.620	2499.410 2499.410	30652.59 30652.59	100877.60 98646.19	3171.45 63567.93
2	TANGENT	END-I END-J	3119.874 3119.874	1013.616 1013.616	1903.271 1903.271	30652.59 30652.59	98646.19 91093.37	63567.93 59183.17
3	TANGENT	END-I END-J	3103.435 3103.435	1005.212 1005.212	1589.211 1589.211	30652.59 30652.59	91093.37 26923.34	59183.17 15522.49
4	TANGENT	END-I END-J	3019.338 3019.338	559.214 559.214	769.213 769.213	30652.59 30652.59	26923.34 81082.41	15522.49 55915.20
5	TANGENT	END-I END-J	2935.253 2935.253	273.094 273.094	356.943 356.943	30652.59 30652.59	81082.41 82085.86	55915.20 58225.27
6	TANGENT	END-I END-J	2919.320 2919.320	265.207 265.207	397.189 397.189	30652.59 30652.59	82085.86 82031.94	58225.27 61652.05
7	TANGENT	END-I END-J	1424.602 1424.602	616.469 616.469	3143.831 3143.831	.00 .00	48269.84 .00	9464.57 .00
8	TANGENT	END-I END-J	2461.713 2461.713	1464.610 1464.610	3295.783 3295.783	38395.51 38395.51	82031.94 48476.56	56576.46 38555.05
9	TANGENT	END-I END-J	2440.405 2440.405	1489.209 1489.209	3332.118 3332.118	38395.51 38395.51	48476.56 92465.08	38555.05 46723.12
10	TANGENT	END-I END-J	2398.400 2398.400	904.574 904.574	1508.017 1508.017	38395.51 38395.51	92465.08 83543.38	46723.12 45978.30
11	TANGENT	END-I END-J	2374.203 2374.203	885.658 885.658	1479.421 1479.421	38395.51 38395.51	83543.38 85336.15	45978.30 54536.41
12	TANGENT	END-I END-J	1190.319 1190.319	1179.443 1179.443	2242.057 2242.057	.00 .00	67439.64 .00	35475.82 .00
13	TANGENT	END-I END-J	1658.232 1658.232	624.998 624.998	1530.938 1530.938	45859.45 45859.45	85336.15 49309.46	68767.24 52280.79
14	TANGENT	END-I END-J	1634.442 1634.442	676.668 676.668	1537.745 1537.745	45859.45 45859.45	49309.46 35457.17	52280.79 38518.80
15	BEND	END-I CENTER END-J	1564.714 1973.735 1916.993	1498.266 876.403 990.184	829.759 829.759 829.759	45859.45 13688.22 13688.22	38518.80 38726.53 35982.78	35457.17 37383.45 33395.30
16	TANGENT	END-I END-J	1618.596 1618.596	837.428 837.428	833.300 833.300	13688.93 13688.93	33395.30 70060.11	35982.38 72923.65
17	TANGENT	END-I END-J	1247.715 1247.715	583.223 583.223	742.312 742.312	13689.03 13689.03	70060.11 38882.60	72923.65 32382.73
18	TANGENT	END-I END-J	1155.318 1155.318	634.390 634.390	1104.855 1104.855	13690.63 13690.63	38882.60 21679.84	32382.03 25655.43
19	BEND	END-I CENTER END-J	1193.682 1366.107 1252.367	967.286 693.083 879.502	444.429 444.429 444.429	13689.13 15927.74 23977.11	25656.03 23401.00 19302.84	21679.84 34377.01 40695.05

20	TANGENT	END-I END-J	1156.288 1156.288	515.605 515.605	862.964 862.964	23977.11 23977.11	40695.05 47140.77	19302.84 23824.29
21	TANGENT	END-I END-J	1046.307 1046.307	796.901 796.901	1044.079 1044.079	15037.03 15037.03	43690.58 28187.78	24962.85 33926.29
22	TANGENT	END-I END-J	932.294 932.294	835.358 835.358	795.826 795.826	15037.03 15037.03	28187.78 36758.28	33926.29 52643.51
23	TANGENT	END-I END-J	839.075 839.075	392.016 392.016	508.389 508.389	15037.03 15037.03	36758.28 53201.01	52643.51 61911.44
24	TANGENT	END-I END-J	595.694 595.694	541.908 541.908	497.930 497.930	14691.22 14691.22	54694.94 33053.35	61816.18 35184.96
25	TANGENT	END-I END-J	488.665 488.665	739.908 739.908	809.002 809.002	14691.22 14691.22	33053.35 26416.74	35184.96 25095.09
26	TANGENT	END-I END-J	438.301 438.301	624.410 624.410	730.795 730.795	14691.22 14691.22	26416.74 17551.64	25095.09 15094.66
27	TANGENT	END-I END-J	85.104 85.104	289.600 289.600	255.295 255.295	.00 .00	7608.63 1591.71	8632.10 1799.51
28	TANGENT	END-I END-J	25.462 25.462	101.601 101.601	89.822 89.822	.00 .00	1591.71 .00	1799.51 .00
29	TANGENT	END-I END-J	835.844 835.844	836.379 836.379	319.340 319.340	6337.21 6337.21	16624.76 11005.21	22878.59 9765.45
30	TANGENT	END-I END-J	813.741 813.741	781.484 781.484	313.086 313.086	6337.21 6337.21	11005.21 8278.25	9765.45 10583.98
31	BEND	END-I CENTER END-J	796.039 988.666 1037.385	719.683 429.958 272.609	302.891 302.891 302.891	6336.71 5349.13 4911.12	8278.55 7323.34 5993.68	10583.98 12956.75 13174.37
32	TANGENT	END-I END-J	899.571 899.571	269.600 269.600	260.729 260.729	4911.12 4911.12	5993.78 9492.93	13174.37 9548.20
33	TANGENT	END-I END-J	688.150 688.150	242.661 242.661	154.290 154.290	4911.12 4911.12	9492.93 13324.82	9548.20 12229.85
34	BEND	END-I CENTER END-J	557.838 571.202 546.610	155.747 112.533 210.747	166.136 166.136 166.136	4911.12 3946.07 5164.90	12229.85 12856.64 12756.43	13324.82 13342.63 13409.97
35	TANGENT	END-I END-J	445.546 445.546	174.400 174.400	182.085 182.085	5163.10 5163.10	13409.97 9352.82	12757.13 10666.50
36	TANGENT	END-I END-J	300.907 300.907	211.328 211.328	193.550 193.550	5163.20 5163.20	9352.82 7784.17	10666.50 8222.51
37	BEND	END-I CENTER END-J	242.615 276.486 281.600	281.700 246.201 242.615	214.679 214.679 214.679	5163.20 3973.98 6540.35	7784.17 7049.21 4244.74	8222.51 7926.06 7482.44
38	TANGENT	END-I END-J	492.437 492.437	301.791 301.791	262.232 262.232	6539.15 6539.15	5434.10 10207.98	6003.26 13040.47
39	BEND	END-I CENTER END-J	665.281 710.487 712.673	345.518 229.099 219.278	216.889 216.889 216.889	6539.15 5639.15 4904.67	6316.61 6653.50 6733.64	15309.36 16547.02 16950.80
40	BEND	END-I	768.636	240.816	283.224	4904.87	6732.24	16951.40

41	BEND	CENTER END-J	720.581 629.696	368.741 515.898	283.224 283.224	4630.97 4685.08	6114.01 5311.65	16329.89 14901.42
		END-I CENTER END-J	660.918 518.004 350.550	569.033 702.945 794.361	355.367 355.367 355.367	4684.18 4725.70 4836.58	5312.05 4274.36 3924.26	14901.32 12634.81 10363.58
42	TANGENT	END-I END-J	377.267 377.267	933.309 933.309	530.678 530.678	4836.07 4836.07	3926.04 23397.01	10363.18 35488.00
43	TANGENT	END-I END-J	426.933 426.933	956.203 956.203	589.205 589.205	4835.78 4835.78	23397.01 33759.01	35488.00 52509.53
44	TANGENT	END-I END-J	478.350 478.350	956.803 956.803	636.209 636.209	4837.07 4837.07	33759.01 37355.43	52509.33 58247.54
45	TANGENT	END-I END-J	10.800 10.800	.000 .000	19.231 19.231	.00 .00	146.90 .00	.00 .00
46	TANGENT	END-I END-J	300.594 300.594	381.420 381.420	324.496 324.496	12352.15 12352.15	17013.44 10496.71	13329.82 9497.67
47	TANGENT	END-I END-J	258.339 258.339	340.891 340.891	322.063 322.063	12352.15 12352.15	10496.71 6901.61	9497.67 8866.07
48	BEND	END-I CENTER END-J	229.255 319.111 366.428	305.919 217.917 136.496	317.935 317.935 317.935	12351.55 9347.22 5946.11	6902.61 8799.57 9385.56	8866.07 9100.83 9196.04
49	TANGENT	END-I END-J	271.655 271.655	137.054 137.054	294.201 294.201	5950.31 5950.31	9382.76 4070.33	9196.04 6916.95
50	TANGENT	END-I END-J	168.758 168.758	172.708 172.708	151.029 151.029	5950.31 5950.31	4070.33 10073.60	6916.95 6799.43
51	BEND	END-I CENTER END-J	180.614 260.452 205.746	205.744 85.144 180.805	71.215 71.215 71.215	5950.31 2789.97 8935.47	10073.60 10453.52 4734.64	6799.43 6853.26 6687.80
52	TANGENT	END-I END-J	312.041 312.041	253.601 253.601	237.032 237.032	8933.07 8933.07	6687.80 8259.81	4739.34 6100.93
53	BEND	END-I CENTER END-J	412.312 446.621 455.342	261.510 201.214 203.642	319.901 319.901 319.901	8933.07 10368.78 11519.88	6100.93 5205.21 3997.50	8259.81 8895.58 9085.86
54	BEND	END-I CENTER END-J	490.984 470.006 424.065	239.263 278.587 334.433	339.401 339.401 339.401	11519.08 12318.77 12721.47	3999.50 2691.30 1520.94	9085.86 8697.54 7891.72
55	BEND	END-I CENTER END-J	457.085 391.117 318.483	372.831 437.155 488.779	354.500 354.500 354.500	12721.27 12709.85 12292.64	1523.64 1527.41 2654.42	7891.72 6694.09 5547.59
56	TANGENT	END-I END-J	429.463 429.463	570.533 570.533	385.800 385.800	12293.34 12293.34	2651.32 13781.61	5547.59 22660.40
57	TANGENT	END-I END-J	594.699 594.699	584.005 584.005	393.600 393.600	12293.34 12293.34	13781.61 20934.40	22660.40 33108.39
58	TANGENT	END-I END-J	740.414 740.414	584.302 584.302	394.700 394.700	12293.34 12293.34	20934.40 23331.90	33108.39 36618.88
59	TANGENT	END-I END-J	21.610 21.610	.000 .000	.200 .200	.00 .00	1.30 .00	.00 .00

60	TANGENT	END-I END-J	434.501 434.501	457.900 457.900	362.002 362.002	7192.52 7192.52	20613.50 13832.76	14691.22 8785.00
61	TANGENT	END-I END-J	422.101 422.101	442.101 442.101	351.901 351.901	7192.52 7192.52	13832.76 10466.05	8785.00 8387.63
62	BEND	END-I CENTER END-J	413.200 493.701 528.703	417.304 309.403 239.302	340.100 340.100 340.100	7192.12 5963.90 5896.51	10466.25 9284.86 7840.35	8387.63 8919.12 9256.05
63	TANGENT	END-I END-J	477.309 477.309	216.921 216.921	300.501 300.501	5896.21 5896.21	7840.45 11261.34	9256.05 10707.30
64	TANGENT	END-I END-J	404.727 404.727	175.007 175.007	194.505 194.505	5896.21 5896.21	11261.34 17391.80	10707.30 11229.12
65	BEND	END-I CENTER END-J	364.644 377.452 366.157	141.335 98.912 133.900	145.308 145.308 145.308	5896.21 4519.75 5181.91	12229.12 12740.92 12552.29	17391.80 17534.01 17352.81
66	TANGENT	END-I END-J	291.328 291.328	184.670 184.670	205.002 205.002	5180.41 5180.41	17352.81 9180.94	12552.89 10359.38
67	TANGENT	END-I END-J	195.665 195.665	187.808 187.808	175.016 175.016	5180.41 5180.41	9180.94 6380.56	10359.38 8361.51
68	BEND	END-I CENTER END-J	189.210 257.624 291.312	291.311 232.392 189.210	202.630 202.630 202.630	5180.41 3671.89 5371.42	6380.56 6151.71 4143.42	8361.51 7839.01 7211.73
69	TANGENT	END-I END-J	468.355 468.355	279.262 279.262	239.311 239.311	5370.42 5370.42	6174.36 8020.50	5373.94 12300.51
70	BEND	END-I CENTER END-J	612.370 643.650 638.373	331.836 255.938 269.013	192.614 192.614 192.614	5370.42 5237.93 5190.14	5672.55 5578.08 5542.93	13517.22 14741.38 15342.17
71	BEND	END-I CENTER END-J	684.332 633.370 548.450	291.239 390.787 503.936	233.288 233.288 233.288	5189.84 5236.96 5333.54	5542.73 5323.14 5271.81	15342.37 15235.32 14636.29
72	BEND	END-I CENTER END-J	574.879 458.684 342.280	547.839 650.285 719.088	280.247 280.247 280.247	5332.54 5435.45 5555.98	5272.31 5446.20 5914.94	14636.49 13656.98 12778.22
73	TANGENT	END-I END-J	371.351 371.351	832.525 832.525	398.725 398.725	5556.08 5556.08	5917.63 19991.27	12777.22 35131.12
74	TANGENT	END-I END-J	423.783 423.783	850.904 850.904	446.579 446.579	5555.98 5555.98	19991.27 27579.30	35131.12 49933.83
75	TANGENT	END-I END-J	477.171 477.171	851.103 851.103	502.681 502.681	5556.58 5556.58	27579.30 30263.88	49933.83 54965.88
76	TANGENT	END-I END-J	10.800 10.800	.000 .000	19.219 19.219	.00 .00	146.82 .00	.00 .00

***** FINAL RESULTS - SRSS COMBINATION OF DYNAMIC RESPONSES WITH HIGH FREQUENCY MODE RESPONSES *****
 MODAL COMBINATION METHOD 2-GROUPING

S U P P O R T F O R C E S A N D M O M E N T S

NODE NUMBER	COMPONENT DIRECTION	FORCE/MOMENT (LOCAL)
1	FX	3066.
1	FY	1020.
1	FZ	3138.
1	MX	3171.
1	MY	100878.
1	MZ	30653.
9	FX	2965.
9	FY	1142.
56	FX	717.
56	FY	957.
56	FZ	488.
56	MX	51403.
56	MY	37350.
56	MZ	27841.
74	FX	864.
74	FY	584.
74	FZ	395.
74	MX	12293.
74	MY	23333.
74	MZ	36619.
95	FX	677.
95	FY	851.
95	FZ	374.
95	MX	48091.
95	MY	30255.
95	MZ	27219.
19	FL	1839.
25	FL-1	1520.
25	FL-2	1442.
27	FL	1115.
32	FL	1240.

BENCHMARK PROBLEM 1

**TOTAL RESPONSE
DOUBLE SUM METHOD**

***** FINAL RESULTS - SRSS COMBINATION OF DYNAMIC RESPONSES WITH HIGH FREQUENCY MODE RESPONSES *****
 MODAL COMBINATION METHOD 3-DOUBLE SUM

N O D E N O D E N U M B E R	D I S P L A C E M E N T S / R O T A T I O N S			A C C E L E R A T I O N S I N G ' S		
	TRANSLATION	TRANSLATION	ROTATION	TRANSLATION	ROTATION	ROTATION
	X- TRANSLATION	Y- TRANSLATION	Z- TRANSLATION	X- TRANSLATION	Y- TRANSLATION	Z- TRANSLATION
1	30743E-08	10864E-08	28996E-08	31232E-08	10086E-06	32443E-07
2	27673E-03	19558E-04	36375E-04	25530E-05	48075E-05	32163E-05
3	26677E-03	30994E-04	36926E-04	26629E-05	49097E-05	32875E-05
301	17156E-02	18116E-02	21215E-03	12232E-04	22786E-04	27691E-04
4	25566E-02	18244E-02	21215E-03	56919E-05	89032E-05	52093E-04
5	23755E-02	17053E-02	22816E-03	12235E-04	17753E-04	56729E-04
6	17137E-02	12423E-02	24549E-03	20658E-04	28831E-04	62422E-04
7	24553E-02	12472E-02	42962E-03	20858E-04	28831E-04	62422E-04
8	69119E-03	52424E-03	25984E-03	26006E-04	34135E-04	62687E-04
9	73188E-07	20358E-07	27622E-03	28005E-04	31383E-04	63682E-04
12	55092E-03	54040E-03	23265E-03	28762E-04	28363E-04	65824E-04
13	13424E-02	13748E-02	30656E-03	28470E-04	27619E-04	68687E-04
14	25734E-02	13813E-02	10445E-02	29609E-04	27619E-04	72553E-04
15	20788E-02	21179E-02	31438E-03	26904E-04	28625E-04	62455E-04
16	26512E-02	26520E-02	32579E-03	27368E-04	28678E-04	55655E-04
18	33277E-02	30631E-02	79717E-03	40695E-04	29247E-04	44943E-04
1801	34368E-02	42292E-02	29314E-02	33072E-04	11548E-04	38040E-04
19	29683E-02	43645E-02	20913E-02	30666E-04	33550E-04	54108E-04
21	30890E-02	49070E-02	24371E-02	33786E-04	34792E-04	56468E-04
23	32159E-02	45062E-02	28216E-02	41589E-04	19253E-04	54131E-04
24	28260E-02	32563E-02	28328E-02	41813E-04	21010E-04	53285E-04
25	24927E-02	26515E-02	28408E-02	38106E-04	22625E-04	54071E-04
29	26474E-02	30315E-02	28537E-02	22112E-04	18388E-04	53138E-04
31	27264E-02	21881E-02	28604E-02	16582E-04	16531E-04	53569E-04
32	23763E-02	25102E-02	28698E-02	39078E-04	33907E-04	58202E-04
33	25762E-02	27357E-02	28714E-02	43462E-04	37785E-04	60626E-04
34	33343E-02	36174E-02	28731E-02	47997E-04	41085E-04	63500E-04
35	40678E-02	44947E-02	28737E-02	47997E-04	41845E-04	63500E-04
36	46988E-02	52281E-02	28738E-02	48111E-04	41945E-04	63500E-04
37	28928E-02	28648E-02	28922E-02	43564E-04	28617E-04	65775E-04
38	30763E-02	27501E-02	30282E-02	44982E-04	35214E-04	67404E-04
40	31932E-02	26771E-02	32197E-02	48721E-04	53344E-04	70594E-04
4001	32256E-02	37972E-02	44818E-02	57444E-04	51918E-04	73445E-04
41	32496E-02	60663E-02	56595E-02	70787E-04	36278E-04	58396E-04
43	32213E-02	62296E-02	56988E-02	77706E-04	43899E-04	45241E-04
44	44137E-02	46933E-02	58119E-02	90244E-04	72810E-04	47104E-04
46	43115E-02	43895E-02	47762E-02	91199E-04	60164E-04	67530E-04
47	36942E-02	43686E-02	20429E-02	81120E-04	61971E-04	58094E-04
49	35555E-02	42626E-02	19019E-02	69505E-04	64727E-04	42153E-04
51	31256E-02	38529E-02	17462E-02	68536E-04	68052E-04	35565E-04
53	25419E-02	31480E-02	14716E-02	70643E-04	67011E-04	36013E-04
54	68437E-03	38483E-03	27125E-03	26600E-04	31657E-04	14028E-04
55	68451E-04	98261E-05	39563E-04	13942E-05	12961E-04	74458E-06
56	70696E-09	90396E-09	46143E-09	48335E-07	11988E-04	26257E-07
57	79260E-04	41792E-06	45774E-04	48338E-07	11987E-04	26260E-07
58	30206E-02	31792E-02	28997E-02	16625E-04	36529E-04	48330E-04
59	32314E-02	29366E-02	29366E-02	18485E-04	48861E-04	44339E-04
61	34127E-02	32525E-02	31422E-02	18333E-04	77855E-04	38958E-04
62	34218E-02	29831E-02	57068E-02	35183E-04	85500E-04	43337E-04
64	34241E-02	31197E-02	87103E-02	56812E-04	65953E-04	41143E-04
65	94459E-03	32072E-02	38397E-02	53831E-04	19245E-04	46241E-04
67	50445E-03	31234E-02	29636E-02	91621E-04	24219E-04	48029E-04
69	14801E-03	28088E-02	22442E-02	77936E-04	28892E-04	49626E-04
71	31390E-04	22800E-02	17509E-02	56073E-04	31888E-04	53817E-04
72	10164E-04	27237E-03	34008E-03	10989E-04	35901E-04	55922E-04
73	78796E-06	68366E-05	49685E-04	46074E-06	19560E-04	21286E-04
					81410E-05	11141E-05

74	.86200E-09	.37939E-09	.11872E-07	.75205E-05	.38829E-07	.000	.000
75	.19921E-06	.57450E-04	.11872E-07	.75208E-05	.38833E-07	.000	.003
76	.36140E-02	.31379E-02	.47598E-04	.41573E-04	.72816E-04	.132	.110
77	.39099E-02	.34238E-02	.49114E-04	.44614E-04	.74316E-04	.146	.143
79	.41335E-02	.38534E-02	.52190E-04	.58934E-04	.72837E-04	.162	.180
7901	.41487E-02	.54885E-02	.62792E-04	.56264E-04	.66206E-04	.164	.263
80	.41598E-02	.66815E-02	.78418E-04	.41293E-04	.50082E-04	.166	.287
82	.41533E-02	.66471E-02	.85289E-04	.55143E-04	.43752E-04	.164	.272
8201	.45540E-02	.54071E-02	.10076E-03	.91802E-04	.54873E-04	.211	.160
83	.63977E-02	.67679E-02	.10879E-03	.94120E-04	.66985E-04	.317	.300
85	.60524E-02	.56408E-02	.11164E-03	.76347E-04	.77259E-04	.306	.255
86	.38885E-02	.18967E-02	.10230E-03	.70134E-04	.73284E-04	.467	.242
88	.34318E-02	.16896E-02	.89887E-04	.69958E-04	.61327E-04	.492	.267
90	.28523E-02	.15584E-02	.84451E-04	.68476E-04	.52263E-04	.459	.259
92	.22677E-02	.13036E-02	.77958E-04	.62352E-04	.45945E-04	.383	.221
93	.40545E-03	.23247E-03	.26864E-04	.27684E-04	.15108E-04	.072	.041
94	.59087E-04	.34002E-04	.13826E-05	.11220E-04	.77435E-06	.010	.006
95	.68360E-09	.37406E-09	.47849E-07	.10360E-04	.26874E-07	.000	.000
96	.68469E-04	.39543E-04	.47853E-07	.10357E-04	.26877E-07	.012	.007

***** FINAL RESULTS - SRSS COMBINATION OF DYNAMIC RESPONSES WITH HIGH FREQUENCY MODE RESPONSES *****
 MODAL COMBINATION METHOD 3-DOUBLE SUM

P I P E F O R C E S A N D M O M E N T S						
ELEMENT NUMBER	ELEMENT TYPE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT
1	TANGENT	END-I	2899.701	1086.419	2509.497	32442.67
		END-J	2899.701	1086.419	2509.497	32442.67
2	TANGENT	END-I	2884.453	1080.015	1916.811	32442.67
		END-J	2884.453	1080.015	1916.811	32442.67
3	TANGENT	END-I	2870.711	1071.011	1605.723	32442.67
		END-J	2870.711	1071.011	1605.723	32442.67
4	TANGENT	END-I	2799.596	589.813	788.886	32442.67
		END-J	2799.596	589.813	788.886	32442.67
5	TANGENT	END-I	2728.395	271.394	349.713	32442.67
		END-J	2728.395	271.394	349.713	32442.67
6	TANGENT	END-I	2714.859	260.509	381.406	32442.67
		END-J	2714.859	260.509	381.406	32442.67
7	TANGENT	END-I	1521.701	588.553	3233.856	.00
		END-J	1521.701	588.553	3233.856	.00
8	TANGENT	END-I	2278.614	1556.509	3359.317	37988.63
		END-J	2278.614	1556.509	3359.317	37988.63
9	TANGENT	END-I	2260.406	1582.808	3395.916	37988.63
		END-J	2260.406	1582.808	3395.916	37988.63
10	TANGENT	END-I	2224.600	919.373	1582.050	37988.63
		END-J	2224.600	919.373	1582.050	37988.63
11	TANGENT	END-I	2204.103	898.857	1553.417	37988.63
		END-J	2204.103	898.857	1553.417	37988.63
12	TANGENT	END-I	1276.471	1106.666	2317.703	.00
		END-J	1276.471	1106.666	2317.703	.00
13	TANGENT	END-I	1656.332	639.680	1454.666	48490.27
		END-J	1656.332	639.680	1454.666	48490.27
14	TANGENT	END-I	1636.441	699.450	1457.913	48490.27
		END-J	1636.441	699.450	1457.913	48490.27
15	BEND	END-I	1577.007	1420.164	875.256	48490.27
		CENTER	1939.252	914.757	875.256	30420.17
16	TANGENT	END-I	1560.483	893.326	872.060	48490.27
		END-J	1560.483	893.326	872.060	48490.27
17	TANGENT	END-I	1232.431	619.916	775.864	13942.18
		END-J	1232.431	619.916	775.864	13942.18
18	TANGENT	END-I	1138.318	689.958	1080.511	13942.18
		END-J	1138.318	689.958	1080.511	13942.18
19	BEND	END-I	1156.407	947.167	466.923	13942.18
		CENTER	1321.089	688.296	466.923	15752.88
		END-I	1219.167	852.502	466.923	24123.09
		END-J	1219.167	852.502	466.923	24123.09

20	TANGENT	END-I END-J	1119.117 1119.117	523.405 523.405	832.902 832.902	24122.99 24122.99	40825.81 46333.57	20993.83 24772.21
21	TANGENT	END-I END-J	1043.112 1043.112	811.401 811.401	1063.574 1063.574	16008.50 16008.50	43694.78 27378.09	25753.01 35714.94
22	TANGENT	END-I END-J	920.613 920.613	885.655 885.655	816.810 816.810	16008.50 16008.50	27378.09 37209.04	35714.94 55057.40
23	TANGENT	END-I END-J	823.998 823.998	417.915 417.915	515.788 515.788	16008.50 16008.50	37209.04 54068.19	55057.40 65435.81
24	TANGENT	END-I END-J	553.747 553.747	568.308 568.308	500.328 500.328	15276.91 15276.91	55940.93 34251.66	65338.47 37429.04
25	TANGENT	END-I END-J	447.399 447.399	767.408 767.408	812.202 812.202	15276.91 15276.91	34251.66 27286.31	37429.04 27009.68
26	TANGENT	END-I END-J	402.718 402.718	660.909 660.909	768.185 768.185	15276.91 15276.91	27286.31 16894.91	27009.68 14830.86
27	TANGENT	END-I END-J	86.201 86.201	306.900 306.900	267.767 267.767	.00 .00	7966.34 1654.89	9160.50 1916.81
28	TANGENT	END-I END-J	25.861 25.861	108.201 108.201	93.410 93.410	.00 .00	1654.89 .00	1916.81 .00
29	TANGENT	END-I END-J	824.645 824.645	788.284 788.284	323.914 323.914	5727.81 5727.81	17438.74 11396.71	22508.43 10136.43
30	TANGENT	END-I END-J	797.542 797.542	735.989 735.989	319.158 319.158	5727.81 5727.81	11396.71 8381.44	10136.43 10629.48
31	BEND	END-I CENTER END-J	775.740 956.469 997.889	679.588 411.161 272.109	309.368 309.368 309.368	5727.31 4826.43 4706.56	8381.74 7296.14 5756.55	10629.48 12687.06 12779.00
32	TANGENT	END-I END-J	865.173 865.173	271.900 271.900	268.023 268.023	4706.16 4706.16	5756.85 9409.90	12779.00 8905.87
33	TANGENT	END-I END-J	662.452 662.452	230.664 230.664	156.779 156.779	4706.16 4706.16	9409.90 13764.71	8905.87 12083.86
34	BEND	END-I CENTER END-J	538.640 551.702 527.911	150.484 104.756 198.201	157.438 157.438 157.438	4706.16 3518.89 4722.69	12083.86 12733.65 12634.33	13764.71 13813.52 13856.37
35	TANGENT	END-I END-J	429.048 429.048	169.000 169.000	176.809 176.809	4720.59 4720.59	13856.37 9060.44	12635.13 10500.90
36	TANGENT	END-I END-J	283.820 283.820	202.530 202.530	186.887 186.887	4720.59 4720.59	9060.44 7380.23	10500.90 7943.36
37	BEND	END-I CENTER END-J	236.526 274.187 270.600	270.700 237.808 236.626	197.286 197.286 197.286	4720.69 3968.69 6102.55	7380.23 6422.71 4007.34	7943.36 7496.28 7008.40
38	TANGENT	END-I END-J	465.239 465.239	280.329 280.329	249.434 249.434	6101.75 6101.75	5183.75 9860.99	5970.56 12154.18
39	BEND	END-I CENTER END-J	627.686 672.003 675.105	323.074 213.498 199.368	203.150 203.150 203.150	6101.75 5263.58 4652.97	6242.51 6499.78 6535.45	14323.32 15450.26 15796.95
40	BEND	END-I	727.900	220.615	266.209	4652.97	6534.05	15797.55

41	BEND	CENTER END-J	679.999 590.695	342.590 484.131	266.209 266.209	4412.17 4516.41	5962.22 5277.99	15199.22 13887.82
		END-I CENTER END-J	620.969 484.475 329.465	535.012 662.354 749.864	337.131 337.131 337.131	4515.71 4685.70 4829.28	5278.48 4454.27 4307.79	13887.82 11874.87 9871.94
42	TANGENT	END-I END-J	357.598 357.598	881.610 881.610	508.681 508.681	4828.98 4828.98	4309.48 22504.91	9871.24 33255.70
43	TANGENT	END-I END-J	409.634 409.634	903.503 903.503	566.875 566.875	4828.68 4828.68	22504.91 32399.67	33255.70 49388.43
44	TANGENT	END-I END-J	462.903 462.903	904.003 904.003	615.114 615.114	4830.08 4830.08	32399.67 35851.82	49388.43 54821.34
45	TANGENT	END-I END-J	10.800 10.800	.000 .000	19.231 19.231	.00 .00	146.89 .00	.00 .00
46	TANGENT	END-I END-J	296.901 296.901	372.725 372.725	311.400 311.400	11713.85 11713.85	16166.42 9994.82	13829.96 9851.66
47	TANGENT	END-I END-J	255.152 255.152	331.500 331.500	308.266 308.266	11713.85 11713.85	9994.82 6646.21	9851.66 9213.65
48	BEND	END-I CENTER END-J	226.077 310.152 354.566	296.529 213.817 136.097	303.737 303.737 303.737	11713.25 8905.83 5748.11	6647.11 8400.98 8905.78	9213.65 9458.14 9514.80
49	TANGENT	END-I END-J	261.138 261.138	142.621 142.621	280.301 280.301	5751.91 5751.91	8903.28 4071.43	9514.80 6880.11
50	TANGENT	END-I END-J	165.262 165.262	175.407 175.407	143.330 143.330	5751.91 5751.91	4071.43 9679.30	6880.11 6999.43
51	BEND	END-I CENTER END-J	175.773 250.773 196.993	196.991 86.745 175.868	71.315 71.315 71.315	5751.91 2700.28 8558.88	9679.30 10031.52 4531.34	6999.43 7119.82 6910.99
52	TANGENT	END-I END-J	318.315 318.315	244.702 244.702	228.448 228.448	8556.58 8556.58	6910.99 8747.22	4535.84 5928.03
53	BEND	END-I CENTER END-J	429.452 460.989 465.472	253.839 203.527 208.221	307.801 307.801 307.801	8556.58 9947.48 11067.58	5928.03 5077.21 3922.40	8747.22 9312.86 9400.22
54	BEND	END-I CENTER END-J	504.348 477.285 424.438	243.979 291.085 355.831	326.501 326.501 326.501	11066.78 11852.08 12255.87	3924.40 2668.90 1536.84	9400.22 8869.88 7937.01
55	BEND	END-I CENTER END-J	459.064 385.684 312.402	397.234 462.924 513.622	340.900 340.900 340.900	12255.57 12259.76 11870.94	1539.44 1498.02 2551.62	7937.01 6734.21 5652.71
56	TANGENT	END-I END-J	424.904 424.904	603.004 603.004	370.900 370.900	11871.64 11871.64	2548.62 13304.51	5652.71 24049.41
57	TANGENT	END-I END-J	591.412 591.412	617.583 617.583	378.500 378.500	11871.64 11871.64	13304.51 20180.40	24049.41 35113.60
58	TANGENT	END-I END-J	737.777 737.777	617.880 617.880	379.500 379.500	11871.64 11871.64	20180.40 22485.30	35113.60 38829.18
59	TANGENT	END-I END-J	21.610 21.610	.000 .000	.200 .200	.00 .00	1.20 .00	.00 .00

60	TANGENT	END-I END-J	438.801 438.801	456.000 456.000	345.702 345.702	6904.82 6904.82	20211.20 13847.76	15276.91 9285.18
61	TANGENT	END-I END-J	423.301 423.301	440.301 440.301	336.901 336.901	6904.82 6904.82	13847.76 10649.84	9285.18 8651.22
62	BEND	END-I CENTER END-J	411.900 492.501 526.003	417.004 312.203 252.202	326.600 326.600 326.600	6904.32 5558.50 5695.41	10650.14 9524.86 7863.75	8651.22 9020.71 9277.75
63	TANGENT	END-I END-J	474.309 474.309	226.620 226.620	292.901 292.901	5694.61 5694.61	7864.15 10934.35	9277.75 10648.91
64	TANGENT	END-I END-J	400.528 400.528	174.507 174.507	196.305 196.305	5694.61 5694.61	10934.35 16711.00	10648.91 12504.80
65	BEND	END-I CENTER END-J	359.245 374.253 365.257	142.735 99.712 127.900	145.008 145.008 145.008	5694.61 4189.06 5144.21	12504.80 13092.80 12934.88	16711.00 16855.31 16707.11
66	TANGENT	END-I END-J	290.029 290.029	185.869 185.869	197.102 197.102	5142.51 5142.51	16707.11 8987.15	12935.48 10643.62
67	TANGENT	END-I END-J	199.258 199.258	191.508 191.508	174.516 174.516	5142.51 5142.51	8987.15 6426.96	10643.62 8555.19
68	BEND	END-I CENTER END-J	198.187 264.920 290.212	290.211 235.787 198.286	193.849 193.849 193.849	5142.61 3555.83 5545.32	6426.96 6172.91 4225.86	8555.19 8033.51 7286.20
69	TANGENT	END-I END-J	460.256 460.256	263.472 263.472	241.211 241.211	5544.32 5544.32	6175.96 8237.00	5582.42 11724.47
70	BEND	END-I CENTER END-J	603.172 629.962 622.999	309.798 241.072 264.156	194.898 194.898 194.898	5544.32 5382.10 5352.13	5930.64 5838.13 5795.73	13026.97 14119.06 14572.70
71	BEND	END-I CENTER END-J	668.179 616.759 530.615	287.120 391.484 503.336	237.750 237.750 237.750	5351.93 5421.86 5529.14	5795.33 5466.74 5224.32	14572.90 14294.84 13592.57
72	BEND	END-I CENTER END-J	557.045 438.342 320.589	546.542 645.086 708.891	287.798 287.798 287.798	5528.24 5584.03 5709.81	5225.02 5221.67 5607.54	13592.67 12589.12 11761.36
73	TANGENT	END-I END-J	351.314 351.314	821.026 821.026	414.317 414.317	5709.61 5709.61	5609.73 20250.98	11760.36 34942.72
74	TANGENT	END-I END-J	406.410 406.410	839.005 839.005	463.520 463.520	5709.51 5709.51	20250.98 28187.24	34942.72 49642.14
75	TANGENT	END-I END-J	461.810 461.810	839.305 839.305	518.089 518.089	5710.10 5710.10	28187.24 30984.43	49642.14 54625.50
76	TANGENT	END-I END-J	10.800 10.800	.000 .000	19.219 19.219	.00 .00	146.83 .00	.00 .00

***** FINAL RESULTS - SRSS COMBINATION OF DYNAMIC RESPONSES WITH HIGH FREQUENCY MODE RESPONSES *****
 MODAL COMBINATION METHOD 3-DOUBLE SUM

S U P P O R T F O R C E S A N D M O M E N T S

FORCE/MOMENT
(LOCAL)

NODE
NUMBER

COMPONENT
DIRECTION

1	FX	3074.
1	FY	1086.
1	FZ	2900.
1	MX	3123.
1	MY	100861.
1	MZ	32443.
1	FX	4098.
9	FY	1140.
9	FZ	707.
56	FX	904.
56	FY	461.
56	FZ	48334.
56	MX	35846.
56	MY	26257.
56	MZ	862.
74	FX	618.
74	FY	379.
74	FZ	11872.
74	MX	22486.
74	MY	38829.
74	MZ	684.
95	FX	839.
95	FY	374.
95	FZ	47849.
95	MX	30976.
95	MY	26875.
95	MZ	1823.
19	FL	1519.
25	FL-1	1474.
25	FL-2	1112.
27	FL	1308.
32	FL	

BENCHMARK PROBLEM 2
INDEPENDENT SUPPORT MOTION RESPONSE
SPECTRUM METHOD

GE ABWR CONFIRMATORY ANALYSIS - FEEDWATER PIPING

C O N T R O L I N F O R M A T I O N

NUMBER OF NODAL POINTS	=	77
NUMBER OF ELEMENT TYPES	=	3
NUMBER OF STATIC LOAD CASES	=	0
NUMBER OF DYNAMIC LOAD CASES	=	1
NUMBER OF ANCHOR MGMT CASES	=	0
NUMBER OF FREQUENCIES	=	50
SOLUTION MODE (MODEX)	=	0
EQ. 0, EXECUTION		
EQ. 1, DATA CHECK		
STRESS CALCULATION FLAG	=	1
EQ. 0 NO		
EQ. 1 YES		
ASME CODE EVALUATION FLAG	=	0
EQ. 1 CLASS 1 PIPING		
EQ. 2 CLASS 2 OR CLASS 3 PIPING		
ACCELERATION DUE TO GRAVITY	=	386.0
BANDWIDTH MINIMIZATION FLAG	=	0
EQ. 0 NO		
EQ. 1 YES		
ARBITRARY NODE NUMBERING FLAG	=	1
EQ. 0 NO		
EQ. 1 YES		
NUMBER OF SUPPORT GROUPS	=	3
FLAG FOR NODAL COORD. INPUT UNITS	=	0
EQ. 0 CONSISTENT UNIT		
EQ. 1 FEET TO INCHES		

LIST OF ANALYSIS TO BE PERFORMED
LOAD CASE DISK FILE ANALYSIS TYPE

1	0	INDEPENDENT RESPONSE SPECT.ANAL
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NODAL POINT INPUT DATA

NEW NODE	OLD NODE	BOUNDARY CONDITION				CODES			NODAL POINT COORDINATES			T
		X	Y	Z	XX	YY	ZZ		X	Y	Z	
1	1	0	0	0	0	0	0		110.236	348.819	-640.185	230.700
2	2	0	0	0	0	0	0		110.236	348.819	-702.599	420.800
3	3	0	0	0	0	0	0		110.236	348.819	-698.268	420.800
4	301	0	0	0	0	0	0		110.236	348.819	-624.272	420.800
5	4	0	0	0	0	0	0		110.236	348.819	-550.276	420.800
6	5	0	0	0	0	0	0		110.236	348.819	-536.221	420.800
7	6	0	0	0	0	0	0		110.236	348.819	-507.717	420.800
8	7	0	0	0	0	0	0		110.236	364.173	-507.717	420.800
9	8	0	0	0	0	0	0		110.236	348.819	-479.213	420.800
10	9	0	0	0	0	0	0		110.236	348.819	-461.654	420.800
11	12	0	0	0	0	0	0		110.236	348.819	-443.780	420.800
12	13	0	0	0	0	0	0		110.236	348.819	-415.276	420.800
13	14	0	0	0	0	0	0		110.236	378.898	-415.276	420.800
14	15	0	0	0	0	0	0		110.236	348.819	-386.772	420.800
15	16	0	0	0	0	0	0		110.236	348.819	-364.233	420.800
16	18	0	0	0	0	0	0		133.579	348.819	-325.383	420.800
17	1801	0	0	0	0	0	0		224.487	348.819	-277.042	420.800
18	19	0	0	0	0	0	0		315.394	348.819	-228.701	420.800
19	21	0	0	0	0	0	0		354.610	348.819	-207.860	420.800
20	23	0	0	0	0	0	0		377.953	348.819	-169.010	420.800
21	24	0	0	0	0	0	0		377.953	348.819	-129.921	420.800
22	25	0	0	0	0	0	0		377.953	348.819	-98.425	420.800
23	29	0	0	0	0	0	0		377.953	348.819	-37.795	420.800
24	31	0	0	0	0	0	0		377.953	348.819	.000	420.800
25	32	0	0	0	0	0	0		377.953	348.819	78.740	420.800
26	27	0	0	0	0	0	0		377.953	348.819	98.425	420.800
27	34	0	0	0	0	0	0		377.953	348.819	129.921	420.800
28	35	0	0	0	0	0	0		377.953	348.819	153.543	420.800
29	36	0	0	0	0	0	0		377.953	348.819	171.260	420.800
30	37	0	0	0	0	0	0		363.379	363.379	-129.921	420.800
31	38	0	0	0	0	0	0		355.116	371.656	-129.921	420.800
32	40	0	0	0	0	0	0		341.815	377.165	-129.921	420.800
33	4001	0	0	0	0	0	0		297.133	377.165	-129.921	420.800
34	41	0	0	0	0	0	0		252.451	377.165	-129.921	420.800
35	43	0	0	0	0	0	0		243.046	377.165	-132.441	420.800
36	4301	0	0	0	0	0	0		188.723	377.165	-163.804	420.800
37	44	0	0	0	0	0	0		134.400	377.165	-195.168	420.800
38	46	0	0	0	0	0	0		118.110	395.975	-204.573	420.800
39	47	0	0	0	0	0	0		118.110	438.410	-204.573	420.800
40	49	0	0	0	0	0	0		116.850	447.814	-202.391	420.800
41	51	0	0	0	0	0	0		113.407	454.700	-196.428	420.800
42	53	0	0	0	0	0	0		108.705	457.220	-188.282	420.800
43	54	0	0	0	0	0	0		87.815	457.220	-152.100	420.800
44	55	0	0	0	0	0	0		78.711	457.220	-136.331	420.800
45	56	0	0	0	0	0	0		75.669	457.220	-131.063	420.800
46	57	0	0	0	0	0	0		71.850	457.220	-124.449	420.800
47	58	0	0	0	0	0	0		363.393	363.379	.000	420.800
48	59	0	0	0	0	0	0		355.116	371.656	.000	420.800
49	61	0	0	0	0	0	0		341.815	377.165	.000	420.800
50	6101	0	0	0	0	0	0		298.422	377.165	.000	420.800
51	62	0	0	0	0	0	0		255.030	377.165	.000	420.800
52	64	0	0	0	0	0	0		236.220	395.975	.000	420.800
53	65	0	0	0	0	0	0		236.220	438.410	.000	420.800
54	67	0	0	0	0	0	0		233.701	447.814	.000	420.800
55	69	0	0	0	0	0	0		226.815	454.700	.000	420.800
56	71	0	0	0	0	0	0		217.410	457.220	.000	420.800
57	72	0	0	0	0	0	0		175.630	457.220	.000	420.800
58	73	0	0	0	0	0	0		157.421	457.220	.000	420.800
59	74	0	0	0	0	0	0		151.339	457.220	.000	420.800
60	75	0	0	0	0	0	0		143.701	457.220	.000	420.800
61	76	0	0	0	0	0	0		363.393	363.379	129.921	420.800
62	77	0	0	0	0	0	0		355.116	371.656	129.921	420.800

2 of 3

SPRING ELEMENTS

ELEMENT TYPE = 1
NUMBER OF ELEMENTS = 26

ELEMENT LOAD CASE MULTIPLIERS

ELEMENT NUMBER	CASE (A) .0000	CASE (B) .0000	CASE (C) 1.0000	CASE (D) .0000	GLOBAL AXES			SPECIFIED DISPLACEMENT	SPECIFIED ROTATION	SPRING RATE
					DIRECTION X-	COSINES Y-	Z-			
1	1	3	1	1.000	1.000	.000	.000	.000	.000	1.0000E+12
2	1	3	0	.000	.000	1.000	.000	.000	.000	1.0000E+12
3	1	3	0	.000	.000	1.000	.000	.000	.000	1.0000E+12
4	1	3	1	1.000	.000	.000	.000	.000	.000	1.0000E+12
5	1	3	1	.000	1.000	.000	.000	.000	.000	1.0000E+12
6	1	3	0	1.000	.000	1.000	.000	.000	.000	1.0000E+12
7	9	2	0	1.000	.000	.000	.000	.000	.000	5.6000E+10
8	9	2	0	.000	1.000	.000	.000	.000	.000	5.6000E+10
9	56	1	0	1.000	.000	1.000	.000	.000	.000	1.0000E+12
10	56	1	0	.000	.000	1.000	.000	.000	.000	1.0000E+12
11	56	1	0	1.000	.000	.000	.000	.000	.000	1.0000E+12
12	56	1	1	.000	1.000	.000	.000	.000	.000	2.9900E+09
13	56	1	0	.000	.000	1.000	.000	.000	.000	1.0000E+12
14	56	1	0	1.000	.000	.000	.000	.000	.000	1.0000E+12
15	74	1	1	.000	1.000	.000	.000	.000	.000	1.0000E+12
16	74	1	1	.000	.000	1.000	.000	.000	.000	1.0000E+12
17	74	1	0	1.000	.000	1.000	.000	.000	.000	1.0000E+12
18	74	1	0	.000	.000	1.000	.000	.000	.000	1.0000E+12
19	74	1	1	.000	.000	1.000	.000	.000	.000	2.9900E+09
20	74	1	0	.000	.000	1.000	.000	.000	.000	1.0000E+12
21	95	1	0	1.000	.000	.000	.000	.000	.000	1.0000E+12
22	95	1	0	.000	1.000	.000	.000	.000	.000	1.0000E+12
23	95	1	0	1.000	.000	1.000	.000	.000	.000	1.0000E+12
24	95	1	1	.000	.000	1.000	.000	.000	.000	1.0000E+12
25	95	1	1	.000	1.000	.000	.000	.000	.000	2.9900E+09
26	95	1	1	.000	.000	1.000	.000	.000	.000	1.0000E+12

[illegible]

S N U B B E R E L E M E N T S

ELEMENT TYPE = 4
 NUMBER OF ELEMENTS = 5

ELEMENT LOAD CASE MULTIPLIERS

ELEMENT NUMBER	CASE (A) 1.0000	NODE (N)	SUPPORT GROUP	CODE KD	CASE (C) 1.0000	CASE (D) 1.0000	DIRECTION COSINES WRT GLOBAL AXES			SPECIFIED DISPLACEMENT	SPECIFIED ROTATION	SPRING RATE
							X-	Y-	Z-			
1		19	2	1			-.439	-.353	.829	.000	.000	7.5000E+05
2		25	2	1			-.707	-.707	.000	.000	.000	5.0000E+05
3		25	2	1			.707	-.707	.000	.000	.000	7.5000E+05
4		27	2	1			-.766	-.643	.000	.000	.000	5.0000E+05
5		32	2	1			.643	-.766	.000	.000	.000	5.0000E+05

PIPE ELEMENT INPUT DATA

CONTROL INFORMATION

NUMBER OF PIPE ELEMENTS	=	76
NUMBER OF MATERIAL SETS	=	1
MAXIMUM NUMBER OF MATERIAL TEMPERATURE INPUT POINTS	=	7
NUMBER OF SECTION PROPERTY SETS	=	9
NUMBER OF BRANCH POINT NODES	=	3
MAXIMUM NUMBER OF TANGENTS COMMON TO A BRANCH POINT	=	3
FLAG FOR NEGLECTING AXIAL DEFORMATIONS IN BEND ELEMENTS (EQ.1, NEGLECT)	=	0

MATERIAL PROPERTY TABLES

MATERIAL NUMBER = (1)		7)		ASME SA-333 GR 6 CARBON STL PIP	
NUMBER OF		TEMPERATURE POINTS = {			
IDENTIFICATION		= {			
POINT	TEMPERATURE	YOUNG'S	POISSON'S	THERMAL	
NUMBER		MODULUS	RATIO	EXPANSION	
1	.00	2.800E+07	.300	6.000E-06	
2	70.00	2.790E+07	.300	6.070E-06	
3	200.00	2.770E+07	.300	6.380E-06	
4	300.00	2.740E+07	.300	6.600E-06	
5	400.00	2.700E+07	.300	6.820E-06	
6	500.00	2.640E+07	.300	7.020E-06	
7	600.00	2.570E+07	.300	7.230E-06	

SECTION PROPERTY TABLE				DESCRIPTION		
SECTION NUMBER	OUTSIDE DIAMETER	WALL THICKNESS	SHAPE FACTOR FOR SHEAR	WEIGHT/UNIT LENGTH	MASS/UNIT LENGTH	DESCRIPTION
1	38.000	1.5750	.0000	5.1667E+01	1.3385E-01	SLEEVE
2	38.000	9.3750	.0000	2.0000E+02	5.1813E-01	HDFTNG
3	22.000	1.3750	.0000	3.7822E+01	9.7984E-02	PENPIP
4	22.000	2.7480	.0000	2.0583E+00	5.3324E-03	CHKVLV
5	22.000	1.3750	.0000	3.7822E+01	9.7984E-02	22 IN
6	22.000	2.7480	.0000	2.0583E+00	5.3324E-03	GVALVE
7	12.539	.8425	.0000	1.3158E+01	3.4089E-02	12 IN
8	14.600	1.0000	.0000	1.7792E+01	4.6092E-02	NZONE3
9	20.700	4.0570	.0000	6.6208E+01	1.7152E-01	NZONE2

BRANCH POINT NODE LIST

BRANCH POINT	NODE NUMBER
1	24
2	31
3	34

ELEMENT	LOAD	CASE MULTIPLIERS
		CASE A CASE B CASE C CASE D
X-DIRECTION GRAVITY	.000	.000 .000 .000
Y-DIRECTION GRAVITY	-1.000	.000 .000 .000
Z-DIRECTION GRAVITY	.000	.000 .000 .000
THERMAL DISTORTION	.000	1.000 .000 .000
PRESSURE DISTORTION	.000	.000 .000 .000

P I P E E L E M E N T I N P U T D A T A														
ELEMENT NUMBER	ELEMENT TYPE	NODE -I	NODE -J	MATL. NUMBER	SECTION NUMBER	REFERENCE TEMPERATURE (BEND RADIUS)	DESIGN PRESSURE (THIRD POINT)	PEAK PRESSURE (X3- ORDINATE)	TEST PRESSURE (Y3- ORDINATE)	END -I (Z3- ORDINATE)	END -J (ORDINATE)	INCREMENT (BEND DEGREE)	NODE	INPUT TAG
1	TANGENT	1	2	1	1	70.00	.00	.00	.00	0	0	1	1	II
2	TANGENT	2	3	1	2	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
3	TANGENT	3	301	1	3	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
4	TANGENT	301	4	1	3	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
5	TANGENT	4	5	1	3	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
6	TANGENT	5	6	1	4	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
7	TANGENT	6	7	1	4	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
8	TANGENT	7	8	1	4	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
9	TANGENT	8	9	1	5	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
10	TANGENT	9	12	1	5	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
11	TANGENT	12	13	1	6	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
12	TANGENT	13	14	1	6	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
13	TANGENT	14	15	1	6	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
14	TANGENT	15	16	1	5	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
15	BEND	16	18	1	5	(44.000)	()	110.236	348.819	(-337.795)	(62.0003)			I
16	TANGENT	18	1801	1	5	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
17	TANGENT	1801	19	1	5	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
18	TANGENT	19	21	1	5	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
19	BEND	21	23	1	5	(44.000)	()	377.953	348.819	(-195.448)	(61.9998)			I
20	TANGENT	23	24	1	5	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
21	TANGENT	24	25	1	5	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
22	TANGENT	25	29	1	5	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
23	TANGENT	29	31	1	5	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
24	TANGENT	31	32	1	5	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
25	TANGENT	32	27	1	5	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
26	TANGENT	27	34	1	5	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
27	TANGENT	34	35	1	5	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
28	TANGENT	35	36	1	5	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
29	TANGENT	36	37	1	7	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
30	TANGENT	37	38	1	7	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
31	BEND	38	40	1	7	(18.800)	()	349.606	377.165	(-129.921)	(45.0229)			I
32	TANGENT	40	4001	1	7	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
33	TANGENT	4001	41	1	7	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
34	BEND	41	43	1	7	(18.800)	()	247.411	377.165	(-129.921)	(30.0146)			I
35	TANGENT	43	4301	1	7	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
36	TANGENT	4301	44	1	7	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
37	BEND	44	46	1	7	(18.800)	()	118.110	377.165	(-204.573)	(90.0307)			I
38	TANGENT	46	47	1	7	70.00	1099.50	1250.00	1250.00	0	0	1	1	II
39	BEND	47	49	1	7	(18.800)	()	118.110	443.450	(-204.573)	(30.0146)			I

PIPE ELEMENT INPUT DATA

ELEMENT NUMBER	ELEMENT TYPE	NODE -I	NODE -J	MATL. NUMBER	SECTION NUMBER	REFERENCE TEMPERATURE (BEND RADIUS)	DESIGN PRESSURE (THIRD POINT)	PEAK PRESSURE (X3- ORDINATE)	TEST PRESSURE (Y3- ORDINATE)	END CODES END-I END-J (Z3- ORDINATE)	NODE INCREMENT (BEND DEGREE)	INPUT TAG
40	BEND	49	51	1	7	70.00 (18.800)	1099.50 ()	1250.00 1115.590 (	1250.00 452.180 (	0 0 -200.208 (	(30.0221)	I
41	BEND	51	53	1	7	70.00 (18.800)	1099.50 ()	1250.00 111.225 (	1250.00 457.220 (	0 0 -192.647 (	(30.0179)	I
42	TANGENT	53	54	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II
43	TANGENT	54	55	1	8	70.00	1099.50	1250.00	1250.00	0 0	1	II
44	TANGENT	55	56	1	9	70.00	1099.50	1250.00	1250.00	0 0	1	II
45	TANGENT	56	57	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II
46	TANGENT	31	58	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II
47	TANGENT	58	59	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II
48	BEND	59	61	1	7	70.00 (18.800)	1099.50 ()	1250.00 349.606 (	1250.00 377.165 (	0 .000 (	(45.0229)	I
49	TANGENT	61	6101	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II
50	TANGENT	6101	62	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II
51	BEND	62	64	1	7	70.00 (18.800)	1099.50 ()	1250.00 236.220 (	1250.00 377.165 (	0 .000 (	(90.0305)	I
52	TANGENT	64	65	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II
53	BEND	65	67	1	7	70.00 (18.800)	1099.50 ()	1250.00 236.220 (	1250.00 443.450 (	0 .000 (	(30.0146)	I
54	BEND	67	69	1	7	70.00 (18.800)	1099.50 ()	1250.00 231.180 (	1250.00 452.180 (	0 .000 (	(30.0235)	I
55	BEND	69	71	1	7	70.00 (18.800)	1099.50 ()	1250.00 222.450 (	1250.00 457.220 (	0 .000 (	(30.0157)	I
56	TANGENT	71	72	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II
57	TANGENT	72	73	1	8	70.00	1099.50	1250.00	1250.00	0 0	1	II
58	TANGENT	73	74	1	9	70.00	1099.50	1250.00	1250.00	0 0	1	II
59	TANGENT	74	75	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II
60	TANGENT	34	76	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II
61	TANGENT	76	77	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II
62	BEND	77	79	1	7	70.00 (18.800)	1099.50 ()	1250.00 349.606 (	1250.00 377.165 (	0 129.921 (	(45.0229)	I
63	TANGENT	79	7901	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II
64	TANGENT	7901	80	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II
65	BEND	80	82	1	7	70.00 (18.800)	1099.50 ()	1250.00 247.411 (	1250.00 377.165 (	0 129.921 (	(30.0146)	I
66	TANGENT	82	8201	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II
67	TANGENT	8201	83	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II
68	BEND	83	85	1	7	70.00 (18.800)	1099.50 ()	1250.00 118.110 (	1250.00 377.165 (	0 204.573 (	(90.0307)	I
69	TANGENT	85	86	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II

P I P E E L E M E N T I N P U T D A T A												
ELEMENT NUMBER	ELEMENT TYPE	NODE -I	NODE -J	MATL. NUMBER	SECTION NUMBER	REFERENCE TEMPERATURE (BEND RADIUS)	DESIGN PRESSURE (THIRD POINT)	PEAK PRESSURE (X3- ORDINATE)	TEST PRESSURE (Y3- ORDINATE)	END CODES END-I (Z3- ORDINATE)	NODE INCREMENT (BEND DEGREE)	INPUT TAG
70	BEND	86	88	1	7	70.00 (18.800)	1099.50 ()	1250.00 118.110)	1250.00 443.450)	0 204.573)	(30.0146)	I
71	BEND	88	90	1	7	70.00 (18.800)	1099.50 ()	1250.00 115.590)	1250.00 452.180)	0 200.208)	(30.0221)	I
72	BEND	90	92	1	7	70.00 (18.800)	1099.50 ()	1250.00 111.225)	1250.00 457.220)	0 192.647)	(30.0179)	I
73	TANGENT	92	93	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II
74	TANGENT	93	94	1	8	70.00	1099.50	1250.00	1250.00	0 0	1	II
75	TANGENT	94	95	1	9	70.00	1099.50	1250.00	1250.00	0 0	1	II
76	TANGENT	95	96	1	7	70.00	1099.50	1250.00	1250.00	0 0	1	II

BENCHMARK PROBLEM 2
LOWER FREQUENCY AMPLIFIED GROUP RESPONSE
GROUPING METHOD

SUPPORT GROUP 1

DIRECTION FACTORS

X = .0000 Y = .0000 Z = 1.0000

INDICATOR FOR DISPLACEMENT OR ACCELERATION SPECTRUM = 2

EQ.0 DISPLACEMENT
EQ.1 ACCELERATION IN IN./SEC.**2
EQ.2 ACCELERATION IN G**S

1 SPECTRA ARE ENTERED FOR CASE 1. KIND= 2

CLUSTER FACTOR, CF = .10000

MODAL PARTICIPATION FACTORS

MODE	FREQ (CPS)	X-DIRECTION	Y-DIRECTION	Z-DIRECTION
1	8.165	7.3718E-02	-1.6145E-01	-1.5057E+00
2	10.872	6.8928E-02	-3.8077E-01	1.3934E-01
3	11.556	-2.8624E-01	-6.4167E-01	-4.3377E-01
4	11.845	-1.5265E-02	-3.8586E-01	2.0166E+00
5	13.026	-4.1332E-03	2.1977E+00	2.4987E-01
6	15.284	7.8663E-03	3.5077E-02	-4.7680E-02
7	15.813	5.2806E-02	-1.2045E+00	2.1886E-01
8	17.999	6.8553E-01	-5.3164E-01	-5.5164E-02
9	19.895	6.8430E-01	-2.9331E-01	-1.8840E-01
10	21.602	1.0857E+00	4.5023E-01	2.1002E-01
11	21.905	-1.3235E-01	-3.5896E-03	1.0222E+00
12	23.021	-8.3531E-02	2.5456E-01	-7.3399E-01
13	23.699	1.8789E-01	-4.0426E-01	-4.2043E-01
14	25.757	-6.7365E-02	9.6032E-01	-2.2048E-02
15	27.331	9.2403E-02	2.6572E-01	2.5694E-02
16	30.464	-2.6613E-01	8.1040E-01	-7.7466E-02
17	32.632	-2.9783E-01	1.4842E+00	1.0800E-01
18	34.397	4.0028E-01	-1.7391E+00	-1.8213E-01

SPECTRUM TABLE (SSE Z-DIRECTION - GROUP 1

NUMBER OF POINTS = 17
SCALE FACTOR = 1.00000E+00

INPUT POINT	PERIOD	SPECTRUM VALUE
1	1.0000E-05	1.7900E+00
2	2.9050E-02	1.7900E+00
3	3.0420E-02	1.9500E+00
4	3.1870E-02	2.8600E+00
5	3.6620E-02	2.8600E+00
6	3.8360E-02	3.1300E+00
7	4.0180E-02	3.3100E+00
8	4.2090E-02	5.1100E+00
9	4.4090E-02	6.6100E+00
10	4.6180E-02	7.7000E+00
11	4.8370E-02	7.7000E+00
12	5.0660E-02	9.0000E+00
13	8.8370E-02	9.0000E+00
14	9.2570E-02	8.7500E+00
15	9.6960E-02	8.5700E+00
16	1.0155E-01	8.5700E+00
17	1.4300E-01	8.5700E+00

CLUSTERING. +1 MEANS MODE I CLOSE TO I+1. -1, NOT
 -1. 1. 1. -1. -1. 1. -1. -1. 1. 1. -1. 1. -1. 1. -1. 0.

***** COMBINED MODAL RESPONSES FOR SUPPORT GROUP 1 *****
MODAL COMBINATION METHOD 2-GROUPING

N O D E N O D E N U M B E R	D I S P L A C E M E N T S / R O T A T I O N S				A C C E L E R A T I O N S I N G ' S			
	X- T R A N S L A T I O N	Y- T R A N S L A T I O N	Z- T R A N S L A T I O N	X- R O T A T I O N	X- D I R E C T I O N	Y- D I R E C T I O N	D I R E C T I O N	D I R E C T I O N
1	.13581E-07	.69884E-08	.14616E-07	.68558E-07	.000	.14026E-06	.000	.0
2	.11452E-03	.53884E-04	.18545E-03	.21952E-04	.001	.14062E-04	.001	.0
3	.88458E-04	.50230E-04	.18824E-03	.22776E-04	.001	.14370E-04	.001	.0
301	.18219E-01	.93209E-01	.63977E-03	.14768E-03	.161	.11987E-03	.118	.0
4	.33130E-01	.16878E-01	.10909E-02	.20052E-04	.291	.22537E-03	.213	.0
5	.32129E-01	.16352E-01	.11765E-02	.83952E-04	.282	.24542E-03	.206	.0
6	.25291E-01	.12845E-01	.12695E-02	.18058E-03	.221	.27003E-03	.162	.0
7	.28156E-01	.12849E-01	.21038E-02	.18071E-03	.235	.27061E-03	.162	.0
8	.12303E-01	.62272E-02	.13627E-02	.29857E-03	.107	.29184E-03	.078	.0
9	.73661E-06	.30110E-06	.14698E-02	.43447E-03	.000	.31409E-03	.000	.0
12	.18887E-01	.94278E-02	.15788E-02	.56420E-03	.164	.33678E-03	.117	.0
13	.54227E-01	.27263E-01	.16719E-02	.65253E-03	.463	.35873E-03	.337	.0
14	.48791E-01	.27283E-01	.18641E-01	.65689E-03	.479	.35781E-03	.337	.0
15	.92012E-01	.46808E-01	.17699E-02	.69292E-03	.792	.38384E-03	.577	.0
16	.12219E+00	.63060E-01	.19145E-02	.70637E-03	1.050	.41799E-03	.774	.0
18	.15457E+00	.96097E-01	.11238E-01	.57073E-03	1.334	.46391E-03	1.102	.1
1801	.13821E+00	.13916E+00	.27190E-01	.20809E-03	1.229	.38722E-03	1.370	.2
19	.88250E-01	.13578E+00	.12413E+00	.43814E-03	882	.32140E-03	1.240	.9
21	.62956E-01	.11757E+00	.17767E+00	.62574E-03	740	.35339E-03	1.079	.3
23	.34719E-01	.81562E-01	.20317E+00	.75797E-03	.555	.40660E-03	.789	.1
24	.20002E-01	.49591E-01	.20354E+00	.61030E-03	.387	.39447E-03	.535	.5
25	.13379E-01	.27423E-01	.20379E+00	.20379E-03	.372	.38429E-03	.412	.5
29	.14179E-01	.86409E-02	.20420E+00	.29089E-03	.498	.36812E-03	.427	.5
31	.14307E-01	.11639E-01	.20441E+00	.14969E-03	.502	.36053E-03	.477	.5
32	.12971E-01	.16910E-01	.20472E+00	.10138E-03	.368	.38175E-03	.611	.5
33	.17294E-01	.18662E-01	.20477E+00	.12077E-03	.377	.38879E-03	.684	.5
34	.29166E-01	.22402E-01	.20484E+00	.14774E-03	.494	.40076E-03	.852	.5
35	.39931E-01	.25461E-01	.20485E+00	.14989E-03	.646	.40076E-03	.992	.5
36	.48573E-01	.27781E-01	.20486E+00	.15016E-03	.784	.40076E-03	1.098	.5
37	.22839E-01	.53698E-01	.20950E+00	.82490E-03	.417	.40184E-03	.575	.5
38	.24634E-01	.56132E-01	.21321E+00	.92020E-03	.431	.40550E-03	.602	.5
40	.25782E-01	.59673E-01	.21485E+00	.90957E-02	.443	.45295E-03	.655	.5
4001	.25818E-01	.69787E-01	.26924E+00	.16256E-02	.443	.50643E-03	1.064	.0
41	.25841E-01	.78082E-01	.38022E+00	.25264E-02	.443	.55344E-03	1.651	.0
43	.31277E-01	.78382E-01	.40208E+00	.27377E-02	.509	.61415E-03	1.676	.0
4301	.91212E-01	.81689E-01	.48408E+00	.39893E-02	1.532	.11824E-02	1.284	.0
44	.12275E+00	.12239E+00	.49848E+00	.52436E-02	2.453	.16995E-02	1.867	.0
46	.96016E-01	.14758E+00	.37848E+00	.62456E-02	2.263	.18465E-02	2.240	.0
47	.42901E-01	.14746E+00	.11463E+00	.58884E-02	1.269	.17634E-02	2.238	.0
49	.40196E-01	.13389E+00	.62357E-01	.27377E-02	1.075	.15219E-02	2.034	.0
51	.36027E-01	.10328E+00	.29419E-01	.38495E-02	.668	.66691E-03	1.116	.0
53	.29069E-01	.58894E-02	.73036E-01	.26025E-02	.111	.16569E-03	.093	.0
54	.48722E-02	.58894E-02	.29736E-02	.57045E-03	.016	.77549E-05	.002	.0
55	.71190E-03	.10281E-03	.42119E-03	.25314E-04	.000	.29419E-06	.000	.0
56	.29674E-08	.44669E-08	.11086E-07	.82591E-06	.019	.29420E-06	.498	.0
57	.83711E-03	.65122E-05	.48335E-03	.82592E-06	.577	.30320E-03	.552	.0
58	.15003E-01	.12550E-01	.20476E+00	.93423E-04	.629	.26746E-03	.621	.0
59	.16206E-01	.14065E-01	.20339E+00	.84893E-04	.660	.10409E-03	.695	.0
6101	.16922E-01	.15835E-01	.19757E+00	.21747E-03	.663	.57312E-04	.605	.0
62	.16967E-01	.13503E-01	.15377E+00	.90896E-03	.664	.11784E-03	.506	.0
64	.13613E-01	.10751E-01	.12240E+00	.13575E-02	.544	.20864E-03	.504	.0
65	.42761E-02	.10707E-01	.63352E-01	.13222E-02	.185	.22555E-03	.480	.0
67	.21235E-02	.10142E-01	.49630E-01	.88500E-03	.095	.22746E-03	.410	.0
69	.55298E-03	.86050E-02	.37013E-01	.91196E-03	.025	.21638E-03	.319	.0
71	.33512E-04	.66509E-02	.27986E-01	.75411E-03	.001	.18543E-03	.034	.0
72	.84490E-05	.70496E-03	.49608E-02	.14779E-03	.000	.58424E-04	.000	.0
73	.53306E-06	.16238E-04	.72135E-03	.61963E-05	.000	.29223E-05	.001	.0

74	.49919E-09	.13137E-08	.47306E-08	.15966E-06	.10991E-03	.10093E-06	.000	.0
75	.49919E-09	.76972E-06	.83956E-03	.15966E-06	.10991E-03	.10093E-06	.000	.0
76	.28475E-01	.23467E-01	.20771E+00	.29821E-03	.11534E-02	.45094E-03	.806	1.5
77	.28429E-01	.25094E-01	.20957E+00	.43778E-03	.14867E-02	.47701E-03	.771	1.5
79	.28452E-01	.29133E-01	.21328E+00	.57207E-03	.22507E-02	.57165E-03	.691	1.7
7901	.28478E-01	.51592E-01	.25422E+00	.18559E-02	.26178E-02	.58970E-03	.961	4.1
80	.28488E-01	.74904E-01	.32445E+00	.20378E-02	.23289E-02	.52408E-03	1.570	4.3
82	.32362E-01	.74485E-01	.33735E+00	.22303E-02	.19189E-02	.42103E-03	1.572	4.7
8201	.72618E-01	.44017E-01	.37723E+00	.31886E-02	.13117E-02	.62089E-03	1.920	4.7
83	.97200E-01	.82366E-01	.37164E+00	.40718E-02	.12292E-02	.10007E-02	1.588	5.0
85	.82420E-01	.10468E+00	.27828E+00	.45588E-02	.12355E-02	.13184E-02	1.873	3.9
86	.41291E-01	.10462E+00	.83454E-01	.43372E-02	.11291E-02	.12973E-02	1.871	1
88	.36328E-01	.94783E-01	.45684E-01	.36229E-02	.10674E-02	.11177E-02	1.717	.6
90	.30400E-01	.72759E-01	.22559E-01	.27784E-02	.91795E-03	.84487E-03	1.359	.4
92	.23746E-01	.51214E-01	.14065E-01	.18571E-02	.71979E-03	.51155E-03	.988	.3
93	.38676E-02	.40649E-02	.23265E-02	.39945E-03	.27856E-03	.12238E-03	.088	.0
94	.56286E-03	.69537E-04	.33087E-03	.17606E-04	.10857E-03	.56541E-05	.002	.0
95	.29233E-08	.30195E-08	.79692E-08	.57276E-06	.10015E-03	.20660E-06	.000	.0
96	.66243E-03	.44982E-05	.38250E-03	.57276E-06	.10015E-03	.20660E-06	.016	.0

***** COMBINED MODAL RESPONSES FOR SUPPORT GROUP 1 *****
 MODAL COMBINATION METHOD 2-GROUPING

PIPE FORCES AND MOMENTS

ELEMENT NUMBER	ELEMENT TYPE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
1	TANGENT	END-I END-J	14616.614 14616.614	6988.400 6988.400	13580.997 13580.997	140259.05 140259.05	137372.96 984975.33	68557.72 504684.77
2	TANGENT	END-I END-J	14613.672 14613.672	6989.695 6989.695	13582.869 13582.869	140259.05 140259.05	984975.33 926148.46	504684.77 474413.03
3	TANGENT	END-I END-J	14610.989 14610.989	6988.461 6988.461	13581.507 13581.507	140259.05 140259.05	926148.46 78914.70	474413.03 42800.64
4	TANGENT	END-I END-J	14597.280 14597.280	6680.327 6680.327	13163.078 13163.078	140259.05 140259.05	78914.70 1052808.09	42800.64 536990.28
5	TANGENT	END-I END-J	14583.441 14583.441	6351.611 6351.611	12713.388 12713.388	140259.05 140259.05	1052808.09 1231469.34	536990.28 626233.80
6	TANGENT	END-I END-J	14580.729 14580.729	6295.428 6295.428	12636.399 12636.399	140259.05 140259.05	1231469.34 1591610.92	626233.80 805628.40
7	TANGENT	END-I END-J	1342.965 1342.965	274.921 274.921	1951.009 1951.009	.00 .00	29955.33 .00	4221.02 .00
8	TANGENT	END-I END-J	14607.669 14607.669	5072.847 5072.847	10815.359 10815.359	126658.11 126658.11	1591610.92 1899150.82	802334.76 946034.81
9	TANGENT	END-I END-J	14603.892 14603.892	5047.995 5047.995	10780.131 10780.131	126658.11 126658.11	1899150.82 2088077.45	946034.81 1034224.81
10	TANGENT	END-I END-J	14596.456 14596.456	11845.500 11845.500	30495.155 30495.155	126658.11 126658.11	2088077.45 1543330.68	1034224.81 822744.03
11	TANGENT	END-I END-J	14592.004 14592.004	11805.109 11805.109	30438.133 30438.133	126658.11 126658.11	1543330.68 677263.79	822744.03 487066.49
12	TANGENT	END-I END-J	3134.814 3134.814	2222.968 2222.968	4451.329 4451.329	.00 .00	133890.93 .00	66862.59 .00
13	TANGENT	END-I END-J	15443.799 15443.799	8896.526 8896.526	26641.858 26641.858	182603.63 182603.63	677263.79 104880.73	428414.66 176242.90
14	TANGENT	END-I END-J	15437.773 15437.773	8662.305 8662.305	26310.519 26310.519	182603.63 182603.63	104880.73 675255.45	176242.90 35923.00
15	BEND	END-I CENTER END-J	15418.868 26082.985 29327.001	25037.891 13548.631 2617.057	7761.479 7761.479 7761.479	182603.63 211366.07 278936.63	35923.00 123440.82 189007.24	675255.45 1145940.85 1289124.06
16	TANGENT	END-I END-J	26457.383 26457.383	5100.786 5100.786	4064.367 4064.367	278930.02 278930.02	1289124.06 913517.63	189016.82 680674.40
17	TANGENT	END-I END-J	22648.524 22648.524	2459.083 2459.083	5392.521 5392.521	278926.92 278926.92	913517.63 488101.99	680675.55 719398.32
18	TANGENT	END-I END-J	19944.158 19944.158	8315.122 8315.122	21622.269 21622.269	279098.59 279098.59	488101.99 516480.95	719331.78 356216.75
19	BEND	END-I CENTER END-J	18467.607 25841.800 26106.178	20109.805 8805.584 8030.945	9890.458 9890.458 9890.458	279025.59 138891.79 95349.78	356273.93 222948.44 63243.53	516480.95 845998.73 863839.84

20	TANGENT	END-I END-J	23961.479 23961.479	10971.887 10971.887	7791.680 7791.680	95349.88 95349.88	863839.84 654864.06	63243.51 413788.92
21	TANGENT	END-I END-J	19466.154 19466.154	12698.930 12698.930	7939.761 7939.761	73795.85 73795.85	645483.64 509025.33	417756.16 803363.22
22	TANGENT	END-I END-J	16383.814 16383.814	4341.574 4341.574	5253.395 5253.395	73795.85 73795.85	509025.33 293515.92	803363.22 558461.70
23	TANGENT	END-I END-J	13771.865 13771.865	4166.887 4166.887	5036.639 5036.639	73795.85 73795.85	293515.92 253777.81	558461.70 412110.19
24	TANGENT	END-I END-J	10473.359 10473.359	4730.202 4730.202	5140.868 5140.868	76620.93 76620.93	349912.01 494187.31	357621.83 140583.78
25	TANGENT	END-I END-J	8231.992 8231.992	3847.676 3847.676	5476.089 5476.089	76620.93 76620.93	494187.31 517213.38	140583.78 143919.67
26	TANGENT	END-I END-J	7251.349 7251.349	2471.645 2471.645	2530.181 2530.181	76620.93 76620.93	517213.38 471831.16	143919.67 122506.33
27	TANGENT	END-I END-J	1693.802 1693.802	1144.865 1144.865	768.323 768.323	.00 .00	22802.40 4656.06	33568.85 6525.29
28	TANGENT	END-I END-J	508.119 508.119	368.263 368.263	262.837 262.837	.00 .00	4656.06 .00	6525.29 .00
29	TANGENT	END-I END-J	2562.913 2562.913	1957.787 1957.787	7982.300 7982.300	462166.14 462166.14	460053.06 300527.28	81269.46 72380.94
30	TANGENT	END-I END-J	2513.087 2513.087	1868.336 1868.336	7960.498 7960.498	462166.14 462166.14	300527.28 214979.01	72380.94 75915.23
31	BEND	END-I CENTER END-J	2472.736 2608.409 2498.210	1786.551 1588.772 1747.300	7923.252 7923.252 7923.252	462148.45 364386.97 236315.54	215016.25 310475.52 367153.50	75915.23 78484.53 77543.00
32	TANGENT	END-I END-J	2366.910 2366.910	1590.034 1590.034	7691.490 7691.490	236484.02 236484.02	367044.99 95213.30	77543.00 88780.69
33	TANGENT	END-I END-J	2180.059 2180.059	973.375 973.375	6088.952 6088.952	236484.02 236484.02	95213.30 266147.32	88780.69 116066.18
34	BEND	END-I CENTER END-J	2076.132 2225.344 2744.457	4349.178 4254.213 3939.405	475.209 475.209 475.209	236484.02 243113.23 235738.44	116066.18 96522.11 110001.77	266147.32 285183.22 302730.51
35	TANGENT	END-I END-J	1796.347 1796.347	576.364 576.364	2162.099 2162.099	235752.31 235752.31	302730.51 386992.07	109971.56 86808.87
36	TANGENT	END-I END-J	1738.553 1738.553	1345.634 1345.634	3664.569 3664.569	235751.67 235751.67	386992.07 170985.46	86810.29 83924.27
37	BEND	END-I CENTER END-J	2886.128 3174.610 2025.191	2026.278 1586.948 2886.817	7509.492 7509.492 7509.492	235752.35 92985.16 47905.16	170985.46 187247.35 95684.78	83922.52 88433.03 65819.04
38	TANGENT	END-I END-J	2895.808 2895.808	10315.093 10315.093	2536.530 2536.530	47872.23 47872.23	46701.40 80623.57	106308.72 339876.04
39	BEND	END-I CENTER END-J	3615.060 1491.810 2801.367	10394.359 10840.528 10558.110	4171.126 4171.126 4171.126	47872.23 64271.35 89996.74	120836.72 132519.18 136585.29	327727.91 380218.30 433037.29
40	BEND	END-I	2647.358	10751.711	4294.644	89922.28	136697.85	433017.14

41	BEND	CENTER END-J	5155.423 7444.888	9803.494 8219.742	4294.644 4294.644	120265.59 149937.55	133237.16 122163.61	483651.43 527834.20
		END-I CENTER END-J	7363.980 9231.577 10491.233	8402.205 6403.208 4055.644	4386.625 4386.625 4386.625	149770.08 175803.45 196229.52	122176.45 105167.46 84228.87	527878.76 563549.90 587463.48
42	TANGENT	END-I END-J	10493.220 10493.220	4426.910 4426.910	4577.525 4577.525	196220.14 196220.14	84206.31 267256.17	587469.98 753128.94
43	TANGENT	END-I END-J	10494.460 10494.460	4466.354 4466.354	4619.865 4619.865	196208.38 196208.38	267256.17 350488.79	753131.84 828051.91
44	TANGENT	END-I END-J	10494.150 10494.150	4466.938 4466.938	4625.808 4625.808	196269.74 196269.74	350488.79 378408.57	828037.29 853181.60
45	TANGENT	END-I END-J	.000 .000	.000 .000	1.153 1.153	.00 .00	8.28 .00	.00 .00
46	TANGENT	END-I END-J	764.248 764.248	1362.962 1362.962	3400.963 3400.963	135024.22 135024.22	212178.98 163002.80	60454.19 49212.45
47	TANGENT	END-I END-J	759.704 759.704	1206.895 1206.895	3382.700 3382.700	135024.22 135024.22	163002.80 139729.46	49212.45 48199.88
48	BEND	END-I CENTER END-J	756.726 1013.526 1174.905	1067.243 833.611 588.021	3359.405 3359.405 3359.405	135015.80 102874.59 91058.03	139737.51 150750.23 140997.97	48199.88 48513.19 47668.26
49	TANGENT	END-I END-J	949.381 949.381	499.153 499.153	3204.418 3204.418	91055.53 91055.53	140999.55 77293.04	47668.26 36688.12
50	TANGENT	END-I END-J	646.530 646.530	572.411 572.411	2112.138 2112.138	91055.53 91055.53	77293.04 105341.63	36688.12 20586.40
51	BEND	END-I CENTER END-J	488.148 306.351 755.551	755.802 381.519 488.461	1907.472 1907.472 1907.472	91055.53 57995.51 97207.39	105341.63 113851.20 60312.91	20586.40 17205.80 14188.31
52	TANGENT	END-I END-J	946.823 946.823	3358.414 3358.414	483.831 483.831	97185.99 97185.99	14188.31 12447.69	60347.46 82853.37
53	BEND	END-I CENTER END-J	1096.884 1074.289 991.525	496.147 515.100 663.575	4002.808 4002.808 4002.808	97185.99 108571.18 120197.61	82853.37 88121.91 90821.14	12447.69 13590.94 14259.71
54	BEND	END-I CENTER END-J	1030.027 896.247 737.971	701.267 880.752 1025.716	4195.955 4195.955 4195.955	120188.48 131812.75 142837.03	90833.06 90879.35 87557.09	14259.71 14591.59 15091.17
55	BEND	END-I CENTER END-J	751.690 604.166 498.814	1070.517 1165.311 1200.347	4343.424 4343.424 4343.424	142819.65 152413.83 159663.27	87585.04 81455.95 73361.93	15091.17 16951.34 20572.16
56	TANGENT	END-I END-J	499.086 499.086	1299.545 1299.545	4647.059 4647.059	159656.84 159656.84	73376.08 218307.08	20572.16 69690.28
57	TANGENT	END-I END-J	499.172 499.172	1313.378 1313.378	4722.810 4722.810	159656.84 159656.84	218307.08 300648.23	69690.28 93079.68
58	TANGENT	END-I END-J	499.172 499.172	1313.700 1313.700	4732.066 4732.066	159656.84 159656.84	300648.23 328618.05	93079.68 100931.69
59	TANGENT	END-I END-J	.000 .000	.000 .000	1.530 1.530	.00 .00	12.16 .00	.00 .00

60	TANGENT	END-I END-J	1837.819 1837.819	1453.382 1453.382	6241.940 6241.940	329928.24 329928.24	327529.05 205070.18	76620.93 59658.06
61	TANGENT	END-I END-J	1854.043 1854.043	1390.965 1390.965	6193.741 6193.741	329928.24 329928.24	205070.18 139077.92	59658.06 53719.31
62	BEND	END-I CENTER END-J	1870.551 1966.696 1874.732	1333.925 1244.279 1348.452	6131.327 6131.327 6131.327	329917.78 270148.91 188449.38	139102.63 203030.01 245334.56	53719.31 51601.27 46921.11
63	TANGENT	END-I END-J	1860.077 1860.077	1266.703 1266.703	5863.718 5863.718	188558.19 188558.19	245251.06 103949.57	46921.11 43771.74
64	TANGENT	END-I END-J	1870.136 1870.136	848.841 848.841	4500.269 4500.269	188558.19 188558.19	103949.57 244031.79	43771.74 68168.02
65	BEND	END-I CENTER END-J	1891.550 2202.622 2576.405	3154.372 2948.629 2624.813	588.812 588.812 588.812	188558.19 182699.18 166617.87	68168.02 81890.68 111560.66	244031.79 256398.73 267146.95
66	TANGENT	END-I END-J	1932.632 1932.632	886.020 886.020	1621.629 1621.629	166638.67 166638.67	267146.95 291728.50	111529.74 81597.15
67	TANGENT	END-I END-J	1566.019 1566.019	1158.821 1158.821	3178.594 3178.594	166638.07 166638.07	291728.50 114542.61	81598.44 69909.94
68	BEND	END-I CENTER END-J	2128.777 1924.414 1176.023	1176.378 1463.047 2129.030	5681.036 5681.036 5681.036	166638.21 74729.22 40282.70	114542.61 124885.51 63284.17	69909.32 67079.43 52864.26
69	TANGENT	END-I END-J	1737.101 1737.101	7465.225 7465.225	2498.640 2498.640	40271.26 40271.26	55565.46 59991.74	59870.93 267029.50
70	BEND	END-I CENTER END-J	2300.799 1691.720 2910.683	7731.568 7847.591 7481.699	2971.645 2971.645 2971.645	40271.26 45030.87 61982.83	98921.15 109846.53 115539.46	254941.33 293397.33 331037.85
71	BEND	END-I CENTER END-J	2845.093 4500.408 5981.633	7627.142 6814.038 5578.400	3065.531 3065.531 3065.531	61931.32 84852.32 108996.79	115620.92 115536.11 109428.31	331019.37 366053.93 395525.55
72	BEND	END-I CENTER END-J	5930.233 7088.182 7800.701	5725.514 4209.437 2664.893	3137.827 3137.827 3137.827	108871.28 131332.35 150153.38	109436.64 98746.32 84655.90	395558.12 418118.10 431668.16
73	TANGENT	END-I END-J	7802.598 7802.598	2982.444 2982.444	3290.242 3290.242	150140.78 150140.78	84647.97 219141.19	431674.21 527567.49
74	TANGENT	END-I END-J	7803.494 7803.494	3018.865 3018.865	3323.264 3323.264	150132.96 150132.96	219141.19 279292.39	527569.65 573575.67
75	TANGENT	END-I END-J	7803.377 7803.377	3019.451 3019.451	3327.766 3327.766	150172.70 150172.70	279292.39 299448.26	573565.29 589260.88
76	TANGENT	END-I END-J	.000 .000	.000 .000	.990 .990	.00 .00	7.25 .00	.00 .00

***** COMBINED MODAL RESPONSES FOR SUPPORT GROUP 1 *****
 MODAL COMBINATION METHOD 2-GROUPING

S U P P O R T F O R C E S A N D M O M E N T S

NODE NUMBER	COMPONENT DIRECTION	FORCE/MOMENT (LOCAL)
1	FX	13581.
1	FY	6988.
1	FZ	14617.
1	MX	68558.
1	MY	137373.
1	MZ	140259.
9	FX	41250.
9	FY	16862.
56	FX	2967.
56	FY	4467.
56	FZ	11086.
56	MX	825907.
56	MY	378415.
56	MZ	294195.
74	FX	499.
74	FY	1314.
74	FZ	4731.
74	MX	159657.
74	MY	328628.
74	MZ	100932.
95	FX	2923.
95	FY	3019.
95	FZ	7969.
95	MX	572753.
95	MY	299453.
95	MZ	206593.
19	FL	20930.
25	FL-1	9747.
25	FL-2	16408.
27	FL	8058.
32	FL	6948.

SUPPORT GROUP 2

DIRECTION FACTORS

X = .0000 Y = .0000 Z = 1.0000

INDICATOR FOR DISPLACEMENT OR ACCELERATION SPECTRUM = 2

EQ.0 DISPLACEMENT

EQ.1 ACCELERATION IN IN./SEC.**2

EQ.2 ACCELERATION IN G**S

1 SPECTRA ARE ENTERED FOR CASE 2. KIND= 2

CLUSTER FACTOR, CF = .10000

MODAL PARTICIPATION FACTORS

MODE	FREQ (CPS)	X-DIRECTION	Y-DIRECTION	Z-DIRECTION
1	8.165	-4.5163E+00	-2.8030E+00	-3.2533E+00
2	10.872	3.8953E+00	-6.8532E+00	4.2226E-01
3	11.556	2.1463E+00	-2.0216E+00	3.9306E-01
4	11.845	-1.8769E+00	-2.0024E+00	5.9547E-01
5	13.026	4.7593E+00	1.9914E+00	-4.9254E-01
6	15.284	3.1004E+00	1.7227E+00	-1.5220E+00
7	15.813	2.9125E-01	1.7136E+00	-2.4284E-01
8	17.999	3.7872E+00	-2.2815E+00	2.5204E-01
9	19.895	5.4748E+00	1.5697E+00	-2.6586E+00
10	21.602	4.2978E-01	-1.0275E+00	7.0440E-01
11	21.905	-1.9446E-01	7.9729E-01	-3.7546E-01
12	23.021	-2.2090E+00	-2.2190E+00	6.1082E-01
13	23.699	1.1369E+00	2.8703E+00	9.8985E-01
14	25.757	2.9617E-01	-8.3438E-01	1.4973E+00
15	27.331	-2.6517E+00	-2.5694E+00	-9.6979E-02
16	30.464	-2.9727E+00	3.1214E+00	-6.5729E-01
17	32.632	-3.2268E-01	-1.0991E-01	-6.8017E-01
18	34.397	-1.3998E+00	2.2826E-01	4.6108E-01

SPECTRUM TABLE (SSE Z-DIRECTION - GROUP 2

NUMBER OF POINTS = 16
SCALE FACTOR = 1.00000E+00

INPUT POINT	PERIOD	SPECTRUM VALUE
1	1.000E-05	1.7400E+00
2	2.9050E-02	1.7400E+00
3	3.0420E-02	2.8200E+00
4	3.1870E-02	3.4800E+00
5	4.8370E-02	3.4800E+00
6	5.0660E-02	3.4800E+00
7	5.3070E-02	3.8300E+00
8	5.5590E-02	3.8300E+00
9	5.8220E-02	3.8300E+00
10	6.6910E-02	3.8300E+00
11	7.0090E-02	3.8300E+00
12	7.3410E-02	4.8600E+00
13	7.6900E-02	5.3200E+00
14	8.0550E-02	5.5000E+00
15	1.0155E-01	5.5000E+00
16	1.4300E-01	5.5000E+00

CLUSTERING. +1 MEANS MODE I CLOSE TO I+1. -1, NOT.
 -1. 1. 1. -1. -1. 1. -1. -1. 1. -1. 1. -1. 1. -1. 1. -1. 0.

***** COMBINED MODAL RESPONSES FOR SUPPORT GROUP 2 *****
MODAL COMBINATION METHOD 2-GROUPING

N O D E N O D E N U M B E R	D I S P L A C E M E N T S / R O T A T I O N S				A C C E L E R A T I O N S I N G ' S				
	X- T R A N S L A T I O N	Y- T R A N S L A T I O N	Z- T R A N S L A T I O N	X- R O T A T I O N	Y- R O T A T I O N	Z- R O T A T I O N	X- D I R E C T I O N	Y- D I R E C T I O N	Z- D I R E C T I O N
1	17314E-07	73637E-08	19941E-07	71981E-07	17609E-06	22803E-06	.000	.000	.000
2	14868E-03	57084E-04	25300E-03	23099E-04	54867E-04	22862E-04	.001	.001	.003
3	11139E-03	54902E-04	25681E-03	23968E-04	56921E-04	23361E-04	.001	.001	.003
301	23249E-01	98115E-02	87279E-03	15536E-03	36997E-03	19488E-03	.206	.152	.011
4	42307E-01	17755E-01	14881E-02	21296E-04	47809E-04	36641E-03	.369	.270	.019
5	41035E-01	17200E-01	16049E-02	88445E-04	20809E-03	39899E-03	.356	.260	.020
6	32311E-01	13508E-01	17318E-02	19003E-03	45164E-03	43901E-03	.279	.202	.022
7	37505E-01	13512E-01	21550E-02	19018E-03	45164E-03	44046E-03	.389	.203	.054
8	15723E-01	65462E-02	18582E-02	31389E-03	75303E-03	47202E-03	.134	.096	.023
9	94165E-06	31629E-06	20036E-02	45655E-03	11035E-02	50566E-03	.000	.000	.025
12	24275E-01	99053E-02	21515E-02	59276E-03	14290E-02	53994E-03	.199	.141	.027
13	69384E-01	28642E-01	22778E-02	68555E-03	16226E-02	57309E-03	.564	.401	.028
14	58959E-01	28663E-01	19220E-01	69010E-03	16226E-02	57254E-03	.620	.402	.296
15	11784E+00	49177E-01	24068E-02	72805E-03	16752E-02	60863E-03	.951	.678	.030
16	15654E+00	66254E-01	25974E-02	74208E-03	15888E-02	65691E-03	1.259	.904	.031
18	19769E+00	10302E+00	13959E-01	60544E-03	15866E-03	72959E-03	1.599	1.121	.159
1801	17486E+00	16365E+00	35810E-01	27445E-03	10521E-02	63240E-03	1.488	1.321	.468
19	10672E+00	17233E+00	16825E+00	64478E-03	17788E-02	42289E-03	1.135	1.609	1.188
21	71127E-01	15430E+00	24152E+00	87745E-03	17624E-02	42621E-03	1.077	1.677	1.695
23	34615E-01	10938E+00	27583E+00	11105E-02	65402E-03	46183E-03	1.017	1.378	1.937
24	23574E-01	66306E-01	27637E+00	10214E-02	38349E-03	45438E-03	.860	.953	1.942
25	20895E-01	36745E-01	27672E+00	81784E-03	26383E-03	42222E-03	.796	.730	1.945
29	22896E-01	12054E-01	27729E+00	38612E-03	11373E-03	37341E-03	.891	.722	1.950
31	21765E-01	15058E-01	27759E+00	21075E-03	10941E-03	35429E-03	.865	.730	1.953
32	11740E-01	20257E-01	27804E+00	20408E-03	29219E-03	37075E-03	.467	.640	1.957
34	18859E-01	22272E-01	27813E+00	22748E-03	33122E-03	38141E-03	.430	.758	1.957
35	26253E-01	33666E-01	27825E+00	25369E-03	38201E-03	40257E-03	.824	1.087	1.958
36	32516E-01	37631E-01	27826E+00	25426E-03	38048E-03	40257E-03	.830	1.607	1.958
37	24750E-01	69090E-01	28709E+00	96891E-03	41032E-03	59104E-03	.875	1.875	2.015
38	26850E-01	71008E-01	29363E+00	91534E-03	51197E-03	65056E-03	.832	.835	2.062
40	28900E-01	74963E-01	29756E+00	81116E-03	80032E-03	83354E-03	.845	.798	2.096
4001	28981E-01	94923E-01	29982E+00	67261E-03	95395E-03	81737E-03	.845	1.308	2.248
41	29038E-01	11618E+00	29811E+00	88332E-03	93031E-03	57373E-03	.847	2.180	2.478
43	29246E-01	11713E+00	29537E+00	99919E-03	93072E-03	37265E-03	.836	2.252	2.493
4301	49196E-01	85153E-01	25867E+00	14776E-02	12271E-02	48640E-03	.960	1.702	2.326
44	85643E-01	38019E-01	20345E+00	19362E-02	13826E-02	73547E-03	1.326	1.059	2.208
46	83240E-01	44414E-01	14612E+00	22413E-02	13443E-02	85862E-03	1.300	1.023	1.731
47	50461E-01	44357E-01	52423E-01	20947E-02	12148E-02	80459E-03	.815	1.019	.564
49	32758E-01	31816E-01	34005E-01	17379E-02	11411E-02	67237E-03	.691	.961	.424
51	24704E-01	22981E-01	14439E-01	92334E-03	75138E-03	54864E-03	.552	.809	.323
53	40075E-02	20529E-02	23583E-02	20354E-03	28786E-03	48153E-03	.429	.623	.246
54	58122E-03	42758E-04	33843E-03	91616E-05	11191E-03	51215E-05	.073	.066	.042
55	58122E-03	32297E-08	42728E-08	29566E-06	10323E-03	15351E-06	.011	.002	.006
56	68280E-03	22564E-05	39425E-03	29566E-06	10323E-03	15351E-06	.012	.000	.007
57	21971E-08	15369E-01	27839E+00	12804E-03	29698E-03	31553E-03	.926	.000	1.965
58	21764E-01	16429E-01	27668E+00	12738E-03	43327E-03	29007E-03	.985	.806	1.962
59	22455E-01	18146E-01	26867E+00	29818E-03	93871E-03	17389E-03	1.028	.929	1.949
61	23034E-01	20574E-01	22771E+00	66968E-03	12671E-02	11989E-03	1.032	1.183	2.231
62	23078E-01	18634E-01	17857E+00	10504E-02	13717E-02	13286E-03	1.033	1.194	2.799
64	18960E-01	16232E-01	13188E+00	14257E-02	13553E-02	28828E-03	.870	1.133	2.467
65	60364E-02	16161E-01	70338E-01	13739E-02	12246E-02	31812E-03	.332	1.127	.932
67	30396E-02	15473E-01	55381E-01	11379E-02	11565E-02	32003E-03	.182	1.094	.932
69	81118E-03	13458E-01	40859E-01	90126E-03	99213E-03	31122E-03	.052	.976	.701
71	69780E-04	10636E-01	30293E-01	72854E-03	78133E-03	28060E-03	.004	.787	.542
72	1751E-04	11960E-02	50190E-02	14278E-03	30803E-03	96204E-04	.001	.092	.103
73	11101E-05	28871E-04	72677E-03	59862E-05	12072E-03	49235E-05	.000	.002	.015

74	10396E-08	39414E-08	15424E-06	11137E-03	17085E-06	000	000
75	10396E-08	85071E-03	15424E-06	11138E-03	17086E-06	000	000
76	22663E-01	28480E+00	22838E-03	60415E-03	50823E-03	1.074	2.013
77	25663E-01	28892E+00	25429E-03	71304E-03	55510E-03	1.072	2.063
79	27924E-01	29524E+00	33516E-03	91429E-03	70516E-03	1.055	2.154
7901	28029E-01	31711E+00	70087E-03	93078E-03	70611E-03	1.307	2.551
80	28116E-01	32906E+00	11150E-02	77357E-03	53285E-03	1.873	2.846
82	28139E-01	32808E+00	12378E-02	80489E-03	35775E-03	1.911	2.838
8201	37847E-01	29491E+00	17719E-02	12170E-02	38642E-03	1.484	2.433
83	72045E-01	23737E+00	22809E-02	14663E-02	55826E-03	1.163	2.437
85	75103E-01	17098E+00	36628E-02	12969E-02	67058E-03	1.197	1.904
86	50764E-01	60297E-01	24806E-02	14351E-02	67058E-03	1.194	1.546
88	44046E-01	38240E-01	20655E-02	12226E-02	58027E-03	1.118	392
90	35080E-01	22883E-01	15894E-02	10475E-02	47991E-03	928	329
92	26709E-01	15617E-01	10958E-02	81425E-03	41547E-03	705	266
93	43210E-02	25449E-02	23958E-03	31083E-03	97870E-04	072	043
94	62665E-03	35501E-03	10712E-04	12071E-03	45094E-05	002	006
95	22848E-08	47289E-08	34492E-06	11134E-03	13988E-06	000	000
96	73642E-03	42521E-03	34493E-06	11134E-03	13988E-06	000	007

***** COMBINED MODAL RESPONSES FOR SUPPORT GROUP 2 *****
 MODAL COMBINATION METHOD 2-GROUPING

P I P E F O R C E S A N D M O M E N T S

ELEMENT NUMBER	ELEMENT TYPE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
1	TANGENT	END-I END-J	19940.889 19940.889	7363.733 7363.733	17313.568 17313.568	228031.82 228031.82	176092.45 1256589.61	71981.11 531377.43
2	TANGENT	END-I END-J	19936.386 19936.386	7364.873 7364.873	17315.750 17315.750	228031.82 228031.82	1256589.61 1181596.39	531377.43 499482.05
3	TANGENT	END-I END-J	19932.376 19932.376	7363.464 7363.464	17314.002 17314.002	228031.82 228031.82	1181596.39 99815.13	499482.05 45774.59
4	TANGENT	END-I END-J	19911.437 19911.437	7024.112 7024.112	16823.465 16823.465	228031.82 228031.82	99815.13 1344351.18	45774.59 564983.31
5	TANGENT	END-I END-J	19890.287 19890.287	6672.253 6672.253	16299.770 16299.770	228031.82 228031.82	1344351.18 1573379.96	564983.31 658644.28
6	TANGENT	END-I END-J	19886.189 19886.189	6613.081 6613.081	16210.446 16210.446	228031.82 228031.82	1573379.96 2035327.41	658644.28 846932.49
7	TANGENT	END-I END-J	1683.376 1683.376	449.671 449.671	3229.749 3229.749	.00 .00	49588.59 .00	6904.17 .00
8	TANGENT	END-I END-J	19828.607 19828.607	5412.005 5412.005	14094.388 14094.388	190278.66 190278.66	2035327.41 2431673.93	843063.64 993698.74
9	TANGENT	END-I END-J	19823.035 19823.035	5389.819 5389.819	14056.416 14056.416	190278.66 190278.66	2431673.93 2675872.29	993698.74 1086528.00
10	TANGENT	END-I END-J	19811.819 19811.819	12440.401 12440.401	38766.534 38766.534	190278.66 190278.66	2675872.29 1984489.28	1086528.00 864815.09
11	TANGENT	END-I END-J	19805.169 19805.169	12397.838 12397.838	38701.233 38701.233	190278.66 190278.66	1984489.28 868645.65	864815.09 513499.74
12	TANGENT	END-I END-J	3730.423 3730.423	2749.192 2749.192	5763.517 5763.517	.00 .00	173360.67 .00	82692.68 .00
13	TANGENT	END-I END-J	20429.118 20429.118	9513.881 9513.881	34724.276 34724.276	259953.67 259953.67	888645.65 127183.48	458619.12 189829.34
14	TANGENT	END-I END-J	20420.853 20420.853	9302.126 9302.126	34340.479 34340.479	259953.67 259953.67	127183.48 880327.58	189829.34 46574.23
15	BEND	END-I CENTER END-J	20394.907 34361.312 38552.079	32866.674 17747.275 3146.857	8528.145 8528.145 8528.145	259953.67 280274.64 331498.67	46574.23 127057.07 185702.35	880327.58 1495995.68 1681326.01
16	TANGENT	END-I END-J	35244.803 35244.803	6468.965 6468.965	4912.894 4912.894	331493.49 331493.49	1681326.01 1214136.25	185711.59 783337.61
17	TANGENT	END-I END-J	30884.027 30884.027	2757.911 2757.911	6666.510 6666.510	331489.93 331489.93	1214136.25 671776.12	783339.13 965529.22
18	TANGENT	END-I END-J	27754.158 27754.158	11273.865 11273.865	30525.572 30525.572	331725.04 331725.04	671776.12 718314.06	965448.41 477077.27
19	BEND	END-I CENTER END-J	26043.796 36725.173 36971.848	28098.427 10919.643 10057.340	13161.124 13161.124 13161.124	331625.39 143152.43 94148.55	477146.57 280577.85 75280.52	718314.06 1184751.68 1194609.86

20	TANGENT	END-I END-J	33822.922 33822.922	14663.628 14663.628	10323.418 10323.418	94148.48 94148.48	1194609.86 820513.92	75280.81 583006.87
21	TANGENT	END-I END-J	27434.078 27434.078	16460.285 16460.285	12097.755 12097.755	166282.86 166282.86	699887.56 428864.31	582171.23 1086727.72
22	TANGENT	END-I END-J	23267.690 23267.690	6102.626 6102.626	4233.676 4233.676	166282.86 166282.86	428864.31 355027.46	1086727.72 764682.19
23	TANGENT	END-I END-J	19699.249 19699.249	5686.584 5686.584	3085.043 3085.043	166282.86 166282.86	355027.46 356762.98	764682.19 573017.79
24	TANGENT	END-I END-J	14513.838 14513.838	6198.213 6198.213	2913.103 2913.103	154929.42 154929.42	443659.51 313556.62	495769.96 172966.84
25	TANGENT	END-I END-J	10698.977 10698.977	3266.485 3266.485	5987.828 5987.828	154929.42 154929.42	313556.62 248112.41	172966.84 165758.76
26	TANGENT	END-I END-J	8615.431 8615.431	4121.289 4121.289	4221.633 4221.633	154929.42 154929.42	248112.41 207145.96	165758.76 96931.09
27	TANGENT	END-I END-J	2189.273 2189.273	1617.006 1617.006	981.749 981.749	.00 .00	29171.14 6005.69	47739.60 9549.15
28	TANGENT	END-I END-J	656.743 656.743	538.951 538.951	339.035 339.035	.00 .00	6005.69 .00	9549.15 .00
29	TANGENT	END-I END-J	2435.205 2435.205	2919.099 2919.099	4268.877 4268.877	159771.28 159771.28	157548.97 87684.57	153629.93 103971.78
30	TANGENT	END-I END-J	2363.753 2363.753	2816.021 2816.021	3925.363 3925.363	159771.28 159771.28	87684.57 70004.07	103971.78 81534.67
31	BEND	END-I CENTER END-J	2307.487 2529.637 2735.935	2717.879 2504.177 2275.616	3645.373 3645.373 3645.373	159769.03 145056.91 122500.30	70007.76 93827.35 98896.33	81534.67 69586.06 58051.70
32	TANGENT	END-I END-J	2438.320 2438.320	2171.840 2171.840	3025.479 3025.479	122530.60 122530.60	98858.64 87010.69	58051.70 67735.81
33	TANGENT	END-I END-J	2000.136 2000.136	1430.498 1430.498	1980.805 1980.805	122530.60 122530.60	87010.69 145881.24	67735.81 122744.99
34	BEND	END-I CENTER END-J	1743.332 1856.476 1903.699	1304.670 1111.449 1025.742	693.877 693.877 693.877	122530.60 104171.57 88151.64	122744.99 139862.64 152472.05	145881.24 149704.68 153225.56
35	TANGENT	END-I END-J	1573.950 1573.950	498.541 498.541	839.409 839.409	88164.39 88164.39	153225.56 136625.65	152464.60 129571.43
36	TANGENT	END-I END-J	1796.988 1796.988	1828.728 1828.728	1872.699 1872.699	88163.78 88163.78	136625.65 46835.16	129571.97 79743.95
37	BEND	END-I CENTER END-J	2345.289 2389.994 2199.306	2199.462 2171.400 2345.415	2683.860 2683.860 2683.860	88164.45 61082.25 46014.97	46835.16 58828.73 49866.90	79743.20 78507.08 63209.02
38	TANGENT	END-I END-J	2540.147 2540.147	3999.101 3999.101	1687.742 1687.742	46016.86 46016.86	37045.28 49595.87	68782.06 145004.46
39	BEND	END-I CENTER END-J	2821.653 2720.090 2777.306	3371.803 3364.444 3293.345	3075.737 3075.737 3076.737	46016.86 34487.03 42362.84	98026.78 115559.66 126137.72	117779.72 132933.47 146516.34
40	BEND	END-I	2818.810	3360.646	3152.426	42331.11	126173.39	146495.17

41	BEND	CENTER END-J	2998.725 3204.812	3246.119 3094.592	3152.426 3152.426	67685.98 97404.99	129024.25 123648.71	158039.68 166861.49
		END-I CENTER END-J	3201.648 3339.886 3393.868	3179.720 3114.731 3015.829	3211.859 3211.859 3211.859	97335.07 125840.90 150577.55	123666.66 110713.51 91408.65	166888.39 173092.39 176244.64
42	TANGENT	END-I END-J	3394.730 3394.730	3202.984 3202.984	3333.782 3333.782	150548.99 150548.99	91431.47 227618.44	176256.98 238045.79
43	TANGENT	END-I END-J	3395.144 3395.144	3229.203 3229.203	3360.620 3360.620	150546.84 150546.84	227618.44 288320.54	238047.13 280497.68
44	TANGENT	END-I END-J	3394.896 3394.896	3229.738 3229.738	3363.982 3363.982	150556.87 150556.87	288320.54 308658.02	280491.93 295746.11
45	TANGENT	END-I END-J	.000 .000	.000 .000	.632 .632	.00 .00	5.51 .00	.00 .00
46	TANGENT	END-I END-J	1034.301 1034.301	2089.693 2089.693	2073.771 2073.771	78436.35 78436.35	186246.64 175829.83	83432.68 54390.40
47	TANGENT	END-I END-J	1007.742 1007.742	1885.156 1885.156	1976.367 1976.367	78436.35 78436.35	175829.83 169775.47	54390.40 48003.64
48	BEND	END-I CENTER END-J	992.528 1461.878 1781.097	1704.268 1338.158 888.854	1945.021 1945.021 1945.021	78426.72 61923.00 97281.23	169779.90 170898.84 146683.47	48003.64 47471.82 46862.56
49	TANGENT	END-I END-J	1450.328 1450.328	714.746 714.746	1993.690 1993.690	97226.72 97226.72	146719.63 97411.50	46862.56 42138.04
50	TANGENT	END-I END-J	1061.753 1061.753	714.853 714.853	2069.939 2069.939	97226.72 97226.72	97411.50 61133.06	42138.04 35406.13
51	BEND	END-I CENTER END-J	947.083 1388.960 1101.121	1101.485 414.762 947.556	2506.814 2506.814 2506.814	97226.72 71627.98 63020.16	61133.06 72983.83 51962.29	35406.13 31945.11 27545.94
52	TANGENT	END-I END-J	1571.606 1571.606	3246.913 3246.913	1026.267 1026.267	63021.50 63021.50	27545.94 30897.87	51960.72 86250.73
53	BEND	END-I CENTER END-J	1932.963 1993.948 1946.744	1038.030 907.548 1047.882	3574.946 3574.946 3574.946	63021.50 62540.84 70589.20	86250.73 103903.60 115895.14	30897.87 33760.49 34816.87
54	BEND	END-I CENTER END-J	2047.238 1872.965 1613.365	1123.696 1389.716 1662.356	3674.200 3674.200 3674.200	70579.21 87477.65 109568.90	115901.23 121299.28 119225.08	34816.87 34071.70 32451.08
55	BEND	END-I CENTER END-J	1658.680 1327.525 1037.723	1769.397 2033.006 2188.948	3749.262 3749.262 3749.262	109530.26 132840.62 154265.34	119260.51 110053.41 94340.94	32451.08 31029.03 31462.15
56	TANGENT	END-I END-J	1039.230 1039.230	2446.522 2446.522	3901.488 3901.488	154243.00 154243.00	94377.35 240063.90	31462.15 111816.06
57	TANGENT	END-I END-J	1039.571 1039.571	2485.380 2485.380	3937.683 3937.683	154243.00 154243.00	240063.90 309559.48	111816.06 155973.49
58	TANGENT	END-I END-J	1039.571 1039.571	2486.145 2486.145	3942.119 3942.119	154243.00 154243.00	309559.48 333002.40	155973.49 170849.40
59	TANGENT	END-I END-J	.000 .000	.000 .000	.975 .975	.00 .00	6.72 .00	.00 .00

60	TANGENT	END-I END-J	2093.561 2093.561	2981.060 2981.060	4575.222 4575.222	134083.01 134083.01	175453.39 95497.75	154929.42 104851.88
61	TANGENT	END-I END-J	2065.585 2065.585	2845.839 2845.839	4222.289 4222.289	134083.01 134083.01	95497.75 67335.57	104851.88 82894.70
62	BEND	END-I CENTER END-J	2045.598 2418.273 2732.955	2724.424 2435.965 2065.788	3926.238 3926.238 3926.238	134081.07 122751.46 106644.21	67339.20 75645.77 85894.89	82894.70 72431.10 62955.94
63	TANGENT	END-I END-J	2531.244 2531.244	1881.092 1881.092	3231.418 3231.418	106665.51 106665.51	85867.79 122907.21	62955.94 60390.58
64	TANGENT	END-I END-J	2246.086 2246.086	1268.387 1268.387	1940.295 1940.295	106665.51 106665.51	122907.21 187670.81	60390.58 99920.38
65	BEND	END-I CENTER END-J	2086.399 2168.923 2136.088	1174.118 1023.003 1085.424	780.156 780.156 780.156	106665.51 94560.25 83541.34	99920.38 112720.02 123686.56	187670.81 190578.89 192940.61
66	TANGENT	END-I END-J	1898.206 1898.206	757.062 757.062	1163.108 1163.108	83550.47 83550.47	192940.61 155720.66	123680.25 111556.85
67	TANGENT	END-I END-J	2084.716 2084.716	1591.514 1591.514	2165.207 2165.207	83549.94 83549.94	155720.66 45503.62	111557.33 92235.10
68	BEND	END-I CENTER END-J	2613.843 2581.182 1931.868	1932.224 1965.041 2614.087	2968.274 2968.274 2968.274	83550.53 53414.36 39951.99	45503.62 55126.56 39558.58	92234.55 89190.70 66876.68
69	TANGENT	END-I END-J	2249.457 2249.457	4470.997 4470.997	1693.351 1693.351	39950.93 39950.93	49968.07 33168.85	59067.99 160429.11
70	BEND	END-I CENTER END-J	2539.593 2373.663 2486.811	3807.651 3878.886 3808.725	3298.097 3298.097 3298.097	39950.93 28575.34 39055.34	92762.80 111019.87 123139.27	134786.58 152965.50 170372.84
71	BEND	END-I CENTER END-J	2522.635 2816.283 3205.493	3884.221 3684.989 3361.855	3372.620 3372.620 3372.620	39018.44 65115.40 95046.15	123183.03 128208.33 125413.70	170349.84 186305.08 199691.80
72	BEND	END-I CENTER END-J	3197.080 3568.319 3838.316	3452.229 3078.966 2745.948	3430.193 3430.193 3430.193	94964.06 124164.44 150020.25	125428.85 115459.59 99027.25	199721.57 210032.54 216434.32
73	TANGENT	END-I END-J	3839.113 3839.113	2946.214 2946.214	3548.972 3548.972	149991.90 149991.90	99039.28 246234.67	216448.58 284976.08
74	TANGENT	END-I END-J	3839.624 3839.624	2973.665 2973.665	3574.520 3574.520	149988.37 149988.37	246234.67 311172.02	284977.84 325582.58
75	TANGENT	END-I END-J	3839.383 3839.383	2974.127 2974.127	3577.834 3577.834	150005.75 150005.75	311172.02 332899.97	325574.64 339966.31
76	TANGENT	END-I END-J	.000 .000	.000 .000	.728 .728	.00 .00	5.71 .00	.00 .00

***** COMBINED MODAL RESPONSES FOR SUPPORT GROUP 2 *****
 MODAL COMBINATION METHOD 2-GROUPING

S U P P O R T F O R C E S A N D M O M E N T S

NODE NUMBER	COMPONENT DIRECTION	FORCE/MOMENT (LOCAL)
1	FX	17314.
1	FY	7364.
1	FZ	19941.
1	MX	71981.
1	MY	176092.
1	MZ	228032.
9	FX	52733.
9	FY	17712.
56	FX	2197.
56	FY	3230.
56	FZ	4273.
56	MX	295657.
56	MY	308662.
56	MZ	153512.
74	FX	1040.
74	FY	2486.
74	FZ	3941.
74	MX	154243.
74	MY	333007.
74	MZ	170849.
95	FX	2285.
95	FY	2974.
95	FZ	4729.
95	MX	344927.
95	MY	332904.
95	MZ	139882.
19	FL	30448.
25	FL-1	14686.
25	FL-2	22720.
27	FL	8530.
32	FL	7422.

SUPPORT GROUP 3

DIRECTION FACTORS

X = .0000 Y = .0000 Z = 1.0000

INDICATOR FOR DISPLACEMENT OR ACCELERATION SPECTRUM = 2

EQ.0 DISPLACEMENT
EQ.1 ACCELERATION IN IN./SEC.**2
EQ.2 ACCELERATION IN G**S

1 SPECTRA ARE ENTERED FOR CASE 3. KIND= 2
CLUSTER FACTOR, CF = .10000

MODAL PARTICIPATION FACTORS

MODE	FREQ (CPS)	X-DIRECTION	Y-DIRECTION	Z-DIRECTION
1	8.165	2.4565E+00	8.3849E-01	-2.8089E+00
2	10.872	-1.2029E+00	1.7299E+00	5.5497E-01
3	11.556	-6.4777E-01	5.3528E-01	3.2860E-01
4	11.845	6.1486E-01	5.4015E-01	-4.5331E-01
5	13.026	-3.6365E-01	-7.0522E-01	-5.0256E-01
6	15.284	-3.1760E-01	-1.2478E+00	-1.0538E+00
7	15.813	-1.3055E-01	-1.3930E+00	-1.3539E+00
8	17.999	3.3825E-02	-1.8779E-01	-4.2491E-01
9	19.895	-6.0430E-01	3.4650E-01	7.3453E-01
10	21.602	1.2917E-01	-1.4097E-01	-1.6394E-01
11	21.905	-8.9812E-02	5.4608E-02	8.8577E-03
12	23.021	3.2839E-02	-5.3465E-02	-2.5462E-01
13	23.699	8.8614E-02	1.8580E-02	2.1964E-01
14	25.757	2.1042E-01	-9.9642E-02	2.8592E-01
15	27.331	-1.0096E-01	2.1975E-01	5.9104E-01
16	30.464	8.0716E-02	-2.2103E-01	-1.3376E+00
17	32.632	4.3685E-02	1.6982E-01	-5.0343E-01
18	34.397	-1.0579E-01	1.8586E-01	1.2697E+00

SPECTRUM TABLE (SSE Z-DIRECTION - GROUP 3 (GE GROUP 4))

NUMBER OF POINTS = 19
SCALE FACTOR = 1.00000E+00

INPUT POINT	PERIOD	SPECTRUM VALUE
1	1.0000E-05	1.0000E+00
2	2.9050E-02	1.0000E+00
3	3.6620E-02	1.0000E+00
4	3.8360E-02	1.0700E+00
5	4.0180E-02	1.1400E+00
6	4.2090E-02	1.4600E+00
7	4.4090E-02	1.5400E+00
8	5.0000E-02	1.5400E+00
9	5.5590E-02	1.5400E+00
10	5.8220E-02	1.5400E+00
11	6.0990E-02	1.5400E+00
12	6.3880E-02	1.7600E+00
13	6.6910E-02	2.0700E+00
14	7.0090E-02	2.7500E+00
15	7.3410E-02	3.6700E+00
16	7.6900E-02	4.0300E+00
17	8.0550E-02	4.1300E+00

18 1.0155E-01 4.1300E+00
19 1.4300E-01 4.1300E+00

CLUSTERING. +1 MEANS MODE I CLOSE TO I+1. -1, NOT
-1. 1. 1. -1. -1. 1. -1. -1. 1. -1. 1. -1. 0.

***** COMBINED MODAL RESPONSES FOR SUPPORT GROUP 3 *****
MODAL COMBINATION METHOD 2-GROUPING

N O D E N O D E N U M B E R	D I S P L A C E M E N T S / R O T A T I O N S				A C C E L E R A T I O N S I N G ' S				
	X- T R A N S L A T I O N	Y- T R A N S L A T I O N	Z- T R A N S L A T I O N	X- R O T A T I O N	Y- R O T A T I O N	Z- R O T A T I O N	X- D I R E C T I O N	Y- D I R E C T I O N	Z- D I R E C T I O N
1	.11167E-07	.49228E-08	.12831E-07	.48345E-07	.11403E-06	.13638E-06	.000	.000	.000
2	.96630E-04	.38418E-04	.16279E-03	.15463E-04	.35427E-04	.13673E-04	.001	.000	.002
3	.70219E-04	.35811E-04	.16524E-03	.16044E-04	.36754E-04	.13971E-04	.001	.001	.002
301	.15008E-01	.65659E-02	.56160E-03	.10403E-03	.23895E-03	.11655E-03	.108	.092	.006
4	.27327E-01	.11890E-01	.95757E-03	.14147E-04	.30672E-04	.21913E-03	.196	.164	.011
5	.26508E-01	.11520E-01	.10328E-02	.59139E-04	.13424E-03	.23862E-03	.190	.158	.012
6	.20878E-01	.90498E-02	.11143E-02	.12722E-03	.29166E-03	.26255E-03	.150	.124	.013
7	.24025E-01	.90528E-02	.14671E-02	.12731E-03	.29166E-03	.26324E-03	.179	.124	.032
8	.10166E-01	.43878E-02	.11959E-02	.21037E-03	.48682E-03	.28317E-03	.073	.059	.014
9	.61028E-06	.21343E-06	.12896E-02	.30625E-03	.71412E-03	.30416E-03	.000	.000	.015
12	.15716E-01	.66477E-02	.13847E-02	.39780E-03	.92541E-03	.32554E-03	.113	.087	.016
13	.44932E-01	.19223E-01	.14662E-02	.46007E-03	.10512E-02	.34619E-03	.321	.250	.016
14	.38385E-01	.19237E-01	.12963E-01	.46303E-03	.10512E-02	.34529E-03	.362	.251	.183
15	.76326E-01	.33006E-01	.15497E-02	.48849E-03	.10857E-02	.36964E-03	.544	.426	.017
16	.10142E+00	.44464E-01	.16729E-02	.49738E-03	.10303E-02	.40120E-03	.722	.569	.018
18	.12817E+00	.69347E-01	.91483E-02	.39938E-03	.11322E-03	.44473E-03	.918	.753	.087
1801	.11356E+00	.10875E+00	.23501E-01	.14780E-03	.68166E-03	.37507E-03	.836	.867	.253
19	.69119E-01	.11258E+00	.10903E+00	.39953E-03	.11534E-02	.23795E-03	.546	.870	.754
21	.45055E-01	.99680E-01	.15646E+00	.55595E-03	.11423E-02	.24646E-03	.400	.809	1.072
23	.17629E-01	.69821E-01	.17870E+00	.71217E-03	.42972E-03	.27992E-03	.241	.600	1.224
24	.81936E-02	.41961E-01	.17905E+00	.65593E-03	.24870E-03	.28043E-03	.172	.379	1.227
25	.69083E-02	.22497E-01	.17927E+00	.52541E-03	.16308E-03	.27056E-03	.160	.259	1.228
29	.99463E-02	.38948E-02	.17964E+00	.24595E-03	.55280E-04	.25612E-03	.206	.266	1.231
31	.99273E-02	.75192E-02	.17983E+00	.12538E-03	.40351E-04	.25052E-03	.213	.273	1.232
32	.55012E-02	.11524E-01	.18013E+00	.74112E-04	.16068E-03	.27375E-03	.151	.167	1.234
27	.61621E-02	.12503E-01	.18018E+00	.82300E-04	.18523E-03	.28150E-03	.152	.161	1.235
34	.10472E-01	.14687E-01	.18025E+00	.89890E-04	.21517E-03	.29491E-03	.191	.210	1.235
35	.14671E-01	.16482E-01	.18026E+00	.90844E-04	.21577E-03	.29491E-03	.235	.273	1.235
36	.18330E-01	.17880E-01	.18027E+00	.90965E-04	.21584E-03	.29491E-03	.277	.327	1.235
37	.99046E-02	.44523E-01	.18595E+00	.61198E-03	.27889E-03	.36345E-03	.226	.383	1.274
38	.12147E-01	.46220E-01	.19019E+00	.56952E-03	.34490E-03	.40010E-03	.284	.400	1.306
40	.14164E-01	.49792E-01	.19277E+00	.48212E-03	.51631E-03	.50110E-03	.333	.485	1.326
4001	.14212E-01	.64642E-01	.19441E+00	.33476E-03	.60517E-03	.47484E-03	.335	.914	1.388
41	.14252E-01	.77568E-01	.19339E+00	.47769E-03	.58720E-03	.30802E-03	.338	1.298	1.496
43	.14708E-01	.78055E-01	.19163E+00	.58651E-03	.60745E-03	.33973E-03	.339	1.327	1.510
4301	.29948E-01	.57855E-01	.16771E+00	.89433E-03	.76620E-03	.33973E-03	.432	1.067	1.473
44	.53881E-01	.23578E-01	.13092E+00	.12151E-02	.87137E-03	.50409E-03	.569	.587	1.326
46	.52006E-01	.27097E-01	.93539E-01	.14311E-02	.85599E-03	.55412E-03	.479	.537	.983
47	.31139E-01	.27068E-01	.33605E-01	.13349E-02	.76731E-03	.51324E-03	.244	.535	.326
49	.25976E-01	.24666E-01	.21543E-01	.11011E-02	.71714E-03	.43165E-03	.206	.512	.205
51	.20048E-01	.19246E-01	.13018E-01	.83392E-03	.60345E-03	.35435E-03	.169	.447	.119
53	.15052E-01	.13823E-01	.88200E-02	.57142E-03	.46171E-03	.31414E-03	.134	.355	.078
54	.24218E-02	.12134E-02	.14312E-02	.12286E-03	.17475E-03	.72881E-04	.023	.041	.013
55	.35127E-03	.25268E-04	.20492E-03	.54778E-05	.67723E-04	.33222E-05	.003	.001	.002
56	.10823E-08	.19499E-08	.27377E-08	.17588E-06	.62464E-04	.97742E-07	.000	.000	.000
57	.41314E-03	.13346E-05	.23855E-03	.17588E-06	.62465E-04	.97744E-07	.004	.000	.002
58	.10045E-01	.76112E-02	.18032E+00	.59078E-04	.12308E-03	.20606E-03	.223	.257	1.236
59	.10506E-01	.81743E-02	.17917E+00	.42843E-04	.20114E-03	.18047E-03	.235	.262	1.229
61	.10797E-01	.89160E-02	.17386E+00	.17737E-03	.52808E-03	.76352E-04	.244	.273	1.194
6101	.10794E-01	.89534E-02	.14573E+00	.40664E-03	.75470E-03	.49779E-04	.245	.270	1.018
62	.10786E-01	.67087E-02	.11012E+00	.63771E-03	.85555E-03	.78245E-04	.245	.239	.813
64	.85644E-02	.50293E-02	.79200E-01	.84029E-03	.87733E-03	.14066E-03	.209	.232	.609
65	.24169E-02	.50094E-02	.42915E-01	.80826E-03	.78844E-03	.14269E-03	.075	.230	.323
67	.11258E-02	.47232E-02	.33901E-01	.66584E-03	.74107E-03	.12896E-03	.040	.226	.254
69	.28033E-03	.39855E-02	.24953E-01	.51832E-03	.63077E-03	.10993E-03	.011	.207	.188
71	.29725E-02	.30798E-02	.18383E-01	.41138E-03	.48627E-03	.86608E-04	.002	.171	.140
72	.74947E-05	.33212E-03	.29652E-02	.81114E-04	.18420E-03	.27204E-04	.000	.021	.023
73	.47286E-06	.78814E-05	.42860E-03	.34008E-05	.71388E-04	.13723E-05	.000	.001	.003

74	.44281E-09	.67728E-09	.20784E-08	.87627E-07	.65845E-04	.47500E-07	.000	.000
75	.44282E-09	.36221E-06	.50293E-03	.87627E-07	.65846E-04	.47502E-07	.000	.004
76	.13585E-01	.16275E-01	.18450E+00	.77701E-04	.37146E-03	.34597E-03	.253	.265
77	.15788E-01	.18246E-01	.18712E+00	.93818E-04	.44358E-03	.36489E-03	.295	1.284
79	.17329E-01	.22783E-01	.19120E+00	.13566E-03	.56824E-03	.40864E-03	.377	1.314
7901	.17385E-01	.40750E-01	.20515E+00	.39725E-03	.59450E-03	.38497E-03	.668	1.450
80	.17431E-01	.55668E-01	.21308E+00	.66419E-03	.50355E-03	.28248E-03	.892	1.598
82	.17477E-01	.56279E-01	.21261E+00	.73965E-03	.49010E-03	.18634E-03	.902	1.615
8201	.21894E-01	.39020E-01	.19232E+00	.10861E-02	.69526E-03	.24347E-03	.685	1.574
83	.40678E-01	.23388E-01	.15423E+00	.14298E-02	.86766E-03	.34038E-03	.396	1.391
85	.42892E-01	.32692E-01	.11074E+00	.16992E-02	.87875E-03	.37482E-03	.411	1.022
86	.30152E-01	.32666E-01	.39365E-01	.15862E-02	.80116E-03	.35808E-03	.410	.337
88	.26581E-01	.29614E-01	.24780E-01	.13180E-02	.75432E-03	.30350E-03	.381	.205
90	.21411E-01	.22787E-01	.14485E-01	.10074E-02	.64262E-03	.25424E-03	.311	.118
92	.16364E-01	.16095E-01	.96059E-02	.68838E-03	.49839E-03	.23511E-03	.233	.079
93	.26498E-02	.13052E-02	.15699E-02	.14568E-03	.19080E-03	.51750E-04	.024	.013
94	.38452E-03	.23468E-04	.22463E-03	.63882E-05	.74130E-04	.23192E-05	.001	.002
95	.10568E-08	.13417E-08	.30786E-08	.20242E-06	.68377E-04	.67422E-07	.000	.000
96	.45225E-03	.14421E-05	.26114E-03	.20242E-06	.68377E-04	.67423E-07	.000	.002

***** COMBINED MODAL RESPONSES FOR SUPPORT GROUP 3 *****
 MODAL COMBINATION METHOD 2-GROUPING

PIPE FORCES AND MOMENTS

ELEMENT NUMBER	ELEMENT TYPE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
1	TANGENT	END-I END-J	12830.776 12830.776	4922.830 4922.830	11167.155 11167.155	136375.87 136375.87	114024.26 811006.78	48344.95 355510.71
2	TANGENT	END-I END-J	12828.158 12828.158	4923.702 4923.702	11168.602 11168.602	136375.87 136375.87	811006.78 762635.68	355510.71 334187.29
3	TANGENT	END-I END-J	12825.780 12825.780	4922.802 4922.802	11167.632 11167.632	136375.87 136375.87	762635.68 63744.15	334187.29 30254.77
4	TANGENT	END-I END-J	12813.286 12813.286	4706.793 4706.793	10872.400 10872.400	136375.87 136375.87	63744.15 868236.82	30254.77 378298.49
5	TANGENT	END-I END-J	12800.556 12800.556	4480.121 4480.121	10553.066 10553.066	136375.87 136375.87	868236.82 1016556.09	378298.49 441215.01
6	TANGENT	END-I END-J	12798.172 12798.172	4441.734 4441.734	10498.298 10498.298	136375.87 136375.87	1016556.09 1315790.23	441215.01 567729.76
7	TANGENT	END-I END-J	1027.183 1027.183	267.213 267.213	1485.470 1485.470	.00 .00	22808.82 .00	4103.66 .00
8	TANGENT	END-I END-J	12773.706 12773.706	3638.222 3638.222	9136.330 9136.330	118141.86 118141.86	1315790.23 1575764.87	565302.67 667408.86
9	TANGENT	END-I END-J	12770.310 12770.310	3622.745 3622.745	9110.645 9110.645	118141.86 118141.86	1575764.87 1735523.16	667408.86 730224.19
10	TANGENT	END-I END-J	12763.568 12763.568	8386.099 8386.099	25067.984 25067.984	118141.86 118141.86	1735523.16 1287979.47	730224.19 580725.31
11	TANGENT	END-I END-J	12759.628 12759.628	8358.324 8358.324	25027.325 25027.325	118141.86 118141.86	1287979.47 577088.98	580725.31 343756.62
12	TANGENT	END-I END-J	2329.350 2329.350	1701.749 1701.749	3358.236 3358.236	.00 .00	101013.43 .00	51188.42 .00
13	TANGENT	END-I END-J	13204.801 13204.801	6426.940 6426.940	22483.757 22483.757	161935.83 161935.83	577088.98 78128.24	306609.35 125165.36
14	TANGENT	END-I END-J	13199.654 13199.654	6279.112 6279.112	22242.753 22242.753	161935.83 161935.83	78128.24 567569.18	125165.36 33784.19
15	BEND	END-I CENTER END-J	13183.720 22246.506 24981.189	21310.832 11527.002 2004.914	5725.911 5725.911 5725.911	161935.83 179723.88 219923.67	33784.18 87861.28 127659.93	567569.18 967428.56 1088389.37
16	TANGENT	END-I END-J	22854.252 22854.252	4194.227 4194.227	3063.357 3063.357	219919.67 219919.67	1088389.37 790967.61	127666.81 522386.24
17	TANGENT	END-I END-J	19949.888 19949.888	1824.206 1824.206	3914.865 3914.865	219917.42 219917.42	790967.61 400522.63	522387.19 632466.46
18	TANGENT	END-I END-J	17749.531 17749.531	7325.794 7325.794	19081.938 19081.938	220068.72 220068.72	400522.63 463282.45	632413.83 315609.16
19	BEND	END-I CENTER END-J	16483.487 23170.684 23286.137	17672.391 6880.177 6464.781	8561.527 8561.527 8561.527	220006.09 110757.66 91802.48	315652.82 185897.40 38096.82	463282.45 756821.01 761606.97

20	TANGENT	END-I END-J	21288.123 21288.123	9401.768 9401.768	6412.668 6412.668	91802.53 91802.53	761606.97 531957.71	38097.16 369068.23
21	TANGENT	END-I END-J	17173.471 17173.471	10675.304 10675.304	6721.302 6721.302	70428.77 70428.77	452400.55 284894.39	365136.39 698035.45
22	TANGENT	END-I END-J	14514.197 14514.197	3666.179 3666.179	1630.979 1630.979	70428.77 70428.77	284894.39 208269.65	698035.45 482923.77
23	TANGENT	END-I END-J	12231.511 12231.511	3598.945 3598.945	1609.583 1609.583	70428.77 70428.77	208269.65 172277.46	482923.77 350302.77
24	TANGENT	END-I END-J	9102.183 9102.183	3939.721 3939.721	1602.770 1602.770	74130.97 74130.97	251010.88 190780.20	297013.60 56366.15
25	TANGENT	END-I END-J	6669.626 6669.626	1592.899 1592.899	3292.306 3292.306	74130.97 74130.97	190780.20 145892.72	56366.15 58933.21
26	TANGENT	END-I END-J	5333.877 5333.877	1634.699 1634.699	1724.736 1724.736	74130.97 74130.97	145892.72 125264.10	58933.21 20464.69
27	TANGENT	END-I END-J	1380.796 1380.796	322.966 322.966	276.210 276.210	.00 .00	8161.27 1644.49	9570.33 1946.02
28	TANGENT	END-I END-J	414.296 414.296	109.877 109.877	92.834 92.834	.00 .00	1644.49 .00	1946.02 .00
29	TANGENT	END-I END-J	846.833 846.833	2072.873 2072.873	2685.375 2685.375	102314.30 102314.30	88982.84 41671.54	115949.58 75054.64
30	TANGENT	END-I END-J	790.424 790.424	2021.717 2021.717	2459.343 2459.343	102314.30 102314.30	41671.54 34711.01	75054.64 53760.00
31	BEND	END-I CENTER END-J	745.370 942.970 1423.410	1963.817 1865.092 1530.440	2273.946 2273.946 2273.946	102313.34 94492.77 80484.51	34711.91 43963.94 57198.88	53760.00 41888.38 32913.41
32	TANGENT	END-I END-J	1302.934 1302.934	1373.763 1373.763	1864.455 1864.455	80504.51 80504.51	57170.78 52449.77	32913.41 46920.11
33	TANGENT	END-I END-J	1126.191 1126.191	853.936 853.936	1193.580 1193.580	80504.51 80504.51	52449.77 89340.30	46920.11 80293.17
34	BEND	END-I CENTER END-J	1022.899 1072.681 1096.287	778.066 683.833 641.411	415.289 415.289 415.289	80504.51 67740.62 56198.41	80293.17 91051.09 99231.68	89340.30 91853.19 94163.72
35	TANGENT	END-I END-J	985.202 985.202	324.074 324.074	457.234 457.234	56207.52 56207.52	94163.72 86910.38	99226.51 84951.48
36	TANGENT	END-I END-J	1183.744 1183.744	1129.676 1129.676	1143.190 1143.190	56207.16 56207.16	86910.38 26512.06	84951.81 49154.48
37	BEND	END-I CENTER END-J	1509.178 1536.833 1426.077	1426.176 1415.441 1509.231	1744.072 1744.072 1744.072	56207.53 39062.02 26488.45	26512.06 33452.67 29604.89	49153.98 46606.15 35426.99
38	TANGENT	END-I END-J	1603.495 1603.495	2570.959 2570.959	938.756 938.756	26493.13 26493.13	18619.92 31207.15	41879.91 92001.52
39	BEND	END-I CENTER END-J	1740.917 1707.101 1789.870	2164.463 2124.672 2034.356	1865.906 1865.906 1865.906	26493.13 15675.11 20960.47	63696.02 75431.08 82333.53	73354.73 83109.80 91902.51
40	BEND	END-I	1808.663	2068.212	1897.386	20935.14	82356.80	91887.74

41	BEND	CENTER END-J	1932.898 2052.377	1953.360 1828.566	1897.386 1897.386	40005.64 60896.91	84031.48 80195.13	99420.58 105295.15
		END-I CENTER	2053.108 2136.405	1871.723 1859.208	1920.209 1920.209	60850.21 80291.41	80207.09 71278.03	105312.89 109843.77
		END-J	2177.735	1837.989	1920.209	96811.71	58027.24	111904.94
42	TANGENT	END-I END-J	2178.159 2178.159	1935.230 1935.230	1965.404 1965.404	96793.05 96793.05	58041.05 139025.10	111913.81 143019.29
43	TANGENT	END-I END-J	2178.473 2178.473	1949.603 1949.603	1974.973 1974.973	96791.70 96791.70	139025.10 174796.97	143020.24 166377.75
44	TANGENT	END-I END-J	2178.349 2178.349	1949.951 1949.951	1976.269 1976.269	96797.58 96797.58	174796.97 186766.21	166374.37 174915.11
45	TANGENT	END-I END-J	.000 .000	.000 .000	.224 .224	.00 .00	1.71 .00	.00 .00
46	TANGENT	END-I END-J	469.535 469.535	301.336 301.336	380.807 380.807	24510.33 24510.33	103003.85 107849.88	33452.36 32885.83
47	TANGENT	END-I END-J	450.370 450.370	274.282 274.282	260.172 260.172	24510.33 24510.33	107849.88 107701.53	32885.83 32861.11
48	BEND	END-I CENTER END-J	438.305 454.813 419.356	258.355 240.626 309.463	325.480 325.480 325.480	24501.03 20764.18 58886.39	107703.64 106823.04 89681.70	32861.11 32371.44 31076.19
49	TANGENT	END-I END-J	372.379 372.379	322.434 322.434	699.786 699.786	58842.82 58842.82	89710.26 60692.37	31076.19 20898.17
50	TANGENT	END-I END-J	354.149 354.149	374.375 374.375	1239.565 1239.565	58842.82 58842.82	60692.37 10237.57	20898.17 13974.81
51	BEND	END-I CENTER END-J	388.305 524.163 439.603	439.708 253.926 388.513	1598.202 1598.202 1598.202	58842.82 45407.00 23976.20	10237.57 26333.36 28872.64	13974.81 12980.95 9872.60
52	TANGENT	END-I END-J	514.441 514.441	1862.927 1862.927	436.026 436.026	23990.42 23990.42	9872.60 10371.67	28860.87 50297.68
53	BEND	END-I CENTER END-J	575.225 616.125 628.076	441.949 371.438 366.597	1968.283 1968.283 1968.283	23990.42 11198.98 13251.99	50297.68 63966.76 73320.04	10371.67 12168.34 13446.87
54	BEND	END-I CENTER END-J	645.900 629.649 586.633	379.131 409.338 461.146	1999.812 1999.812 1999.812	13240.24 31310.43 51214.15	73322.15 77859.59 77109.28	13446.87 14171.41 14447.20
55	BEND	END-I CENTER END-J	594.527 523.600 442.161	479.640 557.059 620.967	2022.963 2022.963 2022.963	51181.08 70463.32 87645.06	77131.29 71256.04 60544.43	14447.20 14504.54 14639.04
56	TANGENT	END-I END-J	442.625 442.625	669.354 669.354	2067.989 2067.989	87627.33 87627.33	60570.10 146494.76	14639.04 32282.93
57	TANGENT	END-I END-J	442.833 442.833	677.158 677.158	2077.470 2077.470	87627.33 87627.33	146494.76 184251.18	32282.93 43608.83
58	TANGENT	END-I END-J	442.833 442.833	677.268 677.268	2078.645 2078.645	87627.33 87627.33	184251.18 196875.16	43608.83 47500.31
59	TANGENT	END-I END-J	.000 .000	.000 .000	.224 .224	.00 .00	1.50 .00	.00 .00

60	TANGENT	END-I END-J	893.535 893.535	1470.656 1470.656	2696.239 2696.239	85483.23 85483.23	88513.72 41543.40	74130.97 50111.41
61	TANGENT	END-I END-J	860.577 860.577	1420.054 1420.054	2463.789 2463.789	85483.23 85483.23	41543.40 29863.74	50111.41 40728.60
62	BEND	END-I CENTER END-J	834.331 1016.378 1227.281	1366.074 1273.516 1085.160	2273.514 2273.514 2273.514	85482.10 77602.45 66505.10	29867.26 43904.15 53611.76	40728.60 36671.00 32776.91
63	TANGENT	END-I END-J	1116.529 1116.529	951.709 951.709	1846.724 1846.724	66519.36 66519.36	53594.31 68349.34	32876.91 38443.47
64	TANGENT	END-I END-J	956.464 956.464	601.052 601.052	1127.578 1127.578	66519.36 66519.36	68349.34 103913.02	38443.47 57245.84
65	BEND	END-I CENTER END-J	864.237 902.035 910.578	705.098 656.452 645.114	359.469 359.469 359.469	66519.36 59844.09 52793.66	57245.84 64123.47 71235.32	103913.02 105917.62 108226.32
66	TANGENT	END-I END-J	945.032 945.032	375.589 375.589	390.661 390.661	52800.21 52800.21	108226.32 99008.01	71230.50 65052.31
67	TANGENT	END-I END-J	1307.561 1307.561	826.427 826.427	1266.86 1266.869	52799.74 52799.74	99008.01 26094.95	65052.66 56927.10
68	BEND	END-I CENTER END-J	1694.799 1549.917 996.970	997.248 1201.668 1694.963	1927.125 1927.125 1927.125	52800.20 34088.48 21394.50	26094.95 30431.78 20830.08	56926.74 53387.00 36496.78
69	TANGENT	END-I END-J	1116.261 1116.261	2898.234 2898.234	901.617 901.617	21398.14 21398.14	24318.94 20228.48	34380.92 101352.99
70	BEND	END-I CENTER END-J	1209.445 1120.566 1308.169	2374.776 2406.400 2309.623	2087.499 2087.499 2087.499	21398.14 11096.10 21437.00	59691.28 72007.30 79766.93	84218.31 95734.04 106818.87
71	BEND	END-I CENTER END-J	1306.201 1620.871 1951.234	2340.408 2134.685 1837.522	2121.329 2121.329 2121.329	21407.93 40953.86 61528.04	79796.32 82552.90 79900.39	106802.77 116934.05 125382.27
72	BEND	END-I CENTER END-J	1943.481 2216.869 2389.427	1869.687 1536.049 1272.772	2145.501 2145.501 2145.501	61474.15 80915.89 97751.27	79910.46 72181.38 59878.05	125402.28 131775.95 135568.89
73	TANGENT	END-I END-J	2389.704 2389.704	1333.443 1333.443	2193.377 2193.377	97733.04 97733.04	59881.29 151002.59	135580.70 165943.10
74	TANGENT	END-I END-J	2389.985 2389.985	1341.561 1341.561	2203.431 2203.431	97730.69 97 30.69	151002.59 191051.48	165944.47 182933.94
75	TANGENT	END-I END-J	2389.772 2389.772	1341.754 1341.754	2204.823 2204.823	97742.40 97742.40	191051.48 204446.00	182927.59 188948.01
76	TANGENT	END-I END-J	.000 .000	.000 .000	.224 .224	.00 .00	1.64 .00	.00 .00

***** COMBINED MODAL RESPONSES FOR SUPPORT GROUP 3 *****
 MODAL COMBINATION METHOD 2-GROUPING

S U P P O R T F O R C E S A N D M O M E N T S

NODE NUMBER	COMPONENT DIRECTION	FORCE/MOMENT (LOCAL)
1	FX	11167.
1	F-	4923.
1	FZ	12831.
1	MX	48345.
1	MY	114024.
1	MZ	136376.
1	FX	34176.
9	FY	11952.
9	FX	1082.
56	FY	1950.
56	FZ	2738.
56	MX	175879.
56	MY	186768.
56	MZ	97742.
74	FX	443.
74	FY	677.
74	FZ	2078.
74	MX	87627.
74	MY	196877.
74	MZ	47500.
95	FX	1057.
95	FY	1342.
95	FZ	3079.
95	MX	202423.
95	MY	204447.
95	MZ	67422.
19	FL	17777.
25	FL-1	6559.
25	FL-2	14669.
27	FL	4060.
32	FL	4283.

***** SRSS COMBINATION OF SUPPORT GROUP RESPONSES *****
 MODAL COMBINATION METHOD 2-GROUPING

N O D E N O D E N U M B E R	D I S P L A C E M E N T S / R O T A T I O N S				A C C E L E R A T I O N S I N G ' S			
	X- TRANSLATION	Y- TRANSLATION	Z- TRANSLATION	X- ROTATION	Y- ROTATION	Z- ROTATION	X- DIRECTION	Y- DIRECTION
1	24676E-07	11283E-07	27855E-07	11054E-06	25076E-06	30045E-06	.000	.000
2	21109E-03	87396E-04	35341E-03	35420E-04	78196E-04	30122E-04	.001	.004
3	15863E-03	82582E-04	35873E-03	36751E-04	81113E-04	30780E-04	.002	.004
301	33131E-01	15042E-01	12192E-02	23826E-03	52717E-03	25677E-03	.214	.214
4	27230E-01	27230E-01	20788E-02	32422E-04	68158E-04	48277E-03	.381	.024
5	58471E-01	26381E-01	22420E-02	13555E-03	29656E-03	52570E-03	.492	.026
6	46038E-01	20721E-01	24192E-02	29139E-03	64335E-03	57843E-03	.386	.287
7	56933E-01	20727E-01	33500E-02	29160E-03	64335E-03	58011E-03	.488	.071
8	24044E-01	10044E-01	25962E-02	48159E-03	10730E-02	62302E-03	.137	.029
9	13423E-05	48606E-06	27996E-02	70071E-03	15724E-02	66847E-03	.000	.032
12	34594E-01	15205E-01	30065E-02	90991E-03	20360E-02	71480E-03	.034	.036
13	98861E-01	43968E-01	31833E-02	10523E-02	23112E-02	75958E-03	.581	.036
14	85616E-01	44000E-01	29748E-01	10593E-02	23112E-02	75832E-03	.581	.422
15	16786E+00	75490E-01	33655E-02	11175E-02	23858E-02	80895E-03	1.352	.037
16	22298E+00	10170E+00	36346E-02	11389E-02	22634E-02	87590E-03	1.791	.040
18	28178E+00	15702E+00	20121E-01	92293E-03	23740E-03	97226E-03	2.275	.211
1801	25015E+00	24078E+00	50734E-01	37479E-03	14781E-02	83099E-03	2.091	.585
19	15477E+00	24659E+00	33820E+00	87597E-03	24929E-02	58203E-03	2.103	1.680
21	10513E+00	21810E+00	38840E+00	24929E-02	24677E-02	60604E-03	1.538	2.210
22	52100E-01	15327E+00	38639E+00	15521E-02	24677E-02	60604E-03	1.366	2.394
23	32984E-01	92825E-01	38713E+00	14311E-02	95770E-03	67599E-03	1.184	1.698
24	32984E-01	51072E-01	38761E+00	11478E-02	61487E-03	66386E-03	.959	2.747
25	25755E-01	10725E-01	38840E+00	54240E-03	16333E-03	58356E-03	1.042	2.751
29	28709E-01	15334E-01	38882E+00	28730E-03	14986E-03	63178E-03	1.022	2.761
31	27874E-01	20463E-01	38944E+00	23962E-03	45089E-03	59844E-03	.613	2.765
32	18340E-01	28794E-01	38955E+00	27038E-03	65574E-03	64003E-03	.592	2.766
33	21921E-01	31955E-01	38969E+00	30330E-03	53507E-03	61309E-03	.802	2.767
34	36276E-01	39197E-01	38972E+00	30835E-03	65879E-03	64003E-03	1.073	2.767
35	49989E-01	45314E-01	38974E+00	30898E-03	65919E-03	64003E-03	1.308	2.767
36	62259E-01	50076E-01	38974E+00	14120E-02	18440E-02	86471E-03	1.974	2.767
37	35104E-01	98179E-01	40111E+00	14174E-02	30645E-02	10722E-02	1.008	2.827
38	38410E-01	10163E+00	40969E+00	13106E-02	37142E-02	10724E-02	1.115	2.885
40	41238E-01	10798E+00	41456E+00	17908E-02	34292E-02	85583E-03	1.014	2.927
4001	41233E-01	13438E+00	44741E+00	27187E-02	29377E-02	74322E-02	3.027	3.998
41	41401E-01	16004E+00	52042E+00	29670E-02	21635E-02	13222E-02	3.105	5.823
43	45276E-01	16111E+00	53442E+00	43471E-02	20099E-02	19192E-02	3.027	7.137
4301	10787E+00	13142E+00	57391E+00	57202E-02	20468E-02	21104E-02	2.226	7.490
44	15088E+00	13031E+00	55409E+00	67882E-02	19087E-02	20051E-02	2.520	5.749
46	13730E+00	15648E+00	41635E+00	63909E-02	19087E-02	20051E-02	2.654	1.716
47	73188E-01	15635E+00	13045E+00	63909E-02	18073E-02	17182E-02	1.295	1.021
49	63828E-01	14205E+00	74222E-01	53770E-02	15519E-02	13185E-02	1.039	.637
51	52559E-01	10977E+00	38420E-01	41577E-02	12273E-02	88052E-03	1.326	.465
53	41010E-01	77804E-01	24271E-01	28199E-02	48412E-03	21294E-03	.003	.011
54	67575E-02	63539E-02	40561E-02	61801E-03	18953E-03	34593E-06	.019	.000
55	98387E-03	11418E-03	57787E-03	27473E-04	17486E-03	34593E-06	.000	.013
56	38476E-08	58469E-08	12192E-07	89469E-06	48927E-03	48368E-03	.928	2.765
57	11566E-02	70201E-05	66781E-03	16384E-03	72149E-03	43387E-03	1.011	2.759
58	28278E-01	21252E-01	38980E+00	16452E-03	14862E-02	21657E-03	1.246	3.815
59	29618E-01	23120E-01	37609E+00	95910E-03	19394E-02	14190E-03	1.399	5.491
61	30553E-01	25681E-01	32126E+00	15285E-02	20145E-02	19406E-03	1.252	4.986
6101	30596E-01	28037E-01	30701E+00	15285E-02	19017E-02	38265E-03	1.047	2.441
62	30607E-01	23970E-01	19659E+00	21404E-02	17222E-02	41580E-03	.387	1.256
64	24863E-01	20109E-01	10394E+00	17238E-02	16340E-02	41326E-03	.209	1.216
65	77839E-02	20023E-01	87728E-01	13830E-02	14136E-02	39467E-03	.058	1.432
67	38750E-02	15094E-01	87728E-01	13830E-02	14136E-02	39467E-03	.058	1.116
69	10210E-04	16464E-01	45153E-01	11376E-02	46505E-03	58876E-05	.001	.002
71	82931E-02	12917E-01	45153E-01	11376E-02	46505E-03	58876E-05	.001	.002
72	20909E-04	14275E-02	76546E-02	22092E-03	92625E-05	58876E-05	.001	.002
73	13191E-05	34049E-04	11101E-02	92625E-05	92625E-05	58876E-05	.001	.002

74	12353E-08	.64987E-08	.23866E-06	.16976E-03	.20404E-06	.000	.000	.000
75	12353E-08	.12967E-02	.23866E-06	.16977E-03	.20405E-06	.000	.000	.036
76	38846E-01	.39786E+00	.38357E-03	.13540E-02	.76291E-03	.837	1.366	2.816
77	41425E-01	.40300E+00	.5148E-03	.17075E-02	.81781E-03	.886	1.353	2.862
79	44652E-01	.41143E+00	.67676E-03	.24945E-02	.99550E-03	.927	1.317	2.968
7901	52693E-01	.45527E+00	.15174E-02	.28412E-02	.99727E-03	.929	1.755	3.987
80	92704E-01	.50887E+00	.24160E-02	.25051E-02	.79899E-03	.930	2.601	5.257
82	13076E+00	.51638E+00	.26558E-02	.21378E-02	.58307E-03	.950	2.634	5.413
8201	13169E+00	.51601E+00	.38061E-02	.19196E-02	.77078E-03	1.586	1.875	5.580
83	88098E-01	.46717E+00	.48812E-02	.21009E-02	.11954E-02	2.853	2.008	5.810
83	95287E-01	.34487E+00	.56287E-02	.20876E-02	.15279E-02	2.808	2.261	4.471
85	12241E+00	.11023E+00	.52422E-02	.18970E-02	.15036E-02	1.625	2.257	1.252
86	12232E+00	.11023E+00	.43737E-02	.17897E-02	.12954E-02	1.333	2.084	.765
88	11095E+00	.64524E-01	.33557E-02	.15339E-02	.10044E-02	1.022	1.675	.558
90	85428E-01	.35315E-01	.22635E-02	.11956E-02	.69970E-03	.769	1.236	.441
92	60350E-01	.23108E-01	.48822E-03	.45893E-03	.16503E-03	.124	.117	.071
93	.48755E-02	.37866E-02	.21576E-04	.17848E-03	.75945E-05	.018	.002	.010
94	.86301E-04	.54145E-03	.69857E-06	.16463E-03	.25845E-06	.000	.000	.000
95	.44455E-08	.97647E-08	.69857E-06	.16463E-03	.25845E-06	.021	.000	.012
96	.53892E-05	.62873E-03						

***** SRSS COMBINATION OF SUPPORT GROUP RESPONSES *****
 MODAL COMBINATION METHOD 2-GROUPING

PIPE FORCES AND MOMENTS

ELEMENT NUMBER	ELEMENT TYPE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
1	TANGENT	END-I END-J	27855.231 27855.231	11282.543 11282.543	24676.115 24676.115	300448.79 300448.79	250761.67 1790789.15	110538.12 814528.42
2	TANGENT	END-I END-J	27849.291 27849.291	11284.524 11284.524	24679.338 24679.338	300448.79 300448.79	1790789.15 1683904.48	814528.42 765657.31
3	TANGENT	END-I END-J	27843.905 27843.905	11282.474 11282.474	24676.852 24676.852	300448.79 300448.79	1683904.48 142316.18	765657.31 69588.49
4	TANGENT	END-I END-J	27815.925 27815.925	10775.823 10775.823	23968.864 23968.864	300448.79 300448.79	142316.18 1915599.17	69588.49 866414.72
5	TANGENT	END-I END-J	27787.676 27787.676	10243.715 10243.715	23209.523 23209.523	300448.79 300448.79	1915599.17 2241746.54	866414.72 1010273.11
6	TANGENT	END-I END-J	27782.219 27782.219	10153.514 10153.514	23079.644 23079.644	300448.79 300448.79	2241746.54 2899497.67	1010273.11 1299480.24
7	TANGENT	END-I END-J	2385.922 2385.922	590.928 590.928	4055.129 4055.129	.00 .00	62262.27 .00	9073.32 .00
8	TANGENT	END-I END-J	27743.931 27743.931	8261.933 8261.933	19977.411 19977.411	257304.81 257304.81	2899497.67 3464512.48	1293856.45 1525730.51
9	TANGENT	END-I END-J	27736.362 27736.362	8225.339 8225.339	19919.738 19919.738	257304.81 257304.81	3464512.48 3812138.64	1525730.51 1668349.91
10	TANGENT	END-I END-J	27721.377 27721.377	19115.598 19115.598	55328.143 55328.143	257304.81 257304.81	3812138.64 2824705.05	1668349.91 1327424.09
11	TANGENT	END-I END-J	27712.449 27712.449	19050.643 19050.643	55232.477 55232.477	257304.81 257304.81	2824705.05 1257540.84	1327424.09 786819.11
12	TANGENT	END-I END-J	5400.830 5400.830	3923.724 3923.724	8019.321 8019.321	.00 .00	241214.45 .00	118020.94 .00
13	TANGENT	END-I END-J	28813.640 28813.640	14524.705 14524.705	49204.564 49204.564	356571.46 356571.46	1257540.84 182427.03	698484.04 287685.77
14	TANGENT	END-I END-J	28802.273 28802.273	14177.151 14177.151	48644.162 48644.162	356571.46 356571.46	182427.03 1246226.89	287685.77 67830.60
15	BEND	END-I CENTER END-J	28766.376 48537.909 54501.355	46489.425 25127.733 4557.611	12874.599 12874.599 12874.599	356571.46 485863.61	67830.60 197739.09 294119.22	1246226.89 2118278.02 2381866.82
16	TANGENT	END-I END-J	49643.821 49643.821	9244.319 9244.319	7073.921 7073.921	485854.46 485854.46	2381866.82 1712971.43	294134.26 1161818.74
17	TANGENT	END-I END-J	43183.035 43183.035	4120.788 4120.788	9425.907 9425.907	485849.19 485849.19	1712971.43 921924.64	1161820.90 1360071.48
18	TANGENT	END-I END-J	38511.186 38511.186	15808.512 15808.512	41993.512 41993.512	486176.65 486176.65	921924.64 998678.35	1359954.44 673871.10
19	BEND	END-I CENTER END-J	35931.011 50531.379 50898.822	38810.280 15624.129 14402.718	18556.288 18556.288 18556.288	486038.45 228146.47 162429.13	673970.82 403717.46 105443.16	998678.35 1640770.68 1659324.33

20	TANGENT	END-I END-J	46597.481 46597.481	20586.345 20586.345	14436.270 14436.270	162429.19 162429.19	1659324.33 1176889.56	105443.52 804567.98
21	TANGENT	END-I END-J	37768.928 37768.928	23370.185 23370.185	15955.346 15955.346	195079.61 195079.61	1054114.81 724013.92	804218.96 1521059.86
22	TANGENT	END-I END-J	31944.902 31944.902	8338.599 8338.599	6941.368 6941.368	195079.61 195079.61	724013.92 505541.63	1521059.86 1062936.37
23	TANGENT	END-I END-J	26969.118 26969.118	7915.337 7915.337	6121.714 6121.714	195079.61 195079.61	505541.63 470491.81	1062936.37 787965.71
24	TANGENT	END-I END-J	20079.655 20079.655	8735.772 8735.772	6122.416 6122.416	188067.24 188067.24	618286.85 615577.71	679631.02 229909.69
25	TANGENT	END-I END-J	15057.157 15057.157	5292.650 5292.650	8756.749 8756.749	188067.24 188067.24	615577.71 591907.21	229909.69 227292.72
26	TANGENT	END-I END-J	12460.215 12460.215	5076.038 5076.038	5215.209 5215.209	188067.24 188067.24	591907.21 530306.74	227292.72 157550.74
27	TANGENT	END-I END-J	3093.316 3093.316	2007.440 2007.440	1276.834 1276.834	.00 .00	37914.50 7775.09	59139.93 11728.25
28	TANGENT	END-I END-J	927.936 927.936	662.000 662.000	438.858 438.858	.00 .00	7775.09 .00	11728.25 .00
29	TANGENT	END-I END-J	3635.344 3635.344	4080.569 4080.569	9442.033 9442.033	499592.42 499592.42	494356.63 315819.19	208928.67 147249.19
30	TANGENT	END-I END-J	3539.485 3539.485	3937.978 3937.978	9210.129 9210.129	499592.42 499592.42	315819.19 228738.71	147249.19 123697.87
31	BEND	END-I CENTER END-J	3463.297 3753.915 3968.907	3799.399 3503.413 3251.698	9013.226 9013.226 9013.226	499575.11 403420.72 278081.09	228774.94 324584.19 384517.73	123697.87 112945.47 102304.49
32	TANGENT	END-I END-J	3639.378 3639.378	3021.943 3021.943	8472.850 8472.850	278243.43 278243.43	384400.25 139238.70	102304.49 121126.57
33	TANGENT	END-I END-J	3165.685 3165.685	1929.503 1929.503	6513.384 6513.384	278243.43 278243.43	139238.70 316381.73	121126.57 187041.96
34	BEND	END-I CENTER END-J	2897.518 3090.184 3515.427	4606.867 4449.833 4120.962	937.969 937.969 937.969	278243.43 273028.55 257878.96	187041.96 192794.30 212591.32	316381.73 334929.79 352123.05
35	TANGENT	END-I END-J	2583.500 2583.500	828.118 828.118	2363.959 2363.959	257898.03 257898.03	352123.05 419503.14	212567.88 177598.68
36	TANGENT	END-I END-J	2766.421 2766.421	2535.943 2535.943	4271.206 4271.206	257897.21 257897.21	419503.14 179255.32	177599.94 125771.85
37	BEND	END-I CENTER END-J	4013.439 4260.509 3312.419	3313.267 3039.175 4014.001	8163.198 8163.198 8163.198	257898.03 117911.50 71511.74	179255.32 199101.61 111887.17	125769.95 127105.85 97890.71
38	TANGENT	END-I END-J	4172.407 4172.407	11357.998 11357.998	3188.026 3188.026	71492.57 71492.57	62450.59 99668.49	133365.82 380796.90
39	BEND	END-I CENTER END-J	4905.270 3540.989 4331.856	11139.912 11547.726 11245.358	5508.138 5508.138 5508.138	71492.57 74604.79 101653.11	168130.73 191324.94 203334.87	355891.20 411271.82 466298.62
40	BEND	END-I	4269.163	11452.953	5655.205	101568.80	203442.03	466270.31

41	BEND	CENTER END-J	6269.486 8361.198	10510.069 8971.276	5655.205 5655.205	143685.97 188884.67	203618.98 191426.75	518439.66 563505.80
42	TANGENT	END-I CENTER END-J	8288.182 10046.968 11239.493	9176.640 7359.277 5377.842	5765.911 5765.911 5765.911	188700.69 230628.51 265616.52	191451.64 168517.76 137175.78	563558.85 599679.19 623456.68
43	TANGENT	END-I END-J	11241.699 11241.699	5796.693 5796.693	5994.208 5994.208	265586.58 265586.58	137183.05 377576.47	623467.91 802697.62
44	TANGENT	END-I END-J	11243.091 11243.091	5846.144 5846.144	6044.645 6044.645	265576.18 265576.18	377576.47 486338.46	802700.88 889960.94
45	TANGENT	END-I END-J	11242.619 11242.619	5846.936 5846.936	6051.470 6051.470	265629.35 265629.35	486338.46 522823.53	889944.90 919771.65
46	TANGENT	END-I END-J	.000 .000	.000 .000	1.356 1.356	.00 .00	10.10 .00	.00 .00
47	TANGENT	END-I END-J	1369.017 1369.017	2513.045 2513.045	4001.557 4001.557	158065.04 158065.04	300528.71 262902.32	108327.23 80384.40
48	BEND	END-I CENTER END-J	1339.949 1339.949	2255.178 2255.178	3926.388 3926.388	158065.04 158065.04	262902.32 244842.13	80384.40 75547.52
49	TANGENT	END-I END-J	1322.784 1836.076 2174.535	2027.394 1594.853 1109.810	3895.452 3895.452 3895.452	158051.61 121855.62 145680.47	244850.67 251680.70 222349.48	75547.52 75199.80 73716.35
50	TANGENT	END-I END-J	1772.967 1772.967	929.483 929.483	3838.325 3838.325	145624.90 145624.90	222385.79 138371.87	73716.35 59652.01
51	BEND	END-I CENTER END-J	1292.582 1292.582	989.393 989.393	3206.565 3206.565	145624.90 145624.90	138371.87 122224.86	59652.01 43274.55
52	TANGENT	END-I END-J	1134.027 1689.493 1405.916	1406.368 618.115 1134.685	3532.258 3532.258 3532.258	145624.90 102741.64 118303.35	122224.86 137775.83 84683.84	43274.55 38536.12 32520.04
53	BEND	END-I CENTER END-J	1905.509 1905.509	5029.076 5029.076	1215.504 1215.504	118289.34 118289.34	32520.04 34888.36	84703.52 129744.86
54	BEND	END-I CENTER END-J	2295.764 2347.198 2273.153	1232.410 1107.620 1293.389	5716.338 5716.338 5716.338	118289.34 125795.37 140021.12	129744.86 150509.73 164486.99	34888.36 38373.84 39954.66
55	BEND	END-I CENTER END-J	2380.990 2169.723 1868.637	1377.766 1695.465 2007.049	5924.978 5924.978 5924.978	140007.15 161267.75 187164.76	164498.85 170395.67 166813.41	39954.66 39681.53 38594.56
56	TANGENT	END-I END-J	1915.664 1549.668 1233.355	2122.914 2408.604 2572.478	6083.987 6083.987 6083.987	187119.83 214106.67 238687.69	166863.53 154351.06 133969.39	38594.56 38216.83 40340.87
57	TANGENT	END-I END-J	1234.881 1234.881	2849.940 2849.940	6410.450 6410.450	238662.40 238662.40	134014.49 356018.81	40340.87 135653.10
58	TANGENT	END-I END-J	1235.330 1235.330	2891.510 2891.510	6490.480 6490.480	238662.40 238662.40	356018.81 469217.36	135653.10 186797.46
59	TANGENT	END-I END-J	1235.330 1235.330	2892.272 2892.272	6500.269 6500.269	238662.40 238662.40	469217.36 507582.73	186797.46 204041.67
		END-I END-J	.000 .000	.000 .000	1.814 1.814	.00 .00	14.00 .00	.00 .00

60	TANGENT	END-I END-J	2925.579 2925.579	3627.987 3627.987	8195.320 8195.320	366248.88 366248.88	381960.49 229998.81	188067.24 130629.87
61	TANGENT	END-I END-J	2905.968 2905.968	3471.332 3471.332	7890.504 7890.504	366248.88 366248.88	229998.81 157380.39	130629.87 106846.21
62	BEND	END-I CENTER END-J	2894.768 3278.590 3534.127	3326.841 3017.313 2695.114	7627.364 7627.364 7627.364	366238.56 306709.13 226515.10	157404.44 221067.95 265407.66	106846.21 96196.26 85123.00
63	TANGENT	END-I END-J	3333.694 3333.694	2459.431 2459.431	6945.158 6945.158	226619.85 226619.85	265318.17 174880.89	85123.00 83910.01
64	TANGENT	END-I END-J	3075.245 3075.245	1640.311 1640.311	5028.812 5028.812	226619.85 226619.85	174880.89 324915.00	83910.01 133820.94
65	BEND	END-I CENTER END-J	2945.790 3220.121 3468.422	3438.883 3189.320 2912.700	1041.459 1041.459 1041.459	226619.85 214247.44 193721.06	133820.94 153374.41 181159.14	324915.00 336569.68 346852.31
66	TANGENT	END-I END-J	2868.995 2868.995	1224.448 1224.448	2033.478 2033.478	193744.69 193744.69	346852.31 345191.31	181133.79 152757.35
67	TANGENT	END-I END-J	2916.873 2916.873	2135.094 2135.094	4049.275 4049.275	193743.78 193743.78	345191.31 125982.26	152758.58 128978.30
68	BEND	END-I CENTER END-J	3773.074 3573.248 2471.684	2472.190 2728.677 3773.484	6693.152 6693.152 6693.152	193744.26 97977.43 60634.83	125982.26 139862.16 77483.33	128977.37 123712.56 92731.57
69	TANGENT	END-I END-J	3053.505 3053.505	9171.620 9171.620	3150.157 3150.157	60627.80 60627.80	78585.91 71472.83	90860.33 327589.19
70	BEND	END-I CENTER END-J	3633.992 3122.826 4045.706	8939.569 9078.626 8707.255	4905.663 4905.663 4905.663	60627.80 54474.33 76333.01	148166.70 171978.84 186749.62	300425.06 344449.44 387328.36
71	BEND	END-I CENTER END-J	4020.480 5550.897 7061.299	8873.395 8035.345 6767.372	5027.090 5027.090 5027.090	76264.14 114530.13 157161.63	186841.36 191313.72 184627.25	387297.99 427058.09 460475.79
72	BEND	END-I CENTER END-J	7011.841 8239.538 9016.246	6942.248 5436.781 4032.577	5120.081 5120.081 5120.081	157003.88 198021.10 233682.31	184646.87 168201.98 143382.06	460522.17 486108.31 501557.74
73	TANGENT	END-I END-J	9018.310 9018.310	4399.177 4399.177	5313.362 5313.362	233648.39 233648.39	143387.02 362568.86	501572.27 622154.29
74	TANGENT	END-I END-J	9019.381 9019.381	4444.833 4444.833	5355.030 5355.030	233640.17 233640.17	362568.86 459709.62	622157.22 684439.86
75	TANGENT	END-I END-J	9019.157 9019.157	4445.568 4445.568	5360.602 5360.602	233681.68 233681.68	459709.62 492229.48	684425.66 706050.17
76	TANGENT	END-I END-J	.000 .000	.000 .000	1.237 1.237	.00 .00	9.40 .00	.00 .00

***** SRSS COMBINATION OF SUPPORT GROUP RESPONSES *****
 MODAL COMBINATION METHOD 2-GROUPING

S U P P O R T F O R C E S A N D M O M E N T S

NODE NUMBER	COMPONENT DIRECTION	FORCE/MOMENT (LOCAL)
1	FX	24676.
1	FY	11283.
1	FZ	27855.
1	MX	110538.
1	MY	250762.
1	MZ	300449.
9	FX	75168.
9	FY	27219.
9	FZ	3848.
56	FX	5847.
56	FY	12193.
56	FZ	894689.
56	MX	522831.
56	MY	345934.
56	MZ	1235.
74	FX	2892.
74	FY	6499.
74	FZ	238662.
74	MX	507593.
74	MY	204042.
74	MZ	3858.
95	FX	4446.
95	FY	9765.
95	FZ	698567.
95	MX	492236.
95	MY	258444.
95	MZ	41002.
19	FL	18807.
25	FL-1	31632.
25	FL-2	12417.
27	FL	11032.
32	FL	

BENCHMARK PROBLEM 2
LOWER FREQUENCY AMPLIFIED GROUP RESPONSE
DOUBLE SUM METHOD

SUPPORT GROUP 1

DIRECTION FACTORS

X = .0000 Y = .0000 Z = 1.0000

INDICATOR FOR DISPLACEMENT OR ACCELERATION SPECTRUM = 2

EQ.0 DISPLACEMENT

EQ.1 ACCELERATION IN IN./SEC.**2

EQ.2 ACCELERATION IN G**S

1 SPECTRA ARE ENTERED FOR CASE 1. KIND= 2

CLUSTER FACTOR, CF = .10000

MODAL PARTICIPATION FACTORS

MODE	FREQ(CPS)	X-DIRECTION	Y-DIRECTION	Z-DIRECTION
1	8.165	7.3718E-02	-1.6145E-01	-1.5057E+00
2	10.872	6.8928E-02	-3.8077E-01	1.3934E-01
3	11.556	-2.8624E-01	-6.4167E-01	-4.3377E-01
4	11.845	-1.5265E-02	-3.8586E-01	2.0166E+00
5	13.026	-4.1332E-03	2.1977E+00	2.4987E-01
6	15.284	7.8663E-03	3.5077E-02	-4.7680E-02
7	15.813	5.2806E-02	-1.2045E+00	2.1886E-01
8	17.999	6.8553E-01	-5.3164E-01	-5.5164E-02
9	19.895	6.8430E-01	-2.9331E-01	-1.8840E-01
10	21.602	1.0857E+00	4.5023E-01	2.1002E-01
11	21.905	-1.3235E-01	-3.5896E-03	1.0222E+00
12	23.021	-8.3531E-02	2.5456E-01	-7.3399E-01
13	23.699	1.8789E-01	-4.0426E-01	-4.2043E-01
14	25.757	-6.7365E-02	9.6032E-01	-2.2048E-02
15	27.331	9.2403E-02	2.6572E-01	2.5694E-02
16	30.464	-2.6613E-01	8.1040E-01	-7.7466E-02
17	32.632	-2.9783E-01	1.4842E+00	1.0800E-01
18	34.397	4.0028E-01	-1.7391E+00	-1.8213E-01

SPECTRUM TABLE (SSE Z-DIRECTION - GROUP 1

NUMBER OF POINTS = 17
SCALE FACTOR = 1.00000E+00

INPUT POINT	PERIOD	SPECTRUM VALUE
1	1.0000E-05	1.7900E+00
2	2.9050E-02	1.7900E+00
3	3.0420E-02	1.9500E+00
4	3.1870E-02	2.8600E+00
5	3.6620E-02	2.8600E+00
6	3.8360E-02	3.1300E+00
7	4.0180E-02	3.3100E+00
8	4.2090E-02	5.1100E+00
9	4.4090E-02	6.6100E+00
10	4.6180E-02	7.7000E+00
11	4.8370E-02	7.7000E+00
12	5.0660E-02	9.0000E+00
13	8.8370E-02	9.0000E+00
14	9.2570E-02	8.7500E+00
15	9.6960E-02	8.5700E+00
16	1.0155E-01	8.5700E+00
17	1.4300E-01	8.5700E+00

***** COMBINED MODAL RESPONSES FOR SUPPORT GROUP 1 *****

MODAL COMBINATION METHOD 3-DOUBLE SUM

N O D E N O D E N U M B E R	D I S P L A C E M E N T S / R O T A T I O N S				A C C E L E R A T I O N S I N G ' S				
	X- T R A N S L A T I O N	Y- T R A N S L A T I O N	Z- T R A N S L A T I O N	X- R O T A T I O N	Y- R O T A T I O N	Z- R O T A T I O N	X- D I R E C T I O N	Y- D I R E C T I O N	Z- D I R E C T I O N
1	13437E-07	65934E-08	14630E-07	64762E-07	13606E-06	14015E-06	.000	.000	.000
2	11365E-03	51067E-04	18562E-03	20717E-04	42540E-04	14050E-04	.001	.001	.002
3	87190E-04	47270E-04	18841E-03	21495E-04	44133E-04	14358E-04	.001	.001	.002
301	18030E-01	87959E-02	64036E-03	13938E-03	28676E-03	11977E-03	.156	.111	.005
	32791E-01	15930E-01	10919E-02	18896E-04	37231E-04	22518E-03	.282	.200	.009
4	31801E-01	15434E-01	11776E-02	18919E-02	16146E-03	24521E-03	.273	.194	.010
5	25034E-01	12125E-01	12707E-02	79206E-04	35008E-03	26981E-03	.215	.152	.011
6	28083E-01	12129E-01	18909E-02	17042E-03	35008E-03	27044E-03	.232	.152	.031
7	12179E-01	58791E-02	13640E-02	17054E-03	58336E-03	29136E-03	.104	.073	.012
8	73035E-06	28413E-06	14712E-02	41029E-03	85446E-03	31344E-03	.000	.000	.013
9	18802E-01	89030E-02	15804E-02	53295E-03	11058E-02	33575E-03	.160	.110	.013
12	53697E-01	25752E-01	16735E-02	61661E-03	12540E-02	35742E-03	.454	.316	.014
13	47771E-01	25771E-01	17475E-01	62066E-03	12540E-02	35600E-03	.460	.317	.224
14	91111E-01	44227E-01	17720E-02	65521E-03	12935E-02	38336E-03	.769	.541	.015
15	12098E+00	59601E-01	19171E-02	66844E-03	12265E-02	41844E-03	1.019	.726	.016
16	13604E+00	13332E+00	10926E-01	54469E-03	12265E-02	46600E-03	1.292	1.023	.102
18	85714E-01	13261E+00	26661E-01	20835E-03	12109E-03	39705E-03	1.179	1.255	.230
1801	60044E-01	11575E+00	12432E+00	62514E-03	13085E-02	31327E-03	.687	1.172	.918
	31781E-01	80669E-01	17796E+00	81151E-03	12917E-02	34252E-03	.514	.768	1.499
21	18300E-01	48967E-01	20365E+00	75130E-03	53302E-03	39591E-03	.373	.521	1.501
23	12781E-01	26950E-01	20390E+00	60426E-03	38458E-03	37891E-03	.352	.390	1.506
24	13659E-01	80520E-02	20431E+00	28746E-03	25267E-03	37891E-03	.452	.394	1.508
25	13781E-01	11224E-01	20452E+00	14857E-03	91744E-04	35903E-03	.460	.441	1.509
29	12257E-01	16082E-01	20483E+00	11754E-03	36117E-03	39367E-03	.343	.592	1.510
31	16413E-01	17695E-01	20489E+00	14213E-03	46775E-03	40718E-03	.460	.735	1.510
32	28159E-01	21153E-01	20496E+00	14413E-03	46988E-03	40718E-03	.611	.858	1.510
34	38799E-01	24012E-01	20497E+00	14438E-03	47017E-03	40718E-03	.740	.952	1.510
35	47022E-01	26210E-01	20498E+00	81078E-03	11929E-02	40206E-03	.414	.550	1.518
36	22156E-01	52533E-01	20986E+00	90173E-03	16565E-02	40729E-03	.437	.573	1.537
37	24568E-01	54666E-01	21350E+00	89506E-03	27963E-02	45093E-03	.453	.635	1.574
38	26084E-01	58305E-01	21511E+00	16029E-02	34066E-02	49904E-03	.454	1.071	2.981
40	26130E-01	69482E-01	37045E+00	24594E-02	31401E-02	54882E-03	.454	1.615	4.924
4001	78299E-01	78299E-01	39112E+00	26617E-02	26378E-02	59660E-03	1.519	1.633	5.248
	31629E-01	80775E-01	39112E+00	38647E-02	16147E-02	59660E-03	2.451	1.262	6.361
41	91399E-01	12093E+00	48238E+00	50729E-02	11880E-02	16736E-02	2.255	1.878	6.831
43	97161E-01	14405E+00	36648E+00	60448E-02	12793E-02	18417E-02	2.226	2.224	5.252
44	42941E-01	14393E+00	11112E+00	57016E-02	12417E-02	17550E-02	1.243	2.023	1.538
46	39904E-01	13077E+00	60620E-01	48132E-02	11890E-02	15156E-02	1.048	1.569	.875
47	35522E-01	10103E+00	28784E-01	37332E-02	10377E-02	11469E-02	.646	1.116	.517
49	28615E-01	71561E-01	17112E-01	25303E-02	84173E-03	67661E-03	.107	.093	.374
51	47891E-02	58003E-02	29189E-02	55748E-03	34198E-03	16736E-03	.105	.002	.062
53	69956E-03	10148E-03	41364E-03	24791E-04	13478E-03	78175E-05	.000	.000	.009
55	29008E-08	43865E-08	10724E-07	81002E-06	12437E-03	29452E-06	.000	.000	.010
56	82258E-03	64120E-05	47496E-03	81002E-06	12437E-03	29452E-06	.000	.000	.010
57	12465E-01	12465E-01	20492E+00	79994E-04	33311E-03	29740E-03	.477	.477	1.510
58	13849E-01	13849E-01	20360E+00	86554E-04	48637E-03	25994E-03	.563	.521	1.507
59	15331E-01	15419E-01	19782E+00	24429E-03	93636E-03	98537E-04	.590	.575	1.542
61	15958E-01	15866E-01	17216E+00	53842E-03	11697E-02	59290E-04	.592	.622	2.620
62	15993E-01	12333E-01	14784E+00	87406E-03	11471E-02	59290E-04	.593	.528	4.042
64	12806E-01	97067E-02	11568E+00	12770E-02	10036E-03	11752E-03	.486	.442	3.705
65	39570E-02	96673E-02	60254E-01	12407E-02	91579E-03	19832E-03	.163	.440	1.808
67	19479E-02	91466E-02	47251E-01	10391E-02	87708E-03	21060E-03	.084	.418	1.398
69	50405E-03	77711E-02	35147E-01	84719E-03	77089E-03	21060E-03	.022	.359	1.061
71	32373E-04	60151E-02	26457E-01	69760E-03	64351E-03	16736E-03	.001	.280	.828
72	51493E-06	14854E-04	46234E-02	13672E-03	27727E-03	52955E-04	.000	.030	.161
73			67173E-03	57320E-05	11101E-03	26553E-05	.000	.001	.024

74	48221E-09	12144E-08	42626E-08	14769E-06	10247E-03	91759E-07	000	000	000	000
75	27733E-01	62975E-06	78270E-03	14769E-06	10247E-03	91761E-07	000	000	000	000
76	27925E-01	22971E-01	20789E+00	28296E-03	10851E-02	46131E-03	712	712	712	712
77	28159E-01	25015E-01	20980E+00	41170E-03	13953E-02	48702E-03	698	698	698	698
79	28190E-01	29787E-01	21350E+00	53839E-03	21055E-02	57652E-03	669	669	669	669
7901	28207E-01	53002E-01	25150E+00	12170E-02	2433E-02	58463E-03	976	976	976	976
80	31899E-01	76213E-01	31460E+00	19313E-02	21749E-02	50622E-03	1536	1536	1536	1536
82	70980E-01	75817E-01	32599E+00	21166E-02	18138E-02	39501E-03	1533	1533	1533	1533
8201	95629E-01	44961E-01	35939E+00	30221E-02	12949E-02	62336E-03	889	889	889	889
83	81159E-01	80063E-01	35191E+00	38497E-02	12159E-02	99797E-03	1483	1483	1483	1483
85	40655E-01	10016E+00	26367E+00	43959E-02	12157E-02	12739E-02	1757	1757	1757	1757
86	35657E-01	90733E-01	79582E-01	41048E-02	11057E-02	10987E-02	1755	1755	1755	1755
88	29692E-01	69740E-01	43871E-01	34370E-02	10445E-02	83131E-03	1607	1607	1607	1607
90	23162E-01	49148E-01	21887E-01	26411E-02	89809E-03	50489E-03	265	265	265	265
92	37672E-02	39156E-02	22633E-02	17693E-02	70317E-03	11987E-03	914	914	914	914
93	54810E-03	67194E-04	32203E-03	38233E-03	27142E-03	55209E-05	080	080	080	080
94	28023E-08	28681E-08	75569E-08	16879E-04	10572E-03	20148E-06	002	002	002	002
95	64507E-03	43322E-05	37247E-03	54977E-06	97526E-04	20148E-06	000	000	000	000
96				54978E-06	97528E-04		000	000	000	000

***** COMBINED MODAL RESPONSES FOR SUPPORT GROUP 1 *****
MODAL COMBINATION METHOD 3-DOUBLE SUM

PIPE FORCES AND MOMENTS

ELEMENT NUMBER	ELEMENT TYPE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
1	TANGENT	END-I END-J	14630.071 14630.071	6593.377 6593.377	13437.401 13437.401	140143.63 140143.63	136063.69 974707.62	64762.10 476231.60
2	TANGENT	END-I END-J	14627.127 14627.127	6594.550 6594.550	13439.226 13439.226	140143.63 140143.63	974707.62 916502.78	476231.60 447671.19
3	TANGENT	END-I END-J	14624.424 14624.424	6593.435 6593.435	13437.905 13437.905	140143.63 140143.63	916502.78 77927.61	447671.19 40314.93
4	TANGENT	END-I END-J	14610.679 14610.679	6306.020 6306.020	13030.482 13030.482	140143.63 140143.63	77927.61 1042019.13	40314.93 506802.61
5	TANGENT	END-I END-J	14596.806 14596.806	5999.830 5999.830	12592.389 12592.389	140143.63 140143.63	1042019.13 1218981.95	506802.61 591100.88
6	TANGENT	END-I END-J	14594.094 14594.094	5947.563 5947.563	12517.354 12517.354	140143.63 140143.63	1218981.95 1575734.71	591100.88 760577.39
7	TANGENT	END-I END-J	1262.662 1262.662	256.513 256.513	1929.400 1929.400	.00 .00	29623.42 .00	3938.49 .00
8	TANGENT	END-I END-J	14625.764 14625.764	4813.388 4813.388	10733.422 10733.422	124839.21 124839.21	1575734.71 1880901.47	757597.56 893844.96
9	TANGENT	END-I END-J	14621.982 14621.982	4790.464 4790.464	10699.147 10699.147	124839.21 124839.21	1880901.47 2068381.12	893844.96 977481.61
10	TANGENT	END-I END-J	14614.521 14614.521	11153.419 11153.419	30229.100 30229.100	124839.21 124839.21	2068381.12 1528487.59	977481.61 778368.29
11	TANGENT	END-I END-J	14610.052 14610.052	11115.846 11115.846	30173.476 30173.476	124839.21 124839.21	1528487.59 670557.96	778368.29 462339.46
12	TANGENT	END-I END-J	2941.355 2941.355	2080.474 2080.474	4274.067 4274.067	.00 .00	128559.28 .00	62576.45 .00
13	TANGENT	END-I END-J	15496.822 15496.822	8418.955 8418.955	26498.276 26498.276	183524.46 183524.46	670557.96 99574.19	408305.49 169868.01
14	TANGENT	END-I END-J	15490.722 15490.722	8202.798 8202.798	26174.234 26174.234	183524.46 183524.46	99574.19 675632.73	169868.01 36854.53
15	BEND	END-I CENTER END-J	15471.540 26073.411 29255.497	24929.031 13433.360 2463.641	7374.220 7374.220 7374.220	183524.46 210892.90 271787.73	36854.53 110958.45 168518.77	675632.73 1143194.31 1283626.36
16	TANGENT	END-I END-J	26441.759 26441.759	4962.345 4962.345	4002.006 4002.006	271781.88 271781.88	1283626.36 905110.80	168527.95 646627.51
17	TANGENT	END-I END-J	22699.821 22699.821	2321.859 2321.859	5361.557 5361.557	271778.95 271778.95	905110.80 476094.28	646628.62 710547.94
18	TANGENT	END-I END-J	19985.426 19985.426	8257.760 8257.760	21587.115 21587.115	271947.84 271947.84	476094.28 516627.68	710483.83 352463.93
19	BEND	END-I CENTER END-J	18492.982 25851.349 26114.409	20059.869 8574.668 7893.217	9775.098 9775.098 9775.098	271876.92 137957.81 99005.59	352518.97 219721.18 63484.98	516627.68 846591.33 863750.63

20	TANGENT	END-I END-J	23975.557 23975.557	10828.218 10828.218	7657.344 7657.344	99005.68 99005.68	863750.63 645171.34	63485.00 413620.78
21	TANGENT	END-I END-J	19457.852 19457.852	12518.211 12518.211	7850.539 7850.539	74141.92 74141.92	630187.49 479196.02	416562.09 796224.30
22	TANGENT	END-I END-J	16373.327 16373.327	4297.574 4297.574	4936.219 4936.219	74141.92 74141.92	479196.02 275570.54	796224.30 552881.98
23	TANGENT	END-I END-J	13761.590 13761.590	4138.828 4138.828	4739.491 4739.491	74141.92 74141.92	275570.54 233788.18	552881.98 407106.03
24	TANGENT	END-I END-J	10468.890 10468.890	4623.936 4623.936	4776.693 4776.693	76447.45 76447.45	334207.15 472765.05	351465.95 133457.38
25	TANGENT	END-I END-J	8178.501 8178.501	3795.376 3795.376	5320.485 5320.485	76447.45 76447.45	472765.05 490074.14	133457.38 134423.55
26	TANGENT	END-I END-J	7141.956 7141.956	2372.497 2372.497	2555.273 2555.273	76447.45 76447.45	490074.14 442921.29	134423.55 115801.26
27	TANGENT	END-I END-J	1687.957 1687.957	990.325 990.325	725.722 725.722	.00 .00	21531.56 4394.72	29050.01 5658.85
28	TANGENT	END-I END-J	506.369 506.369	319.356 319.356	248.074 248.074	.00 .00	4394.72 .00	5658.85 .00
29	TANGENT	END-I END-J	2433.971 2433.971	1929.242 1929.242	7774.886 7774.886	446100.56 446100.56	448867.11 293756.12	80024.45 70784.23
30	TANGENT	END-I END-J	2383.585 2383.585	1842.508 1842.508	7741.402 7741.402	446100.56 446100.56	293756.12 209078.20	70784.23 72612.34
31	BEND	END-I CENTER END-J	2342.880 2471.462 2384.471	1763.307 1586.603 1731.762	7696.176 7696.176 7696.176	446083.24 351068.03 227381.03	209114.91 302314.92 356222.87	72612.34 74163.19 73102.53
32	TANGENT	END-I END-J	2266.097 2266.097	1559.653 1559.653	7453.980 7453.980	227543.48 227543.48	356119.13 96987.49	73102.53 86002.32
33	TANGENT	END-I END-J	2103.581 2103.581	947.066 947.066	5884.773 5884.773	227543.48 227543.48	96987.49 259257.22	86002.32 114756.32
34	BEND	END-I CENTER END-J	2017.073 2151.986 2645.028	4199.854 4115.716 3838.078	458.653 458.653 458.653	227543.48 234520.31 229980.70	114756.32 95917.76 108809.10	259257.22 277352.20 294033.42
35	TANGENT	END-I END-J	1745.327 1745.327	577.605 577.605	2141.286 2141.286	229991.57 229991.57	294033.43 373281.07	108781.12 86309.49
36	TANGENT	END-I END-J	1708.094 1708.094	1305.296 1305.296	3557.391 3557.391	229991.06 229991.06	373281.07 166532.08	86310.82 82046.52
37	BEND	END-I CENTER END-J	2823.327 3079.624 1967.225	1968.183 1579.116 2823.947	7234.259 7234.259 7234.259	229991.72 91669.85 47892.50	166532.08 183086.35 95166.88	82044.86 85582.84 63336.39
38	TANGENT	END-I END-J	2832.507 2832.507	9980.057 9980.057	2474.549 2474.549	47861.83 47861.83	45216.21 80470.06	105385.32 328644.06
39	BEND	END-I CENTER END-J	3540.214 1472.297 2696.494	10039.167 10523.531 10302.356	4089.159 4089.159 4089.159	47861.83 63698.10 88959.95	117941.58 129366.92 133584.09	316616.39 367296.76 418342.17
40	BEND	END-I	2553.764	10493.183	4209.977	88888.70	133691.58	418322.90

41	BEND	CENTER END-J	4954.280 7167.935	9622.763 8122.193	4209.977 4209.977	117953.73 146565.55	130695.48 120312.61	467316.86 510132.89
		END-I CENTER	7089.171 8900.978	8302.830 6315.106	4299.632 4299.632	146403.82 171665.01	120325.49 104190.75	510176.20 545014.89
		END-J	10134.043	3977.317	4299.632	191661.02	84541.90	568548.12
42	TANGENT	END-I END-J	10135.902 10135.902	4346.671 4346.671	4485.346 4485.346	191651.42 191651.42	84522.31 263120.21	568553.97 738121.82
43	TANGENT	END-I END-J	10137.099 10137.099	4385.956 4385.956	4526.469 4526.469	191640.15 191640.15	263120.21 344526.56	738124.63 814466.73
44	TANGENT	END-I END-J	10136.833 10136.833	4386.548 4386.548	4532.198 4532.198	191699.05 191699.05	344526.56 371839.87	814452.88 840068.37
45	TANGENT	END-I END-J	.000 .000	.000 .000	1.063 1.063	.00 .00	7.99 .00	.00 .00
46	TANGENT	END-I END-J	733.144 733.144	1197.087 1197.087	2983.640 2983.640	116513.25 116513.25	192345.62 153262.73	58962.48 49456.30
47	TANGENT	END-I END-J	736.682 736.682	1058.177 1058.177	2946.219 2946.219	116513.25 116513.25	153262.73 135153.62	49456.30 48743.23
48	BEND	END-I CENTER	740.153 931.811	935.342 749.804	2917.575 2917.575	116505.43 89265.16	135160.26 143203.52	48743.23 48857.91
		END-J	1044.987	574.598	2917.575	85861.18	131274.46	47637.73
49	TANGENT	END-I END-J	856.896 856.896	509.889 509.889	2787.151 2787.151	85848.94 85848.94	131282.53 75877.98	47637.73 34247.72
50	TANGENT	END-I END-J	609.623 609.623	585.806 585.806	1944.701 1944.701	85848.94 85848.94	75877.98 91235.64	34247.72 19550.93
51	BEND	END-I CENTER	471.821 807.422	744.335 361.337	1894.318 1894.318	85348.94 56589.51	91235.64 99386.56	19550.93 16557.22
		END-J	744.098	472.133	1894.318	84818.67	54515.56	13409.39
52	TANGENT	END-I END-J	904.614 904.614	3105.667 3105.667	465.002 465.002	84802.05 84802.05	13409.39 11959.11	54541.57 77850.03
53	BEND	END-I CENTER	1030.472 1031.579	478.686 495.370	3648.749 3648.749	84802.05 93911.54	77850.03 85086.36	11959.11 13156.79
		END-J	973.811	610.218	3648.749	104272.21	89434.23	13761.80
54	BEND	END-I CENTER	1006.439 889.821	642.554 791.920	3811.988 3811.988	104263.63 115732.53	89444.12 90564.79	13761.80 14175.74
		END-J	735.168	922.198	3811.988	127530.36	87684.10	14951.54
55	BEND	END-I CENTER	748.093 588.263	960.710 1064.640	3936.453 3936.453	127511.03 138566.31	87712.07 81367.67	14951.54 16712.61
		END-J	481.866	1117.849	3936.453	147701.22	72264.39	19697.47
56	TANGENT	END-I END-J	482.114 482.114	1202.268 1202.268	4192.446 4192.446	147692.49 147692.49	72282.22 207109.06	19697.47 63048.27
57	TANGENT	END-I END-J	482.192 482.192	1214.157 1214.157	4256.104 4256.104	147692.49 147692.49	207109.06 281202.27	63048.27 84521.68
58	TANGENT	END-I END-J	482.192 482.192	1214.460 1214.460	4263.858 4263.858	147692.49 147692.49	281202.27 306366.61	84521.68 91758.56
59	TANGENT	END-I END-J	.000 .000	.000 .000	1.362 1.362	.00 .00	10.40 .00	.00 .00

60	TANGENT	END-I END-J	1729.553 1729.553	1476.611 1476.611	5963.353 5963.353	309893.48 309893.48	308158.74 192327.26	76447.45 58461.39
61	TANGENT	END-I END-J	1732.696 1732.696	1414.611 1414.611	5897.210 5897.210	309893.48 309893.48	192327.26 131136.34	58461.39 52227.91
62	BEND	END-I CENTER END-J	1738.752 1847.577 1796.393	1357.480 1268.664 1343.193	5822.477 5822.477 5822.477	309883.86 254666.37 179096.45	131159.03 189724.28 229450.98	52227.91 49471.36 45126.50
63	TANGENT	END-I END-J	1764.145 1764.145	1235.834 1235.834	5539.460 5539.460	179197.33 179197.33	229373.02 104364.45	45126.50 44185.65
64	TANGENT	END-I END-J	1763.749 1763.749	814.888 814.888	4227.594 4227.594	179197.33 179197.33	104364.45 234377.61	44185.65 68585.42
65	BEND	END-I CENTER END-J	1788.863 2107.421 2468.466	2960.197 2761.269 2497.630	579.911 579.911 579.911	179197.33 172403.36 160016.30	68585.42 82966.05 111829.98	234377.61 245737.42 255584.96
66	TANGENT	END-I END-J	1877.717 1877.717	871.888 871.888	1584.153 1584.153	160032.93 160032.93	255584.96 274531.59	111800.75 81524.79
67	TANGENT	END-I END-J	1557.991 1557.991	1161.920 1161.920	3033.718 3033.718	160032.48 160032.48	274531.59 107949.30	81526.04 69738.43
68	BEND	END-I CENTER END-J	2109.581 1961.629 1169.326	1169.739 1461.333 2109.870	5360.310 5360.310 5360.310	160032.65 73376.20 39251.09	107949.30 119234.60 62167.64	69737.79 66593.77 52201.35
69	TANGENT	END-I END-J	1690.521 1690.521	7081.643 7081.643	2411.995 2411.995	39241.45 39241.45	54825.73 58732.93	60846.28 253408.70
70	BEND	END-I CENTER END-J	2206.173 1598.800 2843.749	7309.082 7473.661 7163.135	2896.115 2896.115 2896.115	39241.45 43054.91 59242.00	96331.71 107213.11 113046.70	240770.00 276751.37 311829.83
71	BEND	END-I CENTER END-J	2773.084 4306.274 5668.211	7301.391 6557.103 5398.677	2983.100 2983.100 2983.100	59192.56 81525.91 105135.98	113122.87 113378.39 107724.74	311811.69 344326.81 372880.13
72	BEND	END-I CENTER END-J	5620.270 6679.080 7375.450	5535.805 4087.440 2542.068	3049.871 3049.871 3049.871	105017.14 127056.26 145635.12	107733.29 97371.23 83565.81	372910.32 395219.71 409114.69
73	TANGENT	END-I END-J	7377.153 7377.153	2834.609 2834.609	3190.352 3190.352	145621.82 145621.82	83558.77 213796.69	409120.73 506405.71
74	TANGENT	END-I END-J	7378.015 7378.015	2867.553 2867.553	3220.685 3220.685	145614.66 145614.66	213796.69 272070.53	506407.71 552039.77
75	TANGENT	END-I END-J	7377.891 7377.891	2868.103 2868.103	3224.815 3224.815	145650.96 145650.96	272070.53 291597.68	552030.12 567525.17
76	TANGENT	END-I END-J	.000 .000	.000 .000	.904 .904	.00 .00	6.70 .00	.00 .00

***** COMBINED MODAL RESPONSES FOR SUPPORT GROUP 1 *****
 MODAL COMBINATION METHOD 3-DOUBLE SUM

S U P P O R T F O R C E S A N D M O M E N T S

NODE NUMBER	COMPONENT DIRECTION	FORCE/MOMENT (LOCAL)
1	FX	13437.
1	FY	6593.
1	FZ	14630.
1	MX	64762.
1	MY	136064.
1	MZ	140144.
9	FX	40899.
9	FY	15911.
9	FZ	2901.
56	FX	4387.
56	FY	10724.
56	FZ	810006.
56	MX	371846.
56	MY	294525.
56	MZ	482.
74	FX	1214.
74	FY	4263.
74	FZ	147692.
74	MX	306375.
74	MY	91759.
74	MZ	2802.
95	FX	2868.
95	FY	7557.
95	FZ	549770.
95	MX	291602.
95	MY	201478.
95	MZ	20897.
19	FL	9520.
25	FL-1	16351.
25	FL-2	7984.
27	FL	6535.
32	FL	

SUPPORT GROUP 2

DIRECTION FACTORS

X = .0000 Y = .0000 Z = 1.0000

INDICATOR FOR DISPLACEMENT OR ACCELERATION SPECTRUM = 2

EQ.0 DISPLACEMENT
EQ.1 ACCELERATION IN IN./SEC.**2
EQ.2 ACCELERATION IN G**S

1 SPECTRA ARE ENTERED FOR CASE 2. KIND= 2
CLUSTER FACTOR, CF = .10000

MODAL PARTICIPATION FACTORS

MODE	FREQ (CPS)	X-DIRECTION	Y-DIRECTION	Z-DIRECTION
1	8.165	-4.5163E+00	-2.8030E+00	-3.2533E+00
2	10.872	3.8953E+00	-6.8532E+00	4.2226E-01
3	11.556	2.1463E+00	-2.0216E+00	3.9306E-01
4	11.845	-1.8769E+00	-2.0024E+00	5.9547E-01
5	13.026	4.7593E+00	1.9914E+00	-4.9254E-01
6	15.284	3.1004E+00	1.7227E+00	-1.5220E+00
7	15.813	2.9125E-01	1.7136E+00	-2.4284E-01
8	17.999	3.7872E+00	-2.2815E+00	2.5204E-01
9	19.895	5.4748E+00	1.5697E+00	-2.6586E+00
10	21.602	4.2978E-01	-1.0275E+00	7.0440E-01
11	21.905	-1.9446E-01	7.9729E-01	-3.7546E-01
12	23.021	-2.2090E+00	-2.2190E+00	6.1082E-01
13	23.699	1.1369E+00	2.8703E+00	9.8985E-01
14	25.757	2.9617E-01	-8.3438E-01	1.4973E+00
15	27.331	-2.6517E+00	-2.5694E+00	-9.6979E-02
16	30.464	-2.9727E+00	3.1214E+00	-6.5729E-01
17	32.632	-3.2268E-01	-1.0991E-01	-6.8017E-01
18	34.397	-1.3998E+00	2.2826E-01	4.6108E-01

SPECTRUM TABLE (SSE Z-DIRECTION - GROUP 2

NUMBER OF POINTS = 16
SCALE FACTOR = 1.00000E+00

INPUT POINT	PERIOD	SPECTRUM VALUE
1	1.000E-05	1.7400E+00
2	2.9050E-02	1.7400E+00
3	3.0420E-02	2.8200E+00
4	3.1870E-02	3.4800E+00
5	4.8370E-02	3.4800E+00
6	5.0660E-02	3.4800E+00
7	5.3070E-02	3.8300E+00
8	5.5590E-02	3.8300E+00
9	5.8220E-02	3.8300E+00
10	6.6910E-02	3.8300E+00
11	7.0090E-02	3.8300E+00
12	7.3410E-02	4.8600E+00
13	7.6900E-02	5.3200E+00
14	8.0550E-02	5.5000E+00
15	1.0155E-01	5.5000E+00
16	1.4300E-01	5.5000E+00

***** COMBINED MODAL RESPONSES FOR SUPPORT GROUP 2 *****
 MODAL COMBINATION METHOD 3-DOUBLE SUM

N O D E N O D E N U M B E R	D I S P L A C E M E N T S / R O T A T I O N S				A C C E L E R A T I O N S I N G ' S				
	X- T R A N S L A T I O N	Y- T R A N S L A T I O N	Z- T R A N S L A T I O N	X- R O T A T I O N	Y- R O T A T I O N	Z- R O T A T I O N	X- D I R E C T I O N	Y- D I R E C T I O N	Z- D I R E C T I O N
1	.17309E-07	.72381E-08	.19971E-07	.70857E-07	.17605E-06	.22875E-06	.000	.000	.000
2	.14868E-03	.56339E-04	.25338E-03	.22714E-04	.54851E-04	.22933E-04	.001	.001	.003
3	.11127E-03	.53674E-04	.25720E-03	.23568E-04	.56905E-04	.23434E-04	.001	.001	.003
301	.23243E-01	.96469E-02	.87410E-03	.15278E-03	.36987E-03	.19549E-03	.204	.147	.011
4	.42296E-01	.17461E-01	.14904E-02	.20897E-04	.47785E-04	.36755E-03	.366	.261	.018
5	.41025E-01	.16916E-01	.16073E-02	.86939E-04	.20803E-03	.40024E-03	.354	.252	.020
6	.32303E-01	.13290E-01	.17344E-02	.18687E-03	.45151E-03	.44038E-03	.277	.196	.021
7	.15720E-01	.64398E-02	.20602E-02	.18701E-03	.45151E-03	.44183E-03	.384	.196	.053
8	.94187E-06	.31104E-06	.18610E-02	.30877E-03	.75286E-03	.47350E-03	.133	.093	.023
9	.24271E-01	.97471E-02	.20066E-02	.44926E-03	.11033E-02	.50724E-03	.000	.000	.025
12	.69372E-01	.28192E-01	.21547E-02	.58346E-03	.14288E-02	.54162E-03	.198	.136	.026
13	.58896E-01	.28192E-01	.22813E-02	.67503E-03	.16223E-02	.57486E-03	.560	.389	.028
14	.11782E+00	.48418E-01	.18847E-01	.67944E-03	.16223E-02	.57400E-03	.604	.389	.287
15	.15651E+00	.65248E-01	.24105E-02	.71729E-03	.16748E-02	.61116E-03	.945	.658	.031
16	.19761E+00	.10164E+00	.26014E-02	.73162E-03	.15883E-02	.66023E-03	1.252	.877	.029
18	.17469E+00	.16226E+00	.35788E-01	.60058E-03	.15331E-03	.73291E-03	1.589	1.082	.157
1801	.10636E+00	.17194E+00	.35788E-01	.28071E-03	.10529E-02	.63601E-03	1.479	1.282	.457
19	.70585E-01	.15434E+00	.16839E+00	.65333E-03	.17799E-02	.42498E-03	1.127	1.587	1.191
21	.33914E-01	.10947E+00	.24172E+00	.88555E-03	.17636E-02	.43182E-03	1.068	1.661	1.702
23	.23461E-01	.66205E-01	.27604E+00	.88555E-03	.17636E-02	.43182E-03	1.068	1.661	1.702
24	.23461E-01	.66205E-01	.27604E+00	.88555E-03	.17636E-02	.43182E-03	1.068	1.661	1.702
25	.21131E-01	.36550E-01	.27693E+00	.10263E-02	.37683E-03	.46570E-03	.864	.926	1.948
29	.23046E-01	.12059E-01	.27750E+00	.82162E-03	.26000E-03	.43281E-03	.802	.716	1.951
31	.21943E-01	.15331E-01	.27780E+00	.38711E-03	.11298E-03	.36050E-03	.930	.727	1.959
32	.11892E-01	.20364E-01	.27826E+00	.21215E-03	.11298E-03	.36050E-03	.930	.727	1.959
27	.12365E-01	.23170E-01	.27835E+00	.21284E-03	.29476E-03	.37691E-03	.474	.635	1.963
34	.19575E-01	.23594E-01	.27845E+00	.23840E-03	.33295E-03	.38946E-03	.457	.785	1.964
35	.27120E-01	.35060E-01	.27847E+00	.26231E-03	.37749E-03	.41355E-03	.644	1.156	1.965
36	.33349E-01	.39325E-01	.27848E+00	.26730E-03	.37970E-03	.41355E-03	.867	1.477	1.965
37	.25115E-01	.68780E-01	.28732E+00	.96932E-03	.37998E-03	.41355E-03	1.057	1.726	1.965
38	.27417E-01	.70602E-01	.28738E+00	.96932E-03	.37998E-03	.41355E-03	1.057	1.726	1.965
40	.29520E-01	.74644E-01	.29781E+00	.80895E-03	.34626E-03	.59910E-03	.838	.844	2.019
4001	.29611E-01	.94703E-01	.29950E+00	.66820E-03	.42623E-03	.65567E-03	.840	.802	2.065
41	.29677E-01	.11555E+00	.29580E+00	.84049E-03	.69625E-03	.82568E-03	.848	.769	2.096
43	.29934E-01	.11644E+00	.29257E+00	.94948E-03	.84522E-03	.80578E-03	.851	1.269	2.239
4301	.49159E-01	.84617E-01	.25311E+00	.13999E-02	.85722E-03	.56918E-03	.854	2.097	2.446
44	.85982E-01	.36958E-01	.19595E+00	.18386E-02	.93439E-03	.37161E-03	.846	2.169	2.454
46	.83443E-01	.41852E-01	.14014E+00	.13999E-02	.12316E-02	.46496E-03	.923	1.696	2.208
47	.50281E-01	.41792E-01	.51147E-01	.19332E-02	.13897E-02	.72256E-03	1.318	1.013	2.073
49	.41995E-01	.38247E-01	.33437E-01	.16493E-02	.12127E-02	.86494E-03	1.290	.972	1.616
51	.32495E-01	.30135E-01	.20776E-01	.12612E-02	.11377E-02	.67796E-03	.662	.914	.399
53	.24474E-01	.21849E-01	.14304E-01	.88003E-03	.96570E-03	.55471E-03	.523	.772	.302
54	.39627E-02	.19772E-02	.23319E-02	.19540E-03	.74609E-03	.48454E-03	.403	.596	.232
55	.57467E-03	.41224E-04	.33461E-03	.88238E-05	.28488E-03	.11151E-03	.068	.064	.039
56	.20906E-08	.31088E-08	.40883E-08	.28479E-06	.11067E-03	.50766E-05	.010	.002	.006
57	.67520E-03	.21719E-05	.38986E-03	.28479E-06	.10208E-03	.15071E-06	.000	.000	.000
58	.22227E-01	.16066E-01	.27862E+00	.28479E-06	.10208E-03	.15071E-06	.000	.000	.000
59	.23053E-01	.17233E-01	.27691E+00	.12577E-03	.42936E-03	.32094E-03	.955	.786	1.972
61	.23700E-01	.19002E-01	.26892E+00	.29829E-03	.42936E-03	.32094E-03	1.021	.855	1.969
62	.23740E-01	.19505E-01	.22786E+00	.66947E-03	.93084E-03	.17010E-03	1.069	.969	1.955
64	.23753E-01	.19505E-01	.17828E+00	.10491E-02	.12595E-02	.11128E-03	1.073	1.208	2.185
65	.62490E-02	.16978E-01	.13142E+00	.14201E-02	.13682E-02	.13293E-03	1.075	1.237	2.687
67	.31593E-02	.16160E-01	.70134E-01	.13679E-02	.12258E-02	.29426E-03	.341	1.167	1.147
69	.84477E-03	.14000E-01	.55223E-01	.11324E-02	.11572E-02	.32369E-03	.188	1.129	.884
71	.64035E-04	.11024E-01	.40727E-01	.89580E-03	.98215E-03	.33123E-03	.053	.664	.513
72	.16147E-04	.12291E-02	.30177E-01	.72356E-03	.77993E-03	.29343E-03	.004	.802	.097
73	.10187E-05	.29487E-04	.72233E-03	.59453E-05	.30649E-03	.99270E-04	.001	.093	.014

74	95399E-09	25200E-08	38848E-08	15318E-06	11071E-03	17563E-06	000	000	000
75	95401E-09	13393E-05	84568E-03	15318E-06	11072E-03	17564E-06	000	000	016
76	23487E-01	31296E-01	28501E+00	24634E-03	57380E-03	52813E-03	1.145	1.145	2.017
77	26644E-01	33542E-01	28911E+00	26158E-03	67003E-03	57808E-03	1.132	1.132	2.061
78	29031E-01	39271E-01	29551E+00	33262E-03	83482E-03	73580E-03	1.351	1.351	2.139
79	29145E-01	67675E-01	31673E+00	67435E-03	82447E-03	73598E-03	1.920	1.920	2.491
80	29238E-01	94611E-01	32718E+00	10716E-02	67287E-03	55178E-03	1.966	1.966	2.758
81	29245E-01	96002E-01	32581E+00	11931E-02	74980E-03	36378E-03	1.555	1.555	2.324
82	38818E-01	68234E-01	29039E+00	17062E-02	11988E-02	40758E-03	1.175	1.175	2.290
83	71838E-01	42720E-01	23102E+00	21932E-02	14511E-02	58905E-03	1.177	1.177	1.793
84	74367E-01	53369E-01	16608E+00	25603E-02	14221E-02	68584E-03	1.174	1.174	533
85	50238E-01	53298E-01	59295E-01	23931E-02	12849E-02	67441E-03	1.103	1.103	389
86	43607E-01	48667E-01	37881E-01	19971E-02	12110E-02	58437E-03	921	921	317
87	34764E-01	38110E-01	22843E-01	15435E-02	10376E-02	48578E-03	704	704	252
88	26498E-01	27416E-01	15496E-01	10725E-02	80721E-03	42216E-03	073	073	041
89	42897E-02	23838E-02	25268E-02	23825E-03	30850E-03	10025E-03	002	002	006
90	62215E-03	46793E-04	36241E-03	10702E-04	11983E-03	46304E-05	000	000	000
91	22222E-08	31127E-08	45950E-08	34580E-06	11054E-03	14447E-06	000	000	007
92	73110E-03	26243E-05	42214E-03	34581E-06	11054E-03	14447E-06	012	012	
93									
94									
95									
96									

***** COMBINED MODAL RESPONSES FOR SUPPORT GROUP 2 *****
 MODAL COMBINATION METHOD 3-DOUBLE SUM

PIPE FORCES AND MOMENTS

ELEMENT NUMBER	ELEMENT TYPE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
1	TANGENT	END-I END-J	19970.957 19970.957	7238.112 7238.112	17308.152 17308.152	228743.73 228743.73	176058.64 1256221.85	70856.33 522424.36
2	TANGENT	END-I END-J	19966.457 19966.457	7239.206 7239.206	17310.325 17310.325	228743.73 228743.73	1256221.85 1181252.08	522424.36 491073.12
3	TANGENT	END-I END-J	19962.456 19962.456	7237.859 7237.859	17308.577 17308.577	228743.73 228743.73	1181252.08 99749.41	491073.12 44867.23
4	TANGENT	END-I END-J	19941.537 19941.537	6909.065 6909.065	16819.252 16819.252	228743.73 228743.73	99749.41 1343986.16	44867.23 555593.90
5	TANGENT	END-I END-J	19920.400 19920.400	6567.891 6567.891	16296.666 16296.666	228743.73 228743.73	1343986.16 1572973.77	555593.90 647795.05
6	TANGENT	END-I END-J	19916.296 19916.296	6510.495 6510.495	16207.506 16207.506	228743.73 228743.73	1572973.77 2034841.85	647795.05 833171.58
7	TANGENT	END-I END-J	1628.315 1628.315	439.099 439.099	3192.558 3192.558	.00 .00	49017.78 .00	6741.75 .00
8	TANGENT	END-I END-J	19858.750 19858.750	5345.032 5345.032	14096.641 14096.641	190686.22 190686.22	2034841.85 2431318.45	829462.86 978320.66
9	TANGENT	END-I END-J	19853.177 19853.177	5323.408 5323.408	14058.910 14058.910	190686.22 190686.22	2431318.45 2675624.71	978320.66 1070039.45
10	TANGENT	END-I END-J	19841.964 19841.964	12205.075 12205.075	38778.723 38778.723	190686.22 190686.22	2675624.71 1984086.67	1070039.45 852443.91
11	TANGENT	END-I END-J	19835.316 19835.316	12163.955 12163.955	38713.512 38713.512	190686.22 190686.22	1984086.67 887943.38	852443.91 507639.14
12	TANGENT	END-I END-J	3614.321 3614.321	2666.910 2666.910	5612.285 5612.285	.00 .00	168811.80 .00	80217.42 .00
13	TANGENT	END-I END-J	20453.065 20453.065	9378.160 9378.160	34726.848 34726.848	259293.58 259293.58	887943.38 126301.47	454138.07 189288.12
14	TANGENT	END-I END-J	20444.741 20444.741	9173.523 9173.523	34343.385 34343.385	259293.58 259293.58	126301.47 881183.45	189288.12 46187.68
15	BEND	END-I CENTER END-J	20418.625 34384.441 38568.775	32871.469 17745.482 3109.252	8427.386 8427.386 8427.386	259293.58 280721.25 330270.20	46187.68 119771.76 175344.19	881183.45 1496699.71 1681809.36
16	TANGENT	END-I END-J	35265.298 35265.298	6438.908 6438.908	4904.102 4904.102	330265.25 330265.25	1681809.36 1213832.96	175353.46 774121.49
17	TANGENT	END-I END-J	30918.489 30918.489	2699.842 2699.842	6677.788 6677.788	330261.74 330261.74	1213832.96 669741.13	774123.01 964773.86
18	TANGENT	END-I END-J	27790.733 27790.733	11292.192 11292.192	30551.846 30551.846	330496.61 330496.61	669741.13 719854.31	964693.52 476406.53
19	BEND	END-I CENTER END-J	26082.559 36746.761 36999.561	28110.792 10868.697 10062.753	13184.625 13184.625 13184.625	330397.26 142467.92 94776.24	476475.60 280403.83 76812.45	719854.31 1185864.71 1195628.60

20	TANGENT	END-I END-J	33838.874 33838.874	14692.399 14692.399	10336.531 10336.531	94776.12 94776.12	1195628.60 819223.51	76812.70 587087.10
21	TANGENT	END-I END-J	27507.912 27507.912	16402.576 16402.576	12206.777 12206.777	170287.57 170287.57	697384.40 418821.11	585997.95 1091880.90
22	TANGENT	END-I END-J	23316.471 23316.471	6150.579 6150.579	4310.472 4310.472	170287.57 170287.57	418821.11 358000.46	1091880.90 768753.32
23	TANGENT	END-I END-J	19729.176 19729.176	5723.351 5723.351	3069.983 3069.983	170287.57 170287.57	358000.46 363746.63	768753.32 577929.08
24	TANGENT	END-I END-J	14492.036 14492.036	6241.489 6241.489	2829.243 2829.243	159847.57 159847.57	449493.61 311263.02	501108.64 185412.47
25	TANGENT	END-I END-J	10644.828 10644.828	3378.213 3378.213	6026.569 6026.569	159847.57 159847.57	311263.02 244083.03	185412.47 177425.20
26	TANGENT	END-I END-J	8539.190 8539.190	4410.989 4410.989	4501.597 4501.597	159847.57 159847.57	244083.03 193323.83	177425.20 93086.30
27	TANGENT	END-I END-J	2196.684 2196.684	1734.543 1734.543	1030.190 1030.190	.00 .00	30581.31 6280.60	51226.80 10257.96
28	TANGENT	END-I END-J	658.968 658.968	578.975 578.975	354.531 354.531	.00 .00	6280.60 .00	10257.96 .00
29	TANGENT	END-I END-J	2278.670 2278.670	2841.334 2841.334	4201.586 4201.586	150728.03 150728.03	156808.65 87890.45	147635.67 100102.71
30	TANGENT	END-I END-J	2205.375 2205.375	2736.523 2736.523	3855.378 3855.378	150728.03 150728.03	87890.45 68445.06	100102.71 78054.79
31	BEND	END-I CENTER END-J	2147.582 2403.573 2640.729	2638.900 2428.717 2197.255	3572.510 3572.510 3572.510	150725.97 137773.65 118190.48	68449.03 81540.72 93692.84	78054.79 66317.25 55462.31
32	TANGENT	END-I END-J	2353.808 2353.808	2101.358 2101.358	2944.688 2944.688	118216.84 118216.84	93659.54 86595.12	55462.31 66455.49
33	TANGENT	END-I END-J	1943.765 1943.765	1400.719 1400.719	1878.459 1878.459	118216.84 118216.84	86595.12 144025.81	66455.49 120530.56
34	BEND	END-I CENTER END-J	1714.371 1825.579 1861.112	1211.657 1017.962 970.895	689.390 689.390 689.390	118216.84 99246.86 84866.39	120530.56 138037.26 150681.65	144025.81 147446.81 150426.47
35	TANGENT	END-I END-J	1570.017 1570.017	494.261 494.261	840.430 840.430	84876.75 84876.75	150426.47 128905.71	150674.59 129551.53
36	TANGENT	END-I END-J	1786.181 1786.181	1771.647 1771.647	1813.491 1813.491	84876.17 84876.17	128905.71 43353.11	129552.04 78523.33
37	BEND	END-I CENTER END-J	2342.454 2369.010 2182.047	2182.163 2178.091 2342.580	2515.796 2515.796 2515.796	84876.86 60855.60 44578.06	43353.11 54803.68 48986.79	78522.60 75855.77 59950.28
38	TANGENT	END-I END-J	2480.798 2480.798	3829.969 3829.969	1616.890 1616.890	44582.39 44582.39	34258.79 49885.42	68604.86 139311.57
39	BEND	END-I CENTER END-J	2731.573 2687.044 2766.094	3141.424 3146.874 3109.924	3045.362 3045.362 3045.362	44582.39 32716.41 41719.48	97523.97 115009.81 125634.07	110787.89 124649.15 136955.29
40	BEND	END-I	2803.784	3172.553	3116.765	41687.35	125668.39	136933.64

41	BEND	CENTER END-J	2924.018 3046.234	3102.558 3002.257	3116.765 3116.765	67308.07 97022.85	128665.18 123513.72	147331.64 155273.43
		END-I CENTER	3047.724 3126.982	3081.387 2997.308	3171.584 3171.584	96954.79 125460.34	123532.00 110895.08	155301.18 160960.41
		END-J	3162.556	2908.919	3171.584	150149.49	92129.54	163811.54
42	TANGENT	END-I END-J	3163.309 3163.309	3083.320 3083.320	3283.772 3283.772	150120.97 150120.97	92152.68 225602.52	163823.99 226490.12
43	TANGENT	END-I END-J	3163.728 3163.728	3108.310 3108.310	3308.561 3308.561	150118.91 150118.91	225602.52 285236.85	226491.40 269356.85
44	TANGENT	END-I END-J	3163.471 3163.471	3108.821 3108.821	3311.682 3311.682	150128.53 150128.53	285236.85 305224.85	269351.40 284678.61
45	TANGENT	END-I END-J	.000 .000	.000 .000	.588 .588	.00 .00	5.16 .00	.00 .00
46	TANGENT	END-I END-J	1068.651 1068.651	2198.338 2198.338	1981.477 1981.477	74507.18 74507.18	183489.88 174885.64	86699.17 55203.87
47	TANGENT	END-I END-J	1043.185 1043.185	1982.283 1982.283	1875.542 1875.542	74507.18 74507.18	174885.64 169534.26	55203.87 48381.44
48	BEND	END-I CENTER END-J	1029.521 1516.536 1856.010	1788.609 1403.888 914.340	1846.871 1846.871 1846.871	74497.38 59213.25 96870.95	169538.55 170311.38 145729.76	48381.44 48519.04 48299.32
49	TANGENT	END-I END-J	1511.125 1511.125	714.500 714.500	1915.273 1915.273	96814.82 96814.82	145767.06 97481.93	48299.32 43781.54
50	TANGENT	END-I END-J	1096.370 1096.370	720.856 720.856	2053.146 2053.146	96814.82 96814.82	97481.93 58481.65	43781.54 35415.76
51	BEND	END-I CENTER END-J	920.414 1388.484 1121.166	1121.520 429.364 920.905	2509.448 2509.448 2509.448	96814.82 71606.56 61014.88	58481.65 70539.61 51233.71	35415.76 31172.07 26851.94
52	TANGENT	END-I END-J	1597.654 1597.654	3224.016 3224.016	943.824 943.824	61017.66 61017.66	26851.94 30449.07	51230.55 85912.31
53	BEND	END-I CENTER END-J	1963.740 2009.019 1941.199	951.274 896.960 1072.297	3537.209 3537.209 3537.209	61017.66 59788.55 67682.43	85912.31 103798.58 115931.52	30449.07 32811.72 33330.58
54	BEND	END-I CENTER END-J	2043.147 1843.742 1556.286	1150.556 1445.973 1728.234	3631.728 3631.728 3631.728	67672.23 85005.29 107636.38	115937.47 121405.15 119339.25	33330.58 32132.10 30402.79
55	BEND	END-I CENTER END-J	1602.760 1245.155 952.445	1838.535 2083.092 2222.011	3703.014 3703.014 3703.014	107596.86 131389.13 153210.88	119374.80 110130.80 94353.00	30402.79 29824.22 31577.99
56	TANGENT	END-I END-J	953.675 953.675	2480.549 2480.549	3847.188 3847.188	153188.15 153188.15	94389.73 239256.63	31577.99 115833.49
57	TANGENT	END-I END-J	953.985 953.985	2519.304 2519.304	3881.277 3881.277	153188.15 153188.15	239256.63 307898.20	115833.49 160556.40
58	TANGENT	END-I END-J	953.985 953.985	2520.024 2520.024	3885.463 3885.463	153188.15 153188.15	307898.20 331036.92	160556.40 175630.81
59	TANGENT	END-I END-J	.000 .000	.000 .000	.910 .910	.00 .00	6.34 .00	.00 .00

60	TANGENT	END-I END-J	2085.651 2085.651	3128.166 3128.166	4441.219 4441.219	124748.35 124748.35	164046.77 87556.53	159847.57 107031.42
61	TANGENT	END-I END-J	2055.547 2055.547	2982.285 2982.285	4081.093 4081.093	124748.35 124748.35	87556.53 63428.05	107031.42 84701.54
62	BEND	END-I CENTER END-J	2034.651 2476.096 2848.629	2852.294 2523.126 2129.088	3782.036 3782.036 3782.036	124747.09 116438.41 103729.83	63430.69 69138.53 77124.35	84701.54 74041.98 64811.79
63	TANGENT	END-I END-J	2617.666 2617.666	1939.570 1939.570	3087.663 3087.663	103747.00 103747.00	77101.78 120919.77	64811.79 62726.63
64	TANGENT	END-I END-J	2287.603 2287.603	1321.314 1321.314	1819.296 1819.296	103747.00 103747.00	120919.77 182917.18	62726.63 103860.32
65	BEND	END-I CENTER END-J	2100.838 2193.949 2161.353	1085.171 913.097 1027.464	808.350 808.350 808.350	103747.00 90614.87 82823.58	103860.32 116835.70 127421.13	182917.18 185568.81 187768.33
66	TANGENT	END-I END-J	1927.889 1927.889	760.787 760.787	1096.979 1096.979	82828.69 82828.69	187768.33 149207.36	127415.73 114731.71
67	TANGENT	END-I END-J	2101.063 2101.063	1652.577 1652.577	2118.243 2118.243	82828.30 82828.30	149207.36 41171.69	114732.16 92131.00
68	BEND	END-I CENTER END-J	2621.304 2654.210 2024.098	2024.483 2004.916 2621.589	2855.301 2855.301 2855.301	82828.91 54190.18 39815.76	41171.69 53837.71 41689.16	92130.43 89819.79 67782.12
69	TANGENT	END-I END-J	2363.128 2363.128	4344.661 4344.661	1673.182 1673.182	39814.47 39814.47	49568.63 34043.72	62029.61 156570.97
70	BEND	END-I CENTER END-J	2665.835 2482.319 2574.094	3621.312 3731.378 3734.356	3289.951 3289.951 3289.951	39814.47 27810.35 38333.15	92943.75 11117.43 123220.15	129976.37 146846.07 162744.75
71	BEND	END-I CENTER END-J	2613.095 2837.526 3132.402	3808.031 3690.106 3442.407	3362.079 3362.079 3362.079	38296.88 64677.93 94684.83	123262.95 128152.47 125122.05	162720.81 177047.40 189843.70
72	BEND	END-I CENTER END-J	3128.962 3406.890 3649.733	3532.559 3211.998 2878.495	3417.680 3417.680 3417.680	94605.02 123752.03 149630.16	125137.43 114851.42 98090.93	189872.92 199964.30 206627.31
73	TANGENT	END-I END-J	3650.411 3650.411	3084.071 3084.071	3532.089 3532.089	149601.36 149601.36	98101.58 244268.59	206642.70 283674.20
74	TANGENT	END-I END-J	3650.869 3650.869	3112.230 3112.230	3556.759 3556.759	149598.07 149598.07	244268.59 308879.40	283675.88 328255.18
75	TANGENT	END-I END-J	3650.608 3650.608	3112.729 3112.729	3559.969 3559.969	149614.12 149614.12	308879.40 330497.74	328247.69 343928.92
76	TANGENT	END-I END-J	.000 .000	.000 .000	.702 .702	.00 .00	5.46 .00	.00 .00

***** COMBINED MODAL RESPONSES FOR SUPPORT GROUP 2 *****
 MODAL COMBINATION METHOD 3-DOUBLE SUM

S U P P O R T F O R C E S A N D M O M E N T S

NODE NUMBER	COMPONENT DIRECTION	FORCE/MOMENT (LOCAL)
1	FX	17308.
1	FY	7238.
1	FZ	19971.
1	MX	70856.
1	MY	176059.
1	MZ	228744.
9	FX	52745.
9	FY	17418.
56	FX	2091.
56	FY	3109.
56	FZ	4088.
56	MX	284784.
56	MY	305228.
56	MZ	150707.
74	FX	954.
74	FY	2520.
74	FZ	3885.
74	MX	153188.
74	MY	331041.
74	MZ	175631.
95	FX	2222.
95	FY	3113.
95	FZ	4595.
95	MX	345803.
95	MY	330501.
95	MZ	144471.
19	FL	30502.
25	FL-1	14626.
25	FL-2	22711.
27	FL	8861.
32	FL	7550.

SUPPORT GROUP 3

DIRECTION FACTORS

X = .0000 Y = .0000 Z = 1.0000

INDICATOR FOR DISPLACEMENT OR ACCELERATION SPECTRUM = 2

EQ.0 DISPLACEMENT

EQ.1 ACCELERATION IN IN./SEC.**2

EQ.2 ACCELERATION IN G**S

1 SPECTRA ARE ENTERED FOR CASE 3. KIND= 2

CLUSTER FACTOR, CF = .10000

MODAL PARTICIPATION FACTORS

MODE	FREQ(CPS)	X-DIRECTION	Y-DIRECTION	Z-DIRECTION
1	8.165	2.4565E+00	8.3849E-01	-2.8089E+00
2	10.872	-1.2029E+00	1.7299E+00	5.5497E-01
3	11.556	-6.4777E-01	5.3528E-01	3.2860E-01
4	11.845	6.1486E-01	5.4015E-01	-4.5331E-01
5	13.026	-3.6365E-01	-7.0522E-01	-5.0256E-01
6	15.284	-3.1760E-01	-1.2478E+00	-1.0538E+00
7	15.813	-1.3055E-01	-1.3930E+00	-1.3539E+00
8	17.999	3.3825E-02	-1.8779E-01	-4.2491E-01
9	19.895	-6.0430E-01	3.4650E-01	7.3453E-01
10	21.602	1.2917E-01	-1.4097E-01	-1.6394E-01
11	21.905	-8.9812E-02	5.4608E-02	8.8577E-03
12	23.021	3.2839E-02	-5.3465E-02	-2.5462E-01
13	23.699	8.8614E-02	1.8580E-02	2.1964E-01
14	25.757	2.1042E-01	-9.9642E-02	2.8592E-01
15	27.331	-1.0096E-01	2.1975E-01	5.9104E-01
16	30.464	8.0716E-02	-2.2103E-01	-1.3376E+00
17	32.632	4.3685E-02	1.6982E-01	-5.0343E-01
18	34.397	-1.0579E-01	1.8586E-01	1.2697E+00

SPECTRUM TABLE (SEE Z-DIRECTION - GROUP 3 (GE GROUP 4))

NUMBER OF POINTS = 19
SCALE FACTOR = 1.00000E+00

INPUT POINT	PERIOD	SPECTRUM VALUE
1	1.0000E-05	1.0000E+00
2	2.9050E-02	1.0000E+00
3	3.6620E-02	1.0000E+00
4	3.8360E-02	1.0700E+00
5	4.0180E-02	1.1400E+00
6	4.2090E-02	1.4600E+00
7	4.4090E-02	1.5400E+00
8	5.0000E-02	1.5400E+00
9	5.5590E-02	1.5400E+00
10	5.8220E-02	1.5400E+00
11	6.0990E-02	1.5400E+00
12	6.3880E-02	1.7600E+00
13	6.6910E-02	2.0700E+00
14	7.0090E-02	2.7500E+00
15	7.3410E-02	3.6700E+00
16	7.6900E-02	4.0300E+00
17	8.0550E-02	4.1300E+00

18 1.015E-01 4.1300E+00
19 1.4300E-01 4.1300E+00

***** COMBINED MODAL RESPONSES FOR SUPPORT GROUP 3 *****
 MODAL COMBINATION METHOD 3-DOUBLE SUM

N O D E N O D E N U M B E R	D I S P L A C E M E N T S / R O T A T I O N S				A C C E L E R A T I O N S I N G ' S				
	X- T R A N S L A T I O N	Y- T R A N S L A T I O N	Z- T R A N S L A T I O N	X- R O T A T I O N	Y- R O T A T I O N	Z- R O T A T I O N	X- D I R E C T I O N	Y- D I R E C T I O N	Z- D I R E C T I O N
1	.11154E-07	.47634E-08	.12836E-07	.46954E-07	.11391E-06	.13523E-06	.000	.000	.000
2	.96577E-04	.37597E-04	.16285E-03	.14976E-04	.35387E-04	.13557E-04	.001	.000	.002
3	.70070E-04	.34267E-04	.16530E-03	.15539E-04	.36712E-04	.13853E-04	.001	.001	.002
301	.14991E-01	.63578E-02	.56181E-03	.10078E-03	.23686E-03	.11557E-03	.107	.086	.007
	.27296E-01	.11519E-01	.95793E-03	.13636E-04	.30628E-04	.21728E-03	.194	.154	.011
5	.26478E-01	.11161E-01	.10331E-02	.57228E-04	.13408E-03	.23660E-03	.189	.148	.012
6	.20855E-01	.87705E-02	.11148E-02	.12322E-03	.29133E-03	.26033E-03	.148	.116	.013
7	.24035E-01	.87733E-02	.13519E-02	.12331E-03	.29133E-03	.26103E-03	.178	.116	.031
8	.10155E-01	.42542E-02	.11964E-02	.20395E-03	.48629E-03	.28067E-03	.072	.055	.014
9	.60992E-06	.20735E-06	.12901E-02	.29715E-03	.71339E-03	.30138E-03	.000	.000	.015
12	.15700E-01	.64512E-02	.13853E-02	.38622E-03	.92448E-03	.32247E-03	.112	.082	.016
13	.44888E-01	.18663E-01	.14668E-02	.44695E-03	.10501E-02	.34284E-03	.319	.234	.017
14	.38205E-01	.18676E-01	.12501E-01	.44970E-03	.10501E-02	.34160E-03	.352	.234	.171
15	.76249E-01	.32062E-01	.15504E-02	.47502E-03	.10846E-02	.36680E-03	.540	.398	.017
16	.10132E+00	.43210E-01	.16739E-02	.48406E-03	.10290E-02	.39894E-03	.716	.531	.018
18	.12800E+00	.67824E-01	.90911E-02	.39070E-03	.10778E-03	.44176E-03	.909	.706	.087
1801	.11328E+00	.10749E+00	.23435E-01	.14540E-03	.68206E-03	.36985E-03	.825	.830	.252
	.68660E-01	.11212E+00	.10911E+00	.40252E-03	.11539E-02	.22900E-03	.532	.853	.754
19	.44395E-01	.99534E-01	.15655E+00	.55875E-03	.11428E-02	.24191E-03	.384	.800	1.073
21	.16586E-01	.69810E-01	.17880E+00	.71324E-03	.42623E-03	.28160E-03	.229	.595	1.225
23	.74016E-02	.41933E-01	.17915E+00	.65653E-03	.24137E-03	.28334E-03	.166	.378	1.227
24	.67778E-02	.22476E-01	.17937E+00	.52574E-03	.15695E-03	.27370E-03	.157	.258	1.229
25	.99553E-02	.38131E-02	.17974E+00	.24618E-03	.51254E-04	.25937E-03	.266	.266	1.232
29	.99764E-02	.75696E-02	.17933E+00	.12601E-03	.39852E-04	.25358E-03	.222	.274	1.233
31	.53966E-02	.11625E-01	.18023E+00	.74881E-04	.15493E-03	.27771E-03	.159	.168	1.235
32	.60150E-02	.12641E-01	.18028E+00	.83287E-04	.18323E-03	.28611E-03	.159	.165	1.235
34	.10544E-01	.14889E-01	.18035E+00	.91030E-04	.21099E-03	.30056E-03	.196	.220	1.236
35	.14930E-01	.16734E-01	.18036E+00	.92037E-04	.21160E-03	.30056E-03	.241	.287	1.236
36	.18502E-01	.18167E-01	.18037E+00	.92164E-04	.21168E-03	.30056E-03	.282	.344	1.236
37	.96845E-02	.44374E-01	.18606E+00	.61051E-03	.22687E-03	.36015E-03	.226	.379	1.276
38	.12087E-01	.46009E-01	.19032E+00	.56688E-03	.27328E-03	.39274E-03	.284	.396	1.308
40	.14105E-01	.49545E-01	.19292E+00	.48094E-03	.42024E-03	.44929E-03	.331	.475	1.327
4001	.14151E-01	.63978E-01	.19400E+00	.33469E-03	.50576E-03	.44929E-03	.334	.871	1.372
	.14188E-01	.76202E-01	.19122E+00	.43697E-03	.52195E-03	.29165E-03	.336	1.224	1.437
43	.14642E-01	.76558E-01	.18904E+00	.50880E-03	.57849E-03	.18169E-03	.338	1.443	1.443
4301	.29839E-01	.55979E-01	.16290E+00	.82179E-03	.76680E-03	.32073E-03	.429	1.005	1.366
	.54034E-01	.22941E-01	.12453E+00	.11256E-02	.87262E-03	.48731E-03	.567	.579	1.207
46	.52163E-01	.25310E-01	.88581E-01	.13363E-02	.85442E-03	.55362E-03	.479	.528	.894
47	.31176E-01	.25310E-01	.32543E-01	.12476E-02	.76493E-03	.51005E-03	.244	.526	.306
49	.25976E-01	.23137E-01	.21148E-01	.10295E-02	.71499E-03	.42844E-03	.205	.506	.197
51	.20019E-01	.18183E-01	.12936E-01	.78226E-03	.60208E-03	.35296E-03	.168	.445	.117
53	.15027E-01	.13149E-01	.88002E-02	.54246E-03	.46087E-03	.31253E-03	.133	.356	.077
54	.24184E-02	.11778E-02	.14278E-02	.11832E-03	.17445E-03	.71779E-04	.022	.041	.013
55	.35074E-03	.24447E-04	.20453E-03	.53052E-05	.67613E-04	.32578E-05	.003	.001	.002
56	.10599E-08	.18501E-08	.25900E-08	.17052E-06	.62362E-04	.95340E-07	.000	.000	.000
57	.41247E-03	.12943E-02	.23816E-03	.17052E-06	.62362E-04	.95340E-07	.004	.000	.002
58	.10187E-01	.77578E-02	.18043E+00	.59214E-04	.12383E-03	.20823E-03	.230	.267	1.237
59	.10672E-01	.83297E-02	.17928E+00	.42264E-04	.12019E-03	.18197E-03	.243	.270	1.230
61	.10977E-01	.90602E-02	.17397E+00	.17777E-03	.52882E-03	.18197E-03	.254	.273	1.195
6101	.10974E-01	.90398E-02	.14585E+00	.40714E-03	.75541E-03	.48864E-04	.254	.253	1.020
62	.10966E-01	.68034E-02	.11023E+00	.63844E-03	.85617E-03	.78865E-04	.254	.240	.816
64	.87161E-02	.51135E-02	.79291E-01	.84131E-03	.87789E-03	.14270E-03	.218	.238	.611
65	.24542E-02	.50946E-02	.42962E-01	.80922E-03	.78905E-03	.14525E-03	.076	.237	.324
67	.11430E-02	.47918E-02	.33939E-01	.66665E-03	.74165E-03	.13095E-03	.040	.230	.255
69	.28477E-03	.40180E-02	.24981E-01	.51899E-03	.63133E-03	.11174E-03	.011	.206	.188
71	.28955E-04	.30854E-02	.18405E-01	.41444E-03	.48677E-03	.88032E-04	.002	.166	.140
72	.73107E-05	.32718E-03	.29689E-02	.81223E-04	.18442E-03	.27009E-04	.000	.020	.023
73	.46135E-06	.76644E-05	.42914E-03	.34054E-05	.71478E-04	.13543E-05	.000	.000	.003

***** COMBINED MODAL RESPONSES FOR SUPPORT GROUP 3 *****
MODAL COMBINATION METHOD 3-DOUBLE SUM

PIPE FORCES AND MOMENTS

ELEMENT NUMBER	ELEMENT TYPE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
1	TANGENT	END-I END-J	12835.568 12835.568	4763.422 4763.422	11153.792 11153.792	135222.02 135222.02	113913.67 810062.92	46953.97 344175.41
2	TANGENT	END-I END-J	12832.936 12832.936	4764.228 4764.228	11155.231 11155.231	135222.02 135222.02	810062.92 761749.73	344175.41 323542.62
3	TANGENT	END-I END-J	12830.547 12830.547	4763.405 4763.405	11154.268 11154.268	135222.02 135222.02	761749.73 63638.80	323542.62 29093.86
4	TANGENT	END-I END-J	12818.006 12818.006	4562.111 4562.111	10860.580 10860.580	135222.02 135222.02	63638.80 867259.78	29093.86 366446.33
5	TANGENT	END-I END-J	12805.231 12805.231	4350.888 4350.888	10542.867 10542.867	135222.02 135222.02	867259.78 1015436.29	366446.33 427549.91
6	TANGENT	END-I END-J	12802.837 12802.837	4315.091 4315.091	10488.367 10488.367	135222.02 135222.02	1015436.29 1314388.50	427549.91 550461.55
7	TANGENT	END-I END-J	961.852 961.852	254.686 254.686	1480.764 1480.764	.00 .00	22736.49 .00	3911.37 .00
8	TANGENT	END-I END-J	12780.109 12780.109	3566.612 3566.612	9133.494 9133.494	116482.81 116482.81	1314388.50 1574270.36	548272.01 648432.96
9	TANGENT	END-I END-J	12776.707 12776.707	3552.158 3552.158	9107.966 9107.966	116482.81 116482.81	1574270.36 1733985.78	648432.96 710052.66
10	TANGENT	END-I END-J	12769.940 12769.940	8111.728 8111.728	25051.615 25051.615	116482.81 116482.81	1733985.78 1286735.46	710052.66 565435.17
11	TANGENT	END-I END-J	12765.980 12765.980	8085.879 8085.879	25011.135 25011.135	116482.81 116482.81	1286735.46 576511.25	565435.17 336180.94
12	TANGENT	END-I END-J	2177.111 2177.111	1589.511 1589.511	3273.667 3273.667	.00 .00	98469.17 .00	47812.23 .00
13	TANGENT	END-I END-J	13216.595 13216.595	6284.943 6284.943	22477.943 22477.943	162168.67 162168.67	576511.25 77326.43	301614.44 124270.32
14	TANGENT	END-I END-J	13211.403 13211.403	6146.753 6146.753	22237.801 22237.801	162168.67 162168.67	77326.43 567962.58	124270.32 34428.97
15	BEND	END-I CENTER END-J	13195.340 22256.380 24986.302	21309.105 11519.576 1971.995	5628.272 5628.272 5628.272	162168.67 180139.49 218839.19	34428.97 82443.43 118976.17	567962.58 967619.51 1088328.24
16	TANGENT	END-I END-J	22864.117 22864.117	4169.961 4169.961	3055.481 3055.481	218835.45 218835.45	108832.24 790442.96	118982.99 514514.87
17	TANGENT	END-I END-J	19964.269 19964.269	1744.032 1744.032	3917.631 3917.631	218833.22 218833.22	790442.96 398604.47	514515.81 631230.43
18	TANGENT	END-I END-J	17764.141 17764.141	7330.146 7330.146	19100.906 19100.906	218984.63 218984.63	398604.47 464184.52	631178.14 314968.86
19	BEND	END-I CENTER END-J	16501.313 23183.739 23309.193	17685.441 6838.581 6447.894	8562.377 8562.377 8562.377	218922.20 109849.06 92858.54	315012.35 186280.11 37390.61	464184.52 757442.03 762273.53

20	TANGENT	END-I END-J	21307.973 21307.973	9404.277 9404.277	6392.590 6392.590	92858.55 92858.55	762273.53 530725.56	37390.92 370761.39
21	TANGENT	END-I END-J	17196.233 17196.233	10649.850 10649.850	6744.253 6744.253	71944.27 71944.27	449804.69 275758.04	366824.32 698730.79
22	TANGENT	END-I END-J	14533.961 14533.961	3681.122 3681.122	1529.460 1529.460	71944.27 71944.27	275758.04 206898.41	698730.79 483658.65
23	TANGENT	END-I END-J	12249.062 12249.062	3610.213 3610.213	1482.408 1482.408	71944.27 71944.27	206898.41 169974.38	483658.65 351055.28
24	TANGENT	END-I END-J	9109.174 9109.174	3948.821 3948.821	1453.009 1453.009	76352.58 76352.58	249893.67 186138.14	297538.57 57996.62
25	TANGENT	END-I END-J	6661.638 6661.638	1628.431 1628.431	3316.520 3316.520	76352.58 76352.58	186138.14 138349.51	57996.62 60260.64
26	TANGENT	END-I END-J	5313.413 5313.413	1679.705 1679.705	1795.295 1795.295	76352.58 76352.58	138349.51 112927.52	60260.64 20347.36
27	TANGENT	END-I END-J	1381.711 1381.711	339.889 339.889	282.403 282.403	.00 .00	8337.37 1675.54	10071.24 2046.33
28	TANGENT	END-I END-J	414.571 414.571	115.530 115.530	94.584 94.584	.00 .00	1675.54 .00	2046.33 .00
29	TANGENT	END-I END-J	851.843 851.843	1947.116 1947.116	2603.585 2603.585	93933.95 93933.95	84459.29 39951.71	107198.62 69254.75
30	TANGENT	END-I END-J	795.673 795.673	1896.787 1896.787	2366.803 2366.803	93933.95 93933.95	39951.71 32271.15	69254.75 49418.67
31	BEND	END-I CENTER END-J	750.671 937.428 1362.858	1840.236 1748.210 1446.023	2172.369 2172.369 2172.369	93933.26 87773.22 76444.05	32272.45 41579.93 52022.37	49418.67 38456.76 30385.44
32	TANGENT	END-I END-J	1245.469 1245.469	1292.663 1292.663	1743.312 1743.312	76460.30 76460.30	51998.49 52047.24	30385.44 45013.80
33	TANGENT	END-I END-J	1074.200 1074.200	801.343 801.343	1069.718 1069.718	76460.30 76460.30	52047.24 85555.52	45013.80 76657.18
34	BEND	END-I CENTER END-J	974.578 1016.320 1022.932	678.341 600.888 600.625	390.650 390.650 390.650	76460.30 63567.07 53297.92	76657.18 88107.73 96513.87	85555.52 87577.01 89463.54
35	TANGENT	END-I END-J	943.410 943.410	312.204 312.204	441.346 441.346	53305.68 53305.68	89463.54 79545.27	96508.85 82987.85
36	TANGENT	END-I END-J	1166.576 1166.576	1062.729 1062.729	1087.731 1087.731	53305.33 53305.33	79545.27 24166.66	82988.20 48685.28
37	BEND	END-I CENTER END-J	1501.282 1461.536 1337.947	1337.982 1399.799 1501.293	1600.172 1600.172 1600.172	53305.75 38484.35 26160.95	24166.66 31259.55 28690.87	48684.80 45051.38 33292.16
38	TANGENT	END-I END-J	1507.319 1507.319	2433.186 2433.186	908.382 908.382	26166.16 26166.16	17244.14 31333.26	40315.48 86577.34
39	BEND	END-I CENTER END-J	1641.681 1634.977 1710.657	1959.584 1948.235 1900.872	1866.017 1866.017 1866.017	26166.16 15091.13 21076.05	62844.52 74654.48 81666.10	66998.69 75732.97 83511.66
40	BEND	END-I	1732.222	1932.474	1897.743	21051.84	81688.06	83496.50

41	BEND	CENTER END-J	1822.163 1901.585	1865.662 1782.269	1897.743 1897.743	39799.05 60414.66	83499.26 79815.50	90069.33 95123.94
		END-I CENTER END-J	1904.686 1951.190 1971.062	1824.365 1775.583 1737.971	1920.629 1920.629 1920.629	60369.82 79660.13 96106.72	79827.53 71054.85 58012.30	95142.15 99093.54 100967.50
42	TANGENT	END-I END-J	1971.424 1971.424	1835.293 1835.293	1965.875 1965.875	96087.97 96087.97	58026.57 138774.52	100976.88 136220.37
43	TANGENT	END-I END-J	1971.682 1971.682	1849.781 1849.781	1975.440 1975.440	96086.72 96086.72	138774.52 174502.69	136221.29 160799.34
44	TANGENT	END-I END-J	1971.542 1971.542	1850.118 1850.118	1976.748 1976.748	96092.15 96092.15	174502.69 186461.28	160796.11 169642.72
45	TANGENT	END-I END-J	.000 .000	.000 .000	.224 .224	.00 .00	1.70 .00	.00 .00
46	TANGENT	END-I END-J	482.381 482.381	307.407 307.407	379.277 379.277	24536.53 24536.53	103077.78 107911.96	34060.47 33415.66
47	TANGENT	END-I END-J	460.876 460.876	281.924 281.924	256.688 256.688	24536.53 24536.53	107911.96 107766.94	33415.66 33375.40
48	BEND	END-I CENTER END-J	447.571 462.205 425.513	264.669 247.278 312.057	325.191 325.191 325.191	24527.23 20835.75 58965.43	107769.05 106881.75 89723.43	33375.40 32903.39 31599.07
49	TANGENT	END-I END-J	377.804 377.804	329.073 329.073	700.736 700.736	58921.86 58921.86	89752.02 60762.23	31599.07 21150.71
50	TANGENT	END-I END-J	351.869 351.869	382.164 382.164	1240.275 1240.275	58921.86 58921.86	60762.23 10342.49	21150.71 14248.31
51	BEND	END-I CENTER END-J	376.975 518.649 440.354	440.454 257.405 377.169	1599.678 1599.678 1599.678	58921.86 45445.51 24022.77	10342.49 26425.27 28925.71	14248.31 13128.16 9886.42
52	TANGENT	END-I END-J	505.493 505.493	1865.560 1865.560	422.732 422.732	24036.97 24036.97	9886.42 9885.28	28913.96 50363.42
53	BEND	END-I CENTER END-J	558.867 596.270 607.216	430.425 377.572 371.911	1971.329 1971.329 1971.329	24036.97 11272.29 13339.49	50363.42 64031.65 73380.40	9885.28 11619.52 12882.78
54	BEND	END-I CENTER END-J	622.344 606.523 565.139	384.073 415.646 465.363	2002.975 2002.975 2002.975	13327.74 31409.35 51321.68	73382.52 77917.03 77159.66	12882.78 13715.23 14177.50
55	BEND	END-I CENTER END-J	571.640 504.845 431.345	483.860 546.174 599.128	2026.212 2026.212 2026.212	51288.61 70577.26 87762.01	77181.71 71299.73 60584.99	14177.50 14505.49 14835.61
56	TANGENT	END-I END-J	431.769 431.769	641.627 641.627	2071.412 2071.412	87744.28 87744.28	60610.67 146660.15	14835.61 32304.96
57	TANGENT	END-I END-J	431.969 431.969	648.448 648.448	2080.932 2080.932	87744.28 87744.28	146660.15 184479.06	32304.96 43098.36
58	TANGENT	END-I END-J	431.969 431.969	648.551 648.551	2082.115 2082.115	87744.28 87744.28	184479.06 197124.00	43098.36 46820.95
59	TANGENT	END-I END-J	.000 .000	.000 .000	.224 .224	.00 .00	1.50 .00	.00 .00

60	TANGENT	END-I END-J	909.512 909.512	1531.267 1531.267	2624.430 2624.430	76494.56 76494.56	81201.90 35603.79	76352.58 51094.77
61	TANGENT	END-I END-J	875.297 875.297	1479.080 1479.080	2383.064 2383.064	76494.56 76494.56	35603.79 27337.50	51094.77 41155.26
62	BEND	END-I CENTER END-J	847.997 1049.510 1279.054	1423.211 1313.791 1114.944	2185.021 2185.021 2185.021	76493.96 71431.06 63631.09	27339.41 37383.78 45179.03	41155.26 36738.03 33091.62
63	TANGENT	END-I END-J	1162.809 1162.809	978.078 978.078	1740.781 1740.781	63641.40 63641.40	45165.59 68466.14	33091.62 39547.55
64	TANGENT	END-I END-J	994.356 994.356	616.962 616.962	1014.536 1014.536	63641.40 63641.40	68466.14 102000.88	39547.55 59068.10
65	BEND	END-I CENTER END-J	897.281 938.225 936.490	611.240 560.667 598.272	366.387 366.387 366.387	63641.40 56507.25 51689.73	59068.10 66166.17 72889.90	102000.88 103675.05 105646.71
66	TANGENT	END-I END-J	970.138 970.138	382.616 382.616	391.525 391.525	51693.69 51693.69	105646.71 93296.81	72885.74 66393.74
67	TANGENT	END-I END-J	1315.928 1315.928	852.876 852.876	1233.272 1233.272	51693.35 51693.35	93296.81 22434.29	66394.06 57193.88
68	BEND	END-I CENTER END-J	1696.282 1577.862 1028.431	1028.722 1217.141 1696.470	1827.986 1827.986 1827.986	51693.80 34435.70 21523.99	22434.29 28975.25 21838.99	57193.52 53892.25 37159.18
69	TANGENT	END-I END-J	1157.677 1157.677	2791.391 2791.391	902.215 902.215	21527.53 21527.53	24815.91 20569.91	35636.95 97411.84
70	BEND	END-I CENTER END-J	1259.548 1157.618 1319.084	2232.946 2293.984 2242.266	2080.090 2080.090 2080.090	21527.53 10364.94 20420.98	59406.88 71737.66 79536.06	79539.72 90136.48 100237.96
71	BEND	END-I CENTER END-J	1320.755 1582.086 1856.797	2271.815 2116.161 1866.971	2113.575 2113.575 2113.575	20392.47 40095.31 60723.12	79564.32 82359.42 79749.09	100221.32 109355.47 117604.00
72	BEND	END-I CENTER END-J	1851.373 2076.759 2246.397	1899.036 1600.720 1328.533	2137.633 2137.633 2137.633	60671.18 80138.66 97014.28	79759.27 72080.28 59856.78	117623.39 124070.91 128148.68
73	TANGENT	END-I END-J	2246.586 2246.586	1394.180 1394.180	2185.320 2185.320	96995.76 96995.76	59860.16 150688.81	128161.07 163438.50
74	TANGENT	END-I END-J	2246.855 2246.855	1402.866 1402.866	2195.349 2195.349	96993.58 96993.58	150688.81 190599.81	163439.75 182632.66
75	TANGENT	END-I END-J	2246.641 2246.641	1403.067 1403.067	2196.719 2196.719	97004.32 97004.32	190599.81 203947.37	182626.74 189364.36
76	TANGENT	END-I END-J	.000 .000	.000 .000	.224 .224	.00 .00	1.65 .00	.00 .00

***** COMBINED MODAL RESPONSES FOR SUPPORT GROUP 3 *****
 MODAL COMBINATION METHOD 3-DOUBLE SUM

S U P P O R T F O R C E S A N D M O M E N T S

NODE NUMBER	COMPONENT DIRECTION	FORCE/MOMENT (LOCAL)
1	FX	11154.
1	FY	4763.
1	FZ	12836.
1	MX	46954.
1	MY	113914.
1	MZ	135222.
9	FX	34155.
9	FY	11611.
9	FZ	1060.
56	FX	1850.
56	FY	2590.
56	FZ	170516.
56	MX	186463.
56	MY	95340.
56	MZ	432.
74	FX	649.
74	FY	2082.
74	FZ	87744.
74	MX	197125.
74	MY	46821.
74	MZ	1059.
95	FX	1403.
95	FY	2963.
95	FZ	200529.
95	MX	203949.
95	MY	70612.
95	MZ	17804.
19	FL	6501.
25	FL-1	14657.
25	FL-2	4168.
27	FL	4253.
32	FL	

***** SRSS COMBINATION OF SUPPORT GROUP RESPONSES *****
 MODAL COMBINATION METHOD 3-DOUBLE SUM

N O D E N O D E N U M B E R	D I S P L A C E M E N T S / R O T A T I O N S				A C C E L E R A T I O N S I N G ' S				
	X- T R A N S L A T I O N	Y- T R A N S L A T I O N	Z- T R A N S L A T I O N	X- R O T A T I O N	Y- R O T A T I O N	Z- R O T A T I O N	X- D I R E C T I O N	Y- D I R E C T I O N	Z- D I R E C T I O N
1	24588E-07	10888E-07	27886E-07	10686E-06	24996E-06	30043E-06	.000	.000	.000
2	21059E-03	84826E-04	35380E-03	34196E-04	77914E-04	30118E-04	.002	.001	.004
3	15777E-03	79307E-04	35913E-03	35482E-04	80831E-04	30777E-04	.002	.002	.004
301	14521E-01	14521E-01	12305E-02	23005E-03	52536E-03	25674E-03	.278	.204	.014
4	33016E-01	26293E-01	20811E-02	31300E-04	67880E-04	48271E-03	.501	.363	.024
5	60077E-01	25474E-01	22444E-02	33079E-03	29551E-03	52564E-03	.485	.351	.025
5	58270E-01	20011E-01	24219E-02	28133E-03	13079E-03	57836E-03	.381	.274	.027
6	45882E-01	20011E-01	31061E-02	28154E-03	64132E-03	58008E-03	.381	.274	.068
7	52679E-01	20018E-01	25911E-02	46517E-03	10594E-02	62279E-03	.483	.131	.029
8	22329E-01	97022E-02	28027E-02	67710E-03	15673E-02	71419E-03	.000	.031	.034
9	13389E-05	46954E-06	30099E-02	87956E-03	20295E-02	75878E-03	.278	.193	.033
12	34483E-01	14693E-01	31869E-02	10177E-02	23037E-02	75690E-03	.789	.553	.402
13	98543E-01	42500E-01	28581E-01	10242E-02	23037E-02	80934E-03	.837	.554	.405
14	84914E-01	42531E-01	28581E-01	10814E-02	23779E-02	87758E-03	.837	.554	.037
15	16732E+00	98370E-01	36393E-02	11029E-02	22552E-02	97440E-03	1.333	.940	.039
15	22225E+00	98370E-01	36393E-02	11029E-02	22552E-02	97440E-03	1.333	.940	.037
16	28071E+00	15235E+00	19895E-01	90002E-03	22312E-02	83603E-03	1.766	1.257	.036
18	24871E+00	23522E+00	50406E-01	90002E-03	22312E-02	83603E-03	2.241	1.648	.039
1801	24871E+00	23522E+00	50406E-01	90002E-03	22312E-02	83603E-03	2.241	1.648	.039
19	15288E+00	21709E+00	38738E+00	14797E-02	14797E-02	87758E-03	2.064	1.977	.570
21	10275E+00	15285E+00	38664E+00	14797E-02	14797E-02	87758E-03	2.064	1.977	.570
23	49349E-01	20453E-01	38907E+00	24651E-03	24651E-03	60192E-03	1.327	2.150	1.683
24	30661E-01	20453E-01	38907E+00	24651E-03	24651E-03	60192E-03	1.327	2.150	1.683
25	25609E-01	14993E-01	38907E+00	24651E-03	24651E-03	60192E-03	1.498	2.116	2.400
29	28580E-01	14993E-01	38907E+00	24651E-03	24651E-03	60192E-03	1.327	2.116	2.400
31	27766E-01	14993E-01	38907E+00	24651E-03	24651E-03	60192E-03	1.158	1.668	2.743
32	17911E-01	28433E-01	38907E+00	24651E-03	24651E-03	60192E-03	1.127	1.127	2.749
33	35879E-01	39306E-01	38907E+00	24651E-03	24651E-03	60192E-03	.856	.856	2.753
34	49636E-01	45671E-01	38907E+00	24651E-03	24651E-03	60192E-03	.890	.890	2.759
35	60544E-01	50631E-01	38907E+00	24651E-03	24651E-03	60192E-03	1.019	.871	2.763
36	34863E-01	97260E-01	40151E+00	14035E-02	17322E-02	10561E-02	1.019	.894	2.767
37	38748E-01	10689E+00	41007E+00	12988E-02	17322E-02	10561E-02	.603	.845	2.768
40	41842E-01	13375E+00	44521E+00	17686E-02	25461E-02	84275E-03	.593	.997	2.769
4001	41950E-01	13375E+00	44521E+00	17686E-02	25461E-02	84275E-03	.815	1.387	2.769
41	42029E-01	15903E+00	51117E+00	26355E-02	28576E-02	12771E-02	1.087	2.001	2.830
43	45944E-01	12969E+00	55691E+00	55120E-02	20259E-02	18869E-02	1.321	2.001	2.887
43	15999E+00	12852E+00	53535E+00	55120E-02	20259E-02	18869E-02	1.063	1.063	2.938
44	13829E+00	15213E+00	40224E+00	65498E-02	20464E-02	21087E-02	1.049	1.077	3.972
46	73103E-01	15200E+00	12658E+00	61675E-02	18967E-02	19981E-02	1.828	2.341	5.683
47	63487E-01	13820E+00	72388E-01	51910E-02	17942E-02	17147E-02	2.840	2.211	5.970
49	52139E-01	10699E+00	37782E-01	40174E-02	15401E-02	13220E-02	1.002	2.486	6.870
51	40541E-01	75969E-01	23976E-01	27333E-02	12155E-02	88896E-03	1.314	1.804	5.567
53	66699E-02	62402E-02	39995E-02	60247E-03	47806E-03	21353E-03	.773	1.314	1.982
54	97090E-03	11223E-03	57000E-03	26844E-04	18704E-03	98741E-05	.128	.002	.610
55	37294E-08	56858E-08	11765E-07	87538E-06	17255E-03	34430E-06	.019	.000	.447
56	11413E-02	68925E-05	65901E-03	16246E-03	17255E-03	34430E-06	.000	.000	.013
57	28323E-01	21764E-01	39010E+00	16246E-03	17255E-03	34430E-06	.022	.000	2.774
58	29671E-01	23625E-01	38765E+00	15847E-03	46253E-03	48457E-03	1.111	.958	2.767
59	30608E-01	28139E-01	32067E+00	40804E-03	67947E-03	43336E-03	1.191	1.037	2.762
61	30663E-01	20214E-01	25650E+00	15074E-02	14223E-02	21047E-03	1.247	1.159	3.561
62	79330E-02	20130E-01	10196E+00	16753E-02	12155E-02	13523E-03	1.251	1.382	2.762
64	24906E-01	20130E-01	32067E+00	40804E-03	67947E-03	43336E-03	1.253	1.367	3.561
65	38835E-02	19177E-01	80213E-01	13377E-02	11222E-02	41378E-03	1.050	1.270	4.921
67	10241E-02	16509E-01	59313E-01	10877E-02	11222E-02	41378E-03	1.265	1.265	4.431
69	77390E-04	12932E-02	44152E-01	21307E-03	45258E-03	58765E-05	.059	1.083	2.165
71	19514E-04	14243E-02	74216E-02	89330E-05	17842E-03	17842E-03	.004	.866	1.674
72	12311E-05	33895E-04	10757E-02	89330E-05	17842E-03	17842E-03	.001	1.225	1.265
73							.000	.002	1.984
									.028

74	.11529E-08	.28716E-08	.61315E-08	.23016E-06	.16463E-03	.20361E-06	.000	.000	.000
75	.11529E-08	.15527E-05	.12575E-02	.23016E-06	.16464E-03	.20362E-06	.000	.000	.032
76	.38837E-01	.42230E-01	.39812E+00	.38278E-03	.12752E-02	.78642E-03	.852	1.373	2.816
77	.41774E-01	.45817E-01	.40332E+00	.49489E-03	.16003E-02	.84386E-03	.908	1.376	2.854
79	.44106E-01	.54534E-01	.41173E+00	.64494E-03	.23194E-02	.10255E-02	.955	1.371	2.973
7901	.44224E-01	.95583E-01	.45335E+00	.14405E-02	.26269E-02	.10199E-02	.957	1.803	3.899
80	.44316E-01	.13422E+00	.50071E+00	.22963E-02	.23147E-02	.80140E-03	.959	2.626	5.042
82	.46762E-01	.13526E+00	.50672E+00	.25291E-02	.20148E-02	.56697E-03	.979	2.662	5.175
8201	.83929E-01	.91062E-01	.49895E+00	.36206E-02	.18968E-02	.78713E-03	1.572	1.926	5.259
83	.12649E+00	.93823E-01	.44649E+00	.46341E-02	.20853E-02	.12128E-02	2.727	1.936	5.477
85	.11823E+00	.11785E+00	.32934E+00	.53377E-02	.20664E-02	.15180E-02	2.656	2.153	4.232
86	.71354E-01	.11775E+00	.10644E+00	.49871E-02	.18740E-02	.14883E-02	1.518	2.149	1.190
88	.62289E-01	.10692E+00	.62902E-01	.41708E-02	.17673E-02	.12837E-02	1.243	1.584	.730
90	.50467E-01	.82542E-01	.34760E-01	.32089E-02	.15147E-02	.99806E-03	.954	1.595	.526
92	.38799E-01	.58463E-01	.22800E-01	.21738E-02	.11805E-02	.70047E-03	.719	1.177	.412
93	.62915E-02	.47675E-02	.37358E-02	.47263E-03	.45286E-03	.16510E-03	.116	.111	.066
94	.91363E-03	.85347E-04	.53406E-03	.20957E-04	.17608E-03	.75932E-05	.017	.002	.010
95	.37298E-08	.44591E-08	.93274E-08	.67973E-06	.16243E-03	.25778E-06	.000	.000	.000
96	.10743E-02	.52672E-05	.62032E-03	.67975E-06	.16243E-03	.25778E-06	.020	.000	.011

***** SRSS COMBINATION OF SUPPORT GROUP RESPONSES *****
 MODAL COMBINATION METHOD 3-DOUBLE SUM

PIPE FORCES AND MOMENTS

ELEMENT NUMBER	ELEMENT TYPE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
1	TANGENT	END-I END-J	27886.077 27886.077	10888.204 10888.204	24587.492 24587.492	300414.54 300414.54	249972.58 1784474.79	106861.70 786244.55
2	TANGENT	END-I END-J	27880.038 27880.038	10889.952 10889.952	24590.589 24590.589	300414.54 300414.54	1784474.79 1677973.93	786244.55 739081.94
3	TANGENT	END-I END-J	27874.652 27874.652	10888.071 10888.071	24588.274 24588.274	300414.54 300414.54	1677973.93 141677.63	739081.94 66968.74
4	TANGENT	END-I END-J	27846.671 27846.671	10407.404 10407.404	23887.976 23887.976	300414.54 300414.54	141677.63 1908989.86	66968.74 836550.27
5	TANGENT	END-I END-J	27818.376 27818.376	9902.790 9902.790	23136.631 23136.631	300414.54 300414.54	1908989.86 2234116.06	836550.27 975621.62
6	TANGENT	END-I END-J	27812.919 27812.919	9817.364 9817.364	23008.148 23008.148	300414.54 300414.54	2234116.06 2889833.65	975621.62 1255253.27
7	TANGENT	END-I END-J	2273.989 2273.989	568.747 568.747	4013.483 4013.483	.00 .00	61621.74 .00	8732.85 .00
8	TANGENT	END-I END-J	27777.922 27777.922	8028.604 8028.604	19933.410 19933.410	255957.60 255957.60	2889833.65 3453610.78	1250026.00 1475308.66
9	TANGENT	END-I END-J	27770.425 27770.425	7994.098 7994.098	19876.596 19876.596	255957.60 255957.60	3453610.78 3800509.79	1475308.66 1613886.50
10	TANGENT	END-I END-J	27755.340 27755.340	18416.364 18416.364	55183.047 55183.047	255957.60 255957.60	3800509.79 2815770.34	1613886.50 1285392.85
11	TANGENT	END-I END-J	27746.439 27746.439	18354.991 18354.991	55088.386 55088.386	255957.60 255957.60	2815770.34 1253178.63	1285392.85 764508.25
12	TANGENT	END-I END-J	5143.419 5143.419	3737.291 3737.291	7777.079 7777.079	.00 .00	233925.42 .00	112412.88 .00
13	TANGENT	END-I END-J	28864.487 28864.487	14082.974 14082.974	49126.027 49126.027	356669.46 356669.46	1253178.63 178455.77	681121.17 283069.30
14	TANGENT	END-I END-J	28852.879 28852.879	13755.805 13755.805	48570.337 48570.337	356669.46 356669.46	178455.77 1247215.00	283069.30 68387.97
15	BEND	END-I CENTER END-J	28816.705 48553.646 54477.076	46433.482 25061.129 4430.108	12533.063 12533.063 12533.063	356669.46 394626.97 480455.57	68387.97 182904.31 270738.82	1247215.00 2117378.26 2379209.50
16	TANGENT	END-I END-J	49654.579 49654.579	9136.343 9136.343	7028.676 7028.676	480447.19 480447.19	2379209.50 1708044.57	270753.56 1132305.97
17	TANGENT	END-I END-J	43241.275 43241.275	3965.057 3965.057	9417.397 9417.397	480442.07 480442.07	1708044.57 913293.20	1132308.03 1354296.43
18	TANGENT	END-I END-J	38565.561 38565.561	15793.524 15793.524	42003.092 42003.092	480767.99 480767.99	913293.20 1000280.78	1354181.14 671117.99
19	BEND	END-I CENTER END-J	35980.355 50557.897 50933.791	38799.356 15440.873 14322.638	18512.184 18512.184 18512.184	480631.20 480631.20 165551.62	671216.35 401999.97 106435.65	1000280.78 1642166.34 1660317.36

20	TANGENT	END-I END-J	46625.437 46625.437	20531.863 20531.863	14364.637 14364.637	165551.68 165551.68	1660317.36 1170061.03	106435.97 807707.37
21	TANGENT	END-I END-J	37828.610 37828.610	23220.056 23220.056	16003.809 16003.809	199175.48 199175.48	1042019.94 693601.03	807193.30 1521315.80
22	TANGENT	END-I END-J	31984.079 31984.079	8357.616 8357.616	6729.476 6729.476	199175.48 199175.48	693601.03 496900.80	1521315.80 1063290.12
23	TANGENT	END-I END-J	26993.766 26993.766	7932.245 7932.245	5838.259 5838.259	199175.48 199175.48	496900.80 464607.15	1063290.12 789289.02
24	TANGENT	END-I END-J	20064.732 20064.732	8713.770 8713.770	5738.680 5738.680	192938.32 192938.32	613339.83 595851.32	680564.03 235695.31
25	TANGENT	END-I END-J	14985.878 14985.878	5335.633 5335.633	8696.367 8696.367	192938.32 192938.32	595851.32 564703.21	235695.31 230609.45
26	TANGENT	END-I END-J	12335.247 12335.247	5282.714 5282.714	5478.783 5478.783	192938.32 192938.32	564703.21 496292.24	230609.45 149963.39
27	TANGENT	END-I END-J	3095.792 3095.792	2026.010 2026.010	1291.395 1291.395	.00 .00	38318.90 7846.44	59745.43 11892.68
28	TANGENT	END-I END-J	928.771 928.771	671.266 671.266	442.914 442.914	.00 .00	7846.44 .00	11892.68 .00
29	TANGENT	END-I END-J	3441.278 3441.278	3947.910 3947.910	9213.102 9213.102	480154.41 480154.41	482911.98 309214.37	199227.91 140808.97
30	TANGENT	END-I END-J	3343.423 3343.423	3805.403 3805.403	8966.333 8966.333	480154.41 480154.41	309214.37 222350.73	140808.97 117504.49
31	BEND	END-I CENTER END-J	3265.718 3572.719 3810.070	3668.700 3387.047 3149.313	8758.628 8758.628 8758.628	480137.49 387213.69 267422.54	222386.65 315867.18 371993.85	117504.49 106663.44 96660.82
32	TANGENT	END-I END-J	3496.692 3496.692	2918.839 2918.839	8201.980 8201.980	267576.97 267576.97	371882.72 140050.70	96660.82 117639.16
33	TANGENT	END-I END-J	3058.986 3058.986	1871.107 1871.107	6269.282 6269.282	267576.97 267576.97	140050.70 308670.49	117639.16 183229.26
34	BEND	END-I CENTER END-J	2820.940 2999.464 3392.056	4423.513 4282.101 4004.295	915.558 915.558 915.558	267576.97 262469.99 250866.69	183229.26 189782.74 209426.12	308670.49 326089.76 342180.49
35	TANGENT	END-I END-J	2530.015 2530.015	821.841 821.841	2342.260 2342.260	250881.85 250881.85	342180.49 402843.54	209404.23 176408.37
36	TANGENT	END-I END-J	2732.960 2732.960	2443.707 2443.707	4138.474 4138.474	250881.11 250881.11	402843.54 173771.29	176409.51 123562.92
37	BEND	END-I CENTER END-J	3963.866 4151.154 3228.154	3228.940 3032.675 3964.352	7824.640 7824.640 7824.640	250882.00 116566.71 70464.86	173771.29 193652.25 110813.42	123561.22 122915.20 93348.32
38	TANGENT	END-I END-J	4055.783 4055.783	10963.200 10963.200	3092.363 3092.363	70448.65 70448.65	59291.90 99728.46	132053.15 367301.37
39	BEND	END-I CENTER END-J	4763.385 3472.875 4224.798	10700.185 11155.381 10928.145	5429.362 5429.362 5429.362	70448.65 73181.64 100491.79	165440.57 395195.93 200743.59	342065.39 395195.93 448041.47
40	BEND	END-I	4169.377	11131.361	5571.338	100410.25	200845.55	448013.98

41	BEND	CENTER END-J	6034.507 8017.120	10281.306 8840.843	5571.338 5571.338	141518.28 185862.33	201514.72 190003.34	498200.93 541658.53
		END-I CENTER	7948.152 9633.956	9042.121 7212.285	5677.527 5677.527	185684.73 227057.02	190028.45 167935.20	541710.47 576861.35
		END-J	10797.464	5225.061	5677.527	261754.18	137842.68	600229.61
42	TANGENT	END-I END-J	10799.507 10799.507	5636.388 5636.388	5896.272 5896.272	261724.05 261724.05	137852.19 373345.80	600240.19 784013.75
43	TANGENT	END-I END-J	10800.805 10800.805	5685.093 5685.093	5944.598 5944.598	261714.09 261714.09	373345.80 480114.36	784016.91 872791.82
44	TANGENT	END-I END-J	10800.429 10800.429	5685.850 5685.850	5951.095 5951.095	261764.71 261764.71	480114.36 515940.80	872776.65 903070.02
45	TANGENT	END-I END-J	.000 .000	.000 .000	1.269 1.269	.00 .00	9.69 .00	.00 .00
46	TANGENT	END-I END-J	1382.847 1382.847	2521.917 2521.917	3601.677 3601.677	140458.93 140458.93	285114.72 256358.01	110242.67 81301.94
47	TANGENT	END-I END-J	1357.727 1357.727	2264.678 2264.678	3501.927 3501.927	140458.93 140458.93	256358.01 242119.97	81301.94 76358.21
48	BEND	END-I CENTER	1344.661 1838.927	2035.667 1610.681	3468.311 3468.311	140445.56 109126.63	242127.63 246854.03	76358.21 76313.97
		END-J	2172.052	1124.062	3468.311	142242.94	215686.02	74837.66
49	TANGENT	END-I END-J	1777.761 1777.761	937.451 937.451	3453.670 3453.670	142179.22 142179.22	215727.99 137667.12	74837.66 59473.33
50	TANGENT	END-I END-J	1302.896 1302.896	1004.458 1004.458	3087.948 3087.948	142179.22 142179.22	137667.12 108862.30	59473.33 42889.75
51	BEND	END-I CENTER	1100.845 1687.831	1416.257 617.395	3527.676 3527.676	142179.22 101956.71	108862.30 124706.97	42889.75 37658.87
		END-J	1415.884	1101.460	3527.676	107210.66	80209.34	31600.28
52	TANGENT	END-I END-J	1904.331 1904.331	4849.743 4849.743	1133.869 1133.869	107202.22 107202.22	31600.28 34174.36	80220.76 126404.18
53	BEND	END-I CENTER	2287.011 2335.777	1148.638 1092.068	5450.763 5450.763	107202.22 111897.77	126404.18 148707.40	34174.36 37211.85
		END-J	2255.047	1288.597	5450.763	125026.16	163778.12	38292.07
54	BEND	END-I CENTER	2361.007 2135.138	1372.716 1700.219	5633.169 5633.169	125012.21 146991.37	163788.71 170329.87	38292.07 37703.17
		END-J	1811.609	2013.387	5633.169	174595.29	166984.93	36727.09
55	BEND	END-I CENTER	1858.857 1466.780	2130.067 2402.293	5771.805 5771.805	174547.04 203580.13	167035.24 154379.87	36727.09 37137.63
		END-J	1151.222	2558.453	5771.805	230198.59	133398.55	40065.65
56	TANGENT	END-I END-J	1152.569 1152.569	2830.204 2830.204	6055.400 6055.400	230171.16 230171.16	133445.83 348779.42	40065.65 135779.60
57	TANGENT	END-I END-J	1152.934 1152.934	2870.815 2870.815	6124.461 6124.461	230171.16 230171.16	348779.42 455969.93	135779.60 186493.29
58	TANGENT	END-I END-J	1152.934 1152.934	2871.601 2871.601	6132.951 6132.951	230171.16 230171.16	455969.93 492243.63	186493.29 203612.41
59	TANGENT	END-I END-J	.000 .000	.000 .000	1.676 1.676	.00 .00	12.25 .00	.00 .00

60	TANGENT	END-I END-J	2858.120 2858.120	3782.970 3782.970	7885.041 7885.041	342706.21 342706.21	358422.77 214297.83	192938.32 132227.59
61	TANGENT	END-I END-J	2827.274 2827.274	3617.035 3617.035	7557.216 7557.216	342706.21 342706.21	214297.83 148213.29	132227.59 107684.06
62	BEND	END-I CENTER END-J	2807.585 3262.843 3602.454	3464.667 3114.756 2753.226	7278.685 7278.685 7278.685	342696.95 288990.10 216527.93	148234.88 20360.64 246245.94	107684.06 96329.22 85627.24
63	TANGENT	END-I END-J	3364.001 3364.001	2499.186 2499.186	6576.499 6576.499	216622.58 216622.58	246163.75 173784.79	85627.24 86319.22
64	TANGENT	END-I END-J	3054.928 3054.928	1670.504 1670.504	4712.925 4712.925	216622.58 216622.58	173784.79 314317.90	86319.22 137767.77
65	BEND	END-I CENTER END-J	2901.495 3183.481 3412.063	3211.543 2961.910 2766.175	1060.133 1060.133 1060.133	216622.58 202798.10 187448.10	137767.77 157835.11 184540.03	314317.90 324917.15 334278.11
66	TANGENT	END-I END-J	2860.708 2860.708	1218.774 1218.774	1966.309 1966.309	187465.63 187465.63	334278.11 326090.08	184516.95 155620.63
67	TANGENT	END-I END-J	2928.067 2928.067	2192.838 2192.838	3900.146 3900.146	187465.00 187465.00	326090.08 117692.22	155621.79 128929.08
68	BEND	END-I CENTER END-J	3768.164 3658.159 2553.791	2554.412 2763.395 3768.631	6342.487 6342.487 6342.487	187465.57 97501.09 59910.18	117692.22 133996.08 77972.70	128928.15 124123.77 93274.89
69	TANGENT	END-I END-J	3127.667 3127.667	8764.553 8764.553	3071.043 3071.043	59904.28 59904.28	77966.23 70934.11	93914.53 313399.91
70	BEND	END-I CENTER END-J	3682.411 3171.437 4056.186	8457.103 8662.677 8383.535	4851.630 4851.630 4851.630	59904.28 52293.10 73457.87	146449.74 170258.69 185172.26	284939.68 326005.68 365747.66
71	BEND	END-I CENTER END-J	4032.727 5394.318 6737.071	8542.387 7816.054 6669.465	4966.881 4966.881 4966.881	73391.22 111522.81 153967.80	185259.37 189896.80 183357.70	365716.97 402324.93 434638.82
72	BEND	END-I CENTER END-J	6693.736 7780.131 8530.218	6835.974 5439.304 4063.613	5054.888 5054.888 5054.888	153817.07 194628.04 230240.21	183377.69 165935.81 142084.14	434682.73 459976.00 475911.51
73	TANGENT	END-I END-J	8532.040 8532.040	4414.796 4414.796	5237.358 5237.358	230205.28 230205.28	142088.85 357887.26	475926.70 603017.35
74	TANGENT	END-I END-J	8533.025 8533.025	4458.368 4458.368	5276.654 5276.654	230197.72 230197.72	357887.26 453604.59	603020.18 667723.09
75	TANGENT	END-I END-J	8532.731 8532.731	4459.102 4459.102	5281.896 5281.896	230235.59 230235.59	453604.59 485646.47	667709.74 690094.79
76	TANGENT	END-I END-J	.000 .000	.000 .000	1.158 1.158	.00 .00	8.83 .00	.00 .00

***** SPSS COMBINATION OF SUPPORT GROUP RESPONSES *****
 MODAL COMBINATION METHOD 3-DOUBLE SUM

S U P P O R T F O R C E S A N D M O M E N T S		
NODE NUMBER	COMPONENT DIRECTION	FORCE/MOMENT (LOCAL)
1	FX	24587.
1	FY	10888.
1	FZ	27886.
1	MX	106862.
1	MY	249973.
1	MZ	300415.
1	FX	74976.
9	FY	26294.
9	FZ	3730.
56	FX	5686.
56	FY	11766.
56	FZ	875378.
56	MX	515948.
56	MY	344307.
56	MZ	1153.
74	FX	2872.
74	FY	6132.
74	FZ	230171.
74	MX	492252.
74	MY	203612.
74	MZ	3730.
95	FX	4459.
95	FY	9327.
95	FZ	679734.
95	MX	485652.
95	MY	257782.
95	MZ	41037.
19	FL	18623.
25	FL-1	31591.
25	FL-2	12635.
27	FL	10853.
32	FL	

BENCHMARK PROBLEM 2
HIGH FREQUENCY GROUP RESPONSE
(RIGID RESPONSE)

STATIC ANALYSIS

STRUCTURE LOAD CASE		ELEMENT A	LOAD B	MULTIPLIERS C	D
1	group 1	.000	.000	.000	.000
2	group 2	.000	.000	.000	.000
3	group 3	.000	.000	.000	.000

STATIC ANALYSIS

LOAD CASE 1 group 1

DISPLACEMENTS/ROTATIONS OF UNRESTRAINED NODES

NODE NUMBER	X- TRANSLATION	Y- TRANSLATION	Z- TRANSLATION	X- ROTATION	Y- ROTATION	Z- ROTATION
1	1.39726E-11	-2.37988E-12	-2.20421E-10	3.24620E-13	7.64265E-11	-1.36102E-09
2	4.06009E-08	-3.76097E-08	-2.76507E-06	5.63151E-09	3.87633E-08	-1.34930E-07
3	2.24847E-07	-6.47248E-08	-2.80709E-06	5.87379E-09	4.03114E-08	-1.37913E-07
301	1.71023E-05	-2.60673E-06	-9.58584E-06	3.60026E-08	2.56333E-07	-1.16166E-06
4	2.90515E-05	-3.95482E-06	-1.62827E-05	-1.75665E-08	-5.78056E-08	-2.18542E-06
5	2.77218E-05	-3.61703E-06	-1.75390E-05	-3.48587E-08	-1.67714E-07	-2.37987E-06
6	2.10178E-05	-2.32017E-06	-1.89015E-05	-5.86336E-08	-3.24493E-07	-2.61871E-06
7	6.23268E-05	-2.32557E-06	-2.01889E-05	-6.78887E-08	-3.24493E-07	-2.64504E-06
8	8.75431E-06	-7.65929E-07	-2.01572E-05	-4.82754E-08	-4.18912E-07	-2.73045E-06
9	1.32738E-09	-7.59609E-11	-2.15931E-05	-3.54066E-08	-3.88782E-07	-2.84411E-06
12	-5.16165E-06	3.97956E-06	-2.30481E-05	-2.7629E-08	-3.51919E-07	-2.95981E-06
13	-1.47805E-05	1.00942E-06	-2.42848E-05	-2.73778E-08	-4.23603E-07	-3.07155E-06
14	8.59610E-05	9.97028E-07	-2.68391E-05	-7.52155E-08	-4.23603E-07	-3.30240E-06
15	-2.98795E-05	5.92677E-07	-2.53778E-05	5.18473E-08	-4.19588E-07	-2.61450E-06
16	-3.96929E-05	-1.74355E-06	-2.69793E-05	1.48400E-07	-8.30677E-08	-2.01776E-06
1801	1.29365E-05	-3.45463E-05	-8.02201E-05	8.75657E-08	3.00752E-06	-4.17817E-07
19	1.39372E-04	-5.01344E-06	-2.40322E-04	2.33633E-06	9.44362E-07	1.46053E-06
21	4.30207E-05	1.79975E-04	-1.70246E-04	1.08884E-06	-1.80965E-06	2.87584E-06
23	-5.69555E-05	1.14637E-04	-1.13819E-04	2.98508E-06	-2.05120E-06	3.27803E-06
24	-1.50338E-04	-5.68011E-05	-1.14252E-04	4.38869E-06	-1.88118E-06	3.56307E-06
25	-9.65798E-05	1.93677E-04	-1.14882E-04	3.95592E-06	9.53641E-07	3.31245E-06
29	8.99198E-06	-3.73920E-04	-1.15035E-04	8.21753E-07	2.05190E-06	2.48934E-06
31	8.93470E-05	-3.46947E-04	-1.14569E-04	-2.55631E-06	2.26638E-06	2.04885E-06
32	1.50158E-04	3.00383E-05	-1.16718E-04	-6.45934E-06	4.51377E-07	3.99228E-06
27	1.57182E-04	1.64995E-04	-1.16710E-04	-7.12092E-06	7.11058E-07	4.47814E-06
34	1.89347E-04	4.07299E-04	-1.16926E-04	-8.05342E-06	1.35021E-06	5.25552E-06
35	2.20988E-04	5.99218E-04	-1.16975E-04	-8.08949E-06	1.34392E-06	5.25552E-06
36	-2.44637E-04	7.43454E-04	-1.16975E-04	-8.08949E-06	1.34392E-06	4.34038E-06
37	-1.90853E-04	-1.26505E-04	-1.20365E-05	4.62966E-06	3.96093E-06	4.34038E-06
38	-2.30554E-04	1.62730E-04	6.97644E-05	4.29058E-06	5.82810E-06	3.21980E-06
4001	-2.37848E-04	-1.46693E-04	2.05798E-04	4.46102E-06	9.82467E-06	-5.58381E-06
41	-2.47958E-04	2.32725E-04	6.68173E-04	1.89108E-06	8.68570E-06	-9.25510E-06
43	-2.50038E-04	5.96163E-04	8.90694E-04	-6.78861E-07	1.16937E-06	-4.49735E-06
4301	1.71320E-04	-1.05526E-05	1.36679E-04	-3.53632E-06	-2.14071E-05	1.54685E-05
44	9.33919E-04	1.28874E-03	-1.21259E-03	-4.14832E-06	-2.14479E-05	2.75705E-05
46	2.01250E-04	1.92898E-03	-1.51381E-03	-2.44532E-06	-2.15558E-06	5.42600E-05
47	-2.14735E-03	-1.91180E-03	-1.56184E-03	-2.43341E-06	2.18870E-05	4.95910E-05
49	-2.49301E-03	-1.94900E-03	-1.53920E-03	-7.55406E-06	2.87397E-05	3.18526E-05
51	-2.44681E-03	-1.93414E-03	-1.49522E-03	-2.12572E-05	3.94218E-05	1.20950E-05
53	-2.09520E-03	-1.69279E-03	-1.33944E-03	-3.68380E-05	4.85294E-05	-2.67431E-06
54	-4.63863E-04	-2.31021E-04	-3.10938E-04	-1.63328E-05	2.93036E-05	-5.78577E-06
55	-7.22264E-05	-6.22958E-06	-4.50798E-05	-8.74652E-07	1.34636E-05	-3.52147E-07
56	3.77139E-10	6.05732E-10	-3.47990E-09	-3.01149E-08	1.24701E-05	-1.34504E-08
57	8.05668E-05	2.49941E-07	4.56909E-05	-3.01149E-08	1.32905E-05	-1.34504E-08
58	9.89519E-05	-3.39092E-04	-8.69619E-05	-1.25018E-05	1.32905E-05	-2.23153E-06
59	1.28216E-04	-3.10641E-04	-7.72369E-05	-1.94068E-05	1.83063E-05	-3.87832E-06
6101	1.61804E-04	-2.21351E-04	7.03405E-05	-3.05876E-05	2.24035E-05	-8.41781E-06
62	1.64767E-04	1.89122E-04	1.11188E-03	-6.22691E-05	2.24035E-05	-9.45723E-06
64	1.66849E-04	5.67452E-04	1.95373E-03	-9.39498E-05	1.93250E-05	-7.41284E-06
65	2.24289E-04	6.58655E-04	2.85016E-04	-1.15127E-04	2.82416E-05	-1.73519E-07
66	1.49331E-04	6.55991E-04	-4.56981E-03	-1.03183E-04	5.17339E-05	4.01907E-06
67	9.34563E-05	6.38343E-04	-5.27526E-03	-7.68033E-05	6.18048E-05	7.71876E-06

69	2.87522E-05	5.70764E-04	-5.23752E-03	-5.56181E-05	7.85605E-05	1.04914E-05
71	-5.45115E-08	4.60323E-04	-4.54177E-03	-4.42059E-05	9.09887E-05	1.14385E-05
72	-1.37418E-08	5.39520E-05	-1.01581E-03	-8.66348E-06	5.33082E-05	4.25807E-06
73	-8.66984E-10	1.33278E-06	-1.55605E-04	-3.63227E-07	2.45767E-05	2.21203E-07
74	-8.11888E-13	1.17236E-10	-2.68314E-09	-9.35905E-09	2.27663E-05	7.69732E-09
75	-8.11888E-13	-5.86749E-08	1.68636E-04	-9.35905E-09	2.25815E-05	7.69732E-09
76	8.75108E-05	3.04152E-04	-1.60623E-04	-7.03101E-06	6.24166E-06	8.33778E-06
77	1.14344E-05	2.27190E-04	-1.53132E-04	-7.03101E-06	8.54313E-06	9.70143E-06
79	-5.18649E-05	6.21813E-05	-2.77781E-05	-5.84952E-06	1.42338E-05	1.37718E-05
7901	-5.08819E-05	-5.52997E-04	6.48387E-04	-6.91859E-06	1.30509E-05	1.13203E-05
80	-4.93361E-05	-8.62203E-04	1.03357E-03	-7.98766E-06	2.18683E-06	8.69611E-07
82	-6.21388E-05	-8.01190E-04	1.00300E-03	-9.81685E-06	-9.20567E-06	-9.10265E-06
8201	-6.42780E-04	4.20644E-04	-1.28625E-05	-5.29667E-06	-2.62147E-05	-2.37535E-05
83	-1.51812E-03	2.01421E-03	-1.54968E-03	1.92325E-06	-2.38496E-05	-3.37283E-05
85	-7.05745E-04	2.65683E-03	-1.70203E-03	7.01948E-06	4.68791E-07	-5.98915E-05
86	1.87969E-03	2.63440E-03	-1.39031E-03	4.06859E-06	1.84026E-05	-5.38147E-05
88	2.26028E-03	2.67535E-03	-1.34901E-03	-8.64830E-06	2.47785E-05	-3.26578E-05
90	2.23446E-03	2.62538E-03	-1.34906E-03	-2.86207E-05	3.49814E-05	-9.38460E-06
92	1.91191E-03	2.27678E-03	-1.23899E-03	-4.84215E-05	4.39005E-05	8.01492E-06
93	4.29603E-04	3.06336E-04	-2.92514E-04	-2.13731E-05	2.70325E-05	8.43180E-06
94	6.72775E-05	8.20254E-06	-4.23077E-05	-1.14436E-06	1.25316E-05	4.96788E-07
95	-4.46734E-10	7.91658E-10	-3.51985E-09	-3.95158E-08	1.16093E-05	1.85929E-08
96	-7.48716E-05	-3.31572E-07	4.24023E-05	-3.95158E-08	1.15171E-05	1.85929E-08

STATIC ANALYSIS

LOAD CASE 2 group 2
DISPLACEMENTS/ROTATIONS OF UNRESTRAINED NODES

NODE NUMBER	X- TRANSLATION	Y- TRANSLATION	Z- TRANSLATION	X- ROTATION	Y- ROTATION	Z- ROTATION
1	2.86194E-10	3.76484E-11	-3.76624E-10	-2.05292E-10	8.66010E-10	-9.04489E-09
2	2.52294E-06	1.10930E-07	-4.72456E-06	-1.04398E-07	7.40477E-07	-8.96702E-07
3	6.06261E-06	6.07236E-07	-4.79695E-06	-1.08567E-07	7.71000E-07	-9.16520E-07
301	3.32735E-04	4.59981E-05	-1.65600E-05	-6.86586E-07	4.79116E-06	-7.72003E-06
4	5.40866E-04	7.74613E-05	-2.86273E-05	1.76260E-07	-1.33084E-06	-1.45235E-05
5	5.11102E-04	7.35505E-05	-3.09776E-05	4.77042E-07	-3.33370E-06	-1.58158E-05
6	3.80875E-04	5.46865E-05	-3.35446E-05	9.04270E-07	-6.03151E-06	-1.74030E-05
7	6.63334E-04	5.47919E-05	-1.80918E-05	9.41770E-07	-6.03151E-06	-1.77677E-05
8	1.60008E-04	2.41045E-05	-3.65436E-05	1.20826E-06	-7.76491E-06	-1.72302E-05
9	1.09550E-08	-9.57138E-10	-4.00048E-05	1.48093E-06	-7.69019E-06	-1.70544E-05
12	-1.16602E-04	-3.08694E-05	-4.35763E-05	1.66200E-06	-6.93168E-06	-1.68755E-05
13	-3.16502E-04	-8.05425E-05	-4.66448E-05	1.63357E-06	-6.29808E-06	-1.67027E-05
14	2.15240E-04	-8.10245E-05	1.36287E-05	1.94140E-06	-6.29808E-06	-1.75164E-05
15	4.92973E-04	-1.16504E-04	-5.06353E-05	9.12277E-07	-5.06959E-06	-1.45249E-05
16	5.90101E-04	-1.26205E-04	-5.65604E-05	1.71294E-08	-1.98034E-06	-1.16816E-05
18	-2.77525E-04	1.70528E-04	-3.70409E-04	-6.00899E-06	1.90287E-05	-3.00305E-06
1801	5.80735E-04	1.73170E-04	-2.01036E-03	-5.66209E-06	6.46202E-06	1.52167E-06
21	-3.07054E-04	3.49819E-04	-3.35495E-04	6.63872E-07	-1.93247E-05	-1.04822E-06
23	-8.00459E-04	1.07349E-04	8.50371E-05	4.65055E-06	-5.43410E-07	-6.55000E-06
24	-6.47058E-04	-8.40656E-05	9.72283E-05	3.95364E-06	1.09642E-05	-7.81711E-06
25	-3.20316E-04	-2.29795E-04	1.04903E-04	3.95364E-06	1.09642E-05	-8.02357E-06
29	3.93751E-04	-3.90330E-04	1.17959E-04	8.48809E-07	9.05688E-06	-8.42102E-06
31	6.51141E-04	-3.76362E-04	1.24968E-04	-1.41536E-06	-2.86798E-06	-8.66877E-06
32	3.36119E-04	-1.24955E-04	1.35175E-04	-3.57998E-06	8.36453E-06	-6.66164E-06
27	1.49104E-04	-5.60222E-05	1.36954E-04	-3.45042E-06	-9.64533E-06	-6.66164E-06
34	-1.84493E-04	5.00904E-05	1.39100E-04	-3.18764E-06	-1.04717E-05	-6.01936E-06
35	-4.40101E-04	1.25508E-04	1.39640E-04	-3.19116E-06	1.07426E-05	-6.01936E-06
36	-6.32327E-04	1.82057E-04	1.39761E-04	-3.19142E-06	-1.07867E-05	-6.01936E-06
37	-5.09945E-04	5.93207E-05	3.29883E-04	6.70818E-06	9.91024E-06	-1.10383E-05
39	-4.08364E-04	1.60116E-04	4.77434E-04	6.65699E-06	1.02006E-05	-1.24012E-05
40	-3.32646E-04	3.59195E-04	6.39035E-04	4.89318E-05	7.20882E-06	-1.53335E-05
4001	-3.34033E-04	9.75851E-04	8.23147E-04	8.74928E-07	-8.34680E-07	-8.77953E-06
43	-2.95157E-04	9.35750E-04	4.06489E-04	-3.14332E-06	-1.10012E-05	5.74709E-06
4301	-2.94303E-04	-5.56118E-04	-6.15394E-04	-1.49352E-06	-1.59618E-05	2.73520E-05
44	6.14633E-04	-1.82590E-03	1.17023E-03	1.12363E-06	-4.85713E-06	2.31552E-05
46	2.93754E-04	-1.97273E-03	-8.05181E-04	2.08632E-05	1.7788E-06	1.49689E-05
47	-2.36404E-04	-1.96023E-03	1.51300E-05	1.5032E-05	3.03056E-06	7.63039E-06
49	-2.57663E-04	-1.96043E-03	3.02324E-05	-4.36218E-06	3.32025E-06	-2.26675E-06
51	-1.89081E-04	-1.84845E-03	-3.92399E-05	-1.95517E-05	3.57828E-06	-1.13357E-05
53	-1.23418E-04	-1.55169E-03	-8.31314E-05	-2.97696E-05	3.47264E-06	-1.72388E-05
54	-2.16441E-05	-1.97720E-04	1.54919E-05	-1.29961E-05	1.57575E-06	-7.51341E-06
55	-3.25563E-06	-5.14515E-06	-2.06901E-06	-6.96087E-07	6.35756E-07	-4.02291E-07
56	5.51233E-11	-4.81258E-10	-1.45169E-10	-2.43596E-08	5.86910E-07	-1.40751E-08
57	3.88255E-06	-2.22596E-04	2.24169E-07	-2.43596E-08	5.86938E-07	-1.40751E-08
58	8.11062E-04	-2.22596E-04	1.55556E-04	-4.82380E-07	2.35857E-06	-1.02391E-05
59	9.00804E-04	-1.35952E-04	1.71701E-04	-2.49644E-07	1.77334E-06	-9.22595E-06
6101	9.47261E-04	-2.20347E-04	1.78133E-04	-7.74951E-07	-7.73243E-07	-2.32233E-07
62	9.48801E-04	-5.74584E-04	8.79605E-05	-8.64369E-07	-3.19989E-06	6.15044E-06
64	6.85676E-04	-7.99255E-04	-8.10989E-05	-9.53784E-07	-3.84350E-06	9.63322E-06
65	3.75119E-05	-7.94251E-04	-1.49593E-04	7.72025E-08	-1.84307E-06	1.58708E-05
67	-3.29558E-05	-8.06836E-04	-1.34626E-04	5.13123E-07	9.56880E-08	1.14633E-05
			-1.27085E-04	7.28987E-07	5.99187E-07	2.27684E-06

1. 84373E-05
6. 45918E-06
1. 62970E-07
1. 02829E-07
1. 02829E-11
9. 62945E-11
1. 19504E-04
1. 95374E-05
-8. 67821E-05
-8. 95244E-05
9. 17909E-05
-8. 98251E-05
-1. 01031E-04
-1. 12174E-04
-1. 07037E-04
-4. 79871E-05
-3. 31438E-05
-2. 00186E-05
-1. 28550E-05
-2. 07322E-06
-3. 01132E-07
-2. 27126E-13
3. 54969E-07

STATIC ANALYSIS

LOAD CASE 3 group 3

DISPLACEMENTS/ROTATIONS OF UNRESTRAINED NODES

NODE NUMBER	X- TRANSLATION	X- TRANSLATION	Y- TRANSLATION	Z- TRANSLATION	X- ROTATION	Y- ROTATION	Z- ROTATION
1	-3.13658E-10	-2.07162E-11	-3.27180E-08	2.13698E-09	-1.14607E-10	3.04559E-09	3.04559E-09
2	-4.78311E-06	4.83361E-06	3.90206E-04	2.12266E-07	-7.47702E-07	3.01936E-07	3.01936E-07
3	-8.38345E-06	3.88258E-06	3.95763E-04	2.17971E-07	-7.79745E-07	3.08610E-07	3.08610E-07
301	-3.43393E-04	-7.55372E-05	-1.23764E-03	1.67262E-06	-4.68586E-06	4.59948E-06	4.59948E-06
4	-5.24757E-04	-1.48481E-04	-1.99410E-03	-2.41216E-06	1.71583E-06	4.89035E-06	4.89035E-06
5	-4.87741E-04	-1.14610E-04	-2.12822E-03	-4.50199E-06	3.63011E-06	5.32548E-06	5.32548E-06
6	-3.50401E-04	4.93263E-05	-2.27218E-03	-8.45194E-06	5.98081E-06	5.85993E-06	5.85993E-06
7	-4.61190E-04	1.07641E-04	-2.58654E-03	-1.28648E-06	5.98081E-06	6.35754E-06	6.35754E-06
8	-1.33569E-04	1.07641E-04	-2.58654E-03	5.15659E-07	4.29965E-06	3.99255E-06	3.99255E-06
9	-2.11391E-08	-3.52983E-08	-2.46958E-03	5.48021E-06	1.19386E-06	2.09313E-06	2.09313E-06
12	2.95116E-05	-3.49297E-04	-2.65532E-03	-6.17674E-06	-9.37622E-07	-1.70775E-06	-1.70775E-06
13	1.01894E-04	-3.60125E-04	-3.44900E-03	-2.29785E-05	-9.37622E-07	-2.28860E-06	-2.28860E-06
14	2.79963E-05	-4.04897E-04	-2.68909E-03	5.21413E-05	-1.43439E-06	-2.14402E-06	-2.14402E-06
15	-7.38459E-05	-6.94868E-04	-2.73477E-03	1.28984E-05	6.41723E-07	-2.71363E-06	-2.71363E-06
16	3.37645E-04	-1.13261E-03	-3.16958E-03	1.63223E-05	1.25050E-05	2.25279E-06	2.25279E-06
18	2.54386E-04	-1.13261E-03	-3.18054E-03	5.74514E-06	-1.67048E-05	1.74838E-05	1.74838E-05
1801	-1.08682E-03	6.01329E-04	-2.35785E-05	4.89544E-06	-1.38022E-05	1.82703E-05	1.82703E-05
21	-1.49537E-03	1.14137E-03	8.03481E-05	1.44638E-05	1.48531E-05	1.24124E-05	1.24124E-05
22	-1.34977E-03	8.86857E-04	8.02515E-05	1.56971E-05	1.77756E-05	-8.13189E-06	-8.13189E-06
24	-6.37667E-04	-2.22754E-04	7.91328E-05	1.50032E-05	1.61748E-05	-8.81304E-06	-8.81304E-06
25	7.06503E-05	-9.82987E-04	7.72815E-05	7.46848E-06	7.51079E-06	-1.01243E-05	-1.01243E-05
31	8.48901E-04	-1.12905E-03	7.62625E-05	-2.41124E-07	-4.82693E-07	-1.09416E-05	-1.09416E-05
32	2.49424E-04	-5.66614E-04	7.49302E-05	1.08550E-05	1.15403E-05	-1.21285E-05	-1.21285E-05
33	7.60425E-06	-3.37483E-04	7.46542E-05	-1.17347E-05	-1.26088E-05	-1.24252E-05	-1.24252E-05
34	-4.17284E-04	5.19602E-05	7.42617E-05	-1.23549E-05	-1.35220E-05	-1.28999E-05	-1.28999E-05
35	-7.47384E-04	3.47366E-04	7.42267E-05	-1.24799E-05	-1.38815E-05	-1.28999E-05	-1.28999E-05
36	-9.95331E-04	5.69265E-04	7.42188E-05	-1.24983E-05	-1.39281E-05	-1.28999E-05	-1.28999E-05
37	-3.43295E-04	5.75295E-04	5.73171E-04	1.57652E-05	1.63039E-05	-2.44059E-05	-2.44059E-05
38	-1.00414E-04	8.15444E-04	8.35195E-04	1.50147E-05	1.46781E-05	-8.5842E-05	-8.5842E-05
4001	7.26342E-05	1.20975E-03	1.04784E-03	3.50635E-06	5.29069E-06	-6.32472E-06	-6.32472E-06
41	1.08120E-04	2.03060E-03	4.75348E-04	3.49562E-06	-1.86087E-05	-2.60233E-05	-2.60233E-05
43	1.72620E-04	1.48126E-03	2.59767E-04	-7.71816E-06	-2.60233E-05	-1.87338E-05	-1.87338E-05
4301	1.00877E-03	-1.2051E-03	-1.16152E-03	-1.91290E-07	7.15179E-08	3.56535E-05	3.56535E-05
44	1.26222E-03	-3.18531E-03	-1.58468E-03	2.08021E-05	5.09641E-06	3.56535E-05	3.56535E-05
46	7.59198E-04	-3.35464E-03	-8.88402E-04	3.28339E-05	5.09641E-06	2.09806E-05	2.09806E-05
47	1.66124E-05	-3.33345E-03	2.91736E-04	1.55627E-06	1.56736E-06	1.01494E-05	1.01494E-05
49	-1.8260E-05	-3.32354E-03	3.25556E-04	-1.08293E-05	6.75556E-07	-4.95013E-06	-4.95013E-06
51	6.99633E-05	-3.11533E-03	1.64940E-04	-3.54989E-05	-5.62536E-07	-1.88559E-05	-1.88559E-05
53	1.6813E-04	-2.60365E-03	4.93423E-05	-5.13370E-05	-1.99632E-06	-2.80314E-05	-2.80314E-05
54	2.62571E-05	-3.28800E-04	1.05937E-05	-2.18459E-05	-1.52456E-06	-1.22977E-05	-1.22977E-05
55	3.70094E-06	-8.51052E-06	1.84894E-06	-1.6463E-06	6.68850E-07	-6.59158E-07	-6.59158E-07
56	-4.09429E-06	3.56625E-07	-1.82675E-10	-4.06758E-08	-6.18546E-07	-2.3144E-08	-2.3144E-08
57	1.01860E-03	-9.64591E-04	5.76457E-05	-4.21001E-07	-1.05810E-06	-1.10674E-05	-1.10674E-05
58	1.11177E-03	-8.73806E-04	4.36734E-05	-3.96019E-07	-1.25797E-06	-1.04374E-05	-1.04374E-05
59	1.16364E-03	-7.65333E-04	2.18663E-05	-3.34822E-07	-1.50221E-06	-6.11537E-06	-6.11537E-06
6101	1.16633E-03	-5.70461E-04	-4.20240E-05	-7.75802E-08	-1.28183E-06	-3.15202E-06	-3.15202E-06
62	1.16527E-03	-5.06512E-04	-8.68463E-05	4.89973E-07	-8.17069E-07	-1.23324E-06	-1.23324E-06
64	9.30080E-04	-6.42443E-04	-8.03476E-06	1.03476E-06	-1.71702E-07	1.81346E-05	1.81346E-05
65	1.20356E-04	-6.36400E-04	-3.47984E-05	1.01481E-06	1.51948E-07	1.58465E-05	1.58465E-05
67	6.95981E-06	-6.60249E-04	-2.53357E-05	8.54085E-07	2.03348E-07	6.57313E-06	6.57313E-06

69	-7.41970E-06	-1.81902E-05	7.21021E-07	2.31753E-07	-3.35305E-06
71	8.50138E-06	-1.39064E-05	6.07967E-07	2.75825E-07	-1.12606E-05
72	2.14439E-06	-2.73286E-06	1.19149E-07	1.56764E-07	-5.91357E-06
73	1.35302E-07	-3.99234E-07	4.99549E-09	6.53929E-08	-3.25854E-07
74	1.26703E-10	-3.06866E-12	1.28716E-10	6.04108E-08	-1.14653E-08
75	1.26703E-10	4.61414E-07	1.28716E-10	6.04108E-08	-1.14653E-08
76	-2.13243E-04	-2.79487E-04	-1.19262E-05	-1.02351E-05	-1.35540E-05
77	-9.53729E-05	4.53893E-04	-1.14965E-05	-8.18062E-06	-1.35963E-05
79	-2.54990E-05	-5.64321E-04	-8.55310E-06	-3.64705E-08	-8.74222E-06
7901	-2.39963E-05	4.07016E-04	-4.87791E-06	6.55359E-06	-4.59113E-07
80	-2.26440E-05	-1.66409E-05	-1.40273E-06	9.66183E-06	8.89738E-06
82	2.78382E-06	7.74094E-05	2.44474E-07	9.72371E-06	1.44824E-05
8201	2.54872E-04	5.13520E-04	-1.19512E-06	4.38715E-06	1.63094E-05
83	2.63853E-04	5.28553E-04	-7.09295E-06	-2.56241E-06	1.18144E-05
85	8.04203E-05	2.69449E-04	-9.68091E-06	-3.88222E-06	6.38236E-06
86	-1.27262E-04	-6.34955E-05	-3.66673E-06	-2.77203E-06	2.26466E-06
88	-1.19954E-04	-6.30074E-05	5.14469E-06	-2.50171E-06	-2.91161E-06
90	-7.00006E-05	-6.81088E-06	1.32709E-05	-2.04955E-06	-7.47061E-06
92	-3.35520E-05	2.49691E-05	1.82807E-05	-1.35261E-06	-1.02926E-05
93	-3.94471E-06	3.68945E-06	7.63232E-06	-3.66549E-07	-4.35527E-06
94	-6.08206E-07	4.40322E-07	4.05452E-07	-1.27815E-07	-2.31927E-07
95	3.60483E-11	6.26126E-11	1.41591E-08	-1.17592E-07	-8.11946E-09
96	7.77331E-07	-4.48809E-07	1.41591E-08	-1.17574E-07	-8.11946E-09

P I P E F O R C E S A N D M O M E N T S									
ELEMENT NUMBER	ELEMENT TYPE	LOAD CASE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
1	TANGENT	1	END-I END-J	220.421 220.421	-2.380 -2.380	13.973 13.973	1361.02 1361.02	76.43 948.51	.32 148.86
1	TANGENT	2	END-I END-J	376.624 376.624	37.648 37.648	286.194 286.194	9044.89 9044.89	866.01 18728.54	-205.29 -2555.08
1	TANGENT	3	END-I END-J	31105.649 31105.649	-20.716 -20.716	-313.658 -313.658	-3045.59 -3045.59	-114.61 -19691.26	2136.98 3429.97
2	TANGENT	1	END-I END-J	-219.861 -219.861	-2.360 -2.360	-13.953 -13.953	-1361.02 -1361.02	948.51 888.09	-148.86 -138.64
2	TANGENT	2	END-I END-J	-378.724 -378.724	37.678 37.678	-285.894 -285.894	-9044.89 -9044.89	18728.54 17490.33	2555.08 2391.89
2	TANGENT	3	END-I END-J	-29067.579 -29067.579	-20.756 -20.756	313.868 313.868	3045.59 3045.59	-19691.26 -18331.89	-3429.97 -3340.07
3	TANGENT	1	END-I END-J	-219.351 -219.351	-2.340 -2.340	-13.913 -13.913	-1361.02 -1361.02	888.09 -141.39	-138.64 34.50
3	TANGENT	2	END-I END-J	-380.634 -380.634	37.648 37.648	-284.944 -284.944	-9044.89 -9044.89	17490.33 -3594.41	2391.89 -393.94
3	TANGENT	3	END-I END-J	-27241.879 -27241.879	-22.326 -22.326	313.018 313.018	3045.59 3045.59	-18331.89 4830.18	-3340.07 -1688.02
4	TANGENT	1	END-I END-J	-216.701 -216.701	-1.570 -1.570	-10.853 -10.853	-1361.02 -1361.02	-141.39 -944.45	34.50 150.66
4	TANGENT	2	END-I END-J	-390.484 -390.484	29.658 29.658	-188.824 -188.824	-9044.89 -9044.89	-3594.41 -17566.65	-393.94 -2588.54
4	TANGENT	3	END-I END-J	-24478.079 -24478.079	-236.436 -236.436	168.488 168.488	3045.59 3045.59	4830.18 17297.62	-1688.02 15807.31
5	TANGENT	1	END-I END-J	-214.021 -214.021	-.950 -.950	-7.913 -7.913	-1361.02 -1361.02	-944.45 -1055.66	150.66 164.02
5	TANGENT	2	END-I END-J	-400.384 -400.384	21.098 21.098	-93.534 -93.534	-9044.89 -9044.89	-17566.65 -18881.27	-2588.54 -2885.08
5	TANGENT	3	END-I END-J	-22848.199 -22848.199	-456.486 -456.486	17.128 17.128	3045.59 3045.59	17297.62 17538.35	15807.31 22223.23
6	TANGENT	1	END-I END-J	-213.511 -213.511	-.850 -.850	-7.423 -7.423	-1361.02 -1361.02	-1055.66 -1267.23	164.02 188.24
6	TANGENT	2	END-I END-J	-402.274 -402.274	19.638 19.638	-77.494 -77.494	-9044.89 -9044.89	-18881.27 -21090.17	-2885.08 -3444.85

PIPE FORCES AND MOMENTS

ELEMENT NUMBER	ELEMENT TYPE	LOAD CASE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
6	TANGENT	3	END-I END-J	-22559.799 -22559.799	-493.866 -493.866	-8.702 -8.702	3045.59 3045.59	17538.35 17290.31	22223.23 36300.39
7	TANGENT	1	END-I END-J	-1.570 -1.570	-16.580 -16.580	47.170 47.170	.00 .00	-724.25 .00	-254.57 .00
7	TANGENT	2	END-I END-J	30.680 30.680	67.180 67.180	653.230 653.230	.00 .00	-10029.69 .00	1031.48 .00
7	TANGENT	3	END-I END-J	807.210 807.210	-7905.410 -7905.410	-891.430 -891.430	.00 .00	13687.02 .00	-121379.67 .00
8	TANGENT	1	END-I END-J	-196.791 -196.791	.730 .730	39.837 39.837	-636.77 -636.77	-1267.23 -131.71	-66.33 -87.14
8	TANGENT	2	END-I END-J	-469.964 -469.964	-11.322 -11.322	578.786 578.786	984.80 984.80	-21090.17 -4592.46	-2413.37 -2090.66
8	TANGENT	3	END-I END-J	-14501.749 -14581.749	-1308.306 -1308.306	-905.192 -905.192	-10641.43 -10641.43	17290.31 -8511.28	-85079.28 -47787.32
9	TANGENT	1	END-I END-J	-196.071 -196.071	.750 .750	39.997 39.997	-636.77 -636.77	-131.71 570.61	-87.14 -100.31
9	TANGENT	2	END-I END-J	-472.604 -472.604	-11.932 -11.932	585.076 585.076	984.80 984.80	-4592.46 5680.88	-2090.66 -1881.15
9	TANGENT	3	END-I END-J	-14229.829 -14229.829	-1324.616 -1324.616	-916.732 -916.732	-10641.43 -10641.43	-8511.28 -24608.18	-47787.32 -24528.38
10	TANGENT	1	END-I END-J	-194.641 -194.641	-3.504 -3.504	-34.336 -34.336	-636.77 -636.77	570.61 -43.12	-100.31 -37.69
10	TANGENT	2	END-I END-J	-477.824 -477.824	-65.531 -65.531	-28.406 -28.406	984.80 984.80	5680.88 5173.15	-1881.15 -709.84
10	TANGENT	3	END-I END-J	-13578.579 -13578.579	-3301.320 -3301.320	267.060 267.060	-10641.43 -10641.43	-24608.18 -19834.75	-24528.38 34479.42
11	TANGENT	1	END-I END-J	-193.811 -193.811	-3.484 -3.484	-34.236 -34.236	-636.77 -636.77	-43.12 -1018.98	-37.69 61.61
11	TANGENT	2	END-I END-J	-480.864 -480.864	-64.581 -64.581	-33.636 -33.636	984.80 984.80	5173.15 4214.40	-709.84 1130.98
11	TANGENT	3	END-I END-J	-13222.249 -13222.249	-3278.510 -3278.510	283.780 283.780	-10641.43 -10641.43	-19834.75 -11745.89	34479.42 127930.08
12	TANGENT	1	END-I END-J	-1.840 -1.840	-22.330 -22.330	107.760 107.760	.00 .00	-3241.31 .00	-671.66 .00

PIPE FORCES AND MOMENTS									
ELEMENT NUMBER	ELEMENT TYPE	LOAD CASE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
12	TANGENT	2	END-I END-J	-71.580 -71.580	143.690 143.690	379.840 379.840	.00 .00	-11425.21 .00	4322.05 .00
12	TANGENT	3	END-I END-J	-1607.870 -1607.870	-7842.830 -7842.830	271.130 271.130	.00 .00	-8155.32 .00	-235904.48 .00
13	TANGENT	1	END-I END-J	-171.271 -171.271	-1.624 -1.624	73.584 73.584	2604.54 2604.54	-1018.98 1078.46	-610.05 -563.77
13	TANGENT	2	END-I END-J	-625.334 -625.334	7.689 7.689	342.864 342.864	12410.01 12410.01	4214.40 13987.40	5453.03 5233.88
13	TANGENT	3	END-I END-J	-5292.629 -5292.629	-1655.150 -1655.150	565.940 565.940	-2486.11 -2486.11	-11745.89 4385.66	-107974.40 -60796.00
14	TANGENT	1	END-I END-J	-170.131 -170.131	-1.414 -1.414	73.734 73.734	2604.54 2604.54	1078.46 2740.36	-563.77 -531.91
14	TANGENT	2	END-I END-J	-629.444 -629.444	13.739 13.739	314.204 314.204	12410.01 12410.01	13987.40 21069.25	5233.88 4924.22
14	TANGENT	3	END-I END-J	-4852.009 -4852.009	-1525.830 -1525.830	656.120 656.120	-2486.11 -2486.11	4385.66 19173.95	-60796.00 -26405.31
15	BEND	1	END-I CENTER END-J	-166.611 -180.928 -143.560	-74.004 22.377 112.366	.224 .224 .224	2604.54 2505.07 1687.17	531.91 -890.58 -2058.65	2740.36 3370.32 1726.13
15	BEND	2	END-I CENTER END-J	-642.074 -656.346 -483.121	-205.774 154.311 470.315	36.139 36.139 36.139	12410.01 8328.39 2321.86	-4924.22 -9793.56 -11865.19	21069.25 21697.21 14075.32
15	BEND	3	END-I CENTER END-J	-3571.229 -3567.622 -2544.860	-983.390 996.397 2691.546	-1038.360 -1038.360 -1038.360	-2486.11 4943.01 -2091.48	26405.31 383.11 -25748.53	19173.95 19015.23 -25986.28
16	TANGENT	1	END-I END-J	-148.106 -148.106	11.316 11.316	-83.307 -83.307	1687.26 1687.26	1726.13 -6851.32	2058.58 893.44
16	TANGENT	2	END-I END-J	-281.814 -281.814	138.019 138.019	-576.604 -576.604	2322.36 2322.36	14075.32 -45292.84	11865.10 -2345.55
16	TANGENT	3	END-I END-J	-1829.300 -1829.300	55.890 55.890	-199.964 -199.964	-2090.40 -2090.40	-25986.28 -46574.95	25748.62 19994.13
17	TANGENT	1	END-I END-J	-151.730 -151.730	1.336 1.336	66.639 66.639	1687.26 1687.26	-6851.32 9.91	893.43 755.84
17	TANGENT	2	END-I END-J	-18.414 -18.414	55.849 55.849	257.644 257.644	2322.35 2322.35	-45292.84 -18765.59	-2345.56 -8095.78

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PIPE FORCES AND MOMENTS

ELEMENT NUMBER	ELEMENT TYPE	LOAD CASE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
17	TANGENT	3	END-I END-J	-878.003 -878.003	338.820 338.820	720.875 720.875	-2090.31 -2090.31	-46574.95 27646.93	19994.14 -14891.02
18	TANGENT	1	END-I END-J	-152.680 -152.680	27.484 27.484	-31.773 -31.773	1687.07 1687.07	9.91 -1401.10	756.27 -464.28
18	TANGENT	2	END-I END-J	164.544 164.544	-10.883 -10.883	565.061 565.061	2324.38 2324.38	-18765.59 6328.72	-8095.20 -7611.89
18	TANGENT	3	END-I END-J	-162.048 -162.048	124.751 124.751	119.493 119.493	-2086.57 -2086.57	27646.93 32953.60	-14891.54 -20431.71
19	BEND	1	END-I CENTER END-J	-152.487 -122.814 -58.057	15.327 91.674 141.833	10.666 10.666 10.666	1686.97 1273.74 630.71	-464.65 -1025.42 -1293.26	1401.10 95.46 -2753.85
19	BEND	2	END-I CENTER END-J	264.356 609.909 781.234	744.242 501.788 115.991	104.613 104.613 104.613	2322.71 -1272.26 -3188.89	-7612.40 -5350.69 -1560.49	-6328.72 -21533.05 -29071.32
19	BEND	3	END-I CENTER END-J	246.956 134.002 -17.231	-150.826 -256.474 -288.858	47.289 47.289 47.289	-2091.05 -12018.02 -17917.50	-20431.25 -15364.40 -5908.52	-32953.60 -27983.63 -21329.37
20	TANGENT	1	END-I END-J	-26.547 -26.547	-31.686 -31.686	147.053 147.053	630.72 630.72	2753.85 8502.01	-1293.26 -54.67
20	TANGENT	2	END-I END-J	746.773 746.773	-45.153 -45.153	-147.864 -147.864	-3188.88 -3188.88	29071.32 23291.45	-1560.51 204.47
20	TANGENT	3	END-I END-J	-5.919 -5.919	-95.859 -95.869	-602.108 -602.108	-17917.46 -17917.46	21329.37 -2206.43	-5908.62 -2161.18
21	TANGENT	1	END-I END-J	-47.897 -47.897	-61.709 -61.709	-67.476 -67.476	-1146.54 -1146.54	5588.37 3463.16	785.40 2728.98
21	TANGENT	2	END-I END-J	583.834 583.834	-78.671 -78.671	-413.418 -413.418	-644.86 -644.86	20742.67 7721.67	2432.27 4910.08
21	TANGENT	3	END-I END-J	-85.064 -85.064	-280.265 -280.265	-238.975 -288.975	-2127.49 -2127.49	-1948.83 -11050.40	-1596.07 7231.17
22	TANGENT	1	END-I END-J	-6.027 -6.027	-128.051 -128.051	-37.824 -37.824	-1146.54 -1146.54	3463.16 1169.90	2728.98 10492.72
22	TANGENT	2	END-I END-J	515.404 515.404	-54.062 -54.062	-387.426 -387.426	-644.86 -644.86	7721.67 -15767.97	4910.08 8187.84
22	TANGENT	3	END-I END-J	-73.104 -73.104	-285.719 -285.719	-238.315 -238.315	-2127.49 -2127.49	-11050.40 -25499.47	7231.17 24554.34

PIPE FORCES AND MOMENTS

ELEMENT NUMBER	ELEMENT TYPE	LOAD CASE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
23	TANGENT	1	END-I END-J	29.543 29.543	-49.611 -49.611	-23.504 -23.504	-1146.54 -1146.54	1169.90 281.58	10492.72 12367.77
23	TANGENT	2	END-I END-J	444.034 444.034	27.868 27.868	-274.376 -274.376	-644.86 -644.86	-15767.97 -26138.01	8187.84 7134.56
23	TANGENT	3	END-I END-J	-64.554 -64.554	-81.089 -81.089	-81.905 -81.905	-2127.49 -2127.49	-25493.47 -28595.09	24554.34 27619.12
24	TANGENT	1	END-I END-J	-60.083 -60.083	45.105 45.105	94.528 94.528	2428.03 2428.03	-6669.41 773.73	8114.90 4563.32
24	TANGENT	2	END-I END-J	310.422 310.422	112.042 112.042	201.119 201.119	2006.08 2006.08	-26161.27 -10325.12	7926.60 -895.56
24	TANGENT	3	END-I END-J	-40.513 -40.513	257.024 257.024	258.141 258.141	-1482.78 -1482.78	-28122.28 -7796.23	27357.64 7119.56
25	TANGENT	1	END-I END-J	-21.113 -21.113	26.951 26.951	92.793 92.793	2428.03 2428.03	773.73 2600.36	4563.32 4032.79
25	TANGENT	2	END-I END-J	216.282 216.282	-5.532 -5.532	205.871 205.871	2006.08 2006.08	-10325.12 -6272.56	-895.56 -786.66
25	TANGENT	3	END-I END-J	-33.573 -33.573	142.698 142.698	86.818 86.818	-1482.78 -1482.78	-7796.23 -6087.22	7119.56 4310.55
26	TANGENT	1	END-I END-J	.587 .587	87.082 87.082	11.516 11.516	2428.03 2428.03	2600.36 2963.08	4032.79 1290.07
26	TANGENT	2	END-I END-J	163.102 163.102	17.801 17.801	199.343 199.343	2006.08 2006.08	-6272.56 5.94	-786.66 -1347.33
26	TANGENT	3	END-I END-J	-29.843 -29.843	113.824 113.824	151.088 151.088	-1482.78 -1482.78	-6087.22 -1328.55	4310.55 725.54
27	TANGENT	1	END-I END-J	-21.870 -21.870	82.900 82.900	13.360 13.360	.00 .00	-406.48 -90.89	2478.97 520.70
27	TANGENT	2	END-I END-J	54.750 54.750	1.300 1.300	95.270 95.270	.00 .00	-2887.39 -636.93	34.43 3.72
27	TANGENT	3	END-I END-J	-3.550 -3.550	34.840 34.840	107.750 107.750	.00 .00	-3218.69 -673.42	1088.57 265.58
28	TANGENT	1	END-I END-J	-6.560 -6.560	29.390 29.390	5.130 5.130	.00 .00	-90.89 .00	520.70 .00
28	TANGENT	2	END-I END-J	16.440 16.440	.210 .210	35.950 35.950	.00 .00	-636.93 .00	3.72 .00

PIPE FORCES AND MOMENTS

ELEMENT NUMBER	ELEMENT TYPE	LOAD CASE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
28	TANGENT	3	END-I END-J	-1.060 -1.060	14.990 14.990	38.010 38.010	.00 .00	-673.42 .00	265.58 .00
29	TANGENT	1	END-I END-J	174.578 174.578	-120.185 -120.185	-49.680 -49.680	1466.22 1466.22	2654.27 1631.32	-1777.26 697.45
29	TANGENT	2	END-I END-J	134.075 134.075	29.787 29.787	-122.859 -122.859	226.97 226.97	3377.55 847.77	2544.02 1930.69
29	TANGENT	3	END-I END-J	-131.717 -131.717	435.768 435.768	-88.075 -88.075	-581.74 -581.74	217.44 -1596.10	15789.97 6817.10
30	TANGENT	1	END-I END-J	174.734 174.734	-114.768 -114.768	-53.160 -53.160	1466.22 1466.22	1631.32 1009.06	697.45 2040.86
30	TANGENT	2	END-I END-J	122.938 122.938	45.350 45.350	-109.549 -109.549	226.97 226.97	847.77 -434.54	1930.69 1399.85
30	TANGENT	3	END-I END-J	-137.261 -137.261	428.230 428.230	-78.085 -78.085	-581.74 -581.74	-1596.10 -2510.11	6817.10 1804.48
31	BEND	1	END-I CENTER END-J	174.828 202.930 200.106	108.190 33.010 -47.200	56.220 56.220 56.220	1466.13 1048.57 632.28	-1009.19 -1088.96 -1002.78	-2040.86 -2569.17 -2516.07
31	BEND	2	END-I CENTER END-J	113.819 85.329 43.836	-51.760 -91.393 -117.099	94.749 94.749 94.749	227.01 511.80 990.06	434.52 996.49 1406.60	-1399.85 -864.24 -84.17
31	BEND	3	END-I CENTER END-J	-141.696 -287.990 -390.395	-410.299 -324.784 -189.775	65.475 65.475 65.475	-581.51 517.65 1725.51	2510.16 3012.82 3056.34	-1804.48 945.83 2871.06
32	TANGENT	1	END-I END-J	188.239 188.239	60.022 60.022	-61.190 -61.190	632.77 632.77	1002.47 -1731.61	2516.07 -165.84
32	TANGENT	2	END-I END-J	25.833 25.833	97.668 97.668	-52.259 -52.259	989.37 989.37	-1407.09 -3742.11	84.17 -4279.82
32	TANGENT	3	END-I END-J	-356.862 -356.862	129.226 129.226	-29.575 -29.575	1724.02 1724.02	-3057.18 -4378.64	-2871.06 -8645.14
33	TANGENT	1	END-I END-J	169.589 169.589	60.742 60.742	-30.180 -30.180	632.77 632.77	-1731.61 -3080.10	-165.84 -2879.92
33	TANGENT	2	END-I END-J	-.757 -.757	16.558 16.558	21.841 21.841	989.37 989.37	-3742.11 -2766.19	-4279.82 -5019.66
33	TANGENT	3	END-I END-J	-303.912 -303.912	-19.434 -19.434	19.995 19.995	1724.02 1724.02	-4378.64 -3485.20	-8645.14 -7776.79

PIPE FORCES AND MOMENTS

ELEMENT NUMBER	ELEMENT TYPE	LOAD CASE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
34	BEND	1	END-I CENTER END-J	157.749 155.908 143.433	13.670 -27.644 -67.072	-30.312 -30.312 -30.312	632.77 -153.98 -969.10	-2879.92 -3093.11 -3095.30	3080.10 3114.71 3349.25
34	BEND	2	END-I CENTER END-J	-16.677 -3.720 9.491	47.841 50.528 49.768	34.732 34.732 34.732	989.37 -321.90 -1566.67	-5019.66 -4935.56 -4514.79	2766.19 2522.60 2274.24
34	BEND	3	END-I CENTER END-J	-270.292 -253.905 -220.197	27.685 96.731 159.178	91.224 91.224 91.224	1724.02 -290.02 -2167.29	-7776.79 -7513.87 -6738.41	3485.20 3177.11 2543.41
35	TANGENT	1	END-I END-J	160.434 160.434	-13.238 -13.238	-2.997 -2.997	-968.30 -968.30	-3349.25 -3537.27	-3095.55 -2265.19
35	TANGENT	2	END-I END-J	5.892 5.892	-94.462 -94.462	79.980 79.980	-1565.50 -1565.50	-2274.24 2742.64	-4515.19 1410.10
35	TANGENT	3	END-I END-J	-178.919 -178.919	-168.834 -168.834	134.088 134.088	-2165.55 -2165.55	-2543.41 5867.48	-6738.97 3851.41
36	TANGENT	1	END-I END-J	188.567 188.567	6.192 6.192	112.486 112.486	-968.33 -968.33	-3537.27 3518.67	-2265.17 -2653.59
36	TANGENT	2	END-I END-J	.201 .201	-27.732 -27.732	-6.719 -6.719	-1565.48 -1565.48	2742.64 2321.17	1410.12 3149.69
36	TANGENT	3	END-I END-J	-104.984 -104.984	-26.964 -26.964	-50.371 -50.371	-2165.49 -2165.49	5867.48 2707.88	3851.44 5542.81
37	BEND	1	END-I CENTER END-J	208.305 259.284 158.281	158.392 -35.363 -208.389	84.938 84.938 84.938	-968.30 2272.23 5116.87	3518.67 4301.71 2563.25	-2653.60 -3612.02 -1713.15
37	BEND	2	END-I CENTER END-J	-3.753 83.183 121.360	121.358 88.445 3.688	-111.708 -111.708 -111.708	-1565.52 80.44 220.78	2321.17 1262.76 -535.83	3149.67 1515.28 797.54
37	BEND	3	END-I CENTER END-J	-49.598 118.114 216.592	216.566 188.175 49.483	-192.703 -192.703 -192.703	-2165.55 -677.37 -915.71	2707.88 883.53 -1458.71	5542.79 2389.79 538.40
38	TANGENT	1	END-I END-J	336.872 336.872	48.290 48.290	-204.559 -204.559	5115.50 5115.50	2766.62 -5913.83	1365.63 -683.54
38	TANGENT	2	END-I END-J	245.238 245.238	145.609 145.609	-71.393 -71.393	221.06 221.06	-958.55 -3988.12	-65.17 -6244.08
38	TANGENT	3	END-I END-J	415.426 415.426	223.505 223.505	-115.688 -115.688	-914.93 -914.93	-1195.87 -6105.07	-994.50 -10478.92

P I P E F O R C E S A N D M O M E N T S									
ELEMENT NUMBER	ELEMENT TYPE	LOAD CASE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
39	BEND	1	END-I	466.492	584.834	22.179	5115.50	-4779.48	-3549.25
			CENTER	602.019	444.093	22.179	3717.64	-5833.11	-6097.16
			END-J	696.480	273.058	22.179	2094.62	-6488.84	-7873.02
39	BEND	2	END-I	334.658	156.477	16.901	221.06	-331.21	-7401.62
			CENTER	363.762	64.483	16.901	138.59	-294.89	-7948.78
			END-J	368.053	-31.909	16.901	68.35	-238.44	-8029.44
39	BEND	3	END-I	558.966	239.435	-8.804	-914.93	-46.76	-12127.55
			CENTER	601.901	86.529	-8.804	-901.48	148.88	-12934.73
			END-J	603.778	-72.280	-8.804	-837.82	334.37	-12970.01
40	BEND	1	END-I	827.234	412.432	100.011	2095.69	-6486.27	-7874.86
			CENTER	905.828	184.100	100.011	408.36	-6320.74	-9352.42
			END-J	922.600	-56.797	100.011	-1178.53	-5723.83	-9667.74
40	BEND	2	END-I	395.844	-51.012	18.915	67.62	-236.40	-8029.51
			CENTER	369.124	-151.797	18.915	16.21	-153.75	-7527.17
			END-J	317.212	-242.222	18.915	-12.03	-60.60	-6551.22
40	BEND	3	END-I	647.991	-103.238	-15.863	-839.20	337.40	-12969.84
			CENTER	599.139	-267.549	-15.863	-733.36	466.00	-12051.44
			END-J	509.397	-413.599	-15.863	-597.81	562.80	-10364.29
41	BEND	1	END-I	1109.981	14.063	188.254	-1179.49	-5724.80	-9667.04
			CENTER	1075.756	-273.868	188.254	-2501.07	-4307.51	-9023.62
			END-J	968.134	-543.113	188.254	-3410.52	-2596.32	-7000.32
41	BEND	2	END-I	332.219	-270.101	20.538	-13.78	-61.03	-6551.21
			CENTER	250.938	-346.921	20.538	-15.95	44.61	-5023.12
			END-J	152.535	-400.071	20.538	9.32	147.21	-3173.15
41	BEND	3	END-I	533.116	-457.917	-22.112	-600.78	561.95	-10364.17
			CENTER	396.342	-580.356	-22.112	-448.94	590.71	-7792.83
			END-J	232.527	-663.198	-22.112	-294.83	579.16	-4713.10
42	TANGENT	1	END-I	1494.093	600.582	-439.499	-3409.33	2599.65	6999.67
			END-J	1494.093	600.582	-439.499	-3409.33	-15762.43	-18092.37
42	TANGENT	2	END-I	153.135	469.628	-24.081	9.36	-146.29	3173.19
			END-J	153.135	469.628	-24.081	9.36	-1152.39	-16447.64
42	TANGENT	3	END-I	233.416	773.066	35.378	-294.91	-577.68	4713.28
			END-J	233.416	773.066	35.378	-294.91	900.39	-27585.06
43	TANGENT	1	END-I	2171.048	605.672	-819.086	-3409.01	-15762.43	-18092.43
			END-J	2171.048	605.672	-819.086	-3409.01	-30676.64	-29120.73
43	TANGENT	2	END-I	153.277	481.008	-24.772	9.65	-1152.39	-16447.64
			END-J	153.277	481.008	-24.772	9.65	-1603.46	-25206.00

PIPE FORCES AND MOMENTS

ELEMENT NUMBER	ELEMENT TYPE	LOAD CASE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
43	TANGENT	3	END-I END-J	233.625 233.625	790.846 790.846	38.945 38.945	-294.42 -294.42	900.39 1609.51	-27585.06 -41985.07
44	TANGENT	1	END-I END-J	2734.210 2734.210	605.732 605.732	-1143.146 -1143.146	-3411.49 -3411.49	-30676.64 -37630.65	-29120.44 -32805.24
44	TANGENT	2	END-I END-J	153.283 153.283	481.258 481.258	-24.871 -24.871	7.51 7.51	-1603.46 -1754.76	-25206.00 -28133.59
44	TANGENT	3	END-I END-J	233.637 233.637	791.226 791.226	39.359 39.359	-297.99 -297.99	1609.51 1848.94	-41985.04 -46798.25
45	TANGENT	1	END-I END-J	-77.889 -77.889	.000 .000	45.193 45.193	.00 .00	-345.16 .00	.00 .00
45	TANGENT	2	END-I END-J	.004 .004	.000 .000	-.014 -.014	.00 .00	.10 .00	.00 .00
45	TANGENT	3	END-I END-J	.004 .004	.000 .000	.067 .067	.00 .00	-.51 .00	.00 .00
46	TANGENT	1	END-I END-J	-50.005 -50.005	58.425 58.425	-133.856 -133.856	7922.33 7922.33	1907.85 -848.36	3574.57 2371.54
46	TANGENT	2	END-I END-J	-175.828 -175.828	151.542 151.542	-35.622 -35.622	-543.61 -543.61	576.50 -156.98	2650.94 -469.45
46	TANGENT	3	END-I END-J	-149.645 -149.645	54.138 54.138	14.401 14.401	-149.43 -149.43	-519.22 -222.68	644.72 -470.04
47	TANGENT	1	END-I END-J	-40.848 -40.848	61.416 61.416	-133.926 -133.926	7922.33 7922.33	-848.36 -2416.02	2371.54 1652.63
47	TANGENT	2	END-I END-J	-155.732 -155.732	131.304 131.304	-25.212 -25.212	-543.61 -543.61	-156.98 -452.10	-469.45 -2006.42
47	TANGENT	3	END-I END-J	-119.650 -119.650	51.197 51.197	12.231 12.231	-149.43 -149.43	-222.68 -79.51	-470.04 -1069.32
48	BEND	1	END-I CENTER END-J	-33.337 -54.849 -68.002	-62.820 -45.270 -20.820	131.146 131.146 131.146	7922.55 8431.48 8031.24	2415.30 141.95 -2153.04	-1652.63 -1248.21 -1000.94
48	BEND	2	END-I CENTER END-J	-139.217 -171.164 -177.026	-111.146 -49.375 19.920	15.872 15.872 15.872	-543.57 -306.30 23.12	452.15 740.05 915.18	2006.42 2607.02 2717.22
48	BEND	3	END-I CENTER END-J	-95.054 -105.414 -99.710	-45.977 -6.080 34.742	-10.011 -10.011 -10.011	-149.42 -121.93 -104.54	79.52 58.61 28.77	1069.32 1264.09 1156.86

P I P E F O R C E S A N D M O M E N T S

ELEMENT NUMBER	ELEMENT TYPE	LOAD CASE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
49	TANGENT	1	END-I END-J	-56.812 -56.812	30.344 30.344	-105.726 -105.726	8032.29 8032.29	2149.10 -2438.64	1000.94 -315.77
49	TANGENT	2	END-I END-J	-118.006 -118.006	-28.263 -28.263	5.318 5.318	22.67 22.67	-915.19 -684.42	-2717.22 -1490.79
49	TANGENT	3	END-I END-J	-51.497 -51.497	-8.304 -8.304	4.671 4.671	-104.56 -104.56	-28.72 173.98	-1156.86 -796.54
50	TANGENT	1	END-I END-J	-39.932 -39.932	16.504 16.504	72.304 72.304	8032.29 8032.29	-2438.64 698.79	-315.77 -1031.90
50	TANGENT	2	END-I END-J	-29.536 -29.536	-15.803 -15.803	21.768 21.768	22.67 22.67	-684.42 260.15	-1490.79 -805.06
50	TANGENT	3	END-I END-J	20.333 20.333	29.906 29.906	-.959 -.959	-104.56 -104.56	173.98 132.39	-796.54 -2094.24
51	BEND	1	END-I CENTER END-J	-25.632 -29.384 -15.913	-15.926 6.871 25.640	286.794 286.794 286.794	8032.29 7752.65 6089.12	698.79 -1373.66 -2640.93	-1031.90 -961.35 -1214.62
51	BEND	2	END-I CENTER END-J	44.844 53.993 31.493	31.517 -9.439 -44.861	12.898 12.898 12.898	22.67 271.10 502.75	260.15 339.38 219.68	-805.06 -977.05 -554.05
51	BEND	3	END-I CENTER END-J	80.493 105.887 69.214	69.256 -7.974 -80.530	-2.579 -2.579 -2.579	-104.56 5.51 83.94	132.39 133.25 56.01	-2094.24 -2571.64 -1882.18
52	TANGENT	1	END-I END-J	-52.236 -52.236	-314.054 -314.054	9.352 9.352	6090.53 6090.53	1214.62 1611.46	-2637.69 10689.21
52	TANGENT	2	END-I END-J	98.107 98.107	3.442 3.442	-96.124 -96.124	502.64 502.64	554.05 -3524.99	219.95 73.89
52	TANGENT	3	END-I END-J	118.466 118.466	2.959 2.959	-125.053 -125.053	83.91 83.91	1882.18 -3424.45	56.05 -69.50
53	BEND	1	END-I CENTER END-J	-78.516 -76.554 -69.369	-2.762 17.663 36.884	-19.754 -19.754 -19.754	6090.53 3102.25 -122.98	-10689.21 -11997.89 -12488.15	1611.46 1574.56 1439.49
53	BEND	2	END-I CENTER END-J	146.187 166.379 175.221	97.234 56.064 11.070	11.662 11.662 11.662	502.64 473.84 427.67	-73.89 -144.76 -205.74	-3524.99 -3904.60 -4070.85
53	BEND	3	END-I CENTER END-J	153.936 181.598 196.873	127.103 82.908 33.056	3.129 3.129 3.129	83.91 101.05 115.31	69.50 60.63 47.63	-3424.45 -3944.50 -4231.66

PIPE FORCES AND MOMENTS

ELEMENT NUMBER	ELEMENT TYPE	LOAD CASE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
54	BEND	1	END-I	-76.945	42.960	117.956	-120.43	-12488.17	1439.49
			CENTER	-63.191	61.424	117.956	-3275.29	-11456.41	1180.93
54	BEND	2	END-J	-45.125	75.696	117.956	-6055.23	-9642.69	841.28
			END-I	190.637	1.129	14.422	427.71	-205.66	-4070.85
54	BEND	3	CENTER	184.423	-48.287	14.422	369.10	-239.20	-3954.04
			END-J	165.622	-94.408	14.422	303.80	-256.41	-3600.58
54	BEND	3	END-I	208.389	25.854	3.169	115.30	47.65	-4231.66
			CENTER	207.974	-29.004	3.169	125.74	31.59	-4223.86
55	BEND	1	END-J	193.364	-81.883	3.169	131.66	13.37	-3949.19
			END-I	-49.028	83.280	279.466	-6051.03	-9645.33	841.28
55	BEND	2	CENTER	-25.796	93.135	279.466	-8163.09	-6388.90	404.41
			END-J	-.793	96.637	279.466	-9359.85	-2696.61	-65.54
55	BEND	3	END-I	174.105	-109.877	16.862	303.91	-256.28	-3600.58
			CENTER	139.713	-151.214	16.862	237.99	-244.15	-2954.02
55	BEND	3	END-J	95.790	-182.235	16.862	177.47	-215.36	-2128.27
			END-I	199.754	-93.406	3.169	131.66	13.43	-3949.19
56	TANGENT	1	CENTER	168.753	-141.947	3.169	132.68	-5.69	-3366.36
			END-J	126.240	-180.804	3.169	128.71	-24.43	-2567.11
56	TANGENT	2	END-I	96.174	-114.526	-746.676	-9359.05	2699.39	65.54
			END-J	96.174	-114.526	-746.676	-9359.05	-28496.71	4850.45
56	TANGENT	3	END-I	126.593	221.747	-22.282	177.53	215.31	2128.27
			END-J	126.593	221.747	-22.282	177.53	-715.63	-7136.31
57	TANGENT	1	END-I	96.174	210.506	-3.119	128.72	24.39	2567.11
			END-J	96.174	210.506	-3.119	128.72	-105.91	-6227.84
57	TANGENT	2	END-I	126.593	-117.186	-1495.826	-9359.05	-28496.71	4850.45
			END-J	126.593	-117.186	-1495.826	-9359.05	-55734.20	6984.29
57	TANGENT	3	END-I	96.284	228.437	-23.772	177.53	-715.63	-7136.31
			END-J	96.284	228.437	-23.772	177.53	-1148.49	-11295.91
57	TANGENT	3	END-I	126.693	215.586	-3.079	128.72	-105.91	-6227.84
			END-J	126.693	215.586	-3.079	128.72	-161.96	-10153.46
58	TANGENT	1	END-I	96.294	-117.236	-2142.196	-9359.05	-55734.20	6984.29
			END-J	96.294	-117.236	-2142.196	-9359.05	-68763.03	7697.32
58	TANGENT	2	END-I	126.703	228.587	-23.952	177.53	-1148.49	-11295.91
			END-J	126.703	228.587	-23.952	177.53	-1294.16	-12686.18
58	TANGENT	3	END-I	126.703	215.696	-3.069	128.72	-161.96	-10153.46
			END-J	126.703	215.696	-3.069	128.72	-180.63	-11465.32

PIPE FORCES AND MOMENTS

ELEMENT NUMBER	ELEMENT TYPE	LOAD CASE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
59	TANGENT	1	END-I END-J	.000 .000	.000 .000	90.590 90.590	.00 .00	-691.93 .00	.00 .00
59	TANGENT	2	END-I END-J	.000 .000	.000 .000	-.030 -.030	.00 .00	.23 .00	.00 .00
59	TANGENT	3	END-I END-J	.000 .000	.000 .000	.000 .000	.00 .00	.00 .00	.00 .00
60	TANGENT	1	END-I END-J	-37.471 -37.471	-27.892 -27.892	-45.477 -45.477	1541.96 1541.96	3223.31 2286.89	-2428.03 -1853.71
60	TANGENT	2	END-I END-J	54.903 54.903	-35.498 -35.498	-50.962 -50.962	1068.84 1068.84	3022.95 1973.58	-2006.08 -1275.15
60	TANGENT	3	END-I END-J	39.388 39.388	72.907 72.907	22.503 22.503	1079.84 1079.84	1593.23 2056.58	1482.78 -18.45
61	TANGENT	1	END-I END-J	-44.528 -44.528	-32.049 -32.049	-53.767 -53.767	1541.96 1541.96	2286.89 1657.52	-1853.71 -1478.56
61	TANGENT	2	END-I END-J	49.380 49.380	-34.826 -34.826	-43.502 -43.502	1068.84 1068.84	1973.58 1464.37	-1275.15 -867.49
61	TANGENT	3	END-I END-J	30.888 30.888	71.521 71.521	15.303 15.303	1079.84 1079.84	2056.58 2235.71	-18.45 -855.63
62	BEND	1	END-I CENTER END-J	-50.316 -33.308 -11.224	34.409 51.051 59.914	62.657 62.657 62.657	1541.81 879.42 262.53	-1657.66 -1670.66 -1429.06	1478.56 1158.81 743.64
62	BEND	2	END-I CENTER END-J	44.837 54.988 56.760	35.437 15.570 -6.669	37.912 37.912 37.912	1068.71 480.89 -71.59	-1464.47 -1489.16 -1286.92	867.49 676.65 643.34
62	BEND	3	END-I CENTER END-J	23.910 -3.151 -29.733	-65.923 -70.054 -63.510	-6.963 -6.963 -6.963	1079.63 131.38 -856.85	-2235.81 -2528.92 -2436.64	855.63 1364.39 1864.12
63	TANGENT	1	END-I END-J	-18.304 -18.304	-68.408 -68.408	-81.767 -81.767	263.22 263.22	1428.93 -2224.60	-743.64 2312.99
63	TANGENT	2	END-I END-J	51.063 51.063	-2.539 -2.539	-26.492 -26.492	-70.96 -70.96	1286.96 103.22	-643.34 -529.92
63	TANGENT	3	END-I END-J	-27.982 -27.982	35.234 35.234	-14.667 -14.667	-855.65 -855.65	2437.06 1781.69	-1864.12 -3438.46
64	TANGENT	1	END-I END-J	-28.784 -28.784	-46.198 -46.198	-56.077 -56.077	263.22 263.22	-2224.60 -4730.24	2312.99 4377.23

PIPE FORCES AND MOMENTS

ELEMENT NUMBER	ELEMENT TYPE	LOAD CASE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
64	TANGENT	2	END-I END-J	42.203 42.203	-11.199 -11.199	-14.102 -14.102	-70.96 -70.96	103.22 -526.90	-529.92 -29.54
64	TANGENT	3	END-I END-J	-25.182 -25.182	-19.856 -19.856	-35.217 -35.217	-855.65 -855.65	1781.69 208.11	-3438.46 -2551.27
65	BEND	1	END-I CENTER END-J	-35.054 -31.808 -26.393	7.917 16.724 24.390	-4.258 -4.258 -4.258	263.22 -881.93 -1972.39	-4377.23 -4316.82 -3961.95	-4730.24 -4791.26 -4893.07
65	BEND	2	END-I CENTER END-J	36.663 38.122 36.980	10.462 .612 -9.280	-10.669 -10.669 -10.669	-70.96 -67.73 -73.57	29.54 -5.03 -39.25	-526.90 -554.33 -532.86
65	BEND	3	END-I CENTER END-J	-23.372 -13.846 -3.376	33.707 38.610 40.878	-40.936 -40.936 -40.936	-855.65 -192.09 432.08	2551.27 2486.54 2252.19	208.11 29.03 -167.81
66	TANGENT	1	END-I END-J	-67.277 -67.277	50.532 50.532	32.360 32.360	-1971.36 -1971.36	-4893.07 -2863.24	3962.46 792.79
66	TANGENT	2	END-I END-J	28.472 28.472	-8.249 -8.249	8.572 8.572	-73.56 -73.56	-532.86 4.80	39.27 556.68
66	TANGENT	3	END-I END-J	-3.475 -3.475	-61.766 -61.766	-33.445 -33.445	431.50 431.50	-167.81 -2265.73	-2252.30 1622.05
67	TANGENT	1	END-I END-J	-137.442 -137.442	-11.278 -11.278	108.486 108.486	-1971.37 -1971.37	-2863.24 3941.74	792.76 1500.23
67	TANGENT	2	END-I END-J	13.537 13.537	5.781 5.781	-.281 -.281	-73.56 -73.56	4.80 -12.85	556.67 194.02
67	TANGENT	3	END-I END-J	-3.466 -3.466	-3.056 -3.056	21.720 21.720	431.47 431.47	-2265.73 -903.32	1622.06 1813.73
68	BEND	1	END-I CENTER END-J	-188.384 -287.447 -218.018	-218.118 -20.948 188.501	37.644 37.644 37.644	-1971.35 1601.81 4650.88	3941.74 4681.38 2676.96	1500.25 3362.62 2057.35
68	BEND	2	END-I CENTER END-J	2.483 8.907 10.110	10.111 5.392 -2.488	.045 .045 .045	-73.56 -60.84 -11.96	-12.85 43.55 74.42	194.02 73.25 50.63
68	BEND	3	END-I CENTER END-J	-3.384 54.505 80.446	80.444 59.261 3.341	63.359 63.359 63.359	431.49 15.22 288.23	-903.32 -101.24 760.14	1813.73 725.40 237.72
69	TANGENT	1	END-I END-J	-439.758 -439.758	107.757 107.757	243.644 243.644	4649.45 4649.45	-3121.44 7217.59	1291.79 -3280.89

PIPE FORCES AND MOMENTS									
ELEMENT NUMBER	ELEMENT TYPE	LOAD CASE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
69	TANGENT	2	END-I	10.851	-3.468	1.937	-12.00	-81.06	39.13
			END-J	10.851	-3.468	1.937	-12.00	1.15	186.27
69	TANGENT	3	END-I	146.834	-70.103	-36.518	287.82	-586.01	539.57
			END-J	146.834	-70.103	-36.518	287.82	-2135.66	3514.38
70	BEND	1	END-I	-600.508	-655.100	3.198	4649.45	-4609.68	6450.48
			CENTER	-749.659	-477.260	3.198	3299.29	-5640.82	9254.52
70	BEND	1	END-J	-847.673	-266.864	3.198	1728.17	-6287.19	11097.17
			END-I	11.371	2.333	-3.353	-12.00	-94.14	-160.74
70	BEND	2	CENTER	11.588	-691	-3.353	-38.12	-104.15	-164.80
			END-J	11.014	-3.668	-3.353	-65.94	-107.05	-154.01
70	BEND	3	END-I	194.754	74.318	-2.628	287.82	92.04	-4111.38
			CENTER	207.356	21.353	-2.628	300.15	1.58	-4348.29
71	BEND	1	END-J	205.813	-33.068	-2.628	288.64	-88.99	-4319.28
			END-I	-988.225	-399.698	75.868	1728.85	-6283.90	11098.93
71	BEND	2	CENTER	-1058.027	-130.103	75.868	90.96	-6147.83	12411.20
			END-J	-1055.620	148.371	75.868	-1455.79	-5592.17	12365.95
71	BEND	2	END-I	11.214	-3.740	-3.071	-65.89	-107.10	-153.99
			CENTER	9.863	-6.517	-3.071	-93.36	-101.34	-128.58
71	BEND	3	END-J	7.838	-8.849	-3.071	-118.39	-88.65	-90.52
			END-I	220.493	-43.460	-2.205	289.09	-90.00	-4319.23
72	BEND	1	CENTER	201.713	-99.086	-2.205	254.50	-172.54	-3966.16
			END-J	169.166	-147.949	-2.205	199.72	-243.31	-3354.27
72	BEND	1	END-I	-1248.323	87.333	159.681	-1457.53	-5593.40	12365.19
			CENTER	-1183.121	407.631	159.681	-2753.91	-4247.70	11139.38
72	BEND	2	END-J	-1037.195	700.117	159.681	-3657.58	-2612.19	8395.98
			END-I	7.965	-9.041	-2.694	-118.34	-88.68	-90.56
72	BEND	2	CENTER	5.351	-10.796	-2.694	-138.99	-68.13	-41.43
			END-J	2.373	-11.813	-2.694	-153.62	-42.92	14.56
72	BEND	3	END-I	177.019	-162.663	-1.693	200.70	-243.03	-3354.23
			CENTER	128.855	-202.956	-1.693	129.83	-294.95	-2448.76
73	TANGENT	1	END-J	71.900	-229.402	-1.693	47.93	-326.75	-1378.00
			END-I	-1563.416	-782.328	-401.644	-3656.34	2616.01	-8395.33
73	TANGENT	2	END-J	-1563.416	-782.328	-401.644	-3656.34	-14164.50	24289.97
			END-I	2.397	12.371	1.843	-153.61	42.98	-14.55
73	TANGENT	3	END-J	2.397	12.371	1.843	-153.61	119.97	-531.43
			END-I	72.185	265.734	.537	48.01	326.33	1378.09
73	TANGENT	3	END-J	72.185	265.734	.537	48.01	348.76	-9724.16
			END-I						

P I P E F O R C E S A N D M O M E N T S									
ELEMENT NUMBER	ELEMENT TYPE	LOAD CASE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
74	TANGENT	1	END-I END-J	-2240.432 -2240.432	-791.518 -791.518	-779.003 -779.003	-3655.91 -3655.91	-14164.50 -28348.85	24290.05 38702.30
74	TANGENT	2	END-I END-J	2.403 2.403	12.481 12.481	1.673 1.673	-153.62 -153.62	119.97 150.43	-531.42 -758.69
74	TANGENT	3	END-I END-J	72.246 72.246	271.574 271.574	.131 .131	47.84 47.84	348.76 351.15	-9724.16 -14669.08
75	TANGENT	1	END-I END-J	-2803.600 -2803.600	-791.658 -791.658	-1102.804 -1102.804	-3659.21 -3659.21	-28348.85 -35057.45	38701.99 43517.82
75	TANGENT	2	END-I END-J	2.404 2.404	12.481 12.481	1.651 1.651	-153.55 -153.55	150.43 160.47	-758.70 -834.63
75	TANGENT	3	END-I END-J	72.253 72.253	271.694 271.694	.084 .084	49.09 49.09	351.15 351.67	-14669.08 -16321.85
76	TANGENT	1	END-I END-J	77.894 77.894	.000 .000	45.243 45.243	.00 .00	-345.54 .00	.00 .00
76	TANGENT	2	END-I END-J	.000 .000	.000 .000	.000 .000	.00 .00	.00 .00	.00 .00
76	TANGENT	3	END-I END-J	.005 .005	.000 .000	-.009 -.009	.00 .00	.07 .00	.00 .00

SUPPORT FORCES AND MOMENTS

NODE NUMBER	COMPONENT DIRECTION	SUPPORT GROUP 1	SUPPORT GROUP 2	SUPPORT GROUP 3
1	FX	14.	286.	-314.
1	FY	-2.	38.	-21.
1	FZ	-220.	-377.	-32718.
1	MX	0.	-205.	2137.
1	MY	76.	866.	-115.
1	MZ	-1361.	-9045.	3046.
9	FX	74.	613.	-1184.
9	FY	-4.	-54.	-1977.
56	FX	377.	55.	151.
56	FY	-606.	-481.	-791.
56	FZ	-3480.	-145.	-183.
56	MX	-30115.	-24360.	-40676.
56	MY	37285.	1755.	-1849.
56	MZ	-13450.	-14075.	-23144.
74	FX	-1.	96.	127.
74	FY	117.	-229.	-216.
74	FZ	-2683.	-24.	-3.
74	MX	-9359.	178.	129.
74	MY	68071.	1294.	181.
74	MZ	7697.	-12686.	-11465.
95	FX	-447.	0.	36.
95	FY	792.	-12.	-272.
95	FZ	-3520.	3.	63.
95	MX	-39516.	646.	14159.
95	MY	34712.	-160.	-352.
95	MZ	18593.	-550.	-8119.
19	FL	-207.	-922.	-262.
25	FL-1	103.	194.	106.
25	FL-2	51.	-48.	77.
27	FL	-113.	-39.	106.
32	FL	37.	156.	297.

BENCHMARK PROBLEM 2
TOTAL RESPONSE; GROUPING METHOD

***** FINAL RESULTS - SRSS COMBINATION OF DYNAMIC RESPONSES WITH HIGH FREQUENCY MODE RESPONSES *****
 MODAL COMBINATION METHOD 2-GROUPING

N O D E N U M B E R	D I S P L A C E M E N T S / R O T A T I O N S				A C C E L E R A T I O N S I N G ' S			
	TRANSLATION	X- TRANSLATION	Y- TRANSLATION	Z- TRANSLATION	X- ROTATION	Y- ROTATION	Z- ROTATION	DIRECTION
1	.24680E-07	.11283E-07	.42972E-07	.11056E-06	.25076E-06	.30060E-06	.000	.000
2	.21116E-03	.87529E-04	.52649E-03	.35421E-04	.78193E-04	.30138E-04	.002	.004
3	.15897E-03	.82675E-04	.53418E-03	.36752E-04	.81121E-04	.30796E-04	.001	.004
301	.33135E-01	.15042E-01	.17374E-02	.23822E-03	.58193E-04	.25690E-03	.282	.014
4	.60289E-01	.27231E-01	.28808E-02	.32582E-04	.58193E-04	.48302E-03	.509	.024
5	.58475E-01	.26381E-01	.30914E-02	.13560E-03	.29660E-03	.52597E-03	.432	.026
6	.46041E-01	.20721E-01	.33192E-02	.29151E-03	.64360E-03	.57872E-03	.386	.028
7	.52700E-01	.20728E-01	.42324E-02	.29189E-03	.64360E-03	.58043E-03	.287	.071
8	.22405E-01	.10045E-01	.35123E-02	.48159E-03	.10730E-02	.62328E-03	.186	.029
9	.13425E-05	.48734E-06	.37335E-02	.70073E-03	.15724E-02	.66870E-03	.000	.032
12	.34595E-01	.15207E-01	.39561E-02	.20360E-02	.20360E-02	.71500E-02	.282	.034
13	.98862E-01	.43969E-01	.41457E-02	.10524E-02	.23113E-02	.75978E-03	.800	.036
14	.85617E-01	.44001E-01	.29947E-01	.10596E-02	.23113E-02	.75854E-03	.863	.422
15	.16786E+00	.75491E-01	.43083E-02	.11175E-02	.23858E-02	.80902E-03	.132	.037
16	.22298E+00	.10170E+00	.45490E-02	.11389E-02	.22634E-02	.87599E-03	.1791	.040
18	.28178E+00	.15703E+00	.20372E-01	.92309E-03	.23851E-03	.97227E-03	.2275	.211
1801	.25015E+00	.24078E+00	.50875E-01	.37488E-03	.14782E-02	.83118E-03	.2103	.585
19	.15478E+00	.24659E+00	.23581E+00	.87598E-03	.24931E-02	.58232E-03	.2103	.1680
21	.10514E+00	.21810E+00	.33820E+00	.12127E-02	.24679E-02	.60618E-03	.2152	.2394
23	.52123E-01	.15327E+00	.38639E+00	.15522E-02	.95782E-03	.67603E-03	.184	.2741
24	.31997E-01	.92825E-01	.38713E+00	.14312E-02	.61517E-03	.66396E-03	.959	.2747
25	.25757E-01	.51073E-01	.38761E+00	.11479E-02	.41460E-03	.63190E-03	.893	.2751
29	.27892E-01	.15375E-01	.38840E+00	.54245E-03	.16377E-03	.58372E-03	.1042	.2757
31	.27895E-01	.20501E-01	.38822E+00	.28732E-03	.14990E-03	.56432E-03	.1022	.2761
32	.18345E-01	.28800E-01	.38944E+00	.23998E-03	.45112E-03	.59862E-03	.613	.2766
32	.21922E-01	.31957E-01	.38955E+00	.27075E-03	.53531E-03	.61326E-03	.592	.2767
34	.36280E-01	.39199E-01	.38969E+00	.30366E-03	.55597E-03	.64021E-03	.802	.2767
35	.49997E-01	.45319E-01	.38972E+00	.30872E-03	.65903E-03	.64021E-03	.1073	.2767
36	.61270E-01	.50085E-01	.38974E+00	.30936E-03	.65942E-03	.64021E-03	.1308	.2767
37	.35110E-01	.98181E-01	.40111E+00	.14121E-02	.13495E-02	.80227E-03	.956	.2827
38	.38413E-01	.10164E+00	.40970E+00	.14175E-02	.18441E-02	.86526E-03	.978	.2885
40	.41240E-01	.10799E+00	.41457E+00	.13107E-02	.30645E-02	.10733E-02	.908	.2927
4001	.41335E-01	.13440E+00	.44741E+00	.17908E-02	.21638E-02	.10723E-02	.1012	.3998
41	.41404E-01	.16005E+00	.52042E+00	.27187E-02	.34292E-02	.85606E-03	.1014	.5823
43	.45278E-01	.16112E+00	.53445E+00	.29670E-02	.25379E-02	.74430E-03	.1036	.6133
4301	.10780E+00	.13143E+00	.57391E+00	.43471E-02	.21638E-02	.3241E-02	.1859	.7137
44	.15909E+00	.13037E+00	.55409E+00	.57202E-02	.20100E-02	.19199E-02	.2846	.7449
46	.13731E+00	.15634E+00	.41635E+00	.67883E-02	.20468E-02	.21113E-02	.2654	.5716
47	.73220E-01	.15641E+00	.13046E+00	.63909E-02	.19089E-02	.20057E-02	.1527	.1716
49	.63877E-01	.14211E+00	.74238E-01	.53770E-02	.18075E-02	.17192E-02	.1295	.1021
51	.52715E-01	.10985E+00	.38449E-01	.41579E-02	.15524E-02	.13188E-02	.1039	.465
53	.41064E-01	.77881E-01	.24308E-01	.28208E-02	.12283E-02	.88114E-03	.134	.078
54	.67735E-02	.63696E-02	.40681E-02	.61875E-03	.48501E-03	.21350E-03	.121	.011
55	.98653E-03	.11478E-03	.57963E-03	.27520E-04	.19001E-03	.59112E-05	.019	.000
55	.38694E-08	.59507E-08	.12681E-07	.89645E-06	.17530E-03	.34725E-06	.000	.000
57	.11594E-02	.70368E-05	.6538E-03	.89646E-06	.17530E-03	.34726E-06	.023	.013
58	.3808E-01	.21278E-01	.38980E+00	.16432E-03	.8945E-03	.48392E-03	.114	.2773
59	.29653E-01	.23139E-01	.38733E+00	.16566E-03	.72173E-03	.43411E-03	.193	.2765
61	.30590E-01	.25694E-01	.37609E+00	.41061E-03	.14864E-02	.21682E-03	.1246	.2759
6101	.30633E-01	.28045E-01	.32126E+00	.96112E-03	.19396E-02	.14238E-03	.1250	.3815
62	.30633E-01	.28045E-01	.26012E+00	.15314E-02	.20147E-02	.19445E-03	.1252	.5491
64	.24890E-01	.20145E-01	.19659E+00	.21435E-02	.19019E-02	.38342E-03	.1047	.4986
65	.77863E-02	.20059E-01	.10404E+00	.17230E-02	.17230E-02	.41627E-03	.387	.2441
67	.38763E-02	.19132E-01	.8188E-01	.17255E-02	.16352E-02	.14340E-03	.209	.1890
69	.10216E-02	.16505E-01	.60741E-01	.13841E-02	.14158E-02	.39488E-03	.058	.1432
71	.83605E-04	.12956E-01	.45381E-01	.11281E-02	.11412E-02	.34796E-03	.005	.1116
72	.21083E-04	.14336E-02	.77217E-02	.23109E-03	.46810E-03	.11622E-03	.001	.2016
73	.13300E-05	.34228E-04	.11209E-02	.92636E-05	.18560E-03	.59118E-05	.000	.032

74	12455E-08	70308E-08	23885E-06	17128E-03	20490E-06	000	000	000
75	12455E-08	1307E-02	23885E-06	17126E-03	20491E-06	000	000	036
76	38847E-01	39786E+00	38382E-03	13541E-02	76309E-03	837	1.366	2.816
77	41426E-01	40300E+00	51507E-03	17075E-02	81799E-03	886	1.353	2.862
79	43469E-01	41143E+00	67683E-03	24949E-02	99563E-03	927	1.317	2.968
7901	43575E-01	45527E+00	15174E-02	28413E-02	99733E-03	929	1.755	3.987
80	43657E-01	50887E+00	24160E-02	25052E-02	79304E-03	930	2.601	5.257
82	46309E-01	13169E+00	51638E-02	21379E-02	58333E-03	950	2.634	5.413
8201	84768E-01	51601E+00	38061E-02	19198E-02	77133E-03	950	1.875	5.580
83	12765E+00	46717E+00	48812E-02	21010E-02	11959E-02	853	2.008	5.810
85	11947E+00	34488E+00	56287E-02	20876E-02	15291E-02	2.261	2.261	4.471
86	12243E+00	11024E+00	52422E-02	18971E-02	15046E-02	1.625	2.257	1.765
88	63019E-01	64538E-01	43737E-02	17899E-02	12958E-02	1.333	2.084	1.765
90	51168E-01	35341E-01	33558E-02	15343E-02	10044E-02	1.022	1.675	558
92	39353E-01	23141E-01	22641E-02	11964E-02	69822E-03	769	1.236	441
93	63903E-02	37999E-02	48875E-02	45972E-03	16530E-03	124	.117	.071
94	92842E-03	54310E-03	21610E-04	17892E-03	76147E-05	.018	.002	.010
95	38838E-08	10380E-07	69983E-06	16504E-03	2524E-06	.000	.000	.000
96	10915E-02	63016E-03	69983E-06	16503E-03	2524E-06	.021	.000	.012

***** FINAL RESULTS - SRSS COMBINATION OF DYNAMIC RESPONSES WITH HIGH FREQUENCY MODE RESPONSES *****
 MODAL COMBINATION METHOD 2-GROUPING

PIPE FORCES AND MOMENTS

ELEMENT NUMBER	ELEMENT TYPE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
1	TANGENT	END-I END-J	41757.225 41757.225	11282.625 11282.625	24679.772 24679.772	300603.41 300603.41	250763.20 1790995.59	110558.97 814539.66
2	TANGENT	END-I END-J	40257.906 40257.906	11284.606 11284.606	24682.994 24682.994	300603.41 300603.41	1790995.59 1684095.33	814539.66 765668.34
3	TANGENT	END-I END-J	38956.335 38956.335	11282.559 11282.559	24680.486 24680.486	300603.41 300603.41	1684095.33 142443.55	765668.34 69610.09
4	TANGENT	END-I END-J	37055.384 37055.384	10778.457 10778.457	23970.202 23970.202	300603.41 300603.41	142443.55 1915758.04	69610.09 866562.79
5	TANGENT	END-I END-J	35977.789 35977.789	10253.903 10253.903	23209.719 23209.719	300603.41 300603.41	1915758.04 2241894.91	866562.79 1010521.64
6	TANGENT	END-I END-J	35791.112 35791.112	10165.537 10165.537	23079.777 23079.777	300603.41 300603.41	2241894.91 2899626.20	1010521.64 1299991.74
7	TANGENT	END-I END-J	2518.959 2518.959	7927.767 7927.767	4203.291 4203.291	.00 .00	64537.15 .00	121722.96 .00
8	TANGENT	END-I END-J	31346.654 31346.654	8364.888 8364.888	20006.322 20006.322	257527.44 257527.44	2899626.20 3464525.98	1296652.93 1526480.13
9	TANGENT	END-I END-J	31177.807 31177.807	8331.324 8331.324	19949.443 19949.443	257527.44 257527.44	3464525.98 3812222.34	1526480.13 1668531.27
10	TANGENT	END-I END-J	30872.621 30872.621	19398.689 19398.689	55328.805 55328.805	257527.44 257527.44	3812222.34 2824779.43	1668531.27 1327872.00
11	TANGENT	END-I END-J	30709.550 30709.550	19330.800 19330.800	55233.227 55233.227	257527.44 257527.44	2824779.43 1257603.17	1327872.00 797152.25
12	TANGENT	END-I END-J	5635.542 5635.542	8770.789 8770.789	8033.611 8033.611	.00 .00	241644.29 .00	263816.22 .00
13	TANGENT	END-I END-J	29302.869 29302.869	14618.708 14618.708	49209.068 49209.068	356805.52 356805.52	1257603.17 183018.21	706801.62 294086.66
14	TANGENT	END-I END-J	29215.373 29215.373	14259.030 14259.030	48649.657 48649.657	356805.52 356805.52	183018.21 1246555.47	294086.66 72957.26
15	BEND	END-I CENTER END-J	28994.794 48673.607 54563.065	46500.338 25147.964 5315.080	12916.455 12916.455 12916.455	356805.52 356805.52 485876.59	72957.26 197983.84 295489.63	1246555.47 2118477.16 2382050.78
16	TANGENT	END-I END-J	49678.533 49678.533	9245.525 9245.525	7100.686 7100.686	485867.44 485867.44	2382050.78 1714216.65	295504.60 1161993.48
17	TANGENT	END-I END-J	43192.230 43192.230	4135.071 4135.071	9457.177 9457.177	485862.16 485862.16	1714216.65 922529.97	1161993.48 1360177.30
18	TANGENT	END-I END-J	38512.182 38512.182	15809.032 15809.032	4197.495 4197.495	486189.61 486189.61	922529.97 999242.91	1360060.27 674223.90
19	BEND	END-I CENTER END-J	35923.156 50535.387 50904.854	38817.712 15634.557 14406.779	18556.646 18556.646 18556.646	486051.43 228469.87 163446.71	674223.91 404046.45 105628.02	999242.91 1641150.57 1659718.32

20	TANGENT	END-I END-J	46603.473 46603.473	20586.642 20586.642	14450.326 14450.326	163446.76 163446.76	1659718.32 1177152.79	105628.38 804570.91
21	TANGENT	END-I END-J	37773.566 37773.566	23372.080 23372.080	15963.460 15963.460	195095.64 195095.64	1054335.49 724147.70	804224.61 1521087.42
22	TANGENT	END-I END-J	31949.144 31949.144	8344.651 8344.651	6956.358 6956.358	195095.64 195095.64	724147.70 506431.20	1521087.42 1063303.24
23	TANGENT	END-I END-J	26972.866 26972.866	7915.957 7915.957	6128.452 6128.452	95095.64 95095.64	506431.20 472084.21	1063303.24 788582.87
24	TANGENT	END-I END-J	20082.185 20082.185	8740.387 8740.387	6131.883 6131.883	188099.45 188099.45	619514.64 615714.14	680276.01 230066.91
25	TANGENT	END-I END-J	15058.763 15058.763	5294.645 5294.645	8760.091 8760.091	188099.45 188099.45	615714.14 591977.45	230066.91 227370.72
26	TANGENT	END-I END-J	12461.318 12461.318	5078.092 5078.092	5221.217 5221.217	188099.45 188099.45	591977.45 530316.68	227370.72 157563.45
27	TANGENT	END-I END-J	3093.879 3093.879	2009.453 2009.453	1284.979 1284.979	.00 .00	38162.44 7830.68	59201.88 11742.80
28	TANGENT	END-I END-J	928.105 928.105	662.822 662.822	441.996 441.996	.00 .00	7830.68 .00	11742.80 .00
29	TANGENT	END-I END-J	3644.384 3644.384	4105.638 4105.638	9443.374 9443.374	499594.96 499594.96	494375.34 315828.57	209547.47 147421.20
30	TANGENT	END-I END-J	3548.583 3548.583	3963.115 3963.115	9211.265 9211.265	499594.96 499594.96	315828.57 228755.12	147421.20 123735.78
31	BEND	END-I CENTER END-J	3472.466 3771.376 3993.319	3823.370 3519.776 3259.676	9014.137 9014.137 9014.137	499577.65 403422.74 278088.93	228791.35 324601.52 384533.76	123735.78 112981.96 102375.73
32	TANGENT	END-I END-J	3661.765 3661.765	3026.877 3026.877	8473.283 8473.283	278251.25 278251.25	384416.29 139368.54	102375.73 121510.20
33	TANGENT	END-I END-J	3184.758 3184.758	1930.628 1930.628	6513.521 6513.521	278251.25 278251.25	139368.54 316428.01	121510.20 187292.99
34	BEND	END-I CENTER END-J	2914.418 3104.517 3525.249	4607.219 4451.256 4124.881	943.521 943.521 943.521	278251.25 273028.93 257894.65	187292.99 193028.56 212768.51	316428.01 334968.84 352155.51
35	TANGENT	END-I END-J	2594.660 2594.660	850.518 850.518	2369.111 2369.111	257913.69 257913.69	352155.51 419568.05	212745.13 177660.47
36	TANGENT	END-I END-J	2774.827 2774.827	2536.245 2536.245	4272.990 4272.990	257912.87 257912.87	419568.05 179325.32	177661.74 125961.28
37	BEND	END-I CENTER END-J	4019.148 4270.835 3325.479	3326.328 3046.485 4019.712	8166.678 8166.678 8166.678	257913.69 117935.37 71700.76	179325.32 199154.04 111927.32	125959.38 127188.65 97910.43
38	TANGENT	END-I END-J	4213.690 4213.690	11361.233 11361.233	3197.473 3197.473	71681.53 71681.53	62530.62 100109.73	133376.54 380992.83
39	BEND	END-I CENTER END-J	4970.285 3660.005 4444.106	11158.920 11556.766 11248.951	5508.216 5508.216 5508.216	71681.53 74702.93 101678.17	168198.98 191414.13 203438.79	356192.37 411597.10 466614.48
40	BEND	END-I	4414.368	11460.955	5656.143	101593.90	203545.82	466586.22

41	BEND	CENTER END-J	6373.555 8433.322	10516.181 8984.250	5656.143 5656.143	143688.42 188889.30	203717.65 191513.14	518718.65 563722.08
		END-I CENTER END-J	8385.738 10115.280 11284.539	9192.038 7395.345 5460.407	5769.062 5769.062 5769.062	188705.34 23042.51 265638.58	191538.04 168573.84 137201.65	563775.10 599818.73 623521.87
42	TANGENT	END-I END-J	11343.986 11343.986	5897.503 5897.503	6010.451 6010.451	265608.63 265608.63	137208.97 377908.17	623533.09 803543.56
43	TANGENT	END-I END-J	11454.197 11454.197	5949.878 5949.878	6100.063 6100.063	265598.22 265598.22	377908.17 487310.29	803546.83 891782.81
44	TANGENT	END-I END-J	11573.697 11573.697	5950.733 5950.733	6158.672 6158.672	265651.42 265651.42	487310.29 524182.23	891766.79 921974.86
45	TANGENT	END-I END-J	77.890 77.890	.000 .000	45.210 45.210	.00 .00	345.31 .00	.00 .00
46	TANGENT	END-I END-J	1389.252 1389.252	2518.870 2518.870	4003.979 4003.979	158264.46 158264.46	300535.77 262903.83	108420.52 80422.12
47	TANGENT	END-I END-J	1354.880 1354.880	2260.412 2260.412	3928.771 3928.771	158264.46 158264.46	262903.83 244854.48	80422.12 75599.79
48	BEND	END-I CENTER END-J	1333.899 1847.862 2185.065	2031.930 1596.271 1110.727	3897.704 3897.704 3897.704	158251.06 122147.42 145901.72	244863.01 251681.84 222361.79	75599.79 75265.94 73782.27
49	TANGENT	END-I END-J	1778.544 1778.544	930.444 930.444	3839.787 3839.787	145846.29 145846.29	222398.06 138395.16	73782.27 59676.79
50	TANGENT	END-I END-J	1293.696 1293.696	990.109 990.109	3207.454 3207.454	145846.29 145846.29	138395.16 122227.21	59676.79 43344.96
51	BEND	END-I CENTER END-J	1138.052 1693.924 1408.061	1408.516 618.277 1138.712	3543.906 3543.906 3543.906	145846.29 103034.08 118461.05	122227.21 137783.16 84725.32	43344.96 38646.15 32601.80
52	TANGENT	END-I END-J	1912.421 1912.421	5038.874 5038.874	1225.730 1225.730	118447.13 118447.13	32601.80 35269.63	84744.89 130184.47
53	BEND	END-I CENTER END-J	2306.896 2361.325 2289.431	1242.759 1112.273 1294.384	5716.385 5716.385 5716.385	118447.13 125834.55 140021.87	130184.47 150987.26 164960.50	35269.63 38805.10 40409.47
54	BEND	END-I CENTER END-J	2398.917 2188.368 1886.440	1378.679 1697.512 2012.361	5926.170 5926.170 5926.170	140007.90 161301.47 187262.98	164972.33 170780.54 167092.08	40409.47 40118.50 38971.89
55	BEND	END-I CENTER END-J	1934.524 1565.290 1243.494	2129.436 2419.310 2587.061	6090.427 6090.427 6090.427	187217.93 214262.41 238871.24	167142.26 154483.42 133996.70	38971.89 38480.49 40478.51
56	TANGENT	END-I END-J	1245.073 1245.073	2868.582 2868.582	6453.828 6453.828	238845.93 238845.93	134041.85 357158.20	40478.51 136069.85
57	TANGENT	END-I END-J	1245.537 1245.537	2910.881 2910.881	6660.661 6660.661	238845.93 238845.93	357158.20 472517.28	136062.85 187544.03
58	TANGENT	END-I END-J	1245.538 1245.538	2911.660 2911.660	6844.202 6844.202	238845.93 238845.93	472517.28 512220.94	187544.03 204901.55
59	TANGENT	END-I END-J	.000 .000	.000 .000	90.608 90.608	.00 .00	692.07 .00	.00 .00

60	TANGENT	END-I END-J	2926.599 2926.599	3629.000 3629.000	8195.635 8195.635	366255.28 366255.28	381989.38 230027.84	188099.45 130649.24
61	TANGENT	END-I END-J	2906.893 2906.893	3472.391 3472.391	7890.822 7890.822	366255.28 366255.28	230027.84 157411.80	130649.24 106863.39
62	BEND	END-I CENTER END-J	2895.651 3279.222 3534.726	3327.861 3018.598 2696.536	7627.719 7627.719 7627.719	366244.96 306710.80 226516.88	157435.85 221093.74 265425.81	106863.39 96215.29 85149.09
63	TANGENT	END-I END-J	3334.253 3334.253	2460.635 2460.635	6945.706 6945.706	226621.62 226621.62	265336.33 174904.14	85149.09 84013.94
64	TANGENT	END-I END-J	3075.772 3075.772	1641.120 1641.120	5029.267 5029.267	226621.62 226621.62	174904.14 324949.93	84013.94 133916.82
65	BEND	END-I CENTER END-J	2946.319 3220.533 3468.721	3439.073 3189.598 2913.104	1042.327 1042.327 1042.327	226621.62 214249.35 193731.59	133916.82 153455.29 181216.46	324949.93 336604.24 346887.27
66	TANGENT	END-I END-J	2869.927 2869.927	1227.073 1227.073	2034.029 2034.029	193755.21 193755.21	346887.27 345210.62	181191.13 152769.03
67	TANGENT	END-I END-J	2920.143 2920.143	2135.134 2135.134	4050.786 4050.786	193754.30 193754.30	345210.62 126047.14	152770.26 128999.92
68	BEND	END-I CENTER END-J	3777.776 3585.216 2482.605	2483.117 2729.406 3778.192	6693.557 6693.557 6693.557	193754.78 97990.55 60813.62	126047.14 139940.53 77533.32	128998.99 123760.40 92754.71
69	TANGENT	END-I END-J	3088.520 3088.520	9172.522 9172.522	3159.776 3159.776	60806.51 60806.51	78650.10 71868.08	90871.12 327624.53
70	BEND	END-I CENTER END-J	3688.437 3218.255 4138.691	8963.848 9091.187 8711.407	4905.666 4905.666 4905.666	60806.51 54574.99 76353.15	148238.45 172071.36 186855.48	300522.47 344601.22 387511.40
71	BEND	END-I CENTER END-J	4146.035 5654.438 7141.776	8882.500 8037.011 6770.621	5027.664 5027.664 5027.664	76284.31 114530.48 157168.54	186947.05 191412.58 184712.11	387481.10 427256.82 460654.03
72	BEND	END-I CENTER END-J	7124.298 8325.046 9075.992	6944.709 5455.828 4099.343	5122.572 5122.572 5122.572	157010.82 198040.34 233710.98	184731.75 168255.88 143406.23	460700.36 486242.09 501629.90
73	TANGENT	END-I END-J	9153.110 9153.110	4476.111 4476.111	5328.521 5328.521	233677.05 233677.05	143411.26 362845.62	501644.41 622704.43
74	TANGENT	END-I END-J	9293.761 9293.761	4522.936 4522.936	5411.394 5411.394	233668.82 233668.82	362845.62 460583.04	622707.36 685690.56
75	TANGENT	END-I END-J	9445.136 9445.136	4523.690 4523.690	5472.862 5472.862	233710.38 233710.38	460583.04 493476.48	685676.37 707578.79
76	TANGENT	END-I END-J	77.890 77.890	.000 .000	45.257 45.257	.00 .00	345.67 .00	.00 .00

***** FINAL RESULTS - SRSS COMBINATION OF DYNAMIC RESPONSES WITH HIGH FREQUENCY MODE RESPONSES *****
 MODAL COMBINATION METHOD 2-GROUPING

SUPPORT FORCES AND MOMENTS

NODE NUMBER	COMPONENT DIRECTION	FORCE/MOMENT (LOCAL)
1	FX	24680.
1	FY	11283.
1	FZ	42972.
1	MX	110559.
1	MY	250763.
1	MZ	300603.
9	FX	75180.
9	FY	27291.
9	FZ	3869.
56	FX	5951.
56	FY	12682.
56	FZ	896451.
56	MX	524165.
56	MY	347253.
56	MZ	1246.
74	FX	2912.
74	FY	7031.
74	FZ	238846.
74	MX	512138.
74	MY	204902.
74	MZ	3884.
95	FX	4524.
95	FY	10380.
95	FZ	699827.
95	MX	493458.
95	MY	259240.
95	MZ	41014.
19	FL	18809.
25	FL-1	31632.
25	FL-2	12418.
27	FL	11038.
32	FL	

BENCHMARK PROBLEM 2
TOTAL RESPONSE; DOUBLE SUM METHOD

***** FINAL RESULTS - SRSS COMBINATION OF DYNAMIC RESPONSES WITH HIGH FREQUENCY MODE RESPONSES *****
 MODAL COMBINATION METHOD 3-DOUBLE SUM

N O D E N O D E N U M B E R	D I S P L A C E M E N T S / R O T A T I O N S			A C C E L E R A T I O N S I N G ' S		
	X- T R A N S L A T I O N	Y- T R A N S L A T I O N	Z- T R A N S L A T I O N	X- D I R E C T I O N	Y- D I R E C T I O N	Z- D I R E C T I O N
1	24592E-07	10888E-07	42992E-07	10688E-06	24996E-06	30058E-06
2	21066E-03	84964E-04	52675E-03	34197E-04	77921E-04	30134E-04
3	15811E-03	79404E-04	52444E-03	30439E-04	80339E-04	30792E-04
301	33019E-01	14521E-01	17383E-02	23006E-03	52540E-03	25688E-03
4	60082E-01	26294E-01	28825E-02	13087E-04	67914E-04	52591E-03
5	58275E-01	25474E-01	30932E-02	13087E-04	29555E-03	52591E-03
6	45884E-01	20012E-01	33211E-02	28146E-03	64138E-03	57866E-03
7	52685E-01	20018E-01	40421E-02	28183E-03	64138E-03	58039E-03
8	22330E-01	97028E-02	35144E-02	46517E-03	10694E-02	62305E-03
9	13391E-05	47087E-06	37358E-02	67713E-03	15673E-02	66829E-03
12	34483E-01	14658E-01	39587E-02	87958E-03	20295E-02	71440E-03
13	98544E-01	42502E-01	41485E-02	10177E-02	23037E-02	75898E-03
14	84915E-01	42532E-01	28788E-01	10245E-02	23037E-02	75712E-03
15	16732E+00	72996E-01	43115E-02	10814E-02	23779E-02	80947E-03
16	22226E+00	98373E-01	45528E-02	11630E-02	22522E-02	87767E-03
18	28071E+00	15236E+00	20149E-01	90018E-03	22430E-02	97441E-03
1801	24871E+00	23592E+00	50548E-01	37870E-03	14798E-02	83622E-03
19	15289E+00	24438E+00	32605E+00	88472E-03	24525E-02	57579E-03
21	10277E+00	21709E+00	33854E+00	12195E-02	24669E-02	60207E-03
23	49374E-01	15286E+00	38664E+00	15537E-02	94344E-03	67768E-03
24	30675E-01	92409E-01	38738E+00	14315E-02	59037E-03	66897E-03
25	25611E-01	50671E-01	38786E+00	11475E-02	39555E-03	63715E-03
29	28591E-01	15035E-01	38866E+00	54143E-03	15476E-03	58874E-03
31	27787E-01	20490E-01	38907E+00	28804E-03	14860E-03	56865E-03
32	17917E-01	28439E-01	38970E+00	24686E-03	44431E-03	60672E-03
33	14143E-01	31779E-01	38982E+00	27890E-03	52452E-03	62348E-03
34	35882E-01	39308E-01	38996E+00	31228E-03	63726E-03	65375E-03
35	49644E-01	45676E-01	38998E+00	31759E-03	64035E-03	65375E-03
36	60556E-01	50648E-01	39000E+00	31837E-03	64075E-03	65375E-03
37	34869E-01	97262E-01	40151E+00	14036E-02	12628E-02	80686E-03
38	38751E-01	10045E+00	41007E+00	17323E-02	29122E-02	10565E-02
40	41844E-01	10690E+00	41495E+00	12988E-02	35462E-02	10490E-02
4001	41953E-01	13377E+00	44521E+00	17686E-02	35462E-02	10490E-02
41	42032E-01	15904E+00	51117E+00	26355E-02	32967E-02	84299E-03
43	45946E-01	15995E+00	52375E+00	28714E-02	28577E-02	72705E-03
4301	10792E+00	12969E+00	55691E+00	41918E-02	21710E-02	12784E-02
44	16000E+00	12857E+00	53535E+00	55120E-02	20260E-02	18876E-02
46	13829E+00	15219E+00	40224E+00	65459E-02	20464E-02	21095E-02
47	73135E-01	15206E+00	12659E+00	61675E-02	18969E-02	15988E-02
49	63537E-01	13827E+00	72405E-01	51911E-02	17945E-02	17150E-02
51	52197E-01	10706E+00	37812E-01	40176E-02	15406E-02	13222E-02
53	40596E-01	76048E-01	24014E-01	27342E-02	12165E-02	88958E-03
53	66861E-02	62562E-02	40117E-02	60322E-03	47896E-03	21410E-03
54	97360E-03	11284E-03	57178E-03	26892E-04	18753E-03	99105E-05
55	37519E-08	57925E-08	12222E-07	87718E-06	17301E-03	34563E-06
56	11442E-02	69095E-05	66060E-03	87719E-06	17301E-03	34564E-06
57	28354E-01	21789E-01	39010E+00	16294E-03	46273E-03	48481E-03
58	29705E-01	23644E-01	38765E+00	15966E-03	67972E-03	43260E-03
59	30645E-01	26106E-01	37645E+00	40919E-03	14225E-02	21072E-03
6101	30688E-01	28146E-01	32068E+00	95275E-03	18777E-02	32573E-03
62	30700E-01	24078E-01	25651E+00	15103E-02	19802E-02	19455E-03
64	24933E-01	20251E-01	19220E+00	20901E-02	19022E-02	38323E-03
65	77955E-02	20167E-01	10206E+00	20189E-02	17224E-02	41692E-03
67	38848E-02	19216E-01	80386E-01	16770E-02	16317E-02	41391E-03
69	10247E-02	16550E-01	59544E-01	13389E-02	11083E-02	39639E-03
71	78123E-04	12970E-01	44385E-01	10881E-02	11259E-02	34973E-03
72	19699E-04	14304E-02	74908E-02	21324E-03	45571E-03	11613E-03
73	12428E-05	34075E-04	10869E-02	89404E-05	18011E-03	59007E-05

74	.11638E-08	.28911E-08	.66929E-08	.23035E-06	.16620E-03	.20447E-06	.000	.000	.000
75	.11639E-08	.15593E-05	.12688E-02	.23035E-06	.16618E-03	.20448E-06	.000	.000	.032
76	.38838E-01	.42232E-01	.39816E+00	.38301E-03	.12753E-02	.78660E-03	1.373	1.373	2.816
77	.41775E-01	.45819E-01	.40332E+00	.49500E-03	.16004E-02	.84403E-03	1.376	1.376	2.864
79	.44106E-01	.54537E-01	.41173E+00	.64502E-03	.23194E-02	.10257E-02	1.371	1.371	2.973
7901	.44224E-01	.95587E-01	.45335E+00	.14405E-02	.26270E-02	.10199E-02	1.803	1.803	3.899
80	.44316E-01	.13423E+00	.50071E+00	.22963E-02	.23147E-02	.80146E-03	2.626	2.626	5.042
82	.46762E-01	.13526E+00	.50672E+00	.25292E-02	.20128E-02	.56724E-03	2.662	2.662	5.176
8201	.83932E-01	.91065E-01	.49895E+00	.36206E-02	.18970E-02	.78767E-03	1.926	1.926	5.259
83	.12650E+00	.93851E-01	.44649E+00	.45342E-02	.20855E-02	.12133E-02	1.936	1.936	5.477
85	.11823E+00	.11788E+00	.32934E+00	.53377E-02	.20664E-02	.15192E-02	2.153	2.153	4.232
86	.71378E-01	.11778E+00	.10645E+00	.49871E-02	.18741E-02	.14892E-02	2.149	2.149	1.190
88	.62313E-01	.10596E+00	.62916E-01	.41708E-02	.17675E-02	.12841E-02	1.984	1.984	.730
90	.50517E-01	.82591E-01	.34787E-01	.32091E-02	.15151E-02	.99813E-03	1.595	1.595	.526
92	.38846E-01	.58514E-01	.28334E-01	.21745E-02	.11813E-02	.70059E-03	1.177	1.177	.412
93	.63062E-02	.47787E-02	.37473E-02	.47318E-03	.45366E-03	.16537E-03	.111	.111	.066
94	.91610E-03	.85791E-04	.53574E-03	.20928E-04	.17653E-03	.76130E-05	.002	.002	.010
95	.37567E-08	.45370E-08	.98968E-08	.68103E-06	.16284E-03	.25858E-06	.000	.000	.000
96	.10769E-02	.52791E-05	.62177E-03	.68104E-06	.16284E-03	.25858E-06	.000	.000	.011

***** FINAL RESULTS - SRSS COMBINATION OF DYNAMIC RESPONSES WITH HIGH FREQUENCY MODE RESPONSES *****
 MODAL COMBINATION METHOD 3-DOUBLE SUM

PIPE FORCES AND MOMENTS

ELEMENT NUMBER	ELEMENT TYPE	STATION	AXIAL FORCE	Y-AXIS SHEAR	Z-AXIS SHEAR	TORSIONAL MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
1	TANGENT	END-I END-J	41777.807 41777.807	10888.289 10888.289	24591.162 24591.162	300569.19 300569.19	249974.12 1784681.95	106883.26 786256.20
2	TANGENT	END-I END-J	40279.182 40279.182	10890.037 10890.037	24594.258 24594.258	300569.19 300569.19	1784681.95 1678165.45	786256.20 739093.37
3	TANGENT	END-I END-J	38978.317 38978.317	10888.160 10888.160	24591.921 24591.921	300569.19 300569.19	1678165.45 141805.57	739093.37 66991.18
4	TANGENT	END-I END-J	37078.470 37078.470	10410.132 10410.132	23889.319 23889.319	300569.19 300569.19	141805.57 1909149.28	66991.18 836703.62
5	TANGENT	END-I END-J	36001.506 36001.506	9913.328 9913.328	23136.828 23136.828	300569.19 300569.19	1909149.28 2234264.93	836703.62 975878.98
6	TANGENT	END-I END-J	35814.947 35814.947	9829.798 9829.798	23008.282 23008.282	300569.19 300569.19	2234264.93 2889962.61	975878.98 1255782.78
7	TANGENT	END-I END-J	2413.204 2413.204	7926.145 7926.145	4163.127 4163.127	.00 .00	63919.42 .00	121698.05 .00
8	TANGENT	END-I END-J	31376.742 31376.742	8134.512 8134.512	19962.384 19962.384	256181.40 256181.40	2889962.61 3453624.32	1252920.32 1476083.89
9	TANGENT	END-I END-J	31208.114 31208.114	8103.108 8103.108	19906.365 19906.365	256181.40 256181.40	3453624.32 3800593.75	1476083.89 1614073.99
10	TANGENT	END-I END-J	30903.122 30903.122	18710.037 18710.037	55183.712 55183.712	256181.40 256181.40	3800593.75 2815844.95	1614073.99 1285855.40
11	TANGENT	END-I END-J	30740.228 30740.228	18645.603 18645.603	55089.138 55089.138	256181.40 256181.40	2815844.95 1253241.17	1285855.40 775138.86
12	TANGENT	END-I END-J	5389.354 5389.354	8688.986 8688.986	7791.813 7791.813	.00 .00	234368.62 .00	261355.53 .00
13	TANGENT	END-I END-J	29352.869 29352.869	14179.906 14179.906	49130.538 49130.538	356903.45 356903.45	1253241.17 175060.06	689648.19 289572.26
14	TANGENT	END-I END-J	29265.266 29265.266	13840.178 13840.178	48575.840 48575.840	356903.45 356903.45	179060.06 1247543.31	289572.26 73475.75
15	BEND	END-I CENTER END-J	29044.727 48889.300 54538.813	46444.409 25081.414 5206.161	12576.055 12576.055 12576.055	356903.45 394753.74 480468.69	73475.75 183168.89 272226.96	1247543.31 2117577.48 2379393.67
16	TANGENT	END-I END-J	49689.284 49689.284	9137.563 9137.563	7055.613 7055.613	480460.31 480460.31	2379393.67 1709293.38	272241.62 1132485.26
17	TANGENT	END-I END-J	43250.458 43250.458	3979.899 3979.899	9448.695 9448.695	480455.19 480455.19	1709293.38 913904.25	1132487.32 1354402.70
18	TANGENT	END-I END-J	38566.554 38566.554	15794.045 15794.045	42007.075 42007.075	480781.10 480781.10	913904.25 1000844.44	1354287.43 671472.24
19	BEND	END-I CENTER END-J	35982.497 50561.903 50939.818	38806.790 15451.425 14326.722	18512.543 18512.543 18512.543	480644.33 227032.94 166550.12	671570.54 402330.36 106618.78	1000844.44 1642545.91 1660711.11

20	TANGENT	END-I END-J	46631.425 46631.425	20532.161 20532.161	14378.763 14378.763	166550.17 166550.17	1660711.11 1170325.79	106619.11 807710.29
21	TANGENT	END-I END-J	37833.241 37833.241	23221.962 23221.962	16011.898 16011.898	199191.18 199191.18	1042243.18 693740.67	807198.93 1521343.36
22	TANGENT	END-I END-J	31988.315 31988.315	8363.653 8363.653	6744.937 6744.937	199191.18 199191.18	593740.67 497805.81	1521343.36 1063656.87
23	TANGENT	END-I END-J	26997.511 26997.511	7932.864 7932.864	5845.324 5845.324	199191.18 199191.18	497805.81 466219.65	1063656.87 789901.16
24	TANGENT	END-I END-J	20067.264 20067.264	8718.397 8718.397	5748.780 5748.780	192969.72 192969.72	614577.50 595992.27	681208.13 235848.66
25	TANGENT	END-I END-J	14987.491 14987.491	5327.612 5327.612	8699.732 8699.732	192969.72 192969.72	595992.27 564776.84	235848.66 230686.33
26	TANGENT	END-I END-J	12336.361 12336.361	5284.688 5284.688	5484.502 5484.502	192969.72 192969.72	564776.84 496302.87	230686.33 149976.74
27	TANGENT	END-I END-J	3096.356 3096.356	2028.005 2028.005	1299.449 1299.449	.00 .00	38564.23 7901.52	59806.76 11907.04
28	TANGENT	END-I END-J	928.940 928.940	672.076 672.076	446.023 446.023	.00 .00	7901.52 .00	11907.04 .00
29	TANGENT	END-I END-J	3450.826 3450.826	3973.817 3973.817	9214.476 9214.476	480157.05 480157.05	482931.14 309223.95	199876.75 140988.84
30	TANGENT	END-I END-J	3353.053 3353.053	3831.409 3831.409	8967.500 8967.500	480157.05 480157.05	309223.95 222367.62	140988.84 117544.40
31	BEND	END-I CENTER END-J	3275.441 3591.062 3835.494	3693.520 3403.970 3157.551	8759.566 8759.566 8759.566	480140.14 387215.79 267430.68	222403.53 315884.99 372010.42	117544.40 106702.07 96736.22
32	TANGENT	END-I END-J	3519.986 3519.986	2923.946 2923.946	8202.428 8202.428	267585.10 267585.10	371899.30 140179.78	96736.22 118034.12
33	TANGENT	END-I END-J	3078.720 3078.720	1872.266 1872.266	6269.424 6269.424	267585.10 267585.10	140179.78 308717.92	118034.12 183485.50
34	BEND	END-I CENTER END-J	2838.296 3014.228 3402.234	4423.880 4283.581 4008.328	921.245 921.245 921.245	267585.10 262470.39 250882.81	183485.50 190207.72 209605.98	308717.92 326123.87 342213.89
35	TANGENT	END-I END-J	2541.409 2541.409	844.408 844.408	2347.460 2347.460	250897.95 250897.95	342213.89 402911.13	209584.14 176470.58
36	TANGENT	END-I END-J	2741.469 2741.469	2444.021 2444.021	4140.315 4140.315	250897.21 250897.21	402911.13 173843.50	176471.72 123755.73
37	BEND	END-I CENTER END-J	3969.647 4161.751 3241.553	3242.340 3040.000 3970.136	7828.270 7828.270 7828.270	250898.10 116590.85 70656.68	173843.50 193706.16 110853.95	123754.02 123000.82 93369.00
38	TANGENT	END-I END-J	4098.242 4098.242	10966.551 10966.551	3102.101 3102.101	70640.40 70640.40	59376.19 100169.44	131063.97 367504.50
39	BEND	END-I CENTER END-J	4830.310 3594.147 4339.817	10719.972 11164.738 10931.841	5429.441 5429.441 5429.441	70640.40 73281.68 100517.13	165509.93 188601.37 200848.86	342378.72 395534.44 448370.20
40	BEND	END-I	4317.939	11139.594	5572.290	100435.65	200950.68	448342.76

41	BEND	CENTER END-J	6142.558 8092.312	10287.554 8854.010	5572.290 5572.290	141520.77 185867.03	201614.42 190090.38	498491.25 541883.53
		CENTER END-J	8049.830 9705.175 10844.346	9057.748 7249.085 5310.002	5680.727 5680.727 5680.727	185689.45 227071.24 261776.56	190115.50 167991.48 137868.42	541935.44 577006.41 600297.32
42	TANGENT	CENTER END-J	10905.943 10905.943	5740.013 5740.013	5912.784 5912.784	261746.42 261746.42	137877.99 373681.26	600307.89 784879.83
43	TANGENT	CENTER END-J	11020.387 11020.387	5791.713 5791.713	6000.940 6000.940	261736.46 261736.46	373681.26 481098.76	784883.00 874649.45
44	TANGENT	CENTER END-J	11144.651 11144.651	5792.534 5792.534	6060.074 6060.074	261787.11 261787.11	481098.76 517317.57	874634.31 905313.88
45	TANGENT	CENTER END-J	77.890 77.890	.000 .000	45.208 45.208	.00 .00	345.30 .00	.00 .00
46	TANGENT	CENTER END-J	1402.882 1402.882	2527.721 2527.721	3604.369 3604.369	140683.31 140683.31	285122.16 256359.56	110334.34 81339.23
47	TANGENT	CENTER END-J	1372.464 1372.464	2269.890 2269.890	3504.599 3504.599	140683.31 140683.31	256359.56 242132.46	81339.23 76409.93
48	BEND	CENTER END-J	1355.596 1850.894 2182.594	2040.186 1612.085 1124.968	3470.841 3470.841 3470.841	140669.96 109452.36 142469.53	242140.11 246855.19 215698.71	76409.93 76379.15 74902.60
49	TANGENT	CENTER END-J	1783.323 1783.323	938.405 938.405	3455.296 3455.296	142405.96 142405.96	215740.63 137690.53	74902.60 59498.18
50	TANGENT	CENTER END-J	1304.001 1304.001	1005.163 1005.163	3088.871 3088.871	142405.96 142405.96	137690.53 108864.93	59498.18 42960.79
51	BEND	CENTER END-J	1104.992 1692.266 1418.013	1418.390 617.557 1105.608	3539.339 3539.339 3539.339	142405.96 102251.39 107384.65	108864.93 124715.07 80253.13	42960.79 37771.45 31684.42
52	TANGENT	CENTER END-J	1911.247 1911.247	4859.903 4859.903	1144.824 1144.824	107376.30 107376.30	31684.42 34563.51	80264.43 126855.38
53	BEND	CENTER END-J	2298.184 2349.973 2271.455	1159.735 1096.786 1289.596	5450.812 5450.812 5450.812	107376.30 111941.82 125027.01	126855.38 149190.70 164253.68	34563.51 37656.42 38766.40
54	BEND	CENTER END-J	2379.085 2154.082 1829.967	1373.631 1702.260 2018.681	5634.424 5634.424 5634.424	125013.05 147028.37 174700.57	164264.24 170714.89 167263.30	38766.40 38162.80 37123.40
55	BEND	CENTER END-J	1878.287 1483.275 1162.078	2136.567 2413.027 2573.115	5778.592 5778.592 5778.592	174652.21 203743.91 230388.91	167313.68 154512.20 133425.98	37123.40 37408.90 40204.23
56	TANGENT	CENTER END-J	1163.482 1163.482	2848.975 2848.975	6101.303 6101.303	230361.46 230361.46	133473.30 349942.38	40204.23 136195.96
57	TANGENT	CENTER END-J	1163.863 1163.863	2890.324 2890.324	6304.530 6304.530	230361.46 230361.46	349942.38 459365.02	136195.96 187241.07
58	TANGENT	CENTER END-J	1163.865 1163.865	2891.127 2891.127	6496.360 6496.360	230361.46 230361.46	459365.02 497025.01	187241.07 204474.10
59	TANGENT	CENTER END-J	.000 .000	.000 .000	90.606 90.606	.00 .00	692.04 .00	.00 .00

60	TANGENT	END-I END-J	2859.164 2859.164	3783.942 3783.942	7885.369 7885.369	342713.04 342713.04	358453.56 214328.99	192969.72 132246.73
61	TANGENT	END-I END-J	2828.225 2828.225	3618.052 3618.052	7557.548 7557.548	342713.04 342713.04	214328.99 148246.65	132246.73 107701.10
62	BEND	END-I CENTER END-J	2808.496 3263.478 3603.041	3465.646 3116.001 2754.618	7279.057 7279.057 7279.057	342703.79 288991.87 216529.80	148268.24 203388.40 246265.50	107701.10 96348.22 85653.17
63	TANGENT	END-I END-J	3364.555 3364.555	2500.371 2500.371	6577.077 6577.077	216624.44 216624.44	246183.32 173808.19	85653.17 86420.26
64	TANGENT	END-I END-J	3055.458 3055.458	1671.299 1671.299	4713.412 4713.412	216624.44 216624.44	173808.19 314354.01	86420.26 137860.91
65	BEND	END-I CENTER END-J	2902.032 3183.898 3412.367	3211.747 2962.209 2766.600	1060.985 1060.985 1060.985	216624.44 202800.12 187458.99	137860.91 157913.71 184596.30	314354.01 324552.95 334314.38
66	TANGENT	END-I END-J	2861.643 2861.643	1221.411 1221.411	1966.878 1966.878	187476.50 187476.50	334314.38 326110.52	184573.24 155632.09
67	TANGENT	END-I END-J	2931.324 2931.324	2192.876 2192.876	3901.715 3901.715	187475.87 187475.87	326110.52 117761.67	155633.26 128950.71
68	BEND	END-I CENTER END-J	3772.872 3669.891 2564.363	2564.990 2764.115 3773.344	6342.915 6342.915 6342.915	187476.45 97514.26 60091.12	117761.67 134077.88 78022.38	128949.78 124171.45 93297.89
69	TANGENT	END-I END-J	3161.861 3161.861	8765.496 8765.496	3080.910 3080.910	60085.13 60085.13	78030.93 71332.34	93224.97 313436.85
70	BEND	END-I CENTER END-J	3736.150 3265.446 4148.936	8482.764 8675.840 8387.847	4851.633 4851.633 4851.633	60085.13 52397.95 73478.79	146522.33 170352.14 185279.02	285042.38 326166.04 365941.50
71	BEND	END-I CENTER END-J	4157.911 5500.807 6821.374	8551.844 7817.767 6672.762	4967.462 4967.462 4967.462	73412.17 111523.17 153974.86	185365.97 189996.40 183443.14	365910.88 402335.88 434827.64
72	BEND	END-I CENTER END-J	6811.446 7870.632 8593.344	6838.473 5458.342 4129.876	5057.411 5057.411 5057.411	153824.15 194647.61 230269.31	183463.16 166990.12 142108.54	434871.51 460117.38 475987.56
73	TANGENT	END-I END-J	8674.400 8674.400	4491.462 4491.462	5252.736 5252.736	230234.38 230234.38	142113.31 358167.64	476002.73 603584.93
74	TANGENT	END-I END-J	8822.543 8822.543	4536.238 4536.238	5333.847 5333.847	230226.81 230226.81	358167.64 454489.74	603587.77 669005.04
75	TANGENT	END-I END-J	8981.809 8981.809	4536.991 4536.991	5395.794 5395.794	230264.72 230264.72	454489.74 486910.32	668991.70 691658.67
76	TANGENT	END-I END-J	77.890 77.890	.000 .000	45.255 45.255	.00 .00	345.65 .00	.00 .00

***** FINAL RESULTS - SRSS COMBINATION OF DYNAMIC RESPONSES WITH HIGH FREQUENCY MODE RESPONSES *****
 MODAL COMBINATION METHOD 3-DOUBLE SUM

SUPPORT FORCES AND MOMENTS

NODE NUMBER	COMPONENT DIRECTION	FORCE/MOMENT (LBS-IN)
1	FX	24591.
1	FY	10888.
1	FZ	42992.
1	MX	106883.
1	MY	249974.
1	MZ	300569.
9	FX	74988.
9	FY	26368.
56	FX	3752.
56	FY	5793.
56	FZ	12272.
56	MX	877178.
56	MY	517300.
56	MZ	345633.
74	FX	1164.
74	FY	2891.
74	FZ	6693.
74	MX	230361.
74	MY	496938.
74	MZ	204474.
95	FX	3757.
95	FY	4537.
95	FZ	9370.
95	MX	681030.
95	MY	486891.
95	MZ	258580.
19	FL	41048.
25	FL-1	18624.
25	FL-2	31591.
27	FL	12636.
32	FL	10858.

BENCHMARK PROBLEM 3
DIRECT INTEGRATION TIME HISTORY ANALYSIS

CONTROL INFORMATION

NUMBER OF NODAL POINTS	=	78
NUMBER OF ELEMENT TYPES	=	2
NUMBER OF LOAD CASES	=	0
NUMBER OF FREQUENCIES	=	1
ANALYSIS CODE (NDYN)	=	4
EQ. 0, STATIC		
EQ. 1, MODAL EXTRACTION		
EQ. 2, FORCED RESPONSE		
EQ. 3, RESPONSE SPECTRUM		
EQ. 4, DIRECT INTEGRATION		
EQ. 5, FREQUENCY RESPONSE		
SOLUTION MODE (MOLEX)	=	0
EQ. 0, EXECUTION		
EQ. 1, DATA CHECK		
NUMBER OF SUBSPACE		
ITERATION VECTORS (NAD)	=	0
EQUATIONS PER BLOCK	=	1
TAPE10 SAVE FLAG (N10SV)	=	0
GRAVITATIONAL CONSTANT	=	386.
TOTAL BLANK COMMON (NTOT)	=	15000.
UNOBTAINED BLANK COMMON FOR THIS STEP		

781

NODAL POINT INPUT DATA		BOUNDARY CONDITION			NODAL POINT COORDINATES			T		
NODE NUMBER	X	Y	Z	XX	YY	ZZ	X		Y	Z
1	0	0	0	0	0	0	-252.950	289.370	438.520	350.000
2	0	0	0	0	0	0	-252.950	328.740	438.130	350.000
3	0	0	0	0	0	0	-252.950	289.370	438.130	350.000
4	0	0	0	0	0	0	-252.950	261.810	438.130	350.000
5	0	0	0	0	0	0	-252.950	234.250	438.130	350.000
6	0	0	0	0	0	0	-252.950	226.380	438.130	350.000
7	0	0	0	0	0	0	-252.950	222.440	438.130	350.000
8	0	0	0	0	0	0	-252.950	214.340	438.130	350.000
9	0	0	0	0	0	0	-281.200	182.760	424.720	350.000
10	0	0	0	0	0	0	-297.050	182.580	417.200	350.000
11	0	0	0	0	0	0	-300.970	182.540	415.340	350.000
12	0	0	0	0	0	0	-344.990	182.060	394.450	350.000
13	0	0	0	0	0	0	-389.000	181.570	373.560	350.000
14	0	0	0	0	0	0	-417.240	149.990	360.150	350.000
15	0	0	0	0	0	0	-417.240	121.450	360.150	350.000
16	0	0	0	0	0	0	-417.240	82.380	360.150	350.000
17	0	0	0	0	0	0	-417.240	43.310	360.150	350.000
18	0	0	0	0	0	0	-417.240	34.960	360.150	350.000
19	0	0	0	0	0	0	-417.240	21.500	360.150	350.000

20	388.130	-16.120	383.380	0	350.000
21	-363.020	-16.440	403.420	0	350.000
22	-337.900	-16.760	423.460	0	350.000
23	-312.780	-17.090	443.510	0	350.000
24	-287.670	-17.410	463.550	0	350.000
25	-258.560	-55.020	486.780	0	350.000
26	-258.560	-85.870	486.780	0	350.000
27	-258.560	-97.440	486.780	0	350.000
28	-258.560	-104.330	486.780	0	350.000
29	-258.560	-117.370	486.780	0	350.000
30	-258.560	-150.600	486.780	0	350.000
31	-258.560	-169.410	481.820	0	350.000
32	-262.450	-198.180	465.480	0	350.000
33	-266.610	-238.190	442.750	0	350.000
34	-269.620	-267.120	426.320	0	350.000
35	-273.200	-301.590	406.750	0	350.000
36	-276.790	-336.060	387.170	0	350.000
37	-277.690	-358.870	382.210	0	350.000
38	-277.690	-371.490	382.210	0	350.000
39	-277.690	-388.100	382.210	0	350.000
40	-277.690	-406.050	382.210	0	350.000
41	-277.690	-424.000	382.210	0	350.000
42	-277.690	-433.860	382.210	0	350.000
43	-279.570	-433.860	370.360	0	350.000
44	-281.250	-433.860	359.740	0	350.000
45	-284.070	-433.860	341.960	0	350.000
46	-286.840	-433.860	324.490	0	350.000
47	-275.820	-433.860	394.070	0	350.000
48	-274.130	-433.860	404.680	0	350.000
49	-271.320	-433.860	422.460	0	350.000
50	-268.550	-433.860	439.930	0	350.000
51	-289.550	-433.860	384.090	0	350.000
52	-300.160	-433.860	385.770	0	350.000
53	-317.940	-433.860	388.590	0	350.000
54	-335.420	-433.860	391.350	0	350.000
55	-265.840	-433.860	380.340	0	350.000
56	-255.220	-433.860	378.650	0	350.000
57	-237.450	-433.860	375.840	0	350.000
58	-219.970	-433.860	373.070	0	350.000
59	-277.690	-465.360	382.210	0	350.000
60	-277.690	-504.120	382.210	0	350.000
61	-277.690	-517.720	382.210	0	350.000

S P R I N G E L E M E N T S

ELEMENT TYPE = 1
NUMBER OF ELEMENTS = 23

ELEMENT LOAD CASE MULTIPLIERS

CASE (A) 1.0000 CASE (B) 1.0000 CASE (C) 1.0000 CASE (D) 1.0000

ELEMENT NUMBER	NODE (N)	SUPPORT GROUP	CODE KD	CODE KR	DIRECTION COSINES WRT GLOBAL AXES X- Y- Z-	SPECIFIED DISPLACEMENT	SPECIFIED ROTATION	SPRING RATE
1	1	1	1	0	-1.000 .000 .000	.000	.000	1.2000E+07
2	1	1	1	0	.000 -1.000 .000	.000	.000	1.2000E+07
3	1	1	1	0	.000 .000 -1.000	.000	.000	1.2000E+07
4	1	1	0	1	-1.000 .000 .000	.000	.000	5.7000E+09
5	1	1	0	1	-1.000 .000 .000	.000	.000	5.7000E+09
6	1	1	0	1	.000 .000 -1.000	.000	.000	5.7000E+09
7	6	1	1	1	.903 .000 .429	.000	.000	6.5000E-01
8	7	1	1	1	.866 .000 .500	.000	.000	7.7000E+04
9	10	1	1	0	.000 .000 -1.000	.000	.000	6.5000E-01
10	10	1	1	0	.429 .000 .903	.000	.000	6.5000E-01
11	11	1	1	0	.000 .000 -1.000	.000	.000	5.6000E+05
12	11	1	1	0	.429 .000 .903	.000	.000	5.6000E+05
13	15	1	1	0	.757 -.015 -.653	.000	.000	2.0700E+06
14	27	1	1	0	.469 .000 .883	.000	.000	6.5000E-01
15	27	1	1	0	.883 .000 .470	.000	.000	3.3600E+05
16	28	1	1	0	.469 .000 .883	.000	.000	2.9100E+06
17	28	1	1	0	.883 .000 .469	.000	.000	9.0000E-01
18	61	1	1	0	-1.000 .000 .000	.000	.000	9.0000E-01
19	61	1	1	0	.000 -1.000 .000	.000	.000	5.6000E+10
20	61	1	1	0	.000 .000 -1.000	.000	.000	5.6000E+10
21	61	1	0	1	-1.000 .000 .000	.000	.000	8.7000E+09
22	61	1	0	1	-1.000 .000 .000	.000	.000	8.7000E+09
23	61	1	0	1	.000 .000 -1.000	.000	.000	8.7000E+09

PIPE ELEMENT INPUT DATA

CONTROL INFORMATION

REQUIRED BLANK COMMON FOR THIS STEP- 886
 NUMBER OF PIPE ELEMENTS - 60

NUMBER OF MATERIAL SETS - 1

MAXIMUM NUMBER OF MATERIAL
 TEMPERATURE INPUT POINTS - 7

NUMBER OF SECTION PROPERTY SETS - 10

NUMBER OF BRANCH POINT NODES - 1

MAXIMUM NUMBER OF TANGENTS
 COMMON TO A BRANCH POINT - 6

FLAG FOR NEGLECTING AXIAL
 DEFORMATIONS IN BEND ELEMENTS - 0
 (EQ.1, NEGLECT)

MATERIAL PROPERTY TABLES

MATERIAL NUMBER = (1)
 NUMBER OF
 TEMPERATURE POINTS = { 7 }
 IDENTIFICATION = { ASME SA-376)

POINT NUMBER	TEMPERATURE	YOUNG'S MODULUS	POISSON'S RATIO	THERMAL EXPANSION
1	0.00	28600000.0	0.300	0.900E-05
2	70.00	28300000.0	0.300	0.911E-05
3	200.00	27700000.0	0.300	0.934E-05
4	300.00	27100000.0	0.300	0.947E-05
5	400.00	26600000.0	0.300	0.959E-05
6	500.00	26100000.0	0.300	0.970E-05
7	600.00	25400000.0	0.300	0.982E-05

SECTION PROPERTY TABLE

SECTION NUMBER	OUTSIDE DIAMETER	WALL THICKNESS	SHAPE FACTOR FOR SHEAR	WEIGHT/ UNIT LENGTH	MASS/ UNIT LENGTH	D E S C R I P T I O N
1	26.000	1.2300	0.0000	0.2717E+02	0.7032E-01	LINE 09
2	10.750	0.5930	0.0000	0.5240E+01	0.1356E-01	LINE 08
3	10.750	0.5000	0.0000	0.4460E+01	0.1154E-01	LINE 01
4	12.750	0.5620	0.0000	0.5990E+01	0.1550E-01	LINE 02
5	12.750	0.5620	0.0000	0.1415E+02	0.3662E-01	LINE 03
6	18.300	1.3600	0.0000	0.3686E+02	0.9539E-01	LINE 04
7	24.000	1.8100	0.0000	0.3686E+02	0.9539E-01	LINE 06
8	12.540	0.6870	0.0000	0.1522E+02	0.3939E-01	LINE 05
9	24.000	1.8100	0.0000	0.6383E+02	0.1652E+00	LINE 07
10	24.000	2.3400	0.0000	0.7198E+02	0.1863E+00	LINE 07

BRANCH POINT NODE LIST

BRANCH
POINT
1 42

ELEMENT LOAD CASE MULTIPLIERS

	CASE A	CASE B	CASE C	CASE D
X-DIRECTION GRAVITY	0.000	0.000	0.000	0.000
Y-DIRECTION GRAVITY	-1.000	0.000	0.000	0.000
Z-DIRECTION GRAVITY	0.000	0.000	0.000	0.000
THERMAL DISTORTION	0.000	0.000	1.000	0.000
PRESSURE DISTORTION	0.000	1.000	0.000	0.000

PIPE ELEMENT INPUT DATA

ELEMENT NUMBER	ELEMENT TYPE	NODE -I	NODE -J	MATL. NUMBER	SECTION NUMBER	REFERENCE TEMPERATURE (BEND RADIUS)	INTERNAL PRESSURE (THIRD POINT)	D I R E C T I O N (X3- A(YX) ORDINATE)	C O S I N E S (Y3- A(YY) ORDINATE)	A(YZ) (Z3- A(YZ) ORDINATE)	INCREMENT (WALL FRACTION)	NODE INPUT TAG
1	TANG T	1	2	1	1	0.00	200.00	0.0000	0.0000	0.0000	1	II
2	TANG T	2	3	1	2	0.00	200.00	0.0000	0.0000	0.0000	1	II
3	TANG T	3	4	1	2	0.00	200.00	0.0000	0.0000	0.0000	1	II
4	TANG T	4	5	1	2	0.00	200.00	0.0000	0.0000	0.0000	1	II
5	TANG T	5	6	1	2	0.00	200.00	0.0000	0.0000	0.0000	1	II
6	TANG T	6	7	1	2	0.00	200.00	0.0000	0.0000	0.0000	1	II
7	TANG T	7	8	1	3	0.00	200.00	0.0000	0.0000	0.0000	1	II
8	BEND	8	9	1	3	(0.00 31.600)	200.00 ()	(-252.950)	(183.070)	(438.130)	(0.1000)	IC
9	TANG T	9	10	1	3	0.00	200.00	0.0000	0.0000	0.0000	1	II
10	TANG T	10	11	1	3	0.00	200.00	0.0000	0.0000	0.0000	1	II
11	TANG T	11	12	1	3	0.00	200.00	0.0000	0.0000	0.0000	1	II
12	TANG T	12	13	1	3	0.00	200.00	0.0000	0.0000	0.0000	1	II
13	BEND	13	14	1	3	(0.00 31.600)	200.00 ()	(-417.240)	(181.250)	(360.150)	(0.1000)	IC
14	TANG T	14	15	1	3	0.00	200.00	0.0000	0.0000	0.0000	1	II
15	TANG T	15	16	1	3	0.00	200.00	0.0000	0.0000	0.0000	1	II
16	TANG T	16	17	1	3	0.00	200.00	0.0000	0.0000	0.0000	1	II
17	TANG T	17	18	1	4	0.00	200.00	0.0000	0.0000	0.0000	1	II
18	TANG T	18	19	1	4	0.00	200.00	0.0000	0.0000	0.0000	1	II

19	BEND	19	20	1	4	(0.00 37.600)	200.00 ()	-417.240) (	-15.750) (	360.150) (	0.1000)	IC
20	TANG T	20	21	1	4	0.00	200.00	0.0000	0.0000	0.0000	1	II
21	TANG T	21	22	1	4	0.00	200.00	0.0000	0.0000	0.0000	1	II
22	TANG T	22	23	1	4	0.00	200.00	0.0000	0.0000	0.0000	1	II
23	TANG T	23	24	1	4	0.00	200.00	0.0000	0.0000	0.0000	1	II
24	BEND	24	25	1	4	(0.00 37.600)	200.00 ()	-258.560) (	-17.780) (	486.780) (	0.1000)	IC
25	TANG T	25	26	1	4	0.00	200.00	0.0000	0.0000	0.0000	1	II
26	TANG T	26	27	1	4	0.00	200.00	0.0000	0.0000	0.0000	1	II
27	TANG T	27	28	1	4	0.00	200.00	0.0000	0.0000	0.0000	1	II
28	TANG T	28	29	1	4	0.00	200.00	0.0000	0.0000	0.0000	1	II
29	TANG T	29	30	1	4	0.00	200.00	0.0000	0.0000	0.0000	1	II
30	BEND	30	31	1	4	(0.00 37.600)	200.00 ()	-258.560) (	-160.680) (	486.780) (	0.1000)	IC
31	TANG T	31	32	1	4	0.00	200.00	0.0000	0.0000	0.0000	1	II
32	TANG T	32	33	1	4	0.00	200.00	0.0000	0.0000	0.0000	1	II
33	TANG T	33	34	1	5	0.00	200.00	0.0000	0.0000	0.0000	1	II
34	TANG T	34	35	1	5	0.00	200.00	0.0000	0.0000	0.0000	1	II
35	TANG T	35	36	1	5	0.00	200.00	0.0000	0.0000	0.0000	1	II
36	BEND	36	37	1	5	(0.00 37.600)	200.00 ()	-277.690) (	-344.790) (	382.210) (	0.1000)	IC
37	TANG T	37	38	1	5	0.00	200.00	0.0000	0.0000	0.0000	1	II
38	TANG T	38	39	1	5	0.00	200.00	0.0000	0.0000	0.0000	1	II
39	TANG T	39	40	1	6	0.00	200.00	0.0000	0.0000	0.0000	1	II
40	TANG T	40	41	1	6	0.00	200.00	0.0000	0.0000	0.0000	1	II
41	TANG T	41	42	1	7	0.00	200.00	0.0000	0.0000	0.0000	1	II
42	TANG T	42	43	1	8	0.00	200.00	0.0000	0.0000	0.0000	1	II
43	TANG T	43	44	1	8	0.00	200.00	0.0000	0.0000	0.0000	1	II
44	TANG T	44	45	1	8	0.00	200.00	0.0000	0.0000	0.0000	1	II

45	TANG	T	45	46	1	8	0.00	200.00	0.0000	0.0000	0.0000	0.0000	1	II
46	TANG	T	42	47	1	8	0.00	200.00	0.0000	0.0000	0.0000	0.0000	1	II
47	TANG	T	47	48	1	8	0.00	200.00	0.0000	0.0000	0.0000	0.0000	1	II
48	TANG	T	48	49	1	8	0.00	200.00	0.0000	0.0000	0.0000	0.0000	1	II
49	TANG	T	49	50	1	8	0.00	200.00	0.0000	0.0000	0.0000	0.0000	1	II
50	TANG	T	42	51	1	8	0.00	200.00	0.0000	0.0000	0.0000	0.0000	1	II
51	TANG	T	51	52	1	8	0.00	200.00	0.0000	0.0000	0.0000	0.0000	1	II
52	TANG	T	52	53	1	8	0.00	200.00	0.0000	0.0000	0.0000	0.0000	1	II
53	TANG	T	53	54	1	8	0.00	200.00	0.0000	0.0000	0.0000	0.0000	1	II
54	TANG	T	42	55	1	8	0.00	200.00	0.0000	0.0000	0.0000	0.0000	1	II
55	TANG	T	55	56	1	8	0.00	200.00	0.0000	0.0000	0.0000	0.0000	1	II
56	TANG	T	56	57	1	8	0.00	200.00	0.0000	0.0000	0.0000	0.0000	1	II
57	TANG	T	57	58	1	8	0.00	200.00	0.0000	0.0000	0.0000	0.0000	1	II
58	TANG	T	42	59	1	9	0.00	200.00	0.0000	0.0000	0.0000	0.0000	1	II
59	TANG	T	59	60	1	10	0.00	200.00	0.0000	0.0000	0.0000	0.0000	1	II
60	TANG	T	60	61	1	10	0.00	200.00	0.0000	0.0000	0.0000	0.0000	1	II

BRANCH POINT DATA

BRANCH NODE
POINT NUMBER CONNECTIONS . . .

1	42	-41AT J	42AT I	46AT I	50AT I	54AT I	58AT I
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NODAL LOADS (STATIC) OR MASSES (DYNAMIC)

NODE NUMBER	LOAD CASE	X-AXIS FORCE	Y-AXIS FORCE	Z-AXIS FORCE	X-AXIS MOMENT	Y-AXIS MOMENT	Z-AXIS MOMENT
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STRUCTURE LOAD CASE	ELEMENT A	LOAD B	MULTIPLIERS C	D
1	0.000	0.000	0.000	0.000

STEP-BY-STEP SOLUTION CONTROL INFORMATION

NUMBER OF TIME VARYING FUNCTIONS	-	1
GROUND MOTION INDICATOR	-	0
EQ.0, NONE GT.0, READ ACCELERATION INPUT		
NUMBER OF ARRIVAL TIMES EQ.0, ALL FUNCTIONS ARRIVE AT TIME ZERO	-	0
NUMBER OF SOLUTION TIME STEPS	-	1148
OUTPUT (PRINT) INTERVAL	-	1
SOLUTION TIME INCREMENT	-	0.5000E-03
MASS- PROPORTIONAL DAMPING COEFFICIENT (ALPHA)	-	0.1600E+00
STIFFNESS-PROPORTIONAL DAMPING COEFFICIENT (BETA)	-	0.1600E-03

ARRIVAL TIME VALUES

INPUT ORDER ARRIVAL TIME VALUE

1 0.0000E+00
TIME FUNCTION DATA

TIME FUNCTION NUMBER = (1)

NUMBER OF POINTS = { 82 }
SCALE FACTOR = { 0.1000E+01 }
DESCRIPTION = { GE IDS-TIM-15-1-ADJO

INPUT ORDER	TIME VALUE	FUNCTION VALUE
1	0.0000E+00	7.2690E+02
2	7.0000E-03	6.6770E+02
3	1.4000E-02	5.6550E+02
4	2.1000E-02	4.2260E+02
5	2.8000E-02	2.3750E+02
6	3.5000E-02	1.3500E+01
7	4.2000E-02	-2.4170E+02
8	4.9000E-02	-5.1100E+02
9	5.6000E-02	-7.6120E+02
10	6.3000E-02	-9.4560E+02
11	7.0000E-02	-1.0170E+03
12	7.7000E-02	-9.5530E+02
13	8.4000E-02	-7.7850E+02
14	9.1000E-02	-5.3270E+02
15	9.8000E-02	-2.6490E+02
16	1.0500E-01	-8.8000E+00
17	1.1200E-01	2.1700E+02
18	1.1900E-01	4.0420E+02
19	1.2600E-01	5.5010E+02
20	1.3300E-01	6.5450E+02
21	1.4000E-01	7.1820E+02
22	1.4700E-01	7.4190E+02
23	1.5400E-01	7.2610E+02
24	1.6100E-01	6.7050E+02
25	1.6800E-01	5.7570E+02
26	1.7500E-01	4.3990E+02
27	1.8200E-01	2.6340E+02
28	1.8900E-01	4.8200E+01
29	1.9600E-01	-1.9890E+02
30	2.0300E-01	-4.6240E+22
31	2.1000E-01	-7.1310E+02
32	2.1700E-01	-9.0780E+02
33	2.2400E-01	-1.0000E+03
34	2.3100E-01	-9.6400E+02
35	2.3800E-01	-8.1100E+02
36	2.4500E-01	-5.8130E+02
37	2.5200E-01	-3.2150E+02
38	2.5900E-01	-6.7100E+01
39	2.6600E-01	1.6120E+02
40	2.7300E-01	3.5360E+02
41	2.8000E-01	5.0640E+02
42	2.8700E-01	6.1910E+02
43	2.9400E-01	6.9240E+02
44	3.0100E-01	7.2700E+02
45	3.0800E-01	7.2360E+02
46	3.1500E-01	6.8230E+02
47	3.2200E-01	6.0300E+02
48	3.2900E-01	4.8510E+02
49	3.3600E-01	3.2830E+02

50	3.4300E-01	1.3360E+02
51	3.5000E-01	3.4700E+01
52	3.5700E-01	3.4560E+02
53	3.6400E-01	5.9740E+02
54	3.7100E-01	8.1460E+02
55	3.7800E-01	9.5300E+02
56	3.8500E-01	9.7680E+02
57	3.9200E-01	8.7920E+02
58	3.9900E-01	6.8940E+02
59	4.0600E-01	4.4860E+02
60	4.1300E-01	1.9720E+02
61	4.2000E-01	3.8500E+01
62	4.2700E-01	2.4420E+02
63	4.3400E-01	4.1380E+02
64	4.4100E-01	5.4530E+02
65	4.4800E-01	6.3890E+02
66	4.5500E-01	6.9530E+02
67	4.6200E-01	7.1510E+02
68	4.6900E-01	6.9900E+02
69	4.7600E-01	6.4700E+02
70	4.8300E-01	5.5860E+02
71	4.9000E-01	4.3360E+02
72	4.9700E-01	2.7180E+02
73	5.0400E-01	7.4900E+01
74	5.1100E-01	1.5150E+02
75	5.1800E-01	3.9530E+02
76	5.2500E-01	6.3310E+02
77	5.3200E-01	8.2950E+02
78	5.3900E-01	9.4370E+02
79	5.4600E-01	9.4630E+02
80	5.5300E-01	8.3750E+02
81	5.6000E-01	6.4570E+02
82	5.6700E-01	4.1180E+02

DISPLACEMENT MAXIMA,*

NUMBER	COMPONENT	VALUE	MAXIMUM	TIME AT	PLOT
1	1	5.4799E-06	1.2200E-01	NA	NA
1	2	3.6311E-05	1.0150E-01	NA	NA
1	3	5.5697E-06	1.4650E-01	NA	NA
1	4	8.6831E-07	1.4650E-01	NA	NA
1	5	6.1605E-07	5.0700E-01	NA	NA
1	6	9.3708E-07	3.2850E-01	NA	NA
1	1	5.3290E-05	3.2850E-01	NA	NA
2	1	4.2662E-05	1.0150E-01	NA	NA
2	2	4.2662E-05	1.4700E-01	NA	NA
2	3	2.1130E-06	1.4650E-01	NA	NA
2	4	1.5254E-06	5.0700E-01	NA	NA
2	5	2.1671E-06	3.2850E-01	NA	NA
2	6	8.0922E-04	3.2800E-01	NA	NA
3	1	7.6246E-05	1.0150E-01	NA	NA
3	2	8.4871E-04	1.4650E-01	NA	NA
3	3	3.9298E-05	1.4650E-01	NA	NA
3	4	2.8825E-05	5.0700E-01	NA	NA
3	5	3.9015E-05	3.2850E-01	NA	NA
3	6	2.1802E-03	3.2850E-01	NA	NA
4	1	9.9720E-05	1.0150E-01	NA	NA
4	2	2.1996E-03	1.4650E-01	NA	NA
4	3	5.6548E-05	1.4650E-01	NA	NA
4	4	4.7935E-05	5.0700E-01	NA	NA
4	5	5.8994E-05	3.2850E-01	NA	NA
4	6	4.0446E-03	3.2850E-01	NA	NA
5	1	1.2316E-04	1.0150E-01	NA	NA
5	2	3.9444E-03	1.4650E-01	NA	NA
5	3	6.8891E-05	1.4700E-01	NA	NA
5	4	6.7045E-05	5.0700E-01	NA	NA
5	5	7.5272E-05	3.2850E-01	NA	NA
5	6	4.6544E-03	3.2850E-01	NA	NA
6	1	1.2984E-04	1.0150E-01	NA	NA
6	2	4.4986E-03	1.4650E-01	NA	NA
6	3	7.1928E-05	1.4700E-01	NA	NA
6	4	7.2502E-05	5.0700E-01	NA	NA
6	5	7.9438E-05	3.2850E-01	NA	NA
6	6	4.9716E-03	3.2850E-01	NA	NA
7	1	1.3318E-04	1.0150E-01	NA	NA
7	2	4.7845E-03	1.4650E-01	NA	NA
7	3	7.3448E-05	1.4700E-01	NA	NA
7	4	7.5234E-05	5.0700E-01	NA	NA
7	5	8.1495E-05	3.2900E-01	NA	NA
7	6	5.6755E-03	3.2850E-01	NA	NA
8	1	1.4126E-03	1.0150E-01	NA	NA
8	2	5.4047E-03	1.4650E-01	NA	NA
8	3	7.6277E-05	1.4700E-01	NA	NA
8	4	8.1722E-05	5.0700E-01	NA	NA
8	5	8.4694E-05	3.2900E-01	NA	NA
8	6	7.1317E-03	3.2850E-01	NA	NA
9	1	9.2715E-04	3.0350E-01	NA	NA
9	2	4.9752E-03	1.4700E-01	NA	NA
9	3	8.0658E-05	5.0650E-01	NA	NA
9	4	1.3958E-04	5.0700E-01	NA	NA
9	5	5.9261E-05	1.4600E-01	NA	NA

10	NA	5.6000E-02	6.8862E-03	1
10	NA	1.0250E-01	9.9494E-04	2
10	NA	5.6000E-02	3.3817E-03	3
10	NA	4.6200E-01	9.5576E-05	4
10	NA	5.0650E-01	1.5260E-04	5
10	NA	8.2000E-02	9.2329E-05	6
11	NA	5.6000E-02	6.9456E-03	1
11	NA	1.0200E-01	1.1754E-03	2
11	NA	5.6000E-02	3.2586E-03	3
11	NA	4.6250E-01	1.0584E-04	4
11	NA	5.0650E-01	1.5592E-04	5
11	NA	8.2000E-02	1.0262E-04	6
12	NA	1.4750E-01	8.0432E-03	1
12	NA	2.9750E-01	9.2522E-03	2
12	NA	5.5250E-01	6.5180E-03	3
12	NA	4.6300E-01	1.6184E-04	4
12	NA	5.0600E-01	1.7120E-04	5
12	NA	8.3000E-02	1.8017E-04	6
13	NA	5.0500E-01	1.0243E-02	1
13	NA	2.9700E-01	2.0625E-02	2
13	NA	5.0700E-01	1.3030E-02	3
13	NA	4.6350E-01	1.8769E-04	4
13	NA	5.0500E-01	1.4943E-04	5
13	NA	8.6500E-02	1.5954E-04	6
14	NA	5.0450E-01	1.1615E-02	1
14	NA	2.9700E-01	2.7069E-02	2
14	NA	5.5100E-01	1.2146E-02	3
14	NA	4.6500E-01	1.9758E-04	4
14	NA	5.5000E-01	1.0868E-04	5
14	NA	8.8500E-02	1.7494E-04	6
15	NA	2.5350E-01	1.0913E-02	1
15	NA	2.9700E-01	2.7073E-02	2
15	NA	5.5000E-01	9.1970E-03	3
15	NA	4.6450E-01	2.0011E-04	4
15	NA	1.0150E-01	1.2684E-04	5
15	NA	8.7500E-02	1.5181E-04	6
16	NA	2.5250E-01	1.3170E-02	1
16	NA	2.9700E-01	2.7074E-02	2
16	NA	9.5000E-02	1.0872E-02	3
16	NA	4.6400E-01	2.0205E-04	4
16	NA	1.0150E-01	1.6389E-04	5
16	NA	8.2000E-02	1.3600E-04	6
17	NA	2.5250E-01	1.4045E-02	1
17	NA	2.9700E-01	2.7069E-02	2
17	NA	1.2700E-01	1.3757E-02	3
17	NA	4.6350E-01	2.0087E-04	4
17	NA	1.0150E-01	2.0094E-04	5
17	NA	8.0000E-02	1.6175E-04	6
18	NA	8.7000E-02	1.4200E-02	1
18	NA	2.9700E-01	2.7067E-02	2
18	NA	2.5550E-01	1.4758E-02	3
18	NA	4.6350E-01	2.0055E-04	4
18	NA	1.0150E-01	2.0513E-04	5
18	NA	8.0000E-02	1.6457E-04	6
19	NA	8.5500E-02	1.5422E-02	1
19	NA	2.9700E-01	2.7065E-02	2
19	NA	4.6600E-01	1.6594E-02	3
19	NA	4.6350E-01	2.0016E-04	4
19	NA	1.0150E-01	2.1189E-04	5
19	NA	8.0000E-02	1.6861E-04	6
20	NA	8.3000E-02	1.8245E-02	1
20	NA	2.9500E-01	2.0180E-02	2
20	NA	4.6450E-01	2.3901E-02	3
20	NA	4.2700E-01	2.1164E-04	4
20	NA	1.2400E-01	2.2913E-04	5
20	NA	6.0500E-02	1.9276E-04	6

21	1	9340E-02	4	5800E-01	NA
21	1	5421E-02	9	2500E-02	NA
21	2	3161E-02	4	6400E-01	NA
21	2	0040E-04	4	2800E-01	NA
21	2	2276E-04	1	2400E-01	NA
21	2	0742E-04	5	8000E-02	NA
21	2	1299E-02	2	5850E-01	NA
21	1	3709E-02	2	2700E-01	NA
22	2	2038E-02	4	6350E-01	NA
22	1	9352E-04	1	2450E-01	NA
22	1	9654E-04	1	2400E-01	NA
22	2	1071E-04	5	7000E-02	NA
22	2	2984E-02	2	5800E-01	NA
22	1	7298E-02	2	2600E-01	NA
22	2	0568E-02	4	6300E-01	NA
22	1	9249E-04	1	2500E-01	NA
22	1	5455E-04	1	2400E-01	NA
22	1	9638E-04	5	6000E-02	NA
22	2	4770E-02	1	2450E-01	NA
22	1	8853E-02	2	2600E-01	NA
22	2	1053E-02	8	2000E-02	NA
22	1	8128E-04	1	2550E-01	NA
22	1	0736E-04	1	2400E-01	NA
22	1	6199E-04	5	5500E-02	NA
22	1	5390E-02	1	2500E-01	NA
22	1	8429E-02	2	3000E-02	NA
22	1	2256E-02	8	2000E-02	NA
22	2	4603E-04	8	1500E-02	NA
22	7	3189E-05	4	7250E-01	NA
22	3	4755E-04	2	5700E-01	NA
22	4	8174E-03	1	2450E-01	NA
22	1	8407E-02	2	3000E-02	NA
22	5	0184E-03	8	2000E-02	NA
22	2	1927E-04	4	5950E-01	NA
22	7	7637E-05	2	3250E-01	NA
22	3	4222E-04	2	5800E-01	NA
22	1	1811E-03	8	2000E-02	NA
22	1	8397E-02	2	3000E-02	NA
22	2	8348E-03	8	2500E-02	NA
22	2	1075E-04	4	6300E-01	NA
22	8	2054E-05	2	3200E-01	NA
22	3	2543E-04	2	5800E-01	NA
22	2	5918E-03	4	6800E-01	NA
22	1	8390E-02	2	3000E-02	NA
22	2	8124E-03	1	8250E-01	NA
22	2	0736E-04	4	2300E-01	NA
22	8	4732E-05	2	3200E-01	NA
22	3	1327E-04	2	5850E-01	NA
22	6	1392E-03	4	6750E-01	NA
22	1	8376E-02	2	3000E-02	NA
22	1	5064E-03	1	8100E-01	NA
22	4	9797E-04	4	2350E-01	NA
22	8	9969E-05	2	3150E-01	NA
22	2	9017E-04	2	5900E-01	NA
22	1	4542E-02	2	5900E-01	NA
22	1	8334E-02	2	3000E-02	NA
22	1	0274E-02	4	2450E-01	NA
22	1	5744E-04	2	0750E-01	NA
22	1	0381E-04	2	3050E-01	NA
22	2	3547E-04	1	2850E-01	NA
22	1	7608E-02	2	9650E-01	NA
22	1	8335E-02	2	3000E-02	NA
22	1	2306E-02	4	2400E-01	NA
22	1	1175E-04	5	1100E-01	NA
22	1	1861E-04	2	3000E-01	NA
22	1	6133E-04	3	4650E-01	NA
23	1	23	1	23	1
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23	98	23	98	23	98
23	99	23	99	23	99
23	100	23	100	23	100

32	2.1189E-02	2.9850E-01	NA
32	1.7017E-02	2.2000E-02	NA
32	1.4520E-02	2.0650E-01	NA
32	1.5033E-04	6.0500E-02	NA
32	1.2216E-04	2.2950E-01	NA
32	1.2689E-04	1.3900E-01	NA
33	2.4215E-02	3.0250E-01	NA
33	1.5512E-02	5.4600E-01	NA
33	1.4081E-02	2.0650E-01	NA
33	2.1213E-04	2.4500E-02	NA
33	1.1901E-04	2.6100E-01	NA
33	7.6167E-05	7.0000E-02	NA
33	2.4963E-02	3.0450E-01	NA
34	1.2845E-02	5.4450E-01	NA
34	1.5620E-02	1.3000E-01	NA
34	2.3500E-04	2.2000E-02	NA
34	1.1723E-04	2.6150E-01	NA
34	8.3704E-05	2.1700E-01	NA
34	2.3843E-02	3.0600E-01	NA
35	7.8024E-03	5.4350E-01	NA
35	1.9364E-02	6.2500E-02	NA
35	2.7866E-04	5.4450E-01	NA
35	1.0370E-04	2.6250E-01	NA
35	1.2616E-02	3.4000E-01	NA
35	2.0665E-02	3.0700E-01	NA
36	1.5225E-03	5.4300E-01	NA
36	2.3346E-02	6.1000E-02	NA
36	2.4880E-04	5.4300E-01	NA
36	7.6026E-05	2.6300E-01	NA
36	1.4523E-04	3.4500E-01	NA
37	1.8403E-02	7.3000E-02	NA
37	4.3914E-04	7.5500E-02	NA
37	2.3177E-02	2.3800E-01	NA
37	1.2623E-04	1.3300E-01	NA
37	4.9261E-05	2.6300E-01	NA
37	1.5202E-04	1.4150E-01	NA
38	1.6202E-02	7.3000E-02	NA
38	3.4262E-04	7.5500E-02	NA
38	2.1095E-02	2.3800E-01	NA
38	1.5734E-04	6.1000E-02	NA
38	3.1063E-05	2.6300E-01	NA
38	1.4856E-04	1.4150E-01	NA
39	1.3873E-02	7.3500E-02	NA
39	2.4607E-04	7.5500E-02	NA
39	1.8337E-02	2.3750E-01	NA
39	1.6726E-04	2.3850E-01	NA
39	1.2877E-05	2.6300E-01	NA
39	1.3225E-04	7.3000E-02	NA
40	2.1515E-04	7.3500E-02	NA
40	1.5282E-02	2.3750E-01	NA
40	1.6652E-04	2.3800E-01	NA
40	9.8668E-06	2.6350E-01	NA
40	1.2878E-04	7.3000E-02	NA
40	9.1828E-03	7.3500E-02	NA
41	1.8419E-04	7.5000E-02	NA
41	1.2260E-02	2.3750E-01	NA
41	1.5882E-04	2.3800E-01	NA
41	6.8602E-06	2.6350E-01	NA
41	1.2058E-04	7.3500E-02	NA
42	7.9844E-03	7.3000E-02	NA
42	1.7443E-04	7.5000E-02	NA
42	1.0678E-02	2.3750E-01	NA
42	1.5617E-04	2.3750E-01	NA
42	6.3082E-06	2.6350E-01	NA
42	1.1823E-04	7.3500E-02	NA

43	1	8.1026E-03	7.3500E-02	NA
43	2	2.4596E-03	7.3500E-02	NA
43	3	1.0678E-02	2.3750E-01	NA
43	4	1.8350E-04	2.3700E-01	NA
43	5	1.1717E-05	2.1700E-01	NA
43	6	1.2402E-04	7.3500E-02	NA
44	1	8.2768E-03	7.3500E-02	NA
44	2	4.8096E-03	7.3500E-02	NA
44	3	1.0670E-02	2.3750E-01	NA
44	4	2.0274E-04	7.4000E-02	NA
44	5	1.6615E-05	7.2500E-02	NA
44	6	1.2736E-04	7.3500E-02	NA
45	1	8.6371E-03	7.3500E-02	NA
45	2	9.0601E-03	7.4000E-02	NA
45	3	1.0645E-02	2.3750E-01	NA
45	4	2.1964E-04	7.4000E-02	NA
45	5	2.0503E-05	7.2500E-02	NA
45	6	1.3001E-04	7.3500E-02	NA
46	1	9.0108E-03	7.3500E-02	NA
46	2	1.3333E-02	7.4000E-02	NA
46	3	1.0614E-02	2.3750E-01	NA
46	4	2.2304E-04	7.4000E-02	NA
46	5	2.1267E-05	7.2500E-02	NA
46	6	1.3054E-04	7.3500E-02	NA
47	1	8.0275E-03	7.3500E-02	NA
47	2	1.6455E-03	2.3900E-01	NA
47	3	1.0681E-02	2.3750E-01	NA
47	4	1.3355E-04	2.3900E-01	NA
47	5	9.8967E-06	1.3250E-01	NA
47	6	1.1343E-04	7.3000E-02	NA
48	1	8.1254E-03	7.3500E-02	NA
48	2	3.0656E-03	2.3950E-01	NA
48	3	1.0677E-02	2.3750E-01	NA
48	4	1.3312E-04	2.5500E-02	NA
48	5	1.4024E-05	8.1000E-02	NA
48	6	1.1081E-04	7.2500E-02	NA
49	1	8.3476E-03	7.3500E-02	NA
49	2	5.6650E-03	2.5500E-02	NA
49	3	1.0658E-02	2.3750E-01	NA
49	4	1.3890E-04	2.5500E-02	NA
49	5	1.7646E-05	8.1000E-02	NA
49	6	1.0883E-04	7.2500E-02	NA
50	1	8.5826E-03	7.4000E-02	NA
50	2	8.2970E-03	2.5500E-02	NA
50	3	1.0633E-02	2.3700E-01	NA
50	4	1.4037E-04	2.5500E-02	NA
50	5	1.8368E-05	8.1000E-02	NA
50	6	1.0845E-04	7.2500E-02	NA
51	1	8.0099E-03	7.3500E-02	NA
51	2	1.6456E-03	7.4500E-02	NA
51	3	1.0822E-02	2.3750E-01	NA
51	4	1.5216E-04	2.3800E-01	NA
51	5	1.8286E-05	8.1500E-02	NA
51	6	1.5408E-04	7.4000E-02	NA
52	1	8.0530E-03	7.3500E-02	NA
52	2	3.2595E-03	7.4500E-02	NA
52	3	1.1080E-02	2.3750E-01	NA
52	4	1.4989E-04	2.3800E-01	NA
52	5	2.7953E-05	8.0000E-02	NA
52	6	1.7496E-04	7.4500E-02	NA
53	1	8.1438E-03	7.3500E-02	NA
53	2	6.2714E-03	7.4500E-02	NA
53	3	1.1640E-02	2.3750E-01	NA
53	4	1.4813E-04	2.3800E-01	NA
53	5	3.5661E-05	7.9500E-02	NA
53	6	1.9156E-04	7.4500E-02	NA

STRESS COMPONENT MAXIMA*

PIPE FORCES AND MOMENTS

ELEMENT NUMBER	STRESS COMPONENT	MAXIMUM VALUE	TIME AT MAXIMUM	PLOT SYMBOL
1	1	4.3418E+02	1.0150E-01	NA
1	2	6.5899E+01	1.4650E-01	NA
1	3	6.5424E+01	1.2200E-01	NA
1	4	3.5158E+03	5.0700E-01	NA
1	5	5.3583E+03	3.2850E-01	NA
1	6	4.9494E+03	1.4650E-01	NA
1	7	4.3418E+02	1.0150E-01	NA
1	8	6.5899E+01	1.4650E-01	NA
1	9	6.5424E+01	1.2200E-01	NA
1	10	3.5158E+03	5.0700E-01	NA
1	11	7.0387E+03	3.2800E-01	NA
1	12	7.5439E+03	1.4650E-01	NA
2	1	4.3340E+02	1.0150E-01	NA
2	2	6.7806E+01	1.4650E-01	NA
2	3	6.6482E+01	1.2200E-01	NA
2	4	3.5065E+03	5.0700E-01	NA
2	5	7.0219E+03	3.2800E-01	NA
2	6	7.5439E+03	1.4650E-01	NA
2	7	4.3340E+02	1.0150E-01	NA
2	8	6.7806E+01	1.4650E-01	NA
2	9	6.6482E+01	1.2200E-01	NA
2	10	3.5065E+03	5.0700E-01	NA
2	11	5.2914E+03	3.2850E-01	NA
2	12	4.8744E+03	1.4650E-01	NA
3	1	4.3273E+02	1.0150E-01	NA
3	2	5.5116E+01	1.4650E-01	NA
3	3	5.6608E+01	1.2250E-01	NA
3	4	3.5065E+03	5.0700E-01	NA
3	5	5.2914E+03	3.2850E-01	NA
3	6	4.8744E+03	1.4650E-01	NA
3	7	4.3273E+02	1.0150E-01	NA
3	8	5.5116E+01	1.4650E-01	NA
3	9	5.6608E+01	1.2250E-01	NA
3	10	3.5065E+03	5.0700E-01	NA
3	11	4.2514E+03	3.2900E-01	NA
3	12	3.8079E+03	5.0500E-01	NA
4	1	4.3201E+02	1.0150E-01	NA
4	2	3.0102E+01	1.4650E-01	NA
4	3	3.7500E+01	1.2300E-01	NA
4	4	3.5065E+03	5.0700E-01	NA
4	5	4.2514E+03	3.2900E-01	NA
4	6	3.8079E+03	5.0500E-01	NA
4	7	4.3201E+02	1.0150E-01	NA
4	8	3.0102E+01	1.4650E-01	NA
4	9	3.7500E+01	1.2300E-01	NA
4	10	3.5065E+03	5.0700E-01	NA
4	11	3.6091E+03	3.0200E-01	NA
4	12	3.1225E+03	5.0450E-01	NA
5	1	4.3144E+02	1.0150E-01	NA
5	2	2.0945E+01	4.6100E-01	NA
5	3	2.1220E+01	9.3000E-02	NA
5	4	3.5065E+03	5.0700E-01	NA
5	5	3.6091E+03	3.0200E-01	NA
5	6	3.1225E+03	5.0450E-01	NA
5	7	4.3144E+02	1.0150E-01	NA

8	2.0945E+01	4.6100E-01	NA
9	2.1220E+01	9.3000E-02	NA
10	3.5065E+03	5.0700E-01	NA
11	3.6584E+03	3.0200E-01	NA
12	2.9887E+03	5.0450E-01	NA
1	4.3124E+02	1.0150E-01	NA
2	2.1449E+01	4.6250E-01	NA
3	2.4352E+01	9.2000E-02	NA
4	3.5065E+03	5.0700E-01	NA
5	3.6584E+03	3.0200E-01	NA
6	2.9887E+03	5.0450E-01	NA
7	4.3124E+02	1.0150E-01	NA
8	2.1449E+01	4.6250E-01	NA
9	2.4352E+01	9.2000E-02	NA
10	3.5065E+03	5.0700E-01	NA
11	3.6584E+03	3.0200E-01	NA
12	2.9333E+03	5.0450E-01	NA
1	4.3106E+02	1.0150E-01	NA
2	1.7860E+02	5.6000E-02	NA
3	3.1548E+02	5.6000E-02	NA
4	3.5065E+03	5.0700E-01	NA
5	3.6953E+03	3.0200E-01	NA
6	2.9333E+03	5.0450E-01	NA
7	4.3106E+02	1.0150E-01	NA
8	1.7860E+02	5.6000E-02	NA
9	3.1548E+02	5.6000E-02	NA
10	3.5065E+03	5.0700E-01	NA
11	3.6953E+03	3.0200E-01	NA
12	2.1667E+03	4.6350E-01	NA
1	1.9928E+03	5.0400E-01	NA
2	4.3015E+02	1.0150E-01	NA
3	3.1383E+02	5.5500E-02	NA
4	4.6103E+01	1.2300E-01	NA
5	3.5065E+03	5.0700E-01	NA
6	2.3567E+03	5.0450E-01	NA
7	1.9760E+03	2.9900E-01	NA
8	5.0617E+02	1.0200E-01	NA
9	3.1876E+02	3.0000E-01	NA
10	4.6103E+01	1.2300E-01	NA
11	3.9293E+03	5.0600E-01	NA
12	1.2850E+03	5.0800E-01	NA
1	5.5085E+03	3.0350E-01	NA
2	2.5446E+02	3.2850E-01	NA
3	4.3509E+02	1.0150E-01	NA
4	6.1344E+01	1.3450E-01	NA
5	1.7719E+03	1.4700E-01	NA
6	4.1233E+03	5.0550E-01	NA
7	1.2198E+04	3.0000E-01	NA
8	2.5446E+02	3.2850E-01	NA
9	4.3509E+02	1.0150E-01	NA
10	6.1344E+01	1.3450E-01	NA
11	1.7719E+03	1.4700E-01	NA
12	4.3600E+03	5.0500E-01	NA
1	1.6687E+04	2.9700E-01	NA
2	2.3903E+02	3.2850E-01	NA
3	4.3831E+02	1.0150E-01	NA
4	6.2549E+01	1.3450E-01	NA
5	1.7708E+03	1.4700E-01	NA
6	4.3617E+03	5.0500E-01	NA
7	1.6687E+04	2.9700E-01	NA
8	2.3903E+02	3.2850E-01	NA
9	4.3831E+02	1.0150E-01	NA
10	6.2549E+01	1.3450E-01	NA
11	1.7708E+03	1.4700E-01	NA
12	4.4202E+03	5.0500E-01	NA
1	1.7939E+04	2.9600E-01	NA
2	2.2306E+02	8.0000E-02	NA

11	2	2.3340E+02	8.0500E-02	NA
11	3	1.0971E+02	1.4650E-01	NA
11	4	1.7721E+03	1.4700E-01	NA
11	5	4.4191E+03	5.0500E-01	NA
11	6	1.7939E+04	2.9600E-01	NA
11	7	2.2306E+02	8.0000E-02	NA
11	8	2.3340E+02	8.0500E-02	NA
11	9	1.0971E+02	1.4650E-01	NA
10	10	1.7721E+03	1.4700E-01	NA
11	11	4.4878E+03	1.0050E-01	NA
11	12	8.3979E+03	9.1000E-02	NA
1	1	2.0778E+02	8.0000E-02	NA
2	2	1.9177E+02	2.9650E-01	NA
3	3	7.5205E+01	1.2300E-01	NA
4	4	1.7715E+03	1.4700E-01	NA
5	5	4.4880E+03	1.0050E-01	NA
6	6	8.3979E+03	9.1000E-02	NA
7	7	2.0778E+02	8.0000E-02	NA
8	8	1.9177E+02	2.9650E-01	NA
9	9	7.5205E+01	1.2300E-01	NA
10	10	1.7715E+03	1.4700E-01	NA
11	11	6.0345E+03	1.4650E-01	NA
12	12	7.2026E+03	4.2500E-02	NA
1	1	1.9179E+02	7.9500E-02	NA
2	2	1.3665E+02	2.9100E-01	NA
3	3	6.9198E+01	1.4700E-01	NA
4	4	1.7701E+03	1.4700E-01	NA
5	5	6.0348E+03	1.4650E-01	NA
6	6	7.2025E+03	4.2500E-02	NA
7	7	1.7235E+02	8.0000E-02	NA
8	8	1.8745E+02	9.2500E-02	NA
9	9	6.9198E+01	1.4700E-01	NA
10	10	2.9430E+03	1.2400E-01	NA
11	11	4.5968E+03	5.0700E-01	NA
12	12	6.9254E+03	1.0350E-01	NA
1	1	1.0689E+02	9.3500E-02	NA
2	2	1.0543E+02	1.4650E-01	NA
3	3	1.7502E+02	4.2000E-02	NA
4	4	5.4988E+03	1.2350E-01	NA
5	5	6.2956E+03	2.8700E-01	NA
6	6	2.9913E+03	1.0000E-01	NA
7	7	1.0689E+02	9.3500E-02	NA
8	8	1.0543E+02	1.4650E-01	NA
9	9	1.7502E+02	4.2000E-02	NA
10	10	5.4988E+03	1.2350E-01	NA
11	11	7.8553E+03	9.2000E-02	NA
12	12	4.0819E+03	9.6500E-02	NA
1	1	1.3574E+02	3.0500E-02	NA
2	2	7.4481E+01	1.4600E-01	NA
3	3	1.3868E+02	4.3500E-02	NA
4	4	5.4988E+03	1.2350E-01	NA
5	5	7.8553E+03	9.2000E-02	NA
6	6	4.0819E+03	9.6500E-02	NA
7	7	1.3574E+02	3.0500E-02	NA
8	8	7.4481E+01	1.4600E-01	NA
9	9	1.3868E+02	4.3500E-02	NA
10	10	5.4988E+03	1.2350E-01	NA
11	11	9.4717E+03	9.1000E-02	NA
12	12	5.3525E+03	1.4650E-01	NA
1	1	1.7426E+02	3.0000E-02	NA
2	2	6.4938E+01	1.0000E-01	NA
3	3	1.0175E+02	2.8700E-01	NA
4	4	5.4988E+03	1.2350E-01	NA
5	5	9.4717E+03	9.1000E-02	NA
6	6	5.3525E+03	1.4650E-01	NA
7	7	1.7426E+02	3.0000E-02	NA

16	NA	1.0000E-01	6.4938E+01	8	NA
16	NA	2.8700E-01	1.0175E+02	9	NA
16	NA	1.2350E-01	5.4988E+03	10	NA
16	NA	4.3500E-02	9.7531E+03	11	NA
16	NA	1.4600E-01	5.5609E+03	12	NA
17	NA	3.0000E-02	1.9929E+02	1	NA
17	NA	9.7000E-02	1.0860E+02	2	NA
17	NA	9.1000E-02	1.3980E+02	3	NA
17	NA	1.2350E-01	5.4988E+03	4	NA
17	NA	4.3500E-02	9.7531E+03	5	NA
17	NA	1.4600E-01	5.5609E+03	6	NA
17	NA	3.0000E-02	1.9929E+02	7	NA
17	NA	9.7000E-02	1.0860E+02	8	NA
17	NA	9.1000E-02	1.3980E+02	9	NA
17	NA	1.2350E-01	5.4988E+03	10	NA
17	NA	4.3500E-02	9.7531E+03	11	NA
17	NA	1.4600E-01	5.5609E+03	12	NA
18	NA	4.4000E-02	2.1418E+02	1	NA
18	NA	2.9500E-02	1.3851E+02	2	NA
18	NA	9.6500E-02	1.7770E+02	3	NA
18	NA	9.1000E-02	5.4988E+03	4	NA
18	NA	1.2350E-01	9.7531E+03	5	NA
18	NA	4.4000E-02	2.1418E+02	6	NA
18	NA	2.9500E-02	1.3851E+02	7	NA
18	NA	9.6500E-02	1.7770E+02	8	NA
18	NA	9.1000E-02	5.4988E+03	9	NA
18	NA	1.2350E-01	9.7531E+03	10	NA
18	NA	4.4000E-02	2.1418E+02	11	NA
18	NA	2.9500E-02	1.3851E+02	12	NA
19	NA	4.3000E-02	5.5179E+03	1	NA
19	NA	2.2550E-01	3.2502E+02	2	NA
19	NA	9.2000E-02	1.8594E+02	3	NA
19	NA	1.0150E-01	5.4988E+03	4	NA
19	NA	1.2350E-01	4.3904E+03	5	NA
19	NA	1.4650E-01	1.0602E+04	6	NA
19	NA	4.4000E-02	3.0370E+02	7	NA
19	NA	2.5650E-01	1.8594E+02	8	NA
19	NA	2.9500E-02	2.3886E+02	9	NA
19	NA	1.0150E-01	5.5018E+03	10	NA
19	NA	1.2450E-01	4.6832E+03	11	NA
19	NA	5.0200E-01	8.5815E+03	12	NA
19	NA	4.2950E-01	4.1239E+02	1	NA
20	NA	5.6500E-02	2.8963E+02	2	NA
20	NA	2.6150E-01	2.1037E+02	3	NA
20	NA	1.2350E-01	7.1910E+03	4	NA
20	NA	3.2600E-01	4.9099E+03	5	NA
20	NA	9.3500E-02	1.0128E+04	6	NA
20	NA	5.6500E-02	4.1239E+02	7	NA
20	NA	2.6150E-01	2.8963E+02	8	NA
20	NA	1.2350E-01	2.1037E+02	9	NA
20	NA	3.2600E-01	7.1910E+03	10	NA
20	NA	9.3500E-02	4.9099E+03	11	NA
20	NA	5.6500E-02	2.8963E+02	12	NA
21	NA	2.6150E-01	4.9342E+02	1	NA
21	NA	1.0150E-01	2.8505E+02	2	NA
21	NA	8.0000E-02	2.0392E+02	3	NA
21	NA	5.7000E-02	7.1918E+03	4	NA
21	NA	2.5900E-01	9.1016E+03	5	NA
21	NA	1.2350E-01	1.4887E+04	6	NA
21	NA	3.2600E-01	4.9342E+02	7	NA
21	NA	1.0150E-01	2.8505E+02	8	NA
21	NA	8.0000E-02	2.0392E+02	9	NA
21	NA	5.7000E-02	7.1918E+03	10	NA
21	NA	2.5900E-01	9.1016E+03	11	NA
21	NA	1.2350E-01	1.4887E+04	12	NA
22	NA	8.0500E-02	2.0225E+04	1	NA
22	NA	2.5300E-01	5.8275E+02		

22	2	2	9316E+02	9	2000E-02	NA
22	3	1	2500E+02	1	2350E-01	NA
22	3	7	1869E+03	3	2600E-01	NA
22	4	1	3812E+04	1	0200E-01	NA
22	5	2	0226E+04	8	0500E-02	NA
22	6	5	8275E+02	2	5300E-01	NA
22	7	2	9316E+02	9	2000E-02	NA
22	8	2	9316E+02	1	2350E-01	NA
22	9	1	2500E+03	3	2600E-01	NA
22	10	7	1869E+03	1	2350E-01	NA
22	11	1	6124E+04	4	6150E-01	NA
22	12	2	4604E+04	2	5300E-01	NA
22	1	6	7217E+02	9	2500E-02	NA
23	1	3	4289E+02	8	7000E-02	NA
23	2	9	8164E+01	3	2600E-01	NA
23	3	7	1904E+03	1	2350E-01	NA
23	4	1	6123E+04	4	6150E-01	NA
23	5	2	4604E+04	1	2350E-01	NA
23	6	6	7217E+02	4	6150E-01	NA
23	7	3	4289E+02	2	5300E-01	NA
23	8	9	8164E+01	9	2500E-02	NA
23	9	7	1904E+03	8	7000E-02	NA
23	10	1	5589E+04	3	2600E-01	NA
23	11	7	0793E+04	1	2400E-01	NA
23	12	3	0793E+04	4	6250E-01	NA
23	1	7	9827E+02	2	5300E-01	NA
24	1	3	5753E+02	9	3000E-02	NA
24	2	2	8455E+02	1	2350E-01	NA
24	3	7	1914E+03	3	2600E-01	NA
24	4	1	5589E+04	4	6250E-01	NA
24	5	3	0793E+04	2	5250E-01	NA
24	6	7	7301E+02	6	0500E-02	NA
24	7	4	7279E+02	1	2350E-01	NA
24	8	2	8455E+02	5	0150E-01	NA
24	9	5	0781E+03	1	2500E-01	NA
24	10	6	9929E+03	2	5650E-01	NA
24	11	2	8391E+04	2	5500E-02	NA
24	12	5	3510E+02	8	3500E-02	NA
25	1	7	6502E+02	2	5500E-01	NA
25	2	7	0209E+02	2	5700E-01	NA
25	3	5	0851E+03	2	5700E-01	NA
25	4	1	1215E+04	3	4450E-01	NA
25	5	1	2127E+04	2	5500E-02	NA
25	6	5	3510E+02	8	3500E-02	NA
25	7	7	6502E+02	2	5500E-01	NA
25	8	7	0209E+02	2	5700E-01	NA
25	9	5	0851E+03	2	5700E-01	NA
25	10	1	15904E+04	8	2500E-01	NA
25	11	2	7929E+04	2	5000E-02	NA
25	12	6	3979E+02	8	3000E-02	NA
26	1	7	9727E+02	2	5500E-01	NA
26	2	7	1282E+02	2	5500E-01	NA
26	3	5	0851E+03	2	5700E-01	NA
26	4	1	15904E+04	8	2500E-01	NA
26	5	2	7929E+04	2	5000E-02	NA
26	6	6	3979E+02	8	3000E-02	NA
26	7	7	9727E+02	2	5500E-01	NA
26	8	7	1282E+02	2	5500E-01	NA
26	9	5	0851E+03	2	5700E-01	NA
26	10	1	2456E+04	2	2900E-01	NA
26	11	2	2456E+04	8	2500E-02	NA
26	12	3	7113E+04	2	5000E-02	NA
27	1	6	8653E+02	2	3500E-02	NA
27	2	7	1580E+02	3	3500E-02	NA
27	3	3	1928E+02	2	5700E-01	NA
27	4	5	0851E+03	2	2900E-01	NA
27	5	2	2456E+04	8	2500E-02</	

27	8	7.1580E+02	2.3500E-02	NA
27	9	3.1928E+02	3.3500E-02	NA
27	10	5.0851E+03	2.5700E-01	NA
27	11	2.1906E+04	2.5450E-01	NA
27	12	3.3649E+04	8.2500E-02	NA
28	1	7.3687E+02	2.5000E-02	NA
28	2	7.0682E+02	2.3500E-02	NA
28	3	3.1991E+02	3.3500E-02	NA
28	4	5.0851E+03	2.5700E-01	NA
28	5	2.1906E+04	2.5450E-01	NA
28	6	3.3649E+04	8.2500E-02	NA
28	7	7.3687E+02	2.5000E-02	NA
28	8	7.0682E+02	2.3500E-02	NA
28	9	3.1991E+02	3.3500E-02	NA
28	10	5.0851E+03	2.5700E-01	NA
28	11	2.1341E+04	2.5500E-01	NA
28	12	3.0069E+04	6.0000E-02	NA
29	1	8.5320E+02	2.5000E-02	NA
29	2	6.7119E+02	2.3500E-02	NA
29	3	3.1833E+02	3.5000E-02	NA
29	4	5.0851E+03	2.5700E-01	NA
29	5	2.1341E+04	2.5500E-01	NA
29	6	3.0069E+04	6.0000E-02	NA
29	7	8.5320E+02	2.5000E-02	NA
29	8	6.7119E+02	2.3500E-02	NA
29	9	3.1833E+02	3.5000E-02	NA
29	10	5.0851E+03	2.5700E-01	NA
29	11	2.0690E+04	2.5800E-01	NA
29	12	9.8555E+02	5.8500E-02	NA
30	1	6.0856E+02	2.4500E-02	NA
30	2	2.4940E+02	2.3000E-02	NA
30	3	5.0851E+03	1.4550E-01	NA
30	4	1.8903E+04	1.2500E-01	NA
30	5	2.5361E+04	5.8500E-02	NA
30	6	1.1007E+03	2.4500E-02	NA
30	7	4.6715E+02	2.0500E-01	NA
30	8	2.4940E+02	1.4550E-01	NA
30	9	2.3635E+03	7.3000E-02	NA
30	10	1.9199E+04	2.5800E-01	NA
30	11	2.7315E+04	2.5000E-02	NA
31	1	1.2078E+03	2.4500E-02	NA
31	2	3.5264E+02	1.0000E-02	NA
31	3	2.5299E+02	1.4450E-01	NA
31	4	5.2299E+03	1.2900E-01	NA
31	5	1.8349E+04	2.5850E-01	NA
31	6	2.8675E+04	2.4500E-02	NA
31	7	1.2078E+03	2.4500E-02	NA
31	8	3.5264E+02	1.0000E-02	NA
31	9	2.5299E+02	1.4450E-01	NA
31	10	5.2299E+03	1.2900E-01	NA
31	11	1.7917E+04	3.4650E-01	NA
31	12	2.6899E+04	2.1500E-02	NA
32	1	1.3053E+03	2.4000E-02	NA
32	2	4.0634E+02	1.0000E-02	NA
32	3	2.2716E+02	1.4400E-01	NA
32	4	5.2318E+03	1.2900E-01	NA
32	5	1.7916E+04	3.4650E-01	NA
32	6	2.6899E+04	2.1500E-02	NA
32	7	1.3053E+03	2.4000E-02	NA
32	8	4.0634E+02	1.0000E-02	NA
32	9	2.2716E+02	1.4400E-01	NA
32	10	5.2318E+03	1.2900E-01	NA
32	11	2.1388E+04	3.4550E-01	NA
32	12	3.6405E+04	2.0800E-01	NA
33	1	1.6045E+03	2.4000E-02	NA

33	2	4.3698E+02	2.1500E-02	NA
33	3	1.6846E+02	9.5000E-02	NA
33	4	5.2296E+03	1.2900E-01	NA
33	5	2.1385E+04	3.4550E-01	NA
33	6	3.6407E+04	2.0800E-01	NA
33	7	1.6045E+03	2.4000E-02	NA
33	8	4.3698E+02	2.1500E-02	NA
33	9	1.6846E+02	9.5000E-02	NA
33	10	5.2296E+03	1.2900E-01	NA
33	11	2.2888E+04	1.4250E-01	NA
33	12	3.2989E+04	2.0800E-01	NA
34	1	1.8069E+03	2.4000E-02	NA
34	2	5.1824E+02	2.0500E-02	NA
34	3	2.4430E+02	3.4500E-01	NA
34	4	5.2295E+03	1.2900E-01	NA
34	5	2.2887E+04	1.4250E-01	NA
34	6	3.2987E+04	2.0800E-01	NA
34	7	1.8069E+03	2.4000E-02	NA
34	8	5.1824E+02	2.0500E-02	NA
34	9	2.4430E+02	3.4500E-01	NA
34	10	5.2295E+03	1.2900E-01	NA
34	11	1.9349E+04	1.4350E-01	NA
34	12	2.4653E+04	7.0000E-03	NA
35	1	3.1907E+03	7.7000E-02	NA
35	2	1.4042E+03	5.4250E-01	NA
35	3	3.9435E+02	3.7500E-02	NA
35	4	5.2290E+03	1.2900E-01	NA
35	5	1.9350E+04	1.4350E-01	NA
35	6	2.4653E+04	7.0000E-03	NA
35	7	3.1907E+03	7.7000E-02	NA
35	8	1.4042E+03	5.4250E-01	NA
35	9	3.9435E+02	3.7500E-02	NA
35	10	5.2290E+03	1.2900E-01	NA
35	11	1.0777E+04	7.2000E-02	NA
35	12	4.3602E+04	2.2000E-02	NA
36	1	3.2159E+03	7.7000E-02	NA
36	2	1.4477E+03	5.4200E-01	NA
36	3	4.6619E+02	1.4250E-01	NA
36	4	5.2510E+03	1.2900E-01	NA
36	5	1.0832E+04	7.2000E-02	NA
36	6	4.3593E+04	2.2000E-02	NA
36	7	3.4157E+03	7.7000E-02	NA
36	8	7.3733E+02	1.3500E-02	NA
36	9	4.6619E+02	1.4250E-01	NA
36	10	7.0024E+03	2.6200E-01	NA
36	11	1.0093E+04	2.1900E-01	NA
36	12	4.6264E+03	5.4600E-01	NA
37	1	3.3854E+03	7.7000E-02	NA
37	2	1.3291E+03	2.3500E-02	NA
37	3	6.6923E+02	1.4100E-01	NA
37	4	9.0553E+03	2.6300E-01	NA
37	5	1.7424E+04	2.1600E-01	NA
37	6	4.6022E+04	5.4450E-01	NA
37	7	3.3854E+03	7.7000E-02	NA
37	8	1.3291E+03	2.3500E-02	NA
37	9	6.6923E+02	1.4100E-01	NA
37	10	9.0553E+03	2.6300E-01	NA
37	11	1.9578E+04	2.1400E-01	NA
37	12	4.0597E+04	5.4350E-01	NA
38	1	3.3876E+03	7.7000E-02	NA
38	2	1.5027E+03	2.3500E-02	NA
38	3	8.1352E+02	1.4100E-01	NA
38	4	9.0553E+03	2.6300E-01	NA
38	5	1.9578E+04	2.1400E-01	NA
38	6	4.0597E+04	5.4350E-01	NA
38	7	3.3876E+03	7.7000E-02	NA

38	8	1.5027E+03	2.3500E-02	NA
38	9	8.1352E+02	1.4100E-01	NA
38	10	9.0553E+03	2.6300E-01	NA
38	11	2.6610E+04	3.4500E-01	NA
38	12	3.8011E+04	1.3000E-02	NA
39	1	3.3909E+03	7.7000E-02	NA
39	2	1.5883E+03	2.3500E-02	NA
39	3	8.7433E+02	1.4150E-01	NA
39	4	9.0553E+03	2.6300E-01	NA
39	5	2.6610E+04	3.4500E-01	NA
39	6	3.8011E+04	1.3000E-02	NA
39	7	3.3909E+03	7.7000E-02	NA
39	8	1.5883E+03	2.3500E-02	NA
39	9	8.7433E+02	1.4150E-01	NA
39	10	9.0553E+03	2.6300E-01	NA
39	11	3.7101E+04	1.4100E-01	NA
39	12	4.2989E+04	2.500E-02	NA
40	1	3.3954E+03	7.7000E-02	NA
40	2	1.9201E+03	2.3500E-02	NA
40	3	1.2888E+03	7.3000E-02	NA
40	4	9.0553E+03	2.6300E-01	NA
40	5	3.7101E+04	1.4100E-01	NA
40	6	4.2989E+04	2.4500E-02	NA
40	7	3.3954E+03	7.7000E-02	NA
40	8	1.9201E+03	2.3500E-02	NA
40	9	1.2888E+03	7.3000E-02	NA
40	10	9.0553E+03	2.6300E-01	NA
40	11	5.9062E+04	1.4100E-01	NA
40	12	7.7173E+04	2.4000E-02	NA
41	1	3.3986E+03	7.7000E-02	NA
41	2	1.9483E+03	2.3900E-01	NA
41	3	1.3648E+03	7.3500E-02	NA
41	4	9.0553E+03	2.6300E-01	NA
41	5	5.9062E+04	1.4100E-01	NA
41	6	7.7173E+04	2.4000E-02	NA
41	7	3.3986E+03	7.7000E-02	NA
41	8	1.9483E+03	2.3900E-01	NA
41	9	1.3648E+03	7.3500E-02	NA
41	10	9.0553E+03	2.6300E-01	NA
41	11	7.1512E+04	1.4150E-01	NA
41	12	9.6305E+04	2.4000E-02	NA
42	1	6.1845E+02	7.3000E-02	NA
42	2	1.2390E+03	7.4000E-02	NA
42	3	3.1065E+02	7.5000E-02	NA
42	4	6.3362E+00	7.4000E-02	NA
42	5	1.0741E+04	7.3000E-02	NA
42	6	4.5075E+04	7.4000E-02	NA
42	7	6.1845E+02	7.3000E-02	NA
42	8	1.2390E+03	7.4000E-02	NA
42	9	3.1065E+02	7.5000E-02	NA
42	10	6.3362E+00	7.4000E-02	NA
42	11	7.0289E+03	7.2500E-02	NA
42	12	3.0209E+04	7.4000E-02	NA
43	1	5.4215E+02	7.2500E-02	NA
43	2	1.1084E+03	7.4000E-02	NA
43	3	2.6503E+02	7.3500E-02	NA
43	4	7.1519E+00	7.4000E-02	NA
43	5	7.0289E+03	7.2500E-02	NA
43	6	3.0209E+04	7.4000E-02	NA
43	7	5.4215E+02	7.2500E-02	NA
43	8	1.1084E+03	7.4000E-02	NA
43	9	2.6503E+02	7.3500E-02	NA
43	10	7.1519E+00	7.4000E-02	NA
43	11	4.1880E+03	7.2000E-02	NA
43	12	1.8292E+04	7.4000E-02	NA
44	1	3.5245E+02	7.2500E-02	NA

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49	8	4.0043E+02	6.0000E-03	NA
49	9	5.7014E+01	7.9500E-02	NA
49	10	1.5461E-11	5.2250E-01	NA
49	11	5.6116E-10	2.3150E-01	NA
49	12	4.2110E-10	8.6500E-02	NA
50	1	3.0162E+02	7.5500E-02	NA
50	2	1.2250E+03	7.4500E-02	NA
50	3	6.1928E+02	7.7500E-02	NA
50	4	3.9434E+00	6.5000E-03	NA
50	5	2.1734E+04	7.7500E-02	NA
50	6	4.4749E+04	6.5000E-03	NA
50	7	3.0162E+02	7.5500E-02	NA
50	8	1.2250E+03	7.4500E-02	NA
50	9	6.1928E+02	7.7500E-02	NA
50	10	3.9434E+00	6.5000E-03	NA
50	11	1.4303E+04	7.8000E-02	NA
50	12	3.0645E+04	6.5000E-03	NA
51	1	2.5618E+02	7.5000E-02	NA
51	2	1.0944E+03	7.5000E-02	NA
51	3	5.4206E+02	7.7500E-02	NA
51	4	1.4275E+00	7.4500E-02	NA
51	5	1.4303E+04	7.8000E-02	NA
51	6	3.0645E+04	6.5000E-03	NA
51	7	2.5618E+02	7.5000E-02	NA
51	8	1.0944E+03	7.5000E-02	NA
51	9	5.4206E+02	7.7500E-02	NA
51	10	1.4275E+00	7.4500E-02	NA
51	11	8.5053E+03	6.6500E-02	NA
51	12	1.9201E+04	6.5000E-03	NA
52	1	1.6674E+02	7.5000E-02	NA
52	2	7.7314E+02	6.5000E-03	NA
52	3	3.5465E+02	7.8000E-02	NA
52	4	3.6615E+00	6.5000E-03	NA
52	5	8.5053E+03	6.6500E-02	NA
52	6	1.9201E+04	6.5000E-03	NA
52	7	1.6674E+02	7.5000E-02	NA
52	8	7.7314E+02	6.5000E-03	NA
52	9	3.5465E+02	7.8000E-02	NA
52	10	3.6615E+00	6.5000E-03	NA
52	11	2.1257E+03	6.6500E-02	NA
52	12	5.2829E+03	6.5000E-03	NA
53	1	5.5664E+01	7.5000E-02	NA
53	2	2.9853E+02	6.5000E-03	NA
53	3	1.2012E+02	6.6500E-02	NA
53	4	5.0022E-11	2.3950E-01	NA
53	5	2.1257E+03	6.6500E-02	NA
53	6	5.2829E+03	6.5000E-03	NA
53	7	5.5664E+01	7.5000E-02	NA
53	8	2.9853E+02	6.5000E-03	NA
53	9	1.2012E+02	6.6500E-02	NA
53	10	5.0022E-11	2.3950E-01	NA
53	11	5.4115E-10	7.1000E-02	NA
53	12	3.4925E-10	2.1600E-01	NA
54	1	3.0205E+02	7.5500E-02	NA
54	2	1.3154E+03	6.5000E-03	NA
54	3	6.3650E+02	7.6500E-02	NA
54	4	2.5654E+01	6.5000E-03	NA
54	5	2.2418E+04	7.6500E-02	NA
54	6	5.0611E+04	6.5000E-03	NA
54	7	3.0205E+02	7.5500E-02	NA
54	8	1.3154E+03	6.5000E-03	NA
54	9	6.3650E+02	7.6500E-02	NA
54	10	2.5654E+01	6.5000E-03	NA
54	11	1.4782E+04	7.6500E-02	NA
54	12	3.4830E+04	6.5000E-03	NA
55	1	2.5574E+02	7.5000E-02	NA

55	2	1.1977E+03	6.5000E-03	NA
55	3	5.5837E+02	7.6000E-02	NA
55	4	1.9461E+01	6.5000E-03	NA
55	5	1.4782E+04	7.6500E-02	NA
55	6	3.4830E+04	6.5000E-03	NA
55	7	2.5574E+02	7.5000E-02	NA
55	8	1.1977E+03	6.5000E-03	NA
55	9	5.5837E+02	7.6000E-02	NA
55	10	1.9461E+01	6.5000E-03	NA
55	11	8.7776E+03	7.6500E-02	NA
55	12	2.1951E+04	6.5000E-03	NA
55	1	1.6690E+02	7.5000E-02	NA
56	2	8.8109E+02	6.5000E-03	NA
56	3	3.6655E+02	7.6500E-02	NA
56	4	1.9941E+00	6.5000E-03	NA
56	5	8.7776E+03	7.6500E-02	NA
56	6	2.1951E+04	6.5000E-03	NA
56	7	1.6690E+02	7.5000E-02	NA
56	8	8.8109E+02	6.5000E-03	NA
56	9	3.6655E+02	7.6500E-02	NA
56	10	1.9941E+00	6.5000E-03	NA
56	11	2.1831E+03	7.6500E-02	NA
56	12	5.5602E+01	6.5000E-02	NA
57	1	3.4463E+02	6.5000E-03	NA
57	2	1.2335E+02	7.6500E-02	NA
57	3	4.3656E-11	1.3700E-01	NA
57	4	2.1831E+03	7.6500E-02	NA
57	5	6.0993E+01	6.5000E-03	NA
57	6	3.4463E+02	7.6500E-02	NA
57	7	5.5602E+01	6.5000E-02	NA
57	8	3.4463E+02	7.6500E-02	NA
57	9	1.2335E+02	6.5000E-03	NA
57	10	4.3656E-11	1.3700E-01	NA
57	11	4.4747E-10	7.0500E-02	NA
57	12	1.4552E-10	5.7300E-01	NA
58	1	8.0814E+03	7.5000E-02	NA
58	2	4.2815E+03	2.3700E-01	NA
58	3	3.1317E+03	7.4500E-02	NA
58	4	1.0907E+04	2.6350E-01	NA
58	5	7.3898E+04	1.4100E-01	NA
58	6	1.0530E+05	2.5000E-02	NA
58	7	8.0814E+03	7.5000E-02	NA
58	8	4.2815E+03	2.3700E-01	NA
58	9	3.1317E+03	7.4500E-02	NA
58	10	1.0907E+04	2.6350E-01	NA
58	11	1.5999E+05	7.3000E-02	NA
58	12	2.0536E+05	2.3900E-01	NA
59	1	8.0946E+03	7.5000E-02	NA
59	2	6.0070E+03	2.3600E-01	NA
59	3	4.3141E+03	7.4500E-02	NA
59	4	1.0907E+04	2.6350E-01	NA
59	5	3.2665E+05	7.3500E-02	NA
59	6	4.3608E+05	2.3750E-01	NA
59	7	8.0973E+03	7.5000E-02	NA
59	8	6.0070E+03	2.3600E-01	NA
59	9	4.3141E+03	7.4500E-02	NA
59	10	1.0907E+04	2.6350E-01	NA
59	11	3.2665E+05	7.3500E-02	NA
59	12	4.3608E+05	2.3750E-01	NA
60	1	8.0973E+03	7.5000E-02	NA
60	2	6.9128E+03	7.1000E-02	NA
60	3	4.8853E+03	7.4500E-02	NA
60	4	1.0907E+04	2.6350E-01	NA
60	5	3.2665E+05	7.3500E-02	NA
60	6	4.3608E+05	2.3750E-01	NA
60	7	8.0973E+03	7.5000E-02	NA

60
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8
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11
12

6.9128E+03
4.8853E+03
1.0907E+04
3.9299E+05
5.2921E+05

7.1000E-02
7.4500E-02
2.6350E-01
7.3500E-02
2.3700E-01

NA
NA
NA
NA
NA

STRESS COMPONENT MAXIMA *					
SUPPORT FORCES AND MOMENTS					
ELEMENT NUMBER	STRESS COMPONENT	MAXIMUM VALUE	TIME AT MAXIMUM	PLOT SYMBOL	
1	1	6.5759E+01	1.2200E-01	NA	
2	1	4.3574E+02	1.0150E-01	NA	
3	1	6.6836E+01	1.4650E-01	NA	
4	2	4.9494E+03	1.4650E-01	NA	
5	2	3.5115E+03	5.0700E-01	NA	
6	2	5.3414E+03	3.2850E-01	NA	
7	1	3.0346E-03	5.6500E-02	NA	
8	1	3.8574E+02	5.6000E-02	NA	
9	1	6.4671E-04	1.0250E-01	NA	
10	1	3.9524E-04	5.0700E-01	NA	
11	1	6.5820E+02	1.0200E-01	NA	
12	1	1.3843E+02	1.2350E-01	NA	
13	1	7.5158E-03	5.0400E-01	NA	
14	1	1.0265E+03	8.2500E-02	NA	
15	1	1.1201E+03	5.9000E-02	NA	
16	1	2.0018E-03	2.6100E-01	NA	
17	1	2.5631E-03	2.5000E-02	NA	
18	1	4.8853E+03	7.4500E-02	NA	
19	1	8.0973E+03	7.5000E-02	NA	
20	1	6.9128E+03	7.1000E-02	NA	
21	2	5.2921E+05	2.3700E-01	NA	
22	2	1.0907E+04	2.6350E-01	NA	
23	2	3.9299E+05	7.3500E-02	NA	

**DATE
FILMED**

10 / 20 / 93

END