TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

October 5, 1981

Director of Nuclear Reactor Regulation
Attention: Ms. E. Adensam, Chief
Licensing Branch No. 4
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Ms. Adensam:

In the Matter of the Application of) Docket Nos. 50-390
Tennessee Valley Authority) 50-391

As committed by TVA during a meeting with the U.S. Nuclear Regulatory Commission's (NRC) Mechanical Engineering Branch representatives on May 27 and 28, 1981, we are submitting the enclosed copy of a report containing documentation of the TPIPE computer program. This documentation includes solutions to seven piping analysis benchmark problems provided by the NRC.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills, Manager
Nuclear Regulation and Safety

Sworn to and subscribed before me
this 5th day of October 1981
Paulette N. White
Notary Public

My Commission Expires 9-5-84

Enclosure

Limited Distribution

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PDR ADOCK 05000390
A PDR

TENNESSEE VALLEY AUTHORITY

NRC REQUESTED TPIPE VERIFICATION

A set of benchmark problems has been run on TPIPE as requested in reference 1 using the suggested benchmark problems of reference 2. TPIPE is a piping analysis program used for all nuclear piping analysis by TVA. All required benchmarks have been run successfully. The results of the seven benchmarks are attached and include computer run listings containing the following information:

1. The input data.

2. The natural frequencies.

3. The mode shapes.

4. The participation factors.

5. The combined displacements, the rotations, and the elemental internal forces and moments for all seismic directional excitations of NRC calculated modes.

TPIPE calculates a total response to dynamic excitation by combining interspatial responses, i.e., directional responses to the support motion for each calculated mode, then by combining intermodal responses, i.e., resultant responses to support motion for each calculated mode. Interspatial combination was performed using the square root of the sum of the squares (SRSS) of corresponding representative maximum values of the spectral responses in an orthogonal coordinate system to a three-dimensional design earthquake (two horizontal components and a vertical component). Intermodal combination was accomplished using either the SRSS method, the NRC 10% method, or the NRC Grouping method. The particular combination method for a given problem was chosen in order to match as closely as possible the method used by the NRC in the benchmark printout.

The SRSS of individual resultant modal responses to support motion over the range of all calculated modes was used when no modes were closely spaced. Calculated modes included at least all of the NRC calculated modes. SRSS was used on problem 5 and on problem 6 for a secondary check (problem 6 contained the results using two combination methods, SRSS and Grouping method).

The NRC 10% method was used in Benchmark problem No. 2 as a secondary verification that the solution was independent of combination techniques as stated in reference 2.

The NRC Grouping method, used for problems 1, 3, 4, 6, and 7, accounts for groups of closely spaced modes. A group includes all modes having frequencies less than 10% above that of the first mode of the group (the mode with the lowest frequency in the group). For the exact equations of any of the methods described herein, please refer to reference 3.

Program dependent differences between the NRC Benchmark input to EPIPE and TVA Benchmark input to TPIPE exist and should be noted. The differences include:

1. Lumped weight/mass, particular weight assigned to individual nodes, was input to EPIPE in LB SEC^2/IN and was input to TPIPE in LB's. The masses were converted by multiplying by 386.4 IN/SEC^2 as TPIPE was executed in a "consistent units" mode with that gravitational constant.

2. Spectral curves input to EPIPE in IN/SEC^2 were converted to G's for TPIPE by dividing by 386.4 $IN/SEC^2/G$.

3. Coefficient's of thermal expansion and design temperatures input to EPIPE were left out of the input to TPIPE since no thermal load cases were requested.

4. "Third points" of curved members input to EPIPE as center of curvature, CC, were changed to tangent intersection, TI, for input to TPIPE.

5. False members with specified "spring rates" input to EPIPE to simulate support types were changed to "flexible supports" with specified "spring rates" and restraint directions for input to TPIPE.

All of these differences have no effect upon the analyses.

Discrepancies were found in the benchmark documentation, reference 2. The member labels on the isometric of problem 2 are incorrect. Problem 3 contains output of two different computer runs. The listing of the computer output up to the participation factor table is from a run containing two skewed supports changed to vertical supports in a second run, except for the evidence of a "pen and ink" change to the input data table. The output from the first run contains the generated nodal data table, the mode shape printout, the boundary element table, the material property table, the pipe cross-section table, and the listing of frequencies for the system with misdirected supports. These specific results were duplicated by TPIPE. The remaining printout contained the participation factor table and the resultant dynamic response table. The specific results contained in this portion, along with the frequencies listed in the erratum attached to reference 1, were also duplicated by TPIPE. As the final results were deemed most necessary, the TPIPE run which matched the participation factors and the resultant dynamic response was chosen to be attached. Problem 4 had four instances of a node having two false members with identical spring rates acting in the same direction. The two restraints were modeled with a single flexible support with twice the spring rate acting in the appropriate direction for each instance of the duplication. TPIPE would not allow a node to be connected to eight other nodes as did EPIPE. The TPIPE model replaced the single node with two very close connecting nodes, then connected half of the eight nodes to each. Problems 3, 5, and 6 had restraint members in misdirected lines of action according to the respective isometrics. The misdirections were duplicated for the TPIPE runs. Problem 6 also contained straight pipe elements next to curved elements which were not tangent at the connecting nodes. This arrangement normally would not have caused problems, but the points of the curved member do not lie on the circle described for the

element by the given radius, the tangent intersection point, and the end points' locations. The problem created in the TPIPE run was nonmatching curved member endpoint coordinates though the differences were small.

The seven piping analysis benchmark problems provided by the NRC have been run successfully on the computer program, TPIPE. The EPIPE program used by the NRC and the TPIPE program used by TVA are both modified versions of the general purpose program, SAP IV. TPIPE has several improvements incorporated; the most significant improvement has provided a shifting capability in the frequency analysis routine that reduces the error associated with obtaining the frequency of modes in the later portion of iterations. TVA's results compare to the NRC's published results (see reference 2) as follows:

1. TPIPE frequencies matched EPIPE frequencies to three significant digits.

2. TPIPE normalized mode shapes matched EPIPE normalized mode shapes to three significant digits.

3. TPIPE participation factors matched EPIPE participation factors to three significant digits.

4. TPIPE reponse spectrum analysis results matched to three significant digits the EPIPE response spectrum analysis results. The results have been presented in this report.

REFERENCES

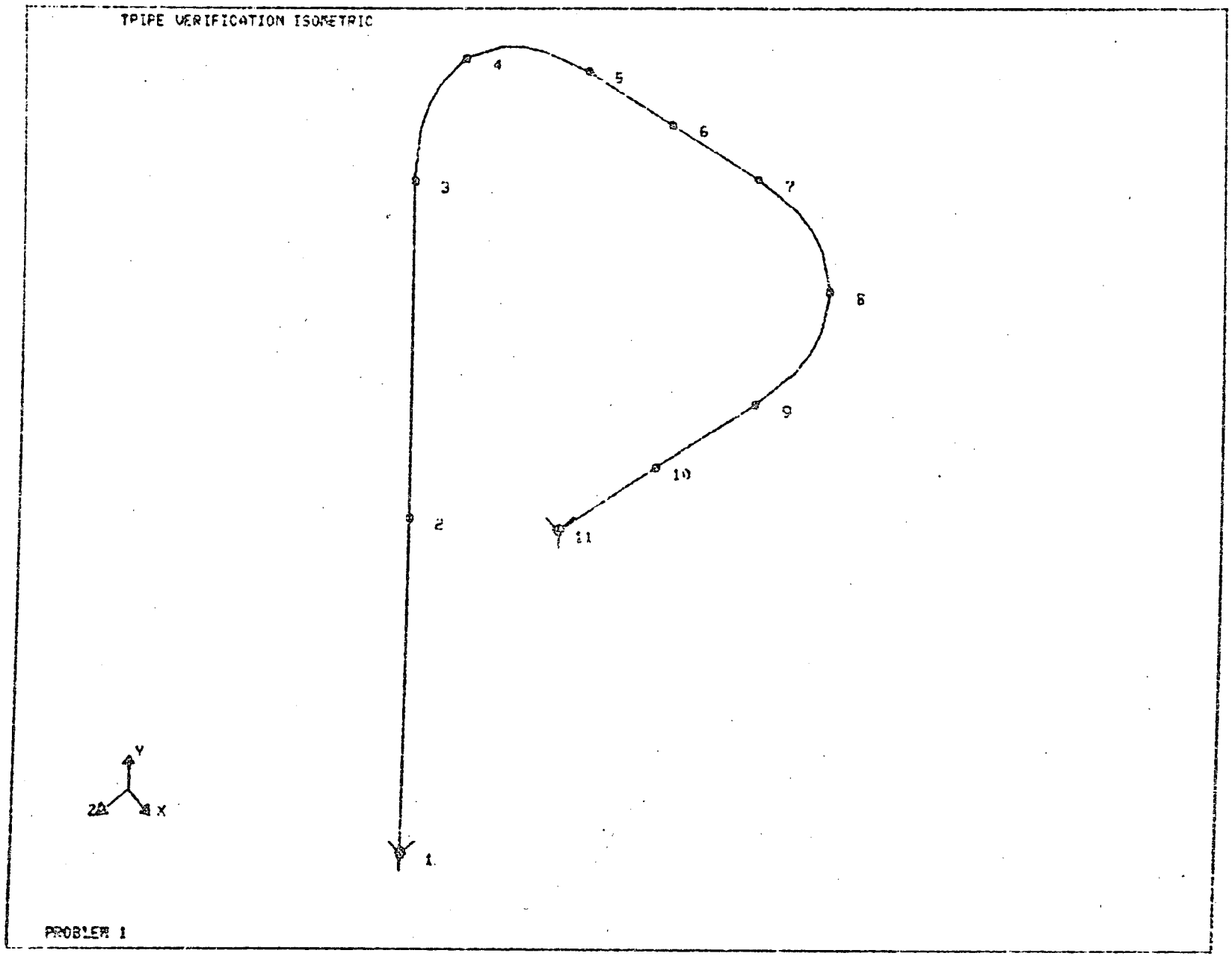
1. U.S. Nuclear Regulatory Commission Mechanical Engineering Branch "Request for Additional Information on Computer Code Verification", TVA letter NEB 810612351.

2. U.S. Nuclear Regulatory Commission "Piping Benchmark Problems: Dynamic Analysis Uniform Support Motion Response Spectrum Method", NUREG/cr 1677 BNL - NUREG - 51267 Vol. 1.

3. U.S. Nuclear Regulatory Commission "Regulatory Guide: Office of Standards Development", Regulatory Guide 1.92.

4. PMB Systems Engineering, Incorporated, "TPIPE User Manual".

BENCHMARK
PROBLEM 1


TPIPE VERIFICATION ISOMETRIC
1
2
3
4
5
6
7
8
9
10
11
Y
Z
X
PROBLEM 1

```
00000000011111111112222222222333333333344444444445555555555666666666677777777778   CARD
12345678901234567890123456789012345678901234567890123456789012345678901234567890  NUMBER

TPIPE  VERIFICATION  N1-TPIPE   PROB. #1    RAGILES  X2159                  1TIT      1
TSI  1 Y            NONE       PLTPIPE   TTTRAG    441       DWHEELER                  2
    4   11    0          1    1        10    0                 1  1    386.4           3
   101000      01100    0    1    1    5 .005  200       8000                          4
 C01    1    3    4  C02        36.3       0.0   123.936        0.0                    5
 C02  C01    4    5  C03        36.3    21.264     145.2        0.0                    6
 C03  C02    7    8  C04        36.3    87.036     145.2        0.0                    7
 C04  C03    8    9   11        36.3     108.3     145.2     21.264                    8
   1        0.0        0.0       0.0                                                  9
   2        0.0     54.450       0.0                1.54096E01                        10
   3                                                1.94436E01                        11
   4                                                8.06803200                        12
   5                                                6.56107200                        13
   6     54.150    145.200       0.0                5.05248E00                        14
   7                                                6.56107200                        15
   8                                                4.03401600                        16
   9                                                6.93588E00                        17
  10    108.300    145.200    56.800                5.79986400                        18
  11    108.300    145.200    77.300                                                  19
    1   1   11                                                                        20
END                                                                                   21
    1   24.0E06                            0.0                                        22
    1     7.288     .241       0.0                                                    23
   1         1    2     1    1                                                        24
   2         2    3                                                                   25
   3         3    4                                                  C01              26
   4         4    5                                                  C02              27
   5         5    6                                                                   28
   6         6    7                                                                   29
   7         7    8                                                  C03              30
   8         8    9                                                  C04              31
   9         9   10                                                                   32
  10        10   11                                                                   33
    1             11                                                                  34
 .1698E-02 .37525880R.C.DIVIDED BY 386.4                                              35
 .2860E-01 .98343685                                                                  36
 .5800E-01 2.0056936                                                                  37
 .7100E-01 2.0056936                                                                  38
 .9100E-01 1.1387164                                                                  39
 .1140E-00 3.0745342                                                                  40
 .1410E-00 3.0745342                                                                  41
 .1720E-00 1.8115942                                                                  42
 .2000E-00 2.2541408                                                                  43
 .2500E-00 2.2541408                                                                  44
 .3230E-00 1.0351967                                                                  45
 D       1    1    1  1.0.6667  1.0        GM     RESPONSE SPECT.GILES                46
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DEVELOPED JOINTLY BY

PMB SYSTEMS ENGINEERING
SAN FRANCISCO, CALIFORNIA, USA

TENNESSEE VALLEY AUTHORITY
KNOXVILLE, TENNESSEE, USA

******* 1976 ******

VERSION 4.4 MAY 1, 1981

EXECUTED AT 13.46.28. ON 07/18/81

PROGRAM CONTROL INFORMATION

PIPING SYSTEM GEOMETRY DEFINITION

NUMBER OF CONTROL POINTS	4
NUMBER OF NODAL POINTS	11
NUMBER OF NONGLOBAL COORDINATE SYSTEMS	0
NUMBER OF ADDITIONAL SUPPORT TYPES	0
NUMBER OF MATERIAL PROPERTY TYPES	1
NUMBER OF PIPE CROSS SECTION TYPES	1
NUMBER OF SPECIAL COMPONENT CROSS SECTIONS	0
NUMBER OF PIPE MEMBERS	10
NUMBER OF SPECIAL CONNECTIONS	0
NUMBER OF SPECIAL COMPONENTS	0
NUMBER OF DYNAMIC SPRINGS	0
NUMBER OF MULTIPLE EXCITATION ZONES	0
UNITS OF LENGTH AND WEIGHT	CONSISTENT
GRAVITY	386.40
NODAL POINT COORDINATE CHECK OPTION	NO

PROBLEM DEFINITION

EXECUTION MODE= 101000
1= STRUCTURAL DEFINITION IS FROM DATA CARDS
0= NORMAL DATA CHECKING RUN
1= ANALYSIS REQUESTED
0= NO STRUCTURAL PLOTTING REQUESTED
0= NO POSTPROCESSING REQUESTED
0= NO THERMAL TRANSIENT RESPONSE EXECUTION REQUESTED

ANALYSIS TYPES(01100) REQUESTED

FREQUENCY ANALYSIS

MAXIMUM NUMBER OF MODES REQUESTED	5
NUMBER OF SPRING SUPPORTS IN DYNAM MODEL	0
MINIMUM PERIOD OF HIGHEST MODE(SEC)	.0050
MAXIMUM FREQUENCY FOR MODE PRINTOUT(HZ)	200.0

RESPONSE SPECTRUM ANALYSIS

NUMBER OF SPECTRAL CURVES TO BE INPUT	1
NUMBER OF RESPONSE SPECTRUM LOAD CASES	1

PROGRAM STORAGE 8000

RESTART TAPE GENERATION OPTION.. NONE REQUESTED

C O N T R O L P O I N T S P E C I F I C A T I O N

CONTROL NAME	I-TAN POINT	*CURVE POINTS* I-END	J-END	J-TAN POINT	CURVE RADIUS	******** COORDINATES ******* X-GLOBAL	Y-GLOBAL	Z-GLOBAL	COMMENT
C01 *	1 *	3 *	4 *	C02 *	36.300	0.00	123.94	0.00	
C02 *	C01 *	4 *	5 *	C03 *	36.300	21.26	145.20	0.00	
C03 *	C02 *	7 *	8 *	C04 *	36.300	87.04	145.20	0.00	
C04 *	C03 *	8 *	9 *	11 *	36.300	108.30	145.20	21.26	

N O D A L P O I N T D E F I N I T I O N

NODAL POINT	NODE NAME	******** COORDINATES ******* X-GLOBAL	Y-GLOBAL	Z-GLOBAL	LUMPED WEIGHT	DATA SOURCE	COMMENT
1	1 *	0.00	0.00	0.00	0.0	INPT	
2	2 *	0.00	54.45	0.00	15.4	INPT	
3	3 *	0.00	108.90	0.00	19.4	CP	
4	4 *	10.63	134.57	0.00	8.1	CP	
5	5 *	36.30	145.20	0.00	6.6	CP	
6	6 *	54.15	145.20	0.00	5.1	INPT	
7	7 *	72.00	145.20	0.00	6.6	CP	
8	8 *	97.67	145.20	10.63	4.0	CP	
9	9 *	108.30	145.20	36.30	6.9	CP	
10	10 *	108.30	145.20	56.80	5.8	INPT	
11	11 *	108.30	145.20	77.30	0.0	INPT	

S U P P O R T T Y P E L I B R A R Y

SUPPORT TYPE	***** RESTRAINT CODES ***** DYNAMIC	GRAVITY	THERMAL	COMMENT
1	111111	111111	111111	
2	111000	111000	111000	
3	111000	111000	101000	
4	111000	110000	110000	
5	111000	110000	100000	
6	111000	101000	101000	
7	111000	100000	100000	
8	111000	11000	11000	
9	111000	11000	1000	
10	111000	10000	10000	
11	111000	10000	0	
12	111000	1000	1000	
13	111000	0	0	
14	110000	110000	110000	
15	110000	110000	100000	
16	110000	100000	100000	
17	110000	10000	10000	
18	110000	10000	0	
19	110000	0	0	
20	101000	101000	101000	
21	101000	100000	100000	
22	101000	11000	1000	
23	101000	10000	0	
24	101000	1000	1000	
25	101000	0	0	
26	100000	110000	100000	
27	100000	100000	100000	
28	100000	10000	0	
29	100000	0	0	
30	11000	11000	11000	
31	11000	11000	1000	
32	11000	10000	10000	
33	11000	10000	0	
34	11000	1000	1000	
35	11000	0	0	
36	10000	10000	10000	
37	10000	10000	0	
38	10000	0	0	
39	1000	11000	1000	
40	1000	10000	0	
41	1000	1000	1000	
42	1000	0	0	
43	0	10000	0	

NODAL POINT RESTRAINT SPECIFICATION

SUPPORT TYPE	RESTRAINED NODAL POINTS 1	2	3	4	5	6	7	8	9	10	11	12	13	14	*** RESTRAINT CODES *** DYNAMIC	GRAVITY	THERMAL	NO MOD
1	1	11	*	*	*	*	*	*	*	*	*	*	*	*	111111	111111	111111	1

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

MATERIAL NUMBER	COLD ELASTIC MODULUS	POISSONS RATIO	THERMAL EXPANSION COEFFICIENT	INTERNAL PIPE PRESSURE	MEMBER TEMPERATURE	HOT ELASTIC MODULUS	COMMENT
1	24000000.0	.300	0.000000000	0.0	0.00	24000000.0	

PIPE MEMBER CROSS SECTION TYPES

SECTION NUMBER	OUTSIDE DIAMETER	WALL THICKNESS	AXIAL AREA	SHEAR AREA	FLEXURAL INERTIA	INPUT FLEXIBILITY	WEIGHT/ LENGTH	SECTION DESCRIPTION
1	7.288	.2410	5.34	2.67	33.2		0.00	

P I P E M E M B E R D A T A

MEMBER NAME	NODE NAME I-END	NODE NAME J-END	MAT TYPE	SECT TYPE	INTENS FACTOR I-END	INTENS FACTOR J-END	REF TEMP	RELEASE CODE I-END	RELEASE CODE J-END	MEMBER LENGTH	CURVE RADIUS	INTERSECTION X-GLOBAL	INTERSECTION Y-GLOBAL	INTERSECTION Z-GLOBAL	INTER ANGLE	MEMBER NUMBER
1	1	2	1	1	1.000	1.000	70.0	0	0	54.45						1
2	2	3	1	1	1.000	1.000	70.0	0	0	54.45						2
3	3	4	1	1	1.137	1.137	70.0	0	0	28.51	36.300	0.00	123.94	0.00	45.000	3
4	4	5	1	1	1.137	1.137	70.0	0	0	28.51	36.300	21.26	145.20	0.00	45.000	4
5	5	6	1	1	1.000	1.000	70.0	0	0	17.85						5
6	6	7	1	1	1.000	1.000	70.0	0	0	17.85						6
7	7	8	1	1	1.137	1.137	70.0	0	0	28.51	36.300	87.04	145.20	0.00	45.000	7
8	8	9	1	1	1.137	1.137	70.0	0	0	28.51	36.300	108.30	145.20	21.26	45.000	8
9	9	10	1	1	1.000	1.000	70.0	0	0	20.50						9
10	10	11	1	1	1.000	1.000	70.0	0	0	20.50						10

MEMBER LENGTH - DIRECTION INFORMATION

MEMBER NAME	I NODE NAME	J NODE NAME	***DELTA MEMBER LENGTHS*** X	Y	Z	CROSS SECTION DESCRIPTION
1 *	1 *	2 *	0.00	54.45	0.00	
2 *	2 *	3 *	0.00	54.45	0.00	
3 *	3 *	4 *	10.63	25.67	0.00	
4 *	4 *	5 *	25.67	10.63	0.00	
5 *	5 *	6 *	17.85	0.00	0.00	
6 *	6 *	7 *	17.85	0.00	0.00	
7 *	7 *	8 *	25.67	0.00	10.63	
8 *	8 *	9 *	10.63	0.00	25.67	
9 *	9 *	10 *	0.00	0.00	20.50	
10 *	10 *	11 *	0.00	0.00	20.50	

F R E Q U E N C Y A N A L Y S I S

OVERALL PROBLEM SIZE

TOTAL NUMBER OF EQUATIONS	54
HALF BANDWIDTH OF STIFFNESS	12
NUMBER OF EQUATION BLOCKS	2
NUMBER OF EQUATIONS PER BLOCK	28
NUMBER OF MODES REQUIRED.(EST.)	5
CUT-OFF FREQUENCY	200.00
TOTAL MODES TO CUT-OFF FREQUENCY	5
NODAL WT./GEN. MASS PRINT CODE (MWPRNT)	0

PRINT NODAL WT. SUMMARY AND GEN. MASS = 0
SUPPRESS GEN. MASS PRINT = 1
SUPPRESS NODAL WT. SUMMARY PRINT = 2
SUPPRESS BOTH OF ABOVE PRINTS = 3

THE OUT OF CORE SUBSPACE ITERATION ALGORITHM WITH A MAXIMUM ALLOWABLE NUMBER OF ITERATIONS PER GROUP OF 16 IS CHOSEN.
SUBSPACE ITERATION WAS USER REQUESTED.
AN IN CORE SOLUTION WOULD REQUIRE A VALUE OF ABOUT 1552 FOR *MTOT*.

STORAGE ESTIMATES

THE FOLLOWING CONTROL PARAMETERS ARE EITHER USER SUPPLIED OR INTERNALLY ESTIMATED ARE USED TO CALCULATE ESTIMATES OF THE MINIMUM VALUE OF *MTOT*, THE PROGRAM STORAGE PARAMETER, AND THE CORRESPONDING CORE FIELD LENGTH SPECIFICATION REQUIRED FOR THE USERS JOB CARD...

NUMBER OF NODAL POINTS (NUMNP)	11
NUMBER OF DYNAMIC NODAL RESTRAINTS (NODREA)	12
NUMBER OF NON-GLOBAL NODES (NNG)	0
NUMBER OF MODES (NM)	5
NUMBER OF EQUATIONS PER BLOCK (NEQB)	28
NUMBER OF SPECTRAL CURVES INPUT (NSC)	1
NUMBER OF MODAL TIME STEPS (NT)	100
NUMBER OF FORCING FUNCTIONS (NFN)	1

EMPLOYING THE ABOVE PARAMETERS,THE FOLLOWING VALUES FOR MTOT AND CORE ARE ESTIMATED...

	MTOT (DECIMAL)	CORE (OCTAL)
RESPONSE SPECTRUM ANALYSIS	611	001143
TIME HISTORY MODAL	496	000760
STRUCTURAL PLOTTING	338	000522
CREATE OR READ RESTART TAPE	549	001045

N O D A L W E I G H T S U M M A R Y

NODE NAME	RESTRAINT CODE	X TRANSLATION	Y TRANSLATION	Z TRANSLATION
1 *	111111	0.000	0.000	0.000
2 *	000000	15.410	15.410	15.410
3 *	000000	19.444	19.444	19.444
4 *	000000	8.068	8.068	8.068
5 *	000000	6.561	6.561	6.561
6 *	000000	5.052	5.052	5.052
7 *	000000	6.561	6.561	6.561
8 *	000000	4.034	4.034	4.034
9 *	000000	6.936	6.936	6.936
10 *	000000	5.800	5.800	5.800
11 *	111111	0.000	0.000	0.000

F R E Q U E N C Y D I S T R I B U T I O N B Y G R O U P

SUBSPACE GROUP	NO. MODES IN GROUP	LOWER BOUND HERTZ	LOWER BOUND EIGENVALUE	UPPER BOUND HERTZ	UPPER BOUND EIGENVALUE
1	3	0.000	0.	141.421	.7896E+06
2	2	141.421	.7896E+06	200.000	.1579E+07

FREQUENCY AND CONVERGENCE DATA - SUBSPACE ITERATION

GROUP	NO. MODES	ITERATIONS	SHIFT EIGENVALUE	MODE	CIRCULAR FREQUENCY (RAD/SEC)	FREQUENCY (HZ)	PERIOD (SEC)	FREQUENCY TOLERANCE	MODE TOLERANCE	//K*Ø// 2	//K*Ø-EIG *M*Ø// MAX	K*Ø OF MAX NORM
1	3	6	.394784E+06	1	179.2876	28.5345	.0350	.3658E-08	.5350E-04	.5757E+04	.1338E+00	-.1645E+04
				2	350.4223	55.7714	.0179	.1899E-09	.4676E-05	.2186E+05	.4504E-01	.1367E+05
				3	512.0597	81.4968	.0123	.6962E-12	.1242E-07	.3646E+05	.2074E-03	.1592E+05
2	2	1	.118435E+07	4	890.5634	141.7376	.0071	.2302E-12	.5862E-08	.1323E+06	.3643E-03	.8487E+04
				5	1023.0205	162.8188	.0061	.1245E-08	.5791E-06	.1816E+06	.4295E-01	.2756E+04

G E N E R A L I Z E D M A S S M A T R I X

	1	2	3	4	5
1	1.00000	.00000	.00000	-.00000	.00000
2	.00000	1.00000	-.00000	.00000	-.00000
3	.00000	-.00000	1.00000	-.00000	.00000
4	-.00000	.00000	-.00000	1.00000	.00000
5	.00000	-.00000	.00000	.00000	1.00000

MAXIMUM VALUE OF OFF DIAGONAL TERMS = .313E-10
MODE SHAPE NUMBER.. 5
ROW NUMBER..... 1

MAXIMUM ABSOLUTE DIFFERANCE BETWEEN DIAGONAL AND 1 = .56843E-13
MODE SHAPE NUMBER.. 2

F R E Q U E N C Y E R R O R E S T I M A T E S U M M A R Y - S U B S P A C E I T E R A T I O N

CONDITIONING NUMBER = .6827E+05

SUMMARY OF WARNINGS

-NONE-

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 5 MODES PRINTED)

MODE SHAPE NUMBER... 1
FREQUENCY (HZ)..... 28.5345 MAX. NORMALIZING COMPONENT..... 3.19646

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	-.10706	.00002	.27706	.00875	.00314	.00336	GLOBAL
3 *	-.31816	.00004	.83490	.01056	.00627	.00392	GLOBAL
4 *	-.40674	.03458	1.00000	.00831	.00852	.00284	GLOBAL
5 *	-.43246	.09087	.82010	.00652	.01149	.00162	GLOBAL
6 *	-.43241	.11688	.60941	.00581	.01200	.00130	GLOBAL
7 *	-.43233	.13734	.39241	.00511	.01215	.00100	GLOBAL
8 *	-.31250	.10828	.09430	.00390	.01028	.00049	GLOBAL
9 *	-.11171	.03905	.00041	.00181	.00504	.00043	GLOBAL
10 *	-.03002	.01025	.00021	.00096	.00277	.00022	GLOBAL
11 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 5 MODES PRINTED)

MODE SHAPE NUMBER... 2
FREQUENCY (HZ)..... 55.7714 MAX. NORMALIZING COMPONENT..... 2.43121

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	.37217	-.00009	.29751	.00836	.00573	-.01047	GLOBAL
3 *	.90994	-.00017	.72628	.00584	.01147	-.00736	GLOBAL
4 *	1.00000	-.02434	.64549	.00007	.01510	-.00053	GLOBAL
5 *	.99570	-.01376	.23725	-.00061	.01452	.00042	GLOBAL
6 *	.99465	-.00762	-.00756	-.00048	.01225	.00029	GLOBAL
7 *	.99338	-.00336	-.19607	-.00036	.00821	.00020	GLOBAL
8 *	.93818	.00139	-.16708	-.00013	-.01139	.00002	GLOBAL
9 *	.49251	.00180	.00122	.00005	-.01812	-.00002	GLOBAL
10 *	.15363	.00066	.00061	.00005	-.01266	-.00001	GLOBAL
11 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 5 MODES PRINTED)

MODE SHAPE NUMBER... 3
FREQUENCY (HZ)..... 81.4968 MAX. NORMALIZING COMPONENT..... 4.39534

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	.20743	.00285	-.10653	-.00230	.00011	-.00448	GLOBAL
3 *	.27459	.00569	-.14115	.00186	.00023	.00363	GLOBAL
4 *	.01746	.13741	-.00581	.00828	-.00053	.01531	GLOBAL
5 *	-.15889	.56227	.11126	.01187	-.00002	.01497	GLOBAL
6 *	-.15898	.81017	.10605	.01385	.00063	.01231	GLOBAL
7 *	-.15901	1.00000	.08866	.01583	.00130	.00887	GLOBAL
8 *	-.13216	.89933	.03176	.01971	.00289	-.00003	GLOBAL
9 *	-.05881	.39971	.00020	.01583	.00234	-.00058	GLOBAL
10 *	-.01745	.11911	.00010	.01015	.00149	-.00029	GLOBAL
11 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 5 MODES PRINTED)

MODE SHAPE NUMBER... 4
FREQUENCY (HZ)..... 141.7376 MAX. NORMALIZING COMPONENT..... 3.70241

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	-.04403	.00170	.70215	.01047	.00745	.00084	GLOBAL
3 *	-.06541	.00338	.46299	-.01898	.01491	.00015	GLOBAL
4 *	-.08455	.01679	-.48345	-.03233	.01655	.00208	GLOBAL
5 *	-.11476	.10173	-1.00000	-.02255	-.00455	.00363	GLOBAL
6 *	-.11395	.16277	-.84076	-.01731	-.01290	.00289	GLOBAL
7 *	-.11297	.20358	-.54588	-.01207	-.01846	.00161	GLOBAL
8 *	-.29591	.24838	-.06111	-.00269	-.01215	-.00283	GLOBAL
9 *	-.31193	.16102	-.00618	.00485	.00823	-.00287	GLOBAL
10 *	-.11496	.05625	-.00309	.00426	.00837	-.00143	GLOBAL
11 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 5 MODES PRINTED)

MODE SHAPE NUMBER... 5
FREQUENCY (HZ)..... 162.8188 MAX. NORMALIZING COMPONENT..... 3.26946

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	-1.00000	.00057	-.07944	-.00082	.00169	.01236	GLOBAL
3 *	-.47151	.00113	-.00523	.00332	.00338	-.02684	GLOBAL
4 *	.35025	-.32702	.08338	.00642	.00404	-.02306	GLOBAL
5 *	.45795	-.36759	.04743	.00860	.00429	.01811	GLOBAL
6 *	.46019	.04164	-.02710	.01003	.00375	.02554	GLOBAL
7 *	.46155	.53043	-.08471	.01146	.00245	.02710	GLOBAL
8 *	.44232	.97488	-.06976	.01682	-.00435	.01678	GLOBAL
9 *	.25334	.59053	-.00019	.02087	-.00860	.00832	GLOBAL
10 *	.08375	.19088	-.00009	.01527	-.00659	.00416	GLOBAL
11 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

S P E C T R A L C U R V E D A T A

IDENT NUMBER 1
CURVE TITLE .....
CURVE TYPE ..... PERIOD VS. ACCELERATION
CURVE SCALE ..... LINEAR
NUMBER OF POINTS .. 11

POINT	PERIOD (SECS)	ACCELERATION (G)	***** COMMENT ******
1	.0017	.3753	R.C.DIVIDED BY 386.4
2	.0286	.9834	
3	.0580	2.0057	
4	.0710	2.0057	
5	.0910	1.1387	
6	.1140	3.0745	
7	.1410	3.0745	
8	.1720	1.8116	
9	.2000	2.2541	
10	.2500	2.2541	
11	.3230	1.0352	

MODAL PARTICIPATION FACTORS

MODE NUMBER	PARTICIPATION FACTORS X DIR	Y DIR	Z DIR
1	-.175	.026	.331
2	.363	-.002	.148
3	.054	.258	-.028
4	-.084	.053	.012
5	-.079	.066	-.011

R E S P O N S E S P E C T R U M A N A L Y S I S

TITLE..... RESPONSE SPECT.
FILE LABEL..... GILES
SPECTRAL CURVES
X-DIRECTION..... 1
Y-DIRECTION..... 1
Z-DIRECTION..... 1
CURVE SCALE FACTORS
X-SCALE..... 1.000
Y-SCALE..... .667
Z-SCALE..... 1.000

SPECTRA COMBINATION CODE... VECTORIAL SUM
MODE COMBINATION CODE..... MODIFIED NRC GROUPING METHOD WITH FR= .1
NODAL PRINT THRESHOLD (G)
VERTICAL ACCELERATION.... 0
HORIZONTAL ACCELERATION.. 0
SAVE RESULTS PARAMETER..... 0

APPLIED SPECTRAL ACCELERATION SUMMARY RESPONSE SPECT.

FREQUENCY NUMBER	PERIOD (SEC)	ZONE NUMBER	SPECTRAL ACCELERATIONS (G) X TRANS	Y TRANS	Z TRANS	XX ROT	YY ROT	ZZ ROT
1	.035	1	1.208	.805	1.208			
2	.018	1	.742	.495	.742			
3	.012	1	.614	.410	.614			
4	.007	1	.496	.331	.496			
5	.006	1	.476	.317	.476			

N O D A L A C C E L E R A T I O N S

NODE NAME	****** ACCELERATIONS ****** X-GLOBAL (G)	Y-GLOBAL (G)	Z-GLOBAL (G)	******* THRESHOLD ACCELERATIONS ******* VERTICAL (G)	EXCEED	HORIZONTAL (G)	EXCEED	
1 *	0.000	0.000	0.000	0.000	YES	0.000	YES	GLOBAL
2 *	.352	.001	.471	.001	YES	.588	YES	GLOBAL
3 *	.805	.003	1.316	.003	YES	1.543	YES	GLOBAL
4 *	.921	.098	1.519	.098	YES	1.777	YES	GLOBAL
5 *	.947	.312	1.211	.312	YES	1.538	YES	GLOBAL
6 *	.947	.435	.894	.435	YES	1.302	YES	GLOBAL
7 *	.946	.538	.593	.538	YES	1.117	YES	GLOBAL
8 *	.809	.492	.182	.492	YES	.829	YES	GLOBAL
9 *	.390	.223	.001	.223	YES	.390	YES	GLOBAL
10 *	.119	.067	.001	.067	YES	.119	YES	GLOBAL
11 *	0.000	0.000	0.000	0.000	YES	0.000	YES	GLOBAL

N O D A L D I S P L A C E M E N T S RESPONSE SPECT.

NODE NAME	NODAL TRANSLATIONS X	Y	Z	NODAL ROTATIONS XX	YY	ZZ	COORDINATE SYSTEM
1 *	0.0000	0.0000	0.0000	0.000000	0.000000	0.000000	GLOBAL
2 *	.0020	.0000	.0049	.000153	.000056	.000063	GLOBAL
3 *	.0059	.0000	.0146	.000184	.000112	.000070	GLOBAL
4 *	.0074	.0006	.0174	.000145	.000152	.000051	GLOBAL
5 *	.0078	.0016	.0143	.000114	.000202	.000030	GLOBAL
6 *	.0078	.0021	.0106	.000102	.000211	.000024	GLOBAL
7 *	.0078	.0025	.0068	.000090	.000212	.000019	GLOBAL
8 *	.0058	.0020	.0017	.000069	.000181	.000009	GLOBAL
9 *	.0022	.0007	.0000	.000034	.000097	.000008	GLOBAL
10 *	.0006	.0002	.0000	.000018	.000056	.000004	GLOBAL
11 *	0.0000	0.0000	0.0000	0.000000	0.000000	0.000000	GLOBAL

FREQUENCY SPACING NRC GROUPING METHOD

FREQUENCY NUMBER	SPACING NUMBER	FREQUENCY (CPS)
1	1	28.5345
2	2	55.7714
3	3	81.4968
4	4	141.7376
5	5	162.8188

P I P E M E M B E R S T R E S S E S RESPONSE SPECT.

PIPE NAME		PIPE TYPE	NODAL PT NAME-END	SECTION DESCRIP	LOCAL X FORCE	LOCAL Y FORCE	LOCAL Z FORCE	LOCAL X MOMENT	LOCAL Y MOMENT	LOCAL Z MOMENT	BENDING STRESS	INTEN FACTR
1	*		1 -I		4.96	17.88	36.43	629.67	3226.71	1393.63	392.41	1.00
1	*		2 -J		4.96	17.88	36.43	629.67	1259.85	473.26	163.29	1.00
2	*		2 -I		4.94	13.44	29.67	629.67	1259.85	473.26	163.29	1.00
2	*		3 -J		4.94	13.44	29.67	629.67	405.02	348.38	90.75	1.00
3	*	CURV	3 -I		4.88	7.32	7.88	629.67	405.02	348.38	90.75	1.14
3	*	CURV	-C		5.06	7.20	7.88	427.93	652.83	304.33	92.07	1.14
3	*	CURV	4 -J		5.92	6.51	7.88	142.09	828.43	289.96	97.71	1.14
4	*	CURV	4 -I		9.30	9.24	10.63	142.09	828.43	289.96	97.71	1.14
4	*	CURV	-C		11.57	6.15	10.63	180.58	726.58	254.18	86.89	1.14
4	*	CURV	5 -J		12.38	4.31	10.63	423.71	541.93	261.35	80.87	1.14
5	*		5 -I		17.80	2.63	16.88	423.71	541.93	261.35	80.87	1.00
5	*		6 -J		17.80	2.63	16.88	423.71	420.70	265.39	71.81	1.00
6	*		6 -I		22.26	1.65	20.66	423.71	420.70	265.39	71.81	1.00
6	*		7 -J		22.26	1.65	20.66	423.71	491.42	245.95	76.26	1.00
7	*	CURV	7 -I		28.20	23.67	3.92	423.71	245.95	491.42	76.26	1.14
7	*	CURV	-C		26.74	25.31	3.92	464.42	86.96	666.80	89.81	1.14
7	*	CURV	8 -J		24.76	27.25	3.92	422.66	217.99	873.52	109.30	1.14
8	*	CURV	8 -I		26.08	29.73	5.71	422.66	217.99	873.52	109.30	1.14
8	*	CURV	-C		23.76	31.62	5.71	300.11	405.82	1116.91	134.69	1.14
8	*	CURV	9 -J		24.01	31.43	5.71	112.95	543.74	1380.05	163.48	1.14
9	*		9 -I		24.02	7.12	34.10	112.95	1380.05	543.74	163.48	1.00
9	*		10 -J		24.02	7.12	34.10	112.95	1871.43	650.18	218.07	1.00
10	*		10 -I		24.02	7.47	34.78	112.95	1871.43	650.18	218.07	1.00
10	*		11 -J		24.02	7.47	34.78	112.95	2476.91	774.57	285.47	1.00

M A X I M U M P I P E M E M B E R S T R E S S E S RESPONSE SPECT.

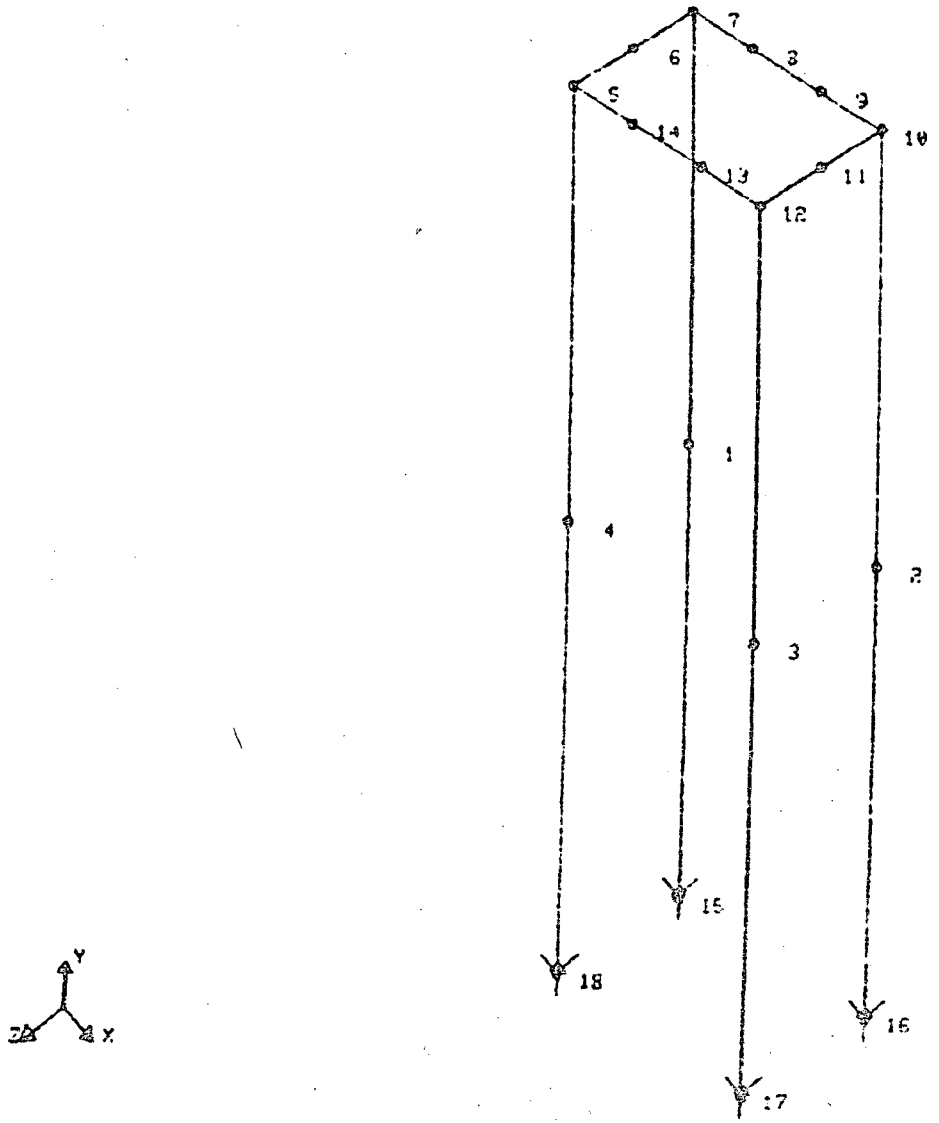
	PIPE NAME		NODAL PT NAME-END	BENDING STRESS(PSI)
1-	1	*	1-I	392.41
2-	10	*	11-J	285.47
3-	10	*	10-I	218.07
4-	9	*	10-J	218.07
5-	9	*	9-I	163.48
6-	8	*	9-J	163.48
7-	1	*	2-J	163.29
8-	2	*	2-I	163.29
9-	8	*	-C	134.69
10-	8	*	-C	134.69

P I P I N G S Y S T E M R E A C T I O N S RESPONSE SPECT.

NODE NAME	SUPPORT CODE	X FORCE	Y FORCE	Z FORCE	X MOMENT	Y MOMENT	Z MOMENT	COORDINATE SYSTEM
1 *	111111	17.88	4.96	36.43	3226.71	629.67	1393.63	GLOBAL
11 *	111111	34.78	7.47	24.02	774.57	2476.91	112.95	GLOBAL

BENCHMARK
PROBLEM 2

TPIPE VERIFICATION ISOMETRIC



PROBLEM 2

```
00000000011111111112222222222333333333344444444445555555555666666666677777777778   CARD
12345678901234567890123456789012345678901234567890123456789012345678901234567890  NUMBER

TPIPE  VERIFICATION  N1-TPIPE   PROB. #2    RAGILES  X2159                  1TIT
TSI  1 Y            NONE       PLTPIP2   TTTRAG    441        DWHEELER
    0   18    0          1    1         18    0                 1  1    386.4
    101000      01100    0    0    1    5 .005  100       8000
   1        0.0    -30.00       0.0                17.2720800
   2     27.250    -30.00       0.0                17.2720800
   3     27.250    -30.00    17.250                17.2720800
   4        0.0    -30.00    17.250                17.2720800
   5        0.0    18.625    17.250                16.7195280
   6        0.0    18.625     8.625                3.45441600
   7        0.0    18.625       0.0                16.7195280
   8      8.625    18.625       0.0                3.45441600
   9     18.625    18.625       0.0                3.45441600
  10     27.250    18.625       0.0                16.7195280
  11     27.250    18.625     8.625                3.45441600
  12     27.250    18.625    17.250                16.7195280
  13     18.625    18.625    17.250                3.45441600
  14      8.625    18.625    17.250                3.45441600
  15        0.0   -80.000       0.0
  16     27.250   -80.000       0.0
  17     27.250   -80.000    17.250
  18        0.0   -80.000    17.250
    1  15   16   17   18
END
    1   27.9E06                          0.0
    1     2.375      .154       0.0
   1        15    1     1    1
   2         1    7
   3         7    6
   4         6    5
   5         5    4
   6         4   18
   7        16    2
   8         2   10
   9        10   11
  10        11   12
  11        12    3
  12         3   17
  13        12   13
  14        13   14
  15        14    5
  16         7    8
  17         8    9
  18         9   10
    1             11
 .1698E-02 .37525880R.C.DIVIDED BY 386.4
 .2860E-01 .98343685
 .5800E-01 2.0056936
 .7100E-01 2.0056936
 .9100E-01 1.1387164
 .1140E-00 3.0745342
 .1410E-00 3.0745342
 .1720E-00 1.8115942
 .2000E-00 2.2541408
 .2500E-00 2.2541408
```

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000000000111111111122222222223333333333444444444455555555556666666667777777778   CARD
123456789012345678901234567890123456789012345678901234567890123456789012345678901  NUMBER

 .3230E-00 1.0351967                                                                  56
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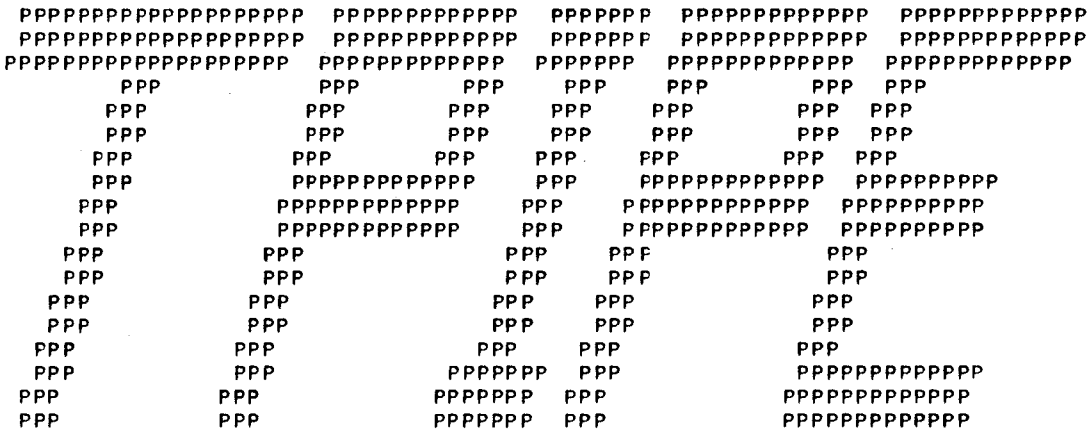

DEVELOPED JOINTLY BY

PMB SYSTEMS ENGINEERING
SAN FRANCISCO, CALIFORNIA, USA

TENNESSEE VALLEY AUTHORITY
KNOXVILLE, TENNESSEE, USA

******* 1976 ******

VERSION 4.4 MAY 1, 1981

EXECUTED AT 13.46.43. ON 07/18/81

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

PIPING SYSTEM GEOMETRY DEFINITION

NUMBER OF CONTROL POINTS	0
NUMBER OF NODAL POINTS	18
NUMBER OF NONGLOBAL COORDINATE SYSTEMS	0
NUMBER OF ADDITIONAL SUPPORT TYPES	0
NUMBER OF MATERIAL PROPERTY TYPES	1
NUMBER OF PIPE CROSS SECTION TYPES	1
NUMBER OF SPECIAL COMPONENT CROSS SECTIONS	0
NUMBER OF PIPE MEMBERS	18
NUMBER OF SPECIAL CONNECTIONS	0
NUMBER OF SPECIAL COMPONENTS	0
NUMBER OF DYNAMIC SPRINGS	0
NUMBER OF MULTIPLE EXCITATION ZONES	0
UNITS OF LENGTH AND WEIGHT	CONSISTENT
GRAVITY	386.40
NODAL POINT COORDINATE CHECK OPTION	NO

PROBLEM DEFINITION

EXECUTION MODE= 101000
1= STRUCTURAL DEFINITION IS FROM DATA CARDS
0= NORMAL DATA CHECKING RUN
1= ANALYSIS REQUESTED
0= NO STRUCTURAL PLOTTING REQUESTED
0= NO POSTPROCESSING REQUESTED
0= NO THERMAL TRANSIENT RESPONSE EXECUTION REQUESTED

ANALYSIS TYPES(01100) REQUESTED

FREQUENCY ANALYSIS

MAXIMUM NUMBER OF MODES REQUESTED	5
NUMBER OF SPRING SUPPORTS IN DYNAM MODEL	0
MINIMUM PERIOD OF HIGHEST MODE(SEC)	.0050
MAXIMUM FREQUENCY FOR MODE PRINTOUT(HZ)	100.0

RESPONSE SPECTRUM ANALYSIS

NUMBER OF SPECTRAL CURVES TO BE INPUT	1
NUMBER OF RESPONSE SPECTRUM LOAD CASES	0

PROGRAM STORAGE 8000

RESTART TAPE GENERATION OPTION.. NONE REQUESTED

N O D A L P O I N T D E F I N I T I O N

NODAL POINT	NODE NAME	******** COORDINATES ******* X-GLOBAL	Y-GLOBAL	Z-GLOBAL	LUMPED WEIGHT	DATA SOURCE	COMMENT
1	1 *	0.00	-30.00	0.00	17.3	INPT	
2	2 *	27.25	-30.00	0.00	17.3	INPT	
3	3 *	27.25	-30.00	17.25	17.3	INPT	
4	4 *	0.00	-30.00	17.25	17.3	INPT	
5	5 *	0.00	18.63	17.25	16.7	INPT	
6	6 *	0.00	18.63	8.63	3.5	INPT	
7	7 *	0.00	18.63	0.00	16.7	INPT	
8	8 *	8.63	18.63	0.00	3.5	INPT	
9	9 *	18.63	18.63	0.00	3.5	INPT	
10	10 *	27.25	18.63	0.00	16.7	INPT	
11	11 *	27.25	18.63	8.63	3.5	INPT	
12	12 *	27.25	18.63	17.25	16.7	INPT	
13	13 *	18.63	18.63	17.25	3.5	INPT	
14	14 *	8.63	18.63	17.25	3.5	INPT	
15	15 *	0.00	-80.00	0.00	0.0	INPT	
16	16 *	27.25	-80.00	0.00	0.0	INPT	
17	17 *	27.25	-80.00	17.25	0.0	INPT	
18	18 *	0.00	-80.00	17.25	0.0	INPT	

S U P P O R T T Y P E L I B R A R Y

SUPPORT TYPE	***** RESTRAINT CODES ***** DYNAMIC	GRAVITY	THERMAL	COMMENT
1	111111	111111	111111	
2	111000	111000	111000	
3	111000	111000	101000	
4	111000	110000	110000	
5	111000	110000	100000	
6	111000	101000	101000	
7	111000	100000	100000	
8	111000	11000	11000	
9	111000	11000	1000	
10	111000	10000	10000	
11	111000	10000	0	
12	111000	1000	1000	
13	111000	0	0	
14	110000	110000	110000	
15	110000	110000	100000	
16	110000	100000	100000	
17	110000	10000	10000	
18	110000	10000	0	
19	110000	0	0	
20	101000	101000	101000	
21	101000	100000	100000	
22	101000	11000	1000	
23	101000	10000	0	
24	101000	1000	1000	
25	101000	0	0	
26	100000	110000	100000	
27	100000	100000	100000	
28	100000	10000	0	
29	100000	0	0	
30	11000	11000	11000	
31	11000	11000	1000	
32	11000	10000	10000	
33	11000	10000	0	
34	11000	1000	1000	
35	11000	0	0	
36	10000	10000	10000	
37	10000	10000	0	
38	10000	0	0	
39	1000	11000	1000	
40	1000	10000	0	
41	1000	1000	1000	
42	1000	0	0	
43	0	10000	0	

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

SUPPORT TYPE	RESTRAINED NODAL POINTS 1	2	3	4	5	6	7	8	9	10	11	12	13	14	*** RESTRAINT CODES *** DYNAMIC	GRAVITY	THERMAL	NO MOD
1	15 *	16 *	17 *	18 *	*	*	*	*	*	*	*	*	*	*	111111	111111	111111	1

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

MATERIAL NUMBER	COLD ELASTIC MODULUS	POISSONS RATIO	THERMAL EXPANSION COEFFICIENT	INTERNAL PIPE PRESSURE	MEMBER TEMPERATURE	HOT ELASTIC MODULUS	COMMENT
1	27900000.0	.300	0.000000000	0.0	0.00	27900000.0	

P I P E M E M B E R C R O S S S E C T I O N T Y P E S

SECTION NUMBER	OUTSIDE DIAMETER	WALL THICKNESS	AXIAL AREA	SHEAR AREA	FLEXURAL INERTIA	INPUT FLEXIBILITY	WEIGHT/ LENGTH	SECTION DESCRIPTION
1	2.375	.1540	1.07	.54	.7		0.00	

P I P E M E M B E R D A T A

MEMBER NAME	NODE NAME I-END	NODE NAME J-END	MAT TYPE	SECT TYPE	INTENS FACTOR I-END	INTENS FACTOR J-END	REF TEMP	RELEASE CODE I-END	RELEASE CODE J-END	MEMBER LENGTH	CURVE RADIUS	INTERSECTION X-GLOBAL	INTERSECTION Y-GLOBAL	INTERSECTION Z-GLOBAL	INTER ANGLE	MEMBER NUMBER
1	15	1	1	1	1.000	1.000	70.0	0	0	50.00						1
2	1	7	1	1	1.000	1.000	70.0	0	0	48.63						2
3	7	6	1	1	1.000	1.000	70.0	0	0	8.63						3
4	6	5	1	1	1.000	1.000	70.0	0	0	8.63						4
5	5	4	1	1	1.000	1.000	70.0	0	0	48.63						5
6	4	18	1	1	1.000	1.000	70.0	0	0	50.00						6
7	16	2	1	1	1.000	1.000	70.0	0	0	50.00						7
8	2	10	1	1	1.000	1.000	70.0	0	0	48.63						8
9	10	11	1	1	1.000	1.000	70.0	0	0	8.63						9
10	11	12	1	1	1.000	1.000	70.0	0	0	8.63						10
11	12	3	1	1	1.000	1.000	70.0	0	0	48.63						11
12	3	17	1	1	1.000	1.000	70.0	0	0	50.00						12
13	12	13	1	1	1.000	1.000	70.0	0	0	8.63						13
14	13	14	1	1	1.000	1.000	70.0	0	0	10.00						14
15	14	5	1	1	1.000	1.000	70.0	0	0	8.63						15
16	7	8	1	1	1.000	1.000	70.0	0	0	8.63						16
17	8	9	1	1	1.000	1.000	70.0	0	0	10.00						17
18	9	10	1	1	1.000	1.000	70.0	0	0	8.63						18

MEMBER LENGTH - DIRECTION INFORMATION

MEMBER NAME	I NODE NAME	J NODE NAME	***DELTA MEMBER LENGTHS*** X	Y	Z	CROSS SECTION DESCRIPTION
1 *	15 *	1 *	0.00	50.00	0.00	
2 *	1 *	7 *	0.00	48.63	0.00	
3 *	7 *	6 *	0.00	0.00	8.63	
4 *	6 *	5 *	0.00	0.00	8.63	
5 *	5 *	4 *	0.00	-48.63	0.00	
6 *	4 *	18 *	0.00	-50.00	0.00	
7 *	16 *	2 *	0.00	50.00	0.00	
8 *	2 *	10 *	0.00	48.63	0.00	
9 *	10 *	11 *	0.00	0.00	8.63	
10 *	11 *	12 *	0.00	0.00	8.63	
11 *	12 *	3 *	0.00	-48.63	0.00	
12 *	3 *	17 *	0.00	-50.00	0.00	
13 *	12 *	13 *	-8.63	0.00	0.00	
14 *	13 *	14 *	-10.00	0.00	0.00	
15 *	14 *	5 *	-8.63	0.00	0.00	
16 *	7 *	8 *	8.63	0.00	0.00	
17 *	8 *	9 *	10.00	0.00	0.00	
18 *	9 *	10 *	8.63	0.00	0.00	

F R E Q U E N C Y A N A L Y S I S

OVERALL PROBLEM SIZE

TOTAL NUMBER OF EQUATIONS	84
HALF BANDWIDTH OF STIFFNESS	24
NUMBER OF EQUATION BLOCKS	2
NUMBER OF EQUATIONS PER BLOCK	43
NUMBER OF MODES REQUIRED.(EST.)	5
CUT-OFF FREQUENCY	200.00
TOTAL MODES TO CUT-OFF FREQUENCY	12
NODAL WT./GEN. MASS PRINT CODE (MWPRNT)	0

PRINT NODAL WT. SUMMARY AND GEN. MASS = 0
SUPPRESS GEN. MASS PRINT = 1
SUPPRESS NODAL WT. SUMMARY PRINT = 2
SUPPRESS BOTH OF ABOVE PRINTS = 3

THE OUT OF CORE SUBSPACE ITERATION ALGORITHM WITH A MAXIMUM ALLOWABLE NUMBER OF ITERATIONS PER GROUP OF 16 IS CHOSEN.
SUBSPACE ITERATION WAS USER REQUESTED.
AN IN CORE SOLUTION WOULD REQUIRE A VALUE OF ABOUT 4372 FOR *MTOT*.

STORAGE ESTIMATES

THE FOLLOWING CONTROL PARAMETERS ARE EITHER USER SUPPLIED OR INTERNALLY ESTIMATED ARE USED TO CALCULATE ESTIMATES OF THE MINIMUM VALUE OF *MTOT*, THE PROGRAM STORAGE PARAMETER, AND THE CORRESPONDING CORE FIELD LENGTH SPECIFICATION REQUIRED FOR THE USERS JOB CARD...

NUMBER OF NODAL POINTS (NUMNP)	18
NUMBER OF DYNAMIC NODAL RESTRAINTS (NODREA)	24
NUMBER OF NON-GLOBAL NODES (NNG)	0
NUMBER OF MODES (NM)	5
NUMBER OF EQUATIONS PER BLOCK (NEQB)	43
NUMBER OF SPECTRAL CURVES INPUT (NSC)	1
NUMBER OF MODAL TIME STEPS (NT)	100
NUMBER OF FORCING FUNCTIONS (NFN)	1

EMPLOYING THE ABOVE PARAMETERS,THE FOLLOWING VALUES FOR MTOT AND CORE ARE ESTIMATED...

	MTOT (DECIMAL)	CORE (OCTAL)
RESPONSE SPECTRUM ANALYSIS	822	001466
TIME HISTORY MODAL	601	001131
STRUCTURAL PLOTTING	539	001033
CREATE OR READ RESTART TAPE	722	001322

N O D A L W E I G H T S U M M A R Y

NODE NAME	RESTRAINT CODE	X TRANSLATION	Y TRANSLATION	Z TRANSLATION
1 *	000000	17.272	17.272	17.272
2 *	000000	17.272	17.272	17.272
3 *	000000	17.272	17.272	17.272
4 *	000000	17.272	17.272	17.272
5 *	000000	16.720	16.720	16.720
6 *	000000	3.454	3.454	3.454
7 *	000000	16.720	16.720	16.720
8 *	000000	3.454	3.454	3.454
9 *	000000	3.454	3.454	3.454
10 *	000000	16.720	16.720	16.720
11 *	000000	3.454	3.454	3.454
12 *	000000	16.720	16.720	16.720
13 *	000000	3.454	3.454	3.454
14 *	000000	3.454	3.454	3.454
15 *	111111	0.000	0.000	0.000
16 *	111111	0.000	0.000	0.000
17 *	111111	0.000	0.000	0.000
18 *	111111	0.000	0.000	0.000

F R E Q U E N C Y D I S T R I B U T I O N B Y G R O U P

SUBSPACE GROUP	NO. MODES IN GROUP	LOWER BOUND HERTZ	LOWER BOUND EIGENVALUE	UPPER BOUND HERTZ	UPPER BOUND EIGENVALUE
1	4	0.000	0.	41.458	.6785E+05
2	4	41.458	.6785E+05	43.301	.7402E+05

FREQUENCY AND CONVERGENCE DATA - SUBSPACE ITERATION

GROUP	NO. MODES	ITERATIONS	SHIFT EIGENVALUE	MODE	CIRCULAR FREQUENCY (RAD/SEC)	FREQUENCY (HZ)	PERIOD (SEC)	FREQUENCY TOLERANCE	MODE TOLERANCE	//K*Ø// 2	//K*Ø-EIG *M*Ø// MAX	K*Ø OF MAX NORM
1	4	21	.339268E+05	1	54.7389	8.7120	.1148	.5216E-08	.2984E-03	.5741E+03	.6791E-01	.7062E-01
				2	55.3312	8.8062	.1136	.4180E-07	.8541E-03	.5868E+03	.2458E+00	-.2536E+00
				3	110.0052	17.5079	.0571	.1154E-12	.4497E-06	.2424E+04	.5151E-03	.3263E+03
				4	253.6323	40.3668	.0248	.6821E-08	.3434E-04	.1359E+05	.2056E+00	.6794E+04
2	4	3	.709378E+05	5	261.5465	41.6264	.0240	.6807E-14	.2556E-08	.1446E+05	.1850E-04	.1428E+00

G E N E R A L I Z E D M A S S M A T R I X

	1	2	3	4	5
1	1.00000	.00000	.00000	.00000	-.00000
2	.00000	1.00000	.00000	-.00000	.00000
3	.00000	.00000	1.00000	.00000	.00000
4	.00000	-.00000	.00000	1.00000	-.00000
5	-.00000	.00000	.00000	-.00000	1.00000

MAXIMUM VALUE OF OFF DIAGONAL TERMS = .721E-06
MODE SHAPE NUMBER.. 5
ROW NUMBER..... 4

MAXIMUM ABSOLUTE DIFFERANCE BETWEEN DIAGONAL AND 1 = .35527E-13
MODE SHAPE NUMBER.. 3

F R E Q U E N C Y E R R O R E S T I M A T E S U M M A R Y - S U B S P A C E I T E R A T I O N

CONDITIONING NUMBER = .5190E+06

SUMMARY OF WARNINGS

-NONE-

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 5 MODES PRINTED)

MODE SHAPE NUMBER... 1
FREQUENCY (HZ)..... 8.7120 MAX. NORMALIZING COMPONENT..... 1.92055

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	-.49850	-.00107	.00001	-.00000	-.00000	.01455	GLOBAL
2 *	-.49850	.00107	.00001	-.00000	-.00000	.01455	GLOBAL
3 *	-.49850	.00107	.00001	-.00000	.00000	.01455	GLOBAL
4 *	-.49850	-.00107	.00001	-.00000	.00000	.01455	GLOBAL
5 *	-.99990	-.00212	-.00000	-.00000	.00001	.00241	GLOBAL
6 *	-1.00000	-.00212	-.00000	.00000	-.00000	.00241	GLOBAL
7 *	-.99990	-.00212	-.00000	-.00000	-.00001	.00241	GLOBAL
8 *	-.99991	.00386	.00002	-.00000	.00000	-.00037	GLOBAL
9 *	-.99991	-.00386	-.00002	-.00000	.00000	-.00037	GLOBAL
10 *	-.99990	.00212	-.00000	-.00000	-.00001	.00241	GLOBAL
11 *	-1.00000	.00212	-.00000	.00000	-.00000	.00241	GLOBAL
12 *	-.99990	.00212	-.00000	-.00000	.00001	.00241	GLOBAL
13 *	-.99991	-.00386	.00002	-.00000	-.00000	-.00037	GLOBAL
14 *	-.99991	.00386	-.00002	-.00000	-.00000	-.00037	GLOBAL
15 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
16 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
17 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
18 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 5 MODES PRINTED)

MODE SHAPE NUMBER... 2
FREQUENCY (HZ)..... 8.8062 MAX. NORMALIZING COMPONENT..... 1.91718

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	-.00003	.00175	.50432	.01465	-.00001	-.00000	GLOBAL
2 *	-.00003	.00175	.50431	.01465	.00001 -	-.00000	GLOBAL
3 *	-.00003	-.00175	.50432	.01465	.00001	-.00000	GLOBAL
4 *	-.00003	-.00175	.50431	.01465	-.00001	.00000	GLOBAL
5 *	.00001	-.00346	.99966	.00198	-.00002	-.00000	GLOBAL
6 *	.00001	.00000	.99966	-.00012	.00001	-.00000	GLOBAL
7 *	.00002	.00346	.99966	.00198	-.00002	-.00000	GLOBAL
8 *	.00002	.00346	1.00000	.00198	-.00003	.00000	GLOBAL
9 *	.00001	.00346	1.00000	.00198	.00003	-.00000	GLOBAL
10 *	.00001	.00346	.99966	.00198	.00002	-.00000	GLOBAL
11 *	.00001	-.00000	.99966	-.00012	-.00001	-.00000	GLOBAL
12 *	.00002	-.00346	.99966	.00198	.00002	-.00000	GLOBAL
13 *	.00001	-.00346	1.00000	.00198	.00003	.00000	GLOBAL
14 *	.00001	-.00346	1.00000	.00198	-.00003	-.00000	GLOBAL
15 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
16 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
17 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
18 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 5 MODES PRINTED)

MODE SHAPE NUMBER... 3
FREQUENCY (HZ)..... 17.5079 MAX. NORMALIZING COMPONENT..... 1.66520

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	-.36221	.00069	.58257	.01481	.03625	.00920	GLOBAL
2 *	-.36221	-.00069	-.58257	-.01481	.03625	.00920	GLOBAL
3 *	.36221	.00069	-.58257	-.01481	.03625	-.00920	GLOBAL
4 *	.36221	-.00069	.58257	.01481	.03625	-.00920	GLOBAL
5 *	.62131	-.00136	.99998	.00111	.07150	-.00068	GLOBAL
6 *	.00000	.00000	1.00000	-.00016	.07221	-.00000	GLOBAL
7 *	-.62131	.00136	.99998	.00111	.07150	.00068	GLOBAL
8 *	-.62133	.00210	.37094	.00041	.07384	-.00028	GLOBAL
9 *	-.62133	-.00210	-.37094	-.00041	.07384	-.00028	GLOBAL
10 *	-.62131	-.00136	-.99998	-.00111	.07150	.00068	GLOBAL
11 *	.00000	-.00000	-1.00000	.00016	.07221	-.00000	GLOBAL
12 *	.62131	.00136	-.99998	-.00111	.07150	-.00068	GLOBAL
13 *	.62133	.00210	-.37094	-.00041	.07384	.00028	GLOBAL
14 *	.62133	-.00210	.37094	.00041	.07384	.00028	GLOBAL
15 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
16 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
17 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
18 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 5 MODES PRINTED)

MODE SHAPE NUMBER... 4
FREQUENCY (HZ)..... 40.3668 MAX. NORMALIZING COMPONENT..... 2.36273

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	-.99979	-.00010	-.00000	-.00000	-.00000	.00347	GLOBAL
2 *	.99994	-.00010	.00006	-.00000	.00000	-.00347	GLOBAL
3 *	1.00000	-.00010	.00004	-.00000	-.00000	-.00347	GLOBAL
4 *	-.99983	-.00010	.00009	-.00000	.00000	.00347	GLOBAL
5 *	-.00061	-.00020	-.00002	-.00000	.00000	-.01715	GLOBAL
6 *	-.00061	-.00020	-.00002	.00000	.00000	-.01715	GLOBAL
7 *	-.00061	-.00020	-.00002	.00000	-.00000	-.01715	GLOBAL
8 *	-.00024	-.10176	-.00002	-.00000	-.00000	-.00634	GLOBAL
9 *	.00018	-.10176	-.00002	-.00000	.00000	.00634	GLOBAL
10 *	.00055	-.00020	-.00002	-.00000	.00000	.01715	GLOBAL
11 *	.00055	-.00019	-.00002	.00000	.00000	.01715	GLOBAL
12 *	.00055	-.00019	-.00002	-.00000	-.00000	.01716	GLOBAL
13 *	.00018	-.10176	-.00002	-.00000	-.00000	.00634	GLOBAL
14 *	-.00024	-.10176	-.00002	-.00000	.00000	-.00634	GLOBAL
15 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
16 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
17 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
18 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 5 MODES PRINTED)

MODE SHAPE NUMBER... 5
FREQUENCY (HZ)..... 41.6264 MAX. NORMALIZING COMPONENT..... 2.36453

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	.00002	-.00003	-1.00000	-.00247	.00000	-.000 00	GLOBAL
2 *	-.00002	-.00003	-1.00000	-.00247	-.00000	.000 00	GLOBAL
3 *	-.00002	-.00003	1.00000	.00247	.00000	.000 00	GLOBAL
4 *	.00002	-.00003	1.00000	.00247	-.00000	-.000 00	GLOBAL
5 *	.00000	-.00006	.00041	-.01318	-.00000	.000 00	GLOBAL
6 *	.00000	-.05697	-.00000	-.00000	.00000	.000 00	GLOBAL
7 *	.00000	-.00006	-.00041	.01318	.00000	.000 00	GLOBAL
8 *	.00000	-.00006	-.00041	.01318	.00000	.000 00	GLOBAL
9 *	-.00000	-.00006	-.00041	.01318	-.00000	-.000 00	GLOBAL
10 *	-.00000	-.00006	-.00041	.01318	-.00000	-.000 00	GLOBAL
11 *	-.00000	-.05697	-.00000	.00000	.00000	-.000 00	GLOBAL
12 *	-.00000	-.00006	.00041	-.01318	.00000	-.000 00	GLOBAL
13 *	-.00000	-.00006	.00041	-.01318	.00000	-.000 00	GLOBAL
14 *	.00000	-.00006	.00041	-.01318	-.00000	.000 00	GLOBAL
15 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.000 00	GLOBAL
16 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.000 00	GLOBAL
17 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.000 00	GLOBAL
18 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.000 00	GLOBAL

S P E C T R A L C U R V E D A T A

IDENT NUMBER 1
CURVE TITLE .....
CURVE TYPE ..... PERIOD VS. ACCELERATION
CURVE SCALE ..... LINEAR
NUMBER OF POINTS .. 11

POINT	PERIOD (SECS)	ACCELERATION (G)	***** COMMENT ******
1	.0017	.3753	R.C.DIVIDED BY 386.4
2	.0286	.9834	
3	.0580	2.0057	
4	.0710	2.0057	
5	.0910	1.1387	
6	.1140	3.0745	
7	.1410	3.0745	
8	.1720	1.8116	
9	.2000	2.2541	
10	.2500	2.2541	
11	.3230	1.0352	

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

MODE NUMBER	PARTICIPATION FACTORS X DIR	Y DIR	Z DIR
1	-.607	.000	.000
2	-.000	-.000	.607
3	-.000	-.000	-.000
4	.000	-.009	.000
5	.000	-.002	.000

R E S P O N S E S P E C T R U M A N A L Y S I S

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TITLE..................... RESPONSE SPECT.
FILE LABEL................ GILES
SPECTRAL CURVES
  X-DIRECTION.............    1
  Y-DIRECTION.............    1
  Z-DIRECTION.............    1
CURVE SCALE FACTORS
  X-SCALE.................    1.000
  Y-SCALE.................     .667
  Z-SCALE.................    1.000


SPECTRA COMBINATION CODE... VECTORIAL SUM
MODE COMBINATION CODE...... MODIFIED NRC 10 PERCENT METHOD WITH FR= .1
NODAL PRINT THRESHOLD (G)
  VERTICAL ACCELERATION....    0
  HORIZONTAL ACCELERATION..    0
SAVE RESULTS PARAMETER.....    0
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A P P L I E D S P E C T R A L A C C E L E R A T I O N S U M M A R Y RESPONSE SPECT.

FREQUENCY NUMBER	PERIOD (SEC)	ZONE NUMBER	SPECTRAL ACCELERATIONS (G) X TRANS	Y TRANS	Z TRANS	XX ROT	YY ROT	ZZ ROT
1	.115	1	3.075	2.050	3.075			
2	.114	1	3.037	2.025	3.037			
3	.057	1	1.975	1.317	1.975			
4	.025	1	.897	.598	.897			
5	.024	1	.880	.587	.880			

N O D A L A C C E L E R A T I O N S

NODE NAME	****** ACCELERATIONS ******* X-GLOBAL (G)	Y-GLOBAL (G)	Z-GLOBAL (G)	******* THRESHOLD ACCELERATIONS ******* VERTICAL (G)	EXCEED	HORIZONTAL (G)	EXCEED	
1 *	1.786	.010	1.784	.010	YES	2.524	YES	GLOBAL
2 *	1.786	.010	1.784	.010	YES	2.524	YES	GLOBAL
3 *	1.786	.010	1.784	.010	YES	2.524	YES	GLOBAL
4 *	1.786	.010	1.784	.010	YES	2.524	YES	GLOBAL
5 *	3.581	.020	3.536	.020	YES	5.033	YES	GLOBAL
6 *	3.582	.008	3.536	.008	YES	5.033	YES	GLOBAL
7 *	3.581	.020	3.536	.020	YES	5.033	YES	GLOBAL
8 *	3.581	.026	3.537	.026	YES	5.033	YES	GLOBAL
9 *	3.581	.026	3.537	.026	YES	5.033	YES	GLOBAL
10 *	3.581	.020	3.536	.020	YES	5.033	YES	GLOBAL
11 *	3.582	.008	3.536	.008	YES	5.033	YES	GLOBAL
12 *	3.581	.020	3.536	.020	YES	5.033	YES	GLOBAL
13 *	3.581	.026	3.537	.026	YES	5.033	YES	GLOBAL
14 *	3.581	.026	3.537	.026	YES	5.033	YES	GLOBAL
15 *	0.000	0.000	0.000	0.000	YES	0.000	YES	GLOBAL
16 *	0.000	0.000	0.000	0.000	YES	0.000	YES	GLOBAL
17 *	0.000	0.000	0.000	0.000	YES	0.000	YES	GLOBAL
18 *	0.000	0.000	0.000	0.000	YES	0.000	YES	GLOBAL

N O D A L D I S P L A C E M E N T S RESPONSE SPECT.

NODE NAME	NODAL TRANSLATIONS X	Y	Z	NODAL ROTATIONS XX	YY	ZZ	COORDINATE SYSTEM
1 *	.2303	.0013	.2251	.006539	.000007	.006721	GLOBAL
2 *	.2303	.0013	.2251	.006539	.000007	.006721	GLOBAL
3 *	.2303	.0013	.2251	.006539	.000007	.006721	GLOBAL
4 *	.2303	.0013	.2251	.006539	.000007	.006721	GLOBAL
5 *	.4618	.0025	.4462	.000886	.000015	.001113	GLOBAL
6 *	.4619	.0010	.4462	.000053	.000003	.001113	GLOBAL
7 *	.4618	.0025	.4462	.000886	.000015	.001113	GLOBAL
8 *	.4618	.0033	.4464	.000886	.000014	.000172	GLOBAL
9 *	.4618	.0033	.4464	.000886	.000014	.000172	GLOBAL
10 *	.4618	.0025	.4462	.000886	.000015	.001113	GLOBAL
11 *	.4619	.0010	.4462	.000053	.000003	.001113	GLOBAL
12 *	.4618	.0025	.4462	.000886	.000015	.001113	GLOBAL
13 *	.4618	.0033	.4464	.000886	.000014	.000172	GLOBAL
14 *	.4618	.0033	.4464	.000886	.000014	.000172	GLOBAL
15 *	0.0000	0.0000	0.0000	0.000000	0.000000	0.000000	GLOBAL
16 *	0.0000	0.0000	0.0000	0.000000	0.000000	0.000000	GLOBAL
17 *	0.0000	0.0000	0.0000	0.000000	0.000000	0.000000	GLOBAL
18 *	0.0000	0.0000	0.0000	0.000000	0.000000	0.000000	GLOBAL

F R E Q U E N C Y S P A C I N G N R C 10 P E R C E N T M E T H O D

FREQUENCY NUMBER	SPACING NUMBER	FREQUENCY (CPS)
1	1	8.7120
2	1	8.8062
3	2	17.5079
4	3	40.3668
5	3	41.6264

P I P E M E M B E R S T R E S S E S RESPONSE SPECT.

PIPE NAME	PIPE TYPE	NODAL PT NAME-END	SECTION DESCRIP	LOCAL X FORCE	LOCAL Y FORCE	LOCAL Z FORCE	LOCAL X MOMENT	LOCAL Y MOMENT	LOCAL Z MOMENT	BENDING STRESS	INTEN FACTR
1	*	15 -I		766.49	109.29	108.25	2.11	5135.40	5229.05	13072.95	1.00
1	*	1 -J		766.49	109.29	108.25	2.11	276.97	235.68	648.70	1.00
2	*	1 -I		766.32	78.47	77.45	2.11	276.97	235.68	648.70	1.00
2	*	7 -J		766.32	78.47	77.45	2.11	4042.60	4049.90	10206.88	1.00
3	*	7 -I		7.33	468.73	12.75	.08	73.95	4042.65	7212.12	1.00
3	*	6 -J		7.33	468.73	12.75	.08	36.02	.56	64.25	1.00
4	*	6 -I		7.34	468.70	12.74	.08	36.02	.56	64.25	1.00
4	*	5 -J		7.34	468.70	12.74	.08	73.93	4042.70	7212.21	1.00
5	*	5 -I		766.19	78.47	77.46	2.11	4042.73	4049.68	10206.75	1.00
5	*	4 -J		766.19	78.47	77.46	2.11	276.87	235.65	648.53	1.00
6	*	4 -I		766.36	109.29	108.24	2.11	276.87	235.65	648.53	1.00
6	*	18 -J		766.36	109.29	108.24	2.11	5135.31	5229.10	13072.90	1.00
7	*	16 -I		766.36	109.29	108.24	2.11	5135.28	5229.08	13072.85	1.00
7	*	2 -J		766.36	109.29	108.24	2.11	276.84	235.63	648.47	1.00
8	*	2 -I		766.19	78.46	77.46	2.11	276.84	235.63	648.47	1.00
8	*	10 -J		766.19	78.46	77.46	2.11	4042.76	4049.63	10206.74	1.00
9	*	10 -I		7.34	468.70	12.75	.08	73.94	4042.72	7212.25	1.00
9	*	11 -J		7.34	468.70	12.75	.08	36.02	.56	64.25	1.00
10	*	11 -I		7.33	468.73	12.75	.08	36.02	.56	64.25	1.00
10	*	12 -J		7.33	468.73	12.75	.08	73.97	4042.66	7212.15	1.00
11	*	12 -I		766.32	78.47	77.45	2.11	4042.63	4049.94	10206.96	1.00
11	*	3 -J		766.32	78.47	77.45	2.11	276.95	235.70	648.69	1.00
12	*	3 -I		766.50	109.29	108.25	2.11	276.95	235.70	648.69	1.00
12	*	17 -J		766.50	109.29	108.25	2.11	5135.38	5229.06	13072.94	1.00
13	*	12 -I		18.93	297.26	13.45	.04	74.82	4050.00	7225.27	1.00
13	*	13 -J		18.93	297.26	13.45	.04	53.45	1486.15	2652.58	1.00
14	*	13 -I		6.56	297.26	1.23	.04	53.45	1486.15	2652.58	1.00
14	*	14 -J		6.56	297.26	1.23	.04	53.47	1486.49	2653.18	1.00
15	*	14 -I		18.93	297.17	13.44	.04	53.47	1486.49	2653.18	1.00
15	*	5 -J		18.93	297.17	13.44	.04	74.79	4049.61	7224.56	1.00

P I P E M E M B E R S T R E S S E S (CONTINUED) RESPONSE SPECT.

PIPE NAME	PIPE TYPE	NODAL PT NAME-END	SECTION DESCRIP	LOCAL X FORCE	LOCAL Y FORCE	LOCAL Z FORCE	LOCAL X MOMENT	LOCAL Y MOMENT	LOCAL Z MOMENT	BENDING STRESS	INTEN FACTR
16	*	7 -I		18.93	297.26	13.45	.04	74.81	4049.97	7225.22	1.00
16	*	8 -J		18.93	297.26	13.45	.04	53.45	1486.14	2652.56	1.00
17	*	8 -I		6.56	297.26	1.23	.04	53.45	1486.14	2652.56	1.00
17	*	9 -J		6.56	297.26	1.23	.04	53.46	1486.48	2653.16	1.00
18	*	9 -I		18.93	297.17	13.45	.04	53.46	1486.48	2653.16	1.00
18	*	10 -J		18.93	297.17	13.45	.04	74.80	4049.58	7224.51	1.00

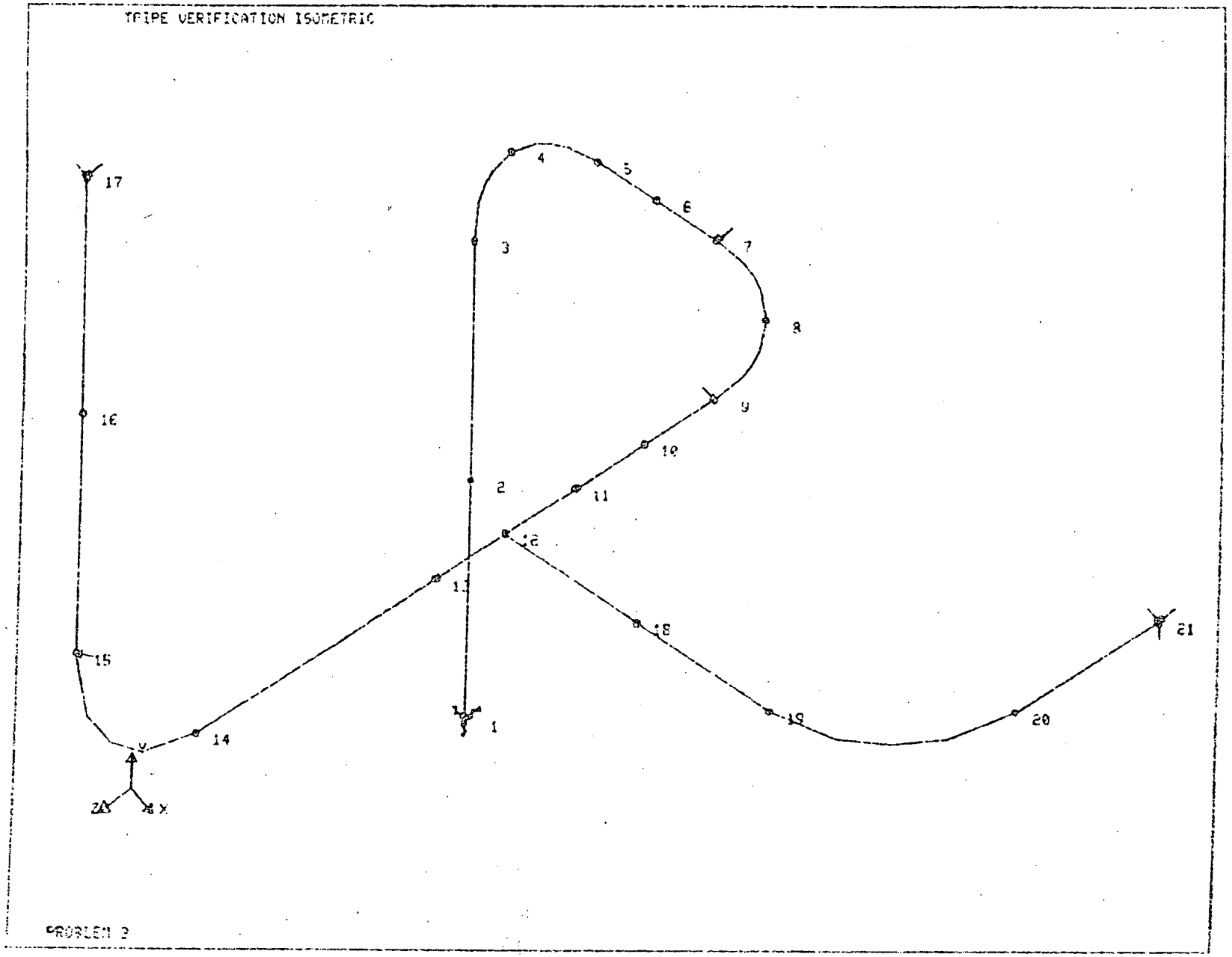
M A X I M U M P I P E M E M B E R S T R E S S E S RESPONSE SPECT.

	PIPE NAME	NODAL PT NAME-END	BENDING STRESS(PSI)
1-	1 *	15-I	13072.95
2-	12 *	17-J	13072.94
3-	6 *	18-J	13072.90
4-	7 *	16-I	13072.85
5-	11 *	12-I	10206.96
6-	2 *	7-J	10206.88
7-	5 *	5-I	10206.75
8-	8 *	10-J	10206.74
9-	13 *	12-I	7225.27
10-	16 *	7-I	7225.22

P I P I N G S Y S T E M R E A C T I O N S RESPONSE SPECT.

NODE NAME	SUPPORT CODE	X FORCE	Y FORCE	Z FORCE	X MOMENT	Y MOMENT	Z MOMENT	COORDINATE SYSTEM
15 *	111111	109.29	766.49	108.25	5135.40	2.11	5229.05	GLOBAL
16 *	111111	109.29	766.36	108.24	5135.28	2.11	5229.08	GLOBAL
17 *	111111	109.29	766.50	108.25	5135.38	2.11	5229.06	GLOBAL
18 *	111111	109.29	766.36	108.24	5135.31	2.11	5229.10	GLOBAL

BENCHMARK
PROBLEM 3


TPIPE VERIFICATION ISOMETRIC
17
4
5
6
7
3
8
16
9
10
2
11
12
13
18
21
15
1
19
20
14
Z
X
PROBLEM 2

```
00000000011111111112222222222333333333344444444445555555555666666666677777777778   CARD
12345678901234567890123456789012345678901234567890123456789012345678901234567890   NUMBER

TPIPE  VERIFICATION  N1-TPIPE   PROB. #3    RAGILES  X2159                  1TIT
TSI 41 Y            NONE       PLTPIP3   TTTRAG    441       DWHEELER
    6   21    1          1    1        20                    1  1 386.4
   101000     01100     0    1    1   10  .01  100       9000
 C01    1    3    4  C02        36.3       0.0   123.936        0.0
 C02  C01    4    5  C03        36.3    21.264     145.2        0.0
 C03  C02    7    8  C04        36.3    87.036     145.2        0.0
 C04  C03    8    9  C05        36.3     108.3     145.2     21.264
 C05  C04   14   15   17        36.3     108.3     145.2      225.1
 C06   12   19   20   21        36.3     224.6     145.2       97.8
   1        0.0       0.0        0.0
   2        0.0    54.450        0.0
   3
   4
   5
   6     54.150   145.200        0.0
   7
   8
   9
  10    108.300   145.200     56.800
  11    108.300   145.200     77.300
  12    108.300   145.200     97.800
  13    108.300   145.200    118.300
  14
  15
  16    108.300   236.000    225.100
  17    108.300   290.000    225.100
  18    148.300   145.200     97.800              586.5552
  19
  20
  21    224.600   145.200     20.000
  15 -.5025189 .5025189   .7035265
    2  17
    1  21
FLEX
   1      RR0.100E11RR0.100E11RR0.100E11RRRIGID   RRRIGID   RRRIGID
   7                          RR0.100E09
   9      RR0.100E09
  11                RR0.100E05
  13                RR0.100E05
  15      RR0.100E09
END
    1   24.0E06                          350.0
    1     7.288     .241      2.179
   1         1    2     1    1
   2         2    3
   3         3    4                                          C01
   4         4    5                                          C02
   5         5    6
   6         6    7
   7         7    8                                          C03
   8         8    9                                          C04
   9         9   10
  10        10   11
  11        11   12
```

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00000000011111111112222222222333333333344444444445555555555666666666677777777778   CARD
12345678901234567890123456789012345678901234567890123456789012345678901234567890  NUMBER

  12        12   13                                                                 56
  13        13   14                                                                 57
  14        14   15                                                C05              58
  15        15   16                                                                 59
  16        16   17                                                                 60
  17        12   18                                                                 61
  18        18   19                                                                 62
  19        19   20                                                C06              63
  20        20   21                                                                 64
    1             11                                                                65
 .1698E-02 .37525880R.C.DIVIDED BY 386.4                                            66
 .2860E-01 .98343685                                                                67
 .5800E-01 2.0056936                                                                68
 .7100E-01 2.0056936                                                                69
 .9100E-01 1.1387164                                                                70
 .1140E-00 3.0745342                                                                71
 .1410E-00 3.0745342                                                                72
 .1720E-00 1.8115942                                                                73
 .2000E-00 2.2541408                                                                74
 .2500E-00 2.2541408                                                                75
 .3230E-00 1.0351967                                                                76
 0       1    1    1  1.0.6667  1.0        GM     RESPONSE SPECT.GILES              77
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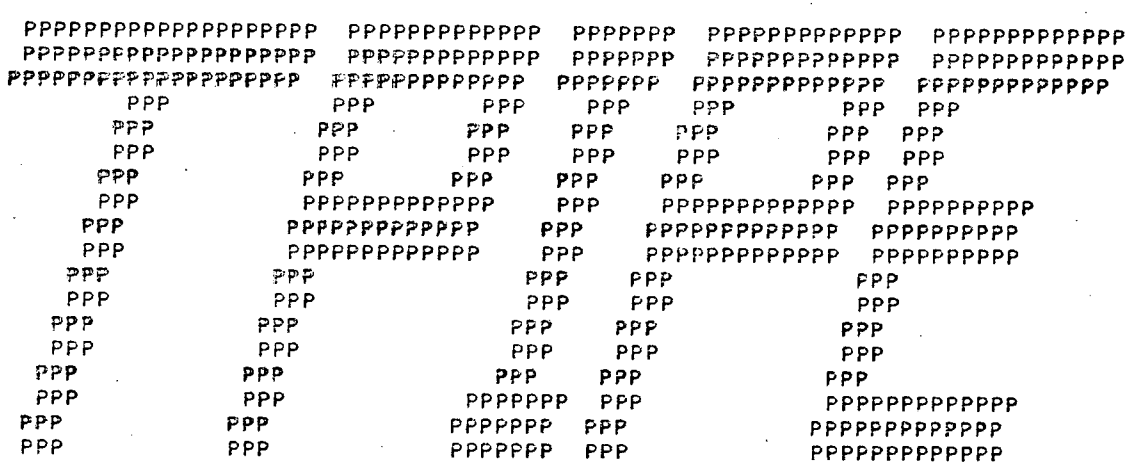


DEVELOPED JOINTLY BY

PMB SYSTEMS ENGINEERING
SAN FRANCISCO, CALIFORNIA, USA

TENNESSEE VALLEY AUTHORITY
KNOXVILLE, TENNESSEE, USA

******* 1976 ******

VERSION 4.4 MAY 1, 1981

EXECUTED AT 11.31.50. ON 07/20/81

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

PIPING SYSTEM GEOMETRY DEFINITION

NUMBER OF CONTROL POINTS	6
NUMBER OF NODAL POINTS	21
NUMBER OF NONGLOBAL COORDINATE SYSTEMS	1
NUMBER OF ADDITIONAL SUPPORT TYPES	0
NUMBER OF MATERIAL PROPERTY TYPES	1
NUMBER OF PIPE CROSS SECTION TYPES	1
NUMBER OF SPECIAL COMPONENT CROSS SECTIONS	0
NUMBER OF PIPE MEMBERS	20
NUMBER OF SPECIAL CONNECTIONS	0
NUMBER OF SPECIAL COMPONENTS	0
NUMBER OF DYNAMIC SPRINGS	0
NUMBER OF MULTIPLE EXCITATION ZONES	0
UNITS OF LENGTH AND WEIGHT	CONSISTENT
GRAVITY	386.40
NODAL POINT COORDINATE CHECK OPTION	NO

PROBLEM DEFINITION

EXECUTION MODE= 101000
1= STRUCTURAL DEFINITION IS FROM DATA CARDS
0= NORMAL DATA CHECKING RUN
1= ANALYSIS REQUESTED
0= NO STRUCTURAL PLOTTING REQUESTED
0= NO POSTPROCESSING REQUESTED
0= NO THERMAL TRANSIENT RESPONSE EXECUTION REQUESTED

ANALYSIS TYPES(01100) REQUESTED

FREQUENCY ANALYSIS

MAXIMUM NUMBER OF MODES REQUESTED	10
NUMBER OF SPRING SUPPORTS IN DYNAM MODEL	0
MINIMUM PERIOD OF HIGHEST MODE(SEC)	.0100
MAXIMUM FREQUENCY FOR MODE PRINTOUT(HZ)	100.0

RESPONSE SPECTRUM ANALYSIS

NUMBER OF SPECTRAL CURVES TO BE INPUT	1
NUMBER OF RESPONSE SPECTRUM LOAD CASES	1

PROGRAM STORAGE 9000

RESTART TAPE GENERATION OPTION.. NONE REQUESTED

C O N T R O L P O I N T S P E C I F I C A T I O N

CONTROL NAME	I-TAN POINT	*CURVE POINTS* I-END	J-END	J-TAN POINT	CURVE RADIUS	******** COORDINATES ******* X-GLOBAL	Y-GLOBAL	Z-GLOBAL	COMMENT
C01 *	1 *	3 *	4 *	C02 *	36.300	0.00	123.94	0.00	
C02 *	C01 *	4 *	5 *	C03 *	36.300	21.26	145.20	0.00	
C03 *	C02 *	7 *	8 *	C04 *	36.300	87.04	145.20	0.00	
C04 *	C03 *	8 *	9 *	C05 *	36.300	108.30	145.20	21.26	
C05 *	C04 *	14 *	15 *	17 *	36.300	108.30	145.20	225.10	
C06 *	12 *	19 *	20 *	21 *	36.300	224.60	145.20	97.80	

NODAL POINT DEFINITION

NODAL POINT	NODE NAME	******** COORDINATES ******* X-GLOBAL	Y-GLOBAL	Z-GLOBAL	LUMPED WEIGHT	DATA SOURCE	COMMENT
1	1 *	0.00	0.00	0.00	0.0	INPT	
2	2 *	0.00	54.45	0.00	0.0	INPT	
3	3 *	0.00	108.90	0.00	0.0	CP	
4	4 *	10.63	134.57	0.00	0.0	CP	
5	5 *	36.30	145.20	0.00	0.0	CP	
6	6 *	54.15	145.20	0.00	0.0	INPT	
7	7 *	72.00	145.20	0.00	0.0	CP	
8	8 *	97.67	145.20	10.63	0.0	CP	
9	9 *	108.30	145.20	36.30	0.0	CP	
10	10 *	108.30	145.20	56.80	0.0	INPT	
11	11 *	108.30	145.20	77.30	0.0	INPT	
12	12 *	108.30	145.20	97.80	0.0	INPT	
13	13 *	108.30	145.20	118.30	0.0	INPT	
14	14 *	108.30	145.20	108.80	0.0	CP	
15	15 *	108.30	181.50	225.10	0.0	CP	
16	16 *	108.30	236.00	225.10	0.0	INPT	
17	17 *	108.30	290.00	225.10	0.0	INPT	
18	18 *	148.30	145.20	97.80	586.6	INPT	
19	19 *	188.30	145.20	97.80	0.0	CP	
20	20 *	224.60	145.20	61.50	0.0	CP	
21	21 *	224.60	145.20	20.00	0.0	INPT	

N O N - G L O B A L C O O R D I N A T E S Y S T E M D E F I N I T I O N

NODE NAME	DIRECTION COSINES **** NON-GLOBAL XS-AXIS *** X	Y	Z	**** NON-GLOBAL YS-AXIS *** X	Y	Z	**** NON-GLOBAL ZS-AXIS *** X	Y	Z	COMMENT
15 *	-.5025	.5025	.7035	.2921	.8646	-.4089	-.8137	0.0000	-.5812	

S U P P O R T T Y P E L I B R A R Y

SUPPORT TYPE	***** RESTRAINT CODES ***** DYNAMIC	GRAVITY	THERMAL	COMMENT
1	111111	111111	111111	
2	111000	111000	111000	
3	111000	111000	101000	
4	111000	110000	110000	
5	111000	110000	100000	
6	111000	101000	101000	
7	111000	100000	100000	
8	111000	11000	11000	
9	111000	11000	1000	
10	111000	10000	10000	
11	111000	10000	0	
12	111000	1000	1000	
13	111000	0	0	
14	110000	110000	110000	
15	110000	110000	100000	
16	110000	100000	100000	
17	110000	10000	10000	
18	110000	10000	0	
19	110000	0	0	
20	101000	101000	101000	
21	101000	100000	100000	
22	101000	11000	1000	
23	101000	10000	0	
24	101000	1000	1000	
25	101000	0	0	
26	100000	110000	100000	
27	100000	100000	100000	
28	100000	10000	0	
29	100000	0	0	
30	11000	11000	11000	
31	11000	11000	1000	
32	11000	10000	10000	
33	11000	10000	0	
34	11000	1000	1000	
35	11000	0	0	
36	10000	10000	10000	
37	10000	10000	0	
38	10000	0	0	
39	1000	11000	1000	
40	1000	10000	0	
41	1000	1000	1000	
42	1000	0	0	
43	0	10000	0	

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

SUPPORT TYPE	RESTRAINED NODAL POINTS 1	2	3	4	5	6	7	8	9	10	11	12	13	14	*** RESTRAINT CODES *** DYNAMIC	GRAVITY	THERMAL	MOD
2	17	*	*	*	*	*	*	*	*	*	*	*	*	*	111000	111000	111000	1
1	21	*	*	*	*	*	*	*	*	*	*	*	*	*	111111	111111	111111	1

RESTRAINT SPECIFICATION. DEFAULT STIFFNESSES K(X),K(Y),K(Z)= 1.0E13 K(XX),K(YY),K(ZZ)= 1.0E15

NODE NAME	RESTRAINT TYPE	K(X)	RESTRAINT TYPE	K(Y)	RESTRAINT TYPE	K(Z)	RESTRAINT TYPE	K(XX)	RESTRAINT TYPE	K(YY)	RESTRAINT TYPE	K(ZZ)	*** RESTRAINT CODES *** DYNAMIC	GRAVITY	THERMAL	MOD
1	RR	0.100E11	RR	0.100E11	RR	0.100E11	RR	RIGID	RR	RIGID	RR	RIGID	222111	222111	222111	1
7					RR	0.100E09							2000	2000	2000	1
9	RR	0.100E09											200000	200000	200000	1
11			RR	0.100E05									20000	20000	20000	1
13			RR	0.100E05									20000	20000	20000	1
15	RR	0.100E09											200000	200000	200000	1

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

MATERIAL NUMBER	COLD ELASTIC MODULUS	POISSONS RATIO	THERMAL EXPANSION COEFFICIENT	INTERNAL PIPE PRESSURE	MEMBER TEMPERATURE	HOT ELASTIC MODULUS	COMMENT
1	24000000.0	.300	0.000000000	350.0	0.00	24000000.0	

PIPE MEMBER CROSS SECTION TYPES

SECTION NUMBER	OUTSIDE DIAMETER	WALL THICKNESS	AXIAL AREA	SHEAR AREA	FLEXURAL INERTIA	INPUT FLEXIBILITY	WEIGHT/ LENGTH	SECTION DESCRIPTION
1	7.288	.2410	5.34	2.67	33.2		2.18	

P I P E M E M B E R D A T A

MEMBER NAME	* NODE NAME * I-END	J-END	MAT TYPE	SECT TYPE	INTENS FACTOR I-END	J-END	REF TEMP	RELEASE CODE I-END	J-END	MEMBER LENGTH	CURVE RADIUS	******* INTERSECTION ******* X-GLOBAL	Y-GLOBAL	Z-GLOBAL	INTER ANGLE	MEMBER NUMBER
1 *	1 *	2 *	1	1	1.000	1.000	70.0	0	0	54.45						1
2 *	2 *	3 *	1	1	1.000	1.000	70.0	0	0	54.45						2
3 *	3 *	4 *	1	1	1.137	1.137	70.0	0	0	28.51	36.300	0.00	123.94	0.00	45.000	3
4 *	4 *	5 *	1	1	1.137	1.137	70.0	0	0	28.51	36.300	21.26	145.20	0.00	45.000	4
5 *	5 *	6 *	1	1	1.000	1.000	70.0	0	0	17.85						5
6 *	6 *	7 *	1	1	1.000	1.000	70.0	0	0	17.85						6
7 *	7 *	8 *	1	1	1.137	1.137	70.0	0	0	28.51	36.300	87.04	145.20	0.00	45.000	7
8 *	8 *	9 *	1	1	1.137	1.137	70.0	0	0	28.51	36.300	108.30	145.20	21.26	45.000	8
9 *	9 *	10 *	1	1	1.000	1.000	70.0	0	0	20.50						9
10 *	10 *	11 *	1	1	1.000	1.000	70.0	0	0	20.50						10
11 *	11 *	12 *	1	1	1.000	1.000	70.0	0	0	20.50						11
12 *	12 *	13 *	1	1	1.000	1.000	70.0	0	0	20.50						12
13 *	13 *	14 *	1	1	1.000	1.000	70.0	0	0	70.50						13
14 *	14 *	15 *	1	1	1.137	1.137	70.0	0	0	57.02	36.300	108.30	145.20	225.10	90.000	14
15 *	15 *	16 *	1	1	1.000	1.000	70.0	0	0	54.50						15
16 *	16 *	17 *	1	1	1.000	1.000	70.0	0	0	54.00						16
17 *	12 *	18 *	1	1	1.000	1.000	70.0	0	0	40.00						17
18 *	18 *	19 *	1	1	1.000	1.000	70.0	0	0	40.00						18
19 *	19 *	20 *	1	1	1.137	1.137	70.0	0	0	57.02	36.300	224.60	145.20	97.80	90.000	19
20 *	20 *	21 *	1	1	1.000	1.000	70.0	0	0	41.50						20

MEMBER LENGTH - DIRECTION INFORMATION

MEMBER NAME	I NODE NAME	J NODE NAME	***DELTA MEMBER LENGTHS*** X	Y	Z	CROSS SECTION DESCRIPTION
1 *	1 *	2 *	0.00	54.45	0.00	
2 *	2 *	3 *	0.00	54.45	0.00	
3 *	3 *	4 *	10.63	25.67	0.00	
4 *	4 *	5 *	25.67	10.63	0.00	
5 *	5 *	6 *	17.85	0.00	0.00	
6 *	6 *	7 *	17.85	0.00	0.00	
7 *	7 *	8 *	25.67	0.00	10.63	
8 *	8 *	9 *	10.63	0.00	25.67	
9 *	9 *	10 *	0.00	0.00	20.50	
10 *	10 *	11 *	0.00	0.00	20.50	
11 *	11 *	12 *	0.00	0.00	20.50	
12 *	12 *	13 *	0.00	0.00	20.50	
13 *	13 *	14 *	0.00	0.00	70.50	
14 *	14 *	15 *	0.00	36.30	36.30	
15 *	15 *	16 *	0.00	54.50	0.00	
16 *	16 *	17 *	0.00	54.00	0.00	
17 *	12 *	18 *	40.00	0.00	0.00	
18 *	18 *	19 *	40.00	0.00	0.00	
19 *	19 *	20 *	36.30	0.00	-36.30	
20 *	20 *	21 *	0.00	0.00	-41.50	

F R E Q U E N C Y A N A L Y S I S

OVERALL PROBLEM SIZE

TOTAL NUMBER OF EQUATIONS	114
HALF BANDWIDTH OF STIFFNESS	18
NUMBER OF EQUATION BLOCKS	2
NUMBER OF EQUATIONS PER BLOCK	58
NUMBER OF MODES REQUIRED.(EST.)	10
CUT-OFF FREQUENCY	100.00
TOTAL MODES TO CUT-OFF FREQUENCY	16
NODAL WT./GEN. MASS PRINT CODE (MWPRNT)	0

PRINT NODAL WT. SUMMARY AND GEN. MASS = 0
SUPPRESS GEN. MASS PRINT = 1
SUPPRESS NODAL WT. SUMMARY PRINT = 2
SUPPRESS BOTH OF ABOVE PRINTS = 3

THE OUT OF CORE SUBSPACE ITERATION ALGORITHM WITH A MAXIMUM ALLOWABLE NUMBER OF ITERATIONS PER GROUP OF 16 IS CHOSEN.
SUBSPACE ITERATION WAS USER REQUESTED.
AN IN CORE SOLUTION WOULD REQUIRE A VALUE OF ABOUT 4564 FOR *MTOT*.

STORAGE ESTIMATES

THE FOLLOWING CONTROL PARAMETERS ARE EITHER USER SUPPLIED OR INTERNALLY ESTIMATED ARE USED TO CALCULATE ESTIMATES OF THE MINIMUM VALUE OF *MTOT*, THE PROGRAM STORAGE PARAMETER, AND THE CORRESPONDING CORE FIELD LENGTH SPECIFICATION REQUIRED FOR THE USERS JOB CARD...

NUMBER OF NODAL POINTS (NUMNP)	21
NUMBER OF DYNAMIC NODAL RESTRAINTS (NODREA)	12
NUMBER OF NON-GLOBAL NODES (NNG)	1
NUMBER OF MODES (NM)	10
NUMBER OF EQUATIONS PER BLOCK (NEQB)	58
NUMBER OF SPECTRAL CURVES INPUT (NSC)	1
NUMBER OF MODAL TIME STEPS (NT)	100
NUMBER OF FORCING FUNCTIONS (NFN)	2

EMPLOYING THE ABOVE PARAMETERS,THE FOLLOWING VALUES FOR MTOT AND CORE ARE ESTIMATED...

	MTOT (DECIMAL)	CORE (OCTAL)
RESPONSE SPECTRUM ANALYSIS	1076	002064
TIME HISTORY MODAL	1212	002274
STRUCTURAL PLOTTING	967	001707
CREATE OR READ RESTART TAPE	778	001412

N O D A L W E I G H T S U M M A R Y

NODE NAME		RESTRAINT CODE	X TRANSLATION	Y TRANSLATION	Z TRANSLATION
1	*	000111	59.323	59.323	59.323
2	*	000000	118.647	118.647	118.647
3	*	000000	90.385	90.385	90.385
4	*	000000	62.123	62.123	62.123
5	*	000000	50.509	50.509	50.509
6	*	000000	38.895	38.895	38.895
7	*	000000	50.509	50.509	50.509
8	*	000000	62.123	62.123	62.123
9	*	000000	53.396	53.396	53.396
10	*	000000	44.670	44.670	44.670
11	*	000000	44.670	44.670	44.670
12	*	000000	88.250	88.250	88.250
13	*	000000	99.144	99.144	99.144
14	*	000000	138.933	138.933	138.933
15	*	000000	121.501	121.501	121.501
16	*	000000	118.211	118.211	118.211
17	*	111000	0.000	0.000	0.000
18	*	000000	673.715	673.715	673.715
19	*	000000	105.703	105.703	105.703
20	*	000000	107.337	107.337	107.337
21	*	111111	0.000	0.000	0.000

F R E Q U E N C Y D I S T R I B U T I O N B Y G R O U P

SUBSPACE GROUP	NO. MODES IN GROUP	LOWER BOUND HERTZ	LOWER BOUND EIGENVALUE	UPPER BOUND HERTZ	UPPER BOUND EIGENVALUE
1	3	8.839	.3084E+04	17.678	.1234E+05
2	4	17.678	.1234E+05	35.355	.4935E+05
3	3	35.355	.4935E+05	50.000	.9870E+05

F R E Q U E N C Y A N D C O N V E R G E N C E D A T A - S U B S P A C E I T E R A T I O N

GROUP	NO. MODES	ITERATIONS	SHIFT EIGENVALUE	MODE	CIRCULAR FREQUENCY (RAD/SEC)	FREQUENCY (HZ)	PERIOD (SEC)	FREQUENCY TOLERANCE	MODE TOLERANCE	//K*Ø// 2	//K*Ø-EIG *M*Ø// MAX	K*Ø OF MAX NORM
1	3	5	.771063E+04	1	58.8117	9.3602	.1068	.4851E-07	.7171E-04	.2418E+04	.1275E+00	-.1715E+04
				2	79.8341	12.7060	.0787	.4936E-11	.1064E-06	.7083E+04	.5659E-03	.3586E+03
				3	96.6182	15.3773	.0650	.1491E-10	.1165E-06	.9818E+04	.5934E-03	-.2101E+03
2	4	4	.308425E+05	4	111.8211	17.7969	.0562	.9310E-13	.2516E-07	.6760E+04	.1031E-03	-.4152E+03
				5	135.7367	21.6032	.0463	.6319E-13	.6443E-07	.1905E+05	.4531E-03	.1715E+04
				6	157.6977	25.0984	.0398	.1156E-11	.7431E-07	.2230E+05	.1097E-02	.2416E+04
				7	201.2795	32.0346	.0312	.2085E-08	.4928E-05	.2764E+05	.7346E-01	-.2347E+03
3	3	4	.740220E+05	8	239.1955	38.0692	.0263	.6918E-13	.1809E-07	.2976E+05	.1820E-03	-.9968E+03
				9	253.1679	40.2929	.0248	.6648E-12	.4573E-07	.5245E+05	.1278E-02	-.6682E+04
				10	307.2324	48.8975	.0205	.6236E-08	.1012E-04	.4988E+05	.2136E+00	.2638E+05

G E N E R A L I Z E D M A S S M A T R I X

	1	2	3	4	5	6	7	8	9	10
1	1.00000	-.00000	-.00000	-.00000	-.00000	-.00000	.00000	-.00000	-.00000	.00000
2	-.00000	1.00000	-.00000	.00000	.00000	.00000	-.00000	.00000	.00000	-.00000
3	-.00000	-.00000	1.00000	-.00000	-.00000	-.00000	.00000	.00000	-.00000	.00000
4	-.00000	.00000	-.00000	1.00000	.00000	-.00000	.00000	.00000	-.00000	.00000
5	-.00000	.00000	-.00000	.00000	1.00000	-.00000	-.00000	-.00000	-.00000	-.00000
6	-.00000	.00000	-.00000	-.00000	-.00000	1.00000	-.00000	.00000	-.00000	.00000
7	.00000	-.00000	.00000	.00000	-.00000	-.00000	1.00000	-.00000	.00000	-.00000
8	-.00000	.00000	.00000	.00000	-.00000	.00000	-.00000	1.00000	-.00000	.00000
9	-.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	-.00000	1.00000	.00000
10	.00000	-.00000	.00000	.00000	-.00000	.00000	-.00000	.00000	.00000	1.00000

MAXIMUM VALUE OF OFF DIAGONAL TERMS = .354E-05
MODE SHAPE NUMBER.. 9
ROW NUMBER..... 1

MAXIMUM ABSOLUTE DIFFERANCE BETWEEN DIAGONAL AND 1 = .85265E-13
MODE SHAPE NUMBER.. 2

F R E Q U E N C Y E R R O R E S T I M A T E S U M M A R Y - S U B S P A C E I T E R A T I O N

CONDITIONING NUMBER = .3767E+08

WARNING CONDITIONING NUMBER GREATER THAN .1E+08

SUMMARY OF WARNINGS

CONDITIONING NUMBER GREATER THAN

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 10 MODES PRINTED)

MODE SHAPE NUMBER... 1
FREQUENCY (HZ)..... 9.3602 MAX. NORMALIZING COMPONENT..... .74533

NODE NAME	*** NODAL TRANSLATIONS *** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	-.00000	.00000	.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	-.08742	.00013	.22171	.00713	.00405	.00285	GLOBAL
3 *	-.27987	.00025	.69269	.00932	.00810	.00392	GLOBAL
4 *	-.38253	.04289	.81992	.00620	.01072	.00395	GLOBAL
5 *	-.42296	.13785	.57296	.00671	.01478	.00337	GLOBAL
6 *	-.42293	.19573	.29767	.00614	.01605	.00308	GLOBAL
7 *	-.42288	.24766	-.00006	.00557	.01728	.00272	GLOBAL
8 *	-.24211	.24966	-.44878	.00474	.01503	.00163	GLOBAL
9 *	-.00003	.15826	-.57414	.00345	.00329	.00090	GLOBAL
10 *	.02128	.09352	-.57501	.00284	-.00080	.00032	GLOBAL
11 *	-.02795	.04236	-.57585	.00212	-.00359	-.00025	GLOBAL
12 *	-.12121	.00673	-.57664	.00139	-.00509	-.00083	GLOBAL
13 *	-.23987	-.01583	-.57716	.00085	-.00633	-.00158	GLOBAL
14 *	-.75895	-.02424	-.57865	-.00051	-.00763	-.00416	GLOBAL
15 *	.00002	-.00136	1.00000	-.00900	-.00261	.00210	NON-GLOBAL
16 *	-.43296	-.00058	-.36154	.00571	-.00678	-.00758	GLOBAL
17 *	0.00000	0.00000	0.00000	.00714	-.00678	-.00822	GLOBAL
18 *	-.12166	-.02073	-.38142	.00120	-.00521	-.00052	GLOBAL
19 *	-.12189	-.03503	-.15640	.00100	-.00563	-.00023	GLOBAL
20 *	-.01570	-.01100	-.00037	.00048	-.00101	-.00004	GLOBAL
21 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 10 MODES PRINTED)

MODE SHAPE NUMBER... 2
FREQUENCY (HZ)..... 12.7060 MAX. NORMALIZING COMPONENT..... .62945

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	-.00000	-.00000	-.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	-.04935	-.00049	-.01535	-.00056	-.00066	.00118	GLOBAL
3 *	-.07403	-.00097	-.06094	-.00113	-.00132	-.00084	GLOBAL
4 *	-.00128	-.04019	-.08217	-.00180	-.00158	-.00517	GLOBAL
5 *	.06861	-.22766	-.06065	-.00244	-.00173	-.00889	GLOBAL
6 *	.06850	-.39321	-.02970	-.00285	-.00171	-.00952	GLOBAL
7 *	.06839	-.56690	-.00001	-.00325	-.00158	-.00984	GLOBAL
8 *	.05143	-.78513	.03919	-.00396	-.00174	-.01011	GLOBAL
9 *	.00001	-.78177	.05946	-.00448	-.00204	-.01040	GLOBAL
10 *	-.04012	-.69127	.05929	-.00413	-.00182	-.01073	GLOBAL
11 *	-.07379	-.61534	.05911	-.00297	-.00141	-.01107	GLOBAL
12 *	-.09739	-.56758	.05893	-.00235	-.00084	-.01140	GLOBAL
13 *	-.12006	-.49517	.05882	-.00398	-.00129	-.01038	GLOBAL
14 *	-.22838	-.16981	.05837	-.00503	-.00146	-.00688	GLOBAL
15 *	.00002	-.00141	.13659	-.00189	-.00082	.00305	NON-GLOBAL
16 *	-.02114	-.00060	-.09243	.00101	-.00166	-.00082	GLOBAL
17 *	0.00000	0.00000	0.00000	.00203	-.00166	-.00020	GLOBAL
18 *	-.09728	-.97692	.05127	.00366	.00101	-.00599	GLOBAL
19 *	-.09683	-1.00000	-.00302	.00968	.00125	.00339	GLOBAL
20 *	-.05563	-.28491	.00035	.01121	-.00193	.00482	GLOBAL
21 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 10 MODES PRINTED)

MODE SHAPE NUMBER... 3
FREQUENCY (HZ)..... 15.3773 MAX. NORMALIZING COMPONENT..... .59355

NODE NAME	*** NODAL TRANSLATIONS *** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	-.00000	-.00000	.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	-.12351	-.00012	.05358	.00163	.00093	.00366	GLOBAL
3 *	-.32994	-.00025	.15251	.00177	.00185	.00329	GLOBAL
4 *	-.38595	.01810	.16753	.00121	.00246	.00091	GLOBAL
5 *	-.38769	.01342	.10703	.00088	.00300	-.00098	GLOBAL
6 *	-.38757	-.00772	.05286	.00077	.00301	-.00134	GLOBAL
7 *	-.38740	-.03415	.00006	.00066	.00284	-.00157	GLOBAL
8 *	-.33407	-.08456	-.10281	.00044	.00756	-.00178	GLOBAL
9 *	.00008	-.10693	-.21832	-.00019	.01796	-.00166	GLOBAL
10 *	.39216	-.10026	-.21732	-.00047	.01858	-.00161	GLOBAL
11 *	.74261	-.08783	-.21627	-.00073	.01397	-.00156	GLOBAL
12 *	.94670	-.06976	-.21519	-.00115	.00444	-.00151	GLOBAL
13 *	1.00000	-.03639	-.21484	-.00190	.00051	-.00044	GLOBAL
14 *	.57673	.08090	-.21336	-.00036	-.01149	.00321	GLOBAL
15 *	-.00006	.00225	.15558	-.00815	-.01459	-.00390	NON-GLOBAL
16 *	-.14287	.00095	-.00184	.00058	-.01671	-.00155	GLOBAL
17 *	0.00000	0.00000	0.00000	-.00021	-.01671	-.00314	GLOBAL
18 *	.94839	-.13951	-.12653	.00004	-.00677	-.00124	GLOBAL
19 *	.94526	-.15383	.18321	.00123	-.00576	.00632	GLOBAL
20 *	.48590	-.04698	-.00215	.00182	.01736	.00075	GLOBAL
21 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 10 MODES PRINTED)

MODE SHAPE NUMBER... 4
FREQUENCY (HZ)..... 17.7969 MAX. NORMALIZING COMPONENT..... 1.35344

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	.00000	.00000	-.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	.13658	.00148	-.07991	-.00218	-.00034	-.00349	GLOBAL
3 *	.25190	.00296	-.17965	-.00094	-.00067	.00055	GLOBAL
4 *	.13596	.06862	-.15622	.00209	-.00133	.00879	GLOBAL
5 *	.01970	.37321	-.07800	.00446	-.00213	.01343	GLOBAL
6 *	.01980	.61544	-.03915	.00575	-.00219	.01330	GLOBAL
7 *	.01990	.84596	.00001	.00704	-.00216	.01224	GLOBAL
8 *	.00357	1.00000	.04567	.01016	-.00103	.00667	GLOBAL
9 *	.00000	.74428	.05066	.01311	.00055	.00269	GLOBAL
10 *	.01442	.47475	.05080	.01273	.00072	.00055	GLOBAL
11 *	.02778	.22852	.05091	.01072	.00045	-.00159	GLOBAL
12 *	.03120	.04004	.05102	.00742	-.00025	-.00374	GLOBAL
13 *	.01971	-.07756	.05097	.00430	-.00083	-.00342	GLOBAL
14 *	-.00015	-.11567	.05069	-.00216	-.00165	-.00235	GLOBAL
15 *	.00001	-.00197	.09750	-.00087	-.00151	.00194	NON-GLOBAL
16 *	-.03403	-.00084	-.07462	.00074	-.00175	-.00068	GLOBAL
17 *	0.00000	0.00000	0.00000	.00167	-.00175	-.00061	GLOBAL
18 *	.03149	-.14720	.06034	.00698	.00014	-.00436	GLOBAL
19 *	.03157	-.27453	.03489	.00655	.00094	-.00208	GLOBAL
20 *	.00496	-.09578	.00018	.00398	.00030	-.00015	GLOBAL
21 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 10 MODES PRINTED)

MODE SHAPE NUMBER... 5
FREQUENCY (HZ)..... 21.6032 MAX. NORMALIZING COMPONENT..... 1.08269

NODE NAME	*** NODAL TRANSLATIONS *** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	.00000	.00000	.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	.08272	.00047	.39679	.01127	.00675	-.00219	GLOBAL
3 *	.17618	.00094	1.00000	.00916	.01349	-.00072	GLOBAL
4 *	.15769	.01464	.98164	.00329	.01769	.00214	GLOBAL
5 *	.12849	.09803	.52909	.00217	.01766	.00317	GLOBAL
6 *	.12838	.14568	.22984	.00216	.01498	.00294	GLOBAL
7 *	.12824	.19445	.00014	.00216	.00980	.00244	GLOBAL
8 *	.11970	.20719	-.04295	.00244	-.00377	.00038	GLOBAL
9 *	.00001	.14101	.00929	.00230	-.00360	-.00097	GLOBAL
10 *	-.05876	.09791	.01055	.00175	-.00198	-.00180	GLOBAL
11 *	-.07950	.07097	.01182	.00069	.00009	-.00263	GLOBAL
12 *	-.05387	.07117	.01307	-.00080	.00252	-.00346	GLOBAL
13 *	.02492	.10843	.01451	-.00251	.00486	-.00230	GLOBAL
14 *	.46986	.25456	.01942	.00117	.00582	.00169	GLOBAL
15 *	-.00010	.00430	-.59251	.00097	.00283	-.00719	NON-GLOBAL
16 *	.28099	.00183	.39427	-.00404	.00293	.00438	GLOBAL
17 *	0.00000	0.00000	0.00000	-.00877	.00293	.00558	GLOBAL
18 *	-.05457	-.09434	-.06435	.00071	.00087	-.00367	GLOBAL
19 *	-.05472	-.19336	-.05275	.00223	-.00107	-.00139	GLOBAL
20 *	-.01051	-.07593	-.00038	.00293	-.00057	.00038	GLOBAL
21 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 10 MODES PRINTED)

MODE SHAPE NUMBER... 6
FREQUENCY (HZ)..... 25.0984 MAX. NORMALIZING COMPONENT..... .72896

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	.00000	-.00000	.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	.09035	-.00053	.43406	.01172	.00705	-.00256	GLOBAL
3 *	.23267	-.00105	1.00000	.00717	.01411	-.00239	GLOBAL
4 *	.28744	-.02359	.89333	-.00048	.01842	-.00206	GLOBAL
5 *	.30912	-.07787	.40430	-.00118	.01594	-.00205	GLOBAL
6 *	.30868	-.11242	.14853	-.00086	.01153	-.00170	GLOBAL
7 *	.30814	-.13772	.00022	-.00055	.00385	-.00105	GLOBAL
8 *	.20269	-.12999	.17907	-.00037	-.01208	.00141	GLOBAL
9 *	.00017	-.10383	.29074	.00028	.00011	.00313	GLOBAL
10 *	.06648	-.11514	.29273	.00095	.00438	.00426	GLOBAL
11 *	.15697	-.14456	.29457	.00210	.00250	.00540	GLOBAL
12 *	.14721	-.20222	.29629	.00353	-.00533	.00653	GLOBAL
13 *	.01022	-.29913	.29483	.00541	-.00765	.00462	GLOBAL
14 *	-.57069	-.51903	.28879	-.00380	-.00618	-.00195	GLOBAL
15 *	.00016	-.00849	.59510	.00291	-.00245	.01300	NON-GLOBAL
16 *	-.27530	-.00362	-.55856	.00461	-.00066	-.00427	GLOBAL
17 *	0.00000	0.00000	0.00000	.01294	-.00066	-.00547	GLOBAL
18 *	.15112	.10083	.60152	.00040	-.00239	.00686	GLOBAL
19 *	.15299	.29859	.36802	-.00274	.01075	.00309	GLOBAL
20 *	-.06254	.13133	.00340	-.00496	-.00065	-.00048	GLOBAL
21 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 10 MODES PRINTED)

MODE SHAPE NUMBER... 7
FREQUENCY (HZ)..... 32.0346 MAX. NORMALIZING COMPONENT..... .78417

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	.00000	.00000	-.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	.23389	.00022	-.02496	-.00033	.00135	-.00561	GLOBAL
3 *	.43442	.00045	.00419	.00171	.00271	-.00082	GLOBAL
4 *	.37802	.03373	.05803	.00514	.00290	.00427	GLOBAL
5 *	.32892	.14427	.05721	.00838	.00218	.00343	GLOBAL
6 *	.32794	.19884	.02151	.01032	.00164	.00276	GLOBAL
7 *	.32678	.24344	-.00005	.01225	.00059	.00243	GLOBAL
8 *	.27551	.16554	.07332	.01479	-.00785	.00408	GLOBAL
9 *	.00006	-.15541	.17978	.01352	-.00976	.00354	GLOBAL
10 *	-.16530	-.41547	.17849	.01138	-.00537	.01194	GLOBAL
11 *	-.20913	-.61868	.17707	.00830	.00196	.01533	GLOBAL
12 *	-.07576	-.75101	.17552	.00391	.01176	.01673	GLOBAL
13 *	.20915	-.79912	.17631	.00073	.01477	.02053	GLOBAL
14 *	1.00000	-.45836	.17801	-.01037	.00169	.02672	GLOBAL
15 *	-.00007	-.00334	.38744	.00907	-.02182	-.00524	NON-GLOBAL
16 *	-.72982	-.00146	-.35806	.00264	-.01430	-.00450	GLOBAL
17 *	0.00000	0.00000	0.00000	.00843	-.01430	-.01759	GLOBAL
18 *	-.07919	.00935	-.33379	-.00210	.00695	.01799	GLOBAL
19 *	-.08087	.62254	-.27508	-.00811	-.00683	.01165	GLOBAL
20 *	.07556	.33428	-.00338	-.01249	.00128	.00096	GLOBAL
21 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

PIPING SYSTEM MODE SHAPES (LOWEST 10 MODES PRINTED)

MODE SHAPE NUMBER... 8
FREQUENCY (HZ)..... 38.0692 MAX. NORMALIZING COMPONENT..... .77611

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	-.00000	-.00000	.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	-.07311	-.00249	.12363	.00228	-.00128	.00116	GLOBAL
3 *	-.02949	-.00496	.11269	-.00342	-.00257	-.00339	GLOBAL
4 *	.13744	-.08763	-.04363	-.01077	-.00242	-.00923	GLOBAL
5 *	.24215	-.34144	-.11327	-.01578	-.00269	-.00983	GLOBAL
6 *	.24165	-.48471	-.05788	-.01868	-.00320	-.00688	GLOBAL
7 *	.24096	-.58596	-.00007	-.02159	-.00312	-.00453	GLOBAL
8 *	.19080	-.37435	.09972	-.02598	-.00608	-.00110	GLOBAL
9 *	.00006	.25120	.17498	-.02143	-.00633	-.00534	GLOBAL
10 *	-.10359	.64142	.17370	-.01559	-.00330	-.00901	GLOBAL
11 *	-.13015	.88221	.17224	-.00757	.00108	-.01268	GLOBAL
12 *	-.05599	.94480	.17060	.00230	.00638	-.01635	GLOBAL
13 *	.12369	.81556	.16915	.00973	.00995	-.01075	GLOBAL
14 *	.66175	-.15086	.16279	.00957	-.00057	.00854	GLOBAL
15 *	.00008	.00006	.46171	.00938	-.02547	.00250	NON-GLOBAL
16 *	-.79090	.00004	-.65069	.00327	-.01730	-.00429	GLOBAL
17 *	0.00000	0.00000	0.00000	.01602	-.01730	-.01933	GLOBAL
18 *	-.05838	.05842	-.05313	.00956	.00337	-.02633	GLOBAL
19 *	-.05896	-1.00000	-.08062	.01682	-.00122	-.02253	GLOBAL
20 *	.00219	-.59763	-.00102	.02200	-.00032	-.00387	GLOBAL
21 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

PIPING SYSTEM MODE SHAPES (LOWEST 10 MODES PRINTED)

MODE SHAPE NUMBER... 5
FREQUENCY (HZ)..... 40.2929 MAX. NORMALIZING COMPONENT..... .76516

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	-.00000	.00000	-.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	-.44372	.00112	-.05841	-.00109	.00011	.00053	GLOBAL
3 *	-.70451	.00223	-.06057	.00126	.00021	-.00059	GLOBAL
4 *	-.59638	-.04822	.00582	.00382	.00007	-.00450	GLOBAL
5 *	-.56989	-.05449	.04437	.00507	.00076	.00476	GLOBAL
6 *	-.56702	.05630	.02668	.00578	.00124	.00713	GLOBAL
7 *	-.56364	.19686	.00019	.00649	.00173	.00815	GLOBAL
8 *	-.45725	.33050	-.16432	.00814	.01501	.00768	GLOBAL
9 *	-.00039	.17193	-.35174	.00942	.01033	.00699	GLOBAL
10 *	.09947	-.01565	-.34792	.00631	.00027	.00695	GLOBAL
11 *	.02105	-.16215	-.34369	.00543	-.00694	.00690	GLOBAL
12 *	-.17371	-.23136	-.33906	.00070	-.01106	.00685	GLOBAL
13 *	-.21205	-.19503	-.34007	-.00371	.00571	.01098	GLOBAL
14 *	1.00000	.19352	-.34046	-.00241	.01408	.02518	GLOBAL
15 *	-.00009	.00461	.03889	.01031	-.01122	-.02104	NON-GLOBAL
16 *	-.73554	.00197	.22958	-.00031	-.00452	-.00168	GLOBAL
17 *	0.00000	0.00000	0.00000	-.00603	-.00452	-.01902	GLOBAL
18 *	-.17774	-.04217	.48142	-.00052	-.01322	.00404	GLOBAL
19 *	-.17557	.11746	.40498	-.00175	.01139	.00341	GLOBAL
20 *	-.30920	.08157	.00674	-.00294	-.00804	.00063	GLOBAL
21 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 10 MODES PRINTED)

MODE SHAPE NUMBER... 10
FREQUENCY (HZ)..... 48.8975 MAX. NORMALIZING COMPONENT..... .91035

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	.00000	.00000	-.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	1.00000	.00406	-.29391	-.00477	-.00150	-.01687	GLOBAL
3 *	.96576	.00807	-.24665	.00655	-.00300	.01754	GLOBAL
4 *	.23556	.33391	.07388	.01332	-.00350	.02937	GLOBAL
5 *	-.00249	.74043	.24090	.01260	.00312	-.00180	GLOBAL
6 *	-.00805	.59693	.15458	.01212	.00674	-.01332	GLOBAL
7 *	-.00961	.27207	-.00026	.01165	.01056	-.02173	GLOBAL
8 *	.07679	-.54993	-.27136	.00834	.00342	-.02777	GLOBAL
9 *	.00035	-.82197	-.26057	-.00948	-.00172	-.01953	GLOBAL
10 *	.01286	-.55074	-.26357	-.01613	.00153	-.01496	GLOBAL
11 *	.04716	-.17642	-.26610	-.01852	.00042	-.01028	GLOBAL
12 *	.01481	.18672	-.26818	-.01501	-.00486	-.00560	GLOBAL
13 *	-.04896	.44504	-.27227	-.00938	-.00149	-.00389	GLOBAL
14 *	.08107	.37872	-.28271	.00954	.00285	.00199	GLOBAL
15 *	.00012	.00854	.06607	.00444	-.00166	-.00580	NON-GLOBAL
16 *	-.33289	.00373	.02184	.00026	.00079	-.00038	GLOBAL
17 *	0.00000	0.00000	0.00000	-.00070	.00079	-.00078	GLOBAL
18 *	.01683	.02318	.13808	-.00966	-.00778	-.00358	GLOBAL
19 *	.01799	-.11215	.18888	-.00430	.00343	-.00260	GLOBAL
20 *	-.08719	-.10534	.00301	.00319	-.00176	.00049	GLOBAL
21 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

S P E C T R A L C U R V E D A T A

IDENT NUMBER 1
CURVE TITLE .....
CURVE TYPE ..... PERIOD VS. ACCELERATION
CURVE SCALE ..... LINEAR
NUMBER OF POINTS .. 11

POINT	PERIOD (SECS)	ACCELERATION (G)	***** COMMENT ******
1	.0017	.3753	R.C.DIVIDED BY 386.4
2	.0286	.9834	
3	.0580	2.0057	
4	.0710	2.0057	
5	.0910	1.1387	
6	.1140	3.0745	
7	.1410	3.0745	
8	.1720	1.8116	
9	.2000	2.2541	
10	.2500	2.2541	
11	.3230	1.0352	

MODAL PARTICIPATION FACTORS

MODE NUMBER	PARTICIPATION FACTORS X DIR	Y DIR	Z DIR
1	-1.004	.070	-.974
2	-.252	-1.832	.044
3	1.427	-.204	-.225
4	.201	.226	.051
5	.465	.028	.778
6	.131	-.093	1.337
7	.226	-.236	-.469
8	-.106	-.002	-.109
9	-.822	.018	.421
10	.455	.219	-.160

R E S P O N S E S P E C T R U M A N A L Y S I S

TITLE..... RESPONSE SPECT.
FILE LABEL..... GILES
SPECTRAL CURVES
X-DIRECTION..... 1
Y-DIRECTION..... 1
Z-DIRECTION..... 1
CURVE SCALE FACTORS
X-SCALE..... 1.000
Y-SCALE..... .667
Z-SCALE..... 1.000

SPECTRA COMBINATION CODE... VECTORIAL SUM
MODE COMBINATION CODE..... MODIFIED NRC GROUPING METHOD WITH FR= .1
NODAL PRINT THRESHOLD (G)
VERTICAL ACCELERATION.... 0
HORIZONTAL ACCELERATION.. 0
SAVE RESULTS PARAMETER..... 0

APPLIED SPECTRAL ACCELERATION SUMMARY RESPONSE SPECT.

FREQUENCY NUMBER	PERIOD (SEC)	ZONE NUMBER	SPECTRAL ACCELERATIONS (G) X TRANS	Y TRANS	Z TRANS	XX ROT	YY ROT	ZZ ROT
1	.107	1	2.472	1.648	2.472			
2	.079	1	1.672	1.115	1.672			
3	.065	1	2.006	1.337	2.006			
4	.056	1	1.943	1.295	1.943			
5	.046	1	1.599	1.066	1.599			
6	.040	1	1.374	.916	1.374			
7	.031	1	1.074	.716	1.074			
8	.026	1	.931	.621	.931			
9	.025	1	.898	.599	.898			
10	.020	1	.799	.533	.799			

N O D A L A C C E L E R A T I O N S

NODE NAME	****** ACCELERATIONS ****** X-GLOBAL (G)	Y-GLOBAL (G)	Z-GLOBAL (G)	******* THRESHOLD ACCELERATIONS ******* VERTICAL (G)	EXCEED	HORIZONTAL (G)	EXCEED	
1 *	.000	.000	.000	.000	YES	.000	YES	GLOBAL
2 *	.609	.002	1.040	.002	YES	1.206	YES	GLOBAL
3 *	1.194	.005	2.751	.005	YES	2.999	YES	GLOBAL
4 *	1.352	.191	2.898	.191	YES	3.198	YES	GLOBAL
5 *	1.426	.628	1.795	.628	YES	2.292	YES	GLOBAL
6 *	1.425	.913	.879	.913	YES	1.675	YES	GLOBAL
7 *	1.424	1.215	.000	1.215	YES	1.424	YES	GLOBAL
8 *	.975	1.483	1.209	1.483	YES	1.553	YES	GLOBAL
9 *	.000	1.300	1.603	1.300	YES	1.603	YES	GLOBAL
10 *	.702	1.070	1.605	1.070	YES	1.752	YES	GLOBAL
11 *	1.316	.942	1.607	.942	YES	2.077	YES	GLOBAL
12 *	1.688	.919	1.608	.919	YES	2.332	YES	GLOBAL
13 *	1.851	.910	1.609	.910	YES	2.452	YES	GLOBAL
14 *	2.600	.900	1.610	.900	YES	3.058	YES	GLOBAL
15 *	.000	.015	2.881					NON-GLOBAL
16 *	1.440	.006	1.382	.006	YES	1.996	YES	GLOBAL
17 *	0.000	0.000	0.000	0.000	YES	0.000	YES	GLOBAL
18 *	1.692	1.326	1.346	1.326	YES	2.162	YES	GLOBAL
19 *	1.687	1.486	.779	1.486	YES	1.859	YES	GLOBAL
20 *	.872	.486	.008	.486	YES	.872	YES	GLOBAL
21 *	0.000	0.000	0.000	0.000	YES	0.000	YES	GLOBAL

N O D A L D I S P L A C E M E N T S RESPONSE SPECT.

NODE NAME		NODAL TRANSLATIONS X	Y	Z	NODAL ROTATIONS XX	YY	ZZ	COORDINATE SYSTEM
1	*	.0000	.0000	.0000	0.000000	0.000000	0.000000	GLOBAL
2	*	.0274	.0001	.0660	.002105	.001200	.000574	GLOBAL
3	*	.0848	.0001	.2037	.002710	.002400	.001158	GLOBAL
4	*	.1139	.0129	.2395	.002370	.003172	.001228	GLOBAL
5	*	.1253	.0445	.1664	.001948	.004317	.001242	GLOBAL
6	*	.1253	.0660	.0862	.001791	.004663	.001208	GLOBAL
7	*	.1253	.0866	.0000	.001636	.004994	.001146	GLOBAL
8	*	.0741	.0980	.1296	.001421	.004374	.000952	GLOBAL
9	*	.0000	.0792	.1663	.001096	.001609	.000882	GLOBAL
10	*	.0290	.0626	.1665	.000925	.001361	.000876	GLOBAL
11	*	.0542	.0513	.1668	.000697	.001443	.000906	GLOBAL
12	*	.0766	.0459	.1670	.000483	.001511	.000969	GLOBAL
13	*	.0999	.0406	.1671	.000455	.001842	.000960	GLOBAL
14	*	.2241	.0215	.1675	.000441	.002361	.001349	GLOBAL
15	*	.0000	.0005	.2694	.002664	.001298	.000801	NON-GLOBAL
16	*	.1257	.0002	.1059	.001654	.002297	.002193	GLOBAL
17	*	0.0000	0.0000	0.0000	.002102	.002297	.002390	GLOBAL
18	*	.0768	.0788	.1111	.000475	.001581	.000555	GLOBAL
19	*	.0766	.0817	.0476	.000845	.001692	.000299	GLOBAL
20	*	.0354	.0236	.0002	.000929	.001285	.000388	GLOBAL
21	*	0.0000	0.0000	0.0000	0.000000	0.000000	0.000000	GLOBAL

F R E Q U E N C Y S P A C I N G N R C G R O U P I N G M E T H O D

FREQUENCY NUMBER	SPACING NUMBER	FREQUENCY (CPS)
1	1	9.3602
2	2	12.7060
3	3	15.3773
4	4	17.7969
5	5	21.6032
6	6	25.0984
7	7	32.0346
8	8	38.0692
9	8	40.2929
10	9	48.8975

PIPE MEMBER STRESSES RESPONSE SPECT.

PIPE NAME		PIPE TYPE	NODAL PT NAME-END	SECTION DESCRIP	LOCAL X FORCE	LOCAL Y FORCE	LOCAL Z FORCE	LOCAL X MOMENT	LOCAL Y MOMENT	LOCAL Z MOMENT	BENDING STRESS	INTEN FACTR
1	*		1 -I		154.40	209.16	463.32	13493.11	43125.37	18055.06	5347.59	1.00
1	*		2 -J		154.40	209.16	463.32	13493.11	18763.38	8095.38	2691.13	1.00
2	*		2 -I		154.22	159.84	362.83	13493.11	18763.38	8095.38	2691.13	1.00
2	*		3 -J		154.22	159.84	362.83	13493.11	4541.13	5560.54	1679.67	1.00
3	*	CURV	3 -I		153.93	100.60	207.06	13493.11	4541.13	5560.54	1679.67	1.14
3	*	CURV	-C		153.01	102.76	207.06	11639.43	8867.79	5797.73	1729.69	1.14
3	*	CURV	4 -J		138.99	121.27	207.06	7226.33	14591.21	5690.97	1895.54	1.14
4	*	CURV	4 -I		153.26	101.21	218.37	7226.33	14591.21	5690.97	1895.54	1.14
4	*	CURV	-C		135.19	123.97	218.37	1806.83	16676.93	5087.51	1926.37	1.14
4	*	CURV	5 -J		110.31	146.06	218.37	5823.51	16870.86	4671.47	2027.46	1.14
5	*		5 -I		158.35	119.12	262.48	5823.51	16870.86	4671.47	2027.46	1.00
5	*		6 -J		158.35	119.12	262.48	5823.51	18049.03	4859.61	2151.54	1.00
6	*		6 -I		205.08	87.29	282.23	5823.51	18049.03	4859.61	2151.54	1.00
6	*		7 -J		205.08	87.29	282.23	5823.51	20036.05	5438.90	2369.62	1.00
7	*	CURV	7 -I		270.61	1813.52	39.14	5823.51	5438.90	20036.05	2369.62	1.14
7	*	CURV	-C		611.62	1728.59	39.14	7308.32	3361.10	12499.08	1633.48	1.14
7	*	CURV	8 -J		1200.22	1386.20	39.14	7810.12	2256.47	31741.21	3600.82	1.14
8	*	CURV	8 -I		1140.24	1363.60	72.32	7810.12	2256.47	31741.21	3600.82	1.14
8	*	CURV	-C		1556.49	858.42	72.32	7153.77	3797.67	46905.28	5230.98	1.14
8	*	CURV	9 -J		1746.84	328.80	72.32	5333.90	6412.64	54075.23	6012.92	1.14
9	*		9 -I		1675.32	135.49	1040.55	5333.90	54075.23	6412.64	6012.92	1.00
9	*		10 -J		1675.32	135.49	1040.55	5333.90	39030.41	7912.31	4415.61	1.00
10	*		10 -I		1616.38	179.48	1020.24	5333.90	39030.41	7912.31	4415.61	1.00
10	*		11 -J		1616.38	179.48	1020.24	5333.90	31675.63	10607.66	3717.53	1.00
11	*		11 -I		1558.36	321.28	977.20	5333.90	31675.63	10607.66	3717.53	1.00
11	*		12 -J		1558.36	321.28	977.20	5333.90	35714.38	8878.13	4086.57	1.00
12	*		12 -I		1006.24	375.64	297.15	7467.09	19979.66	12249.42	2703.06	1.00
12	*		13 -J		1006.24	375.64	297.15	7467.09	16786.12	6414.30	2138.53	1.00
13	*		13 -I		887.75	144.02	229.64	7467.09	16786.12	6414.30	2138.53	1.00
13	*		14 -J		887.75	144.02	229.64	7467.09	8621.28	8547.10	1566.30	1.00
14	*	CURV	14 -I		746.90	94.39	237.50	7467.09	8621.28	8547.10	1566.30	1.14
14	*	CURV	-C		525.96	538.63	237.50	4260.26	5280.03	5259.86	943.41	1.14
14	*	CURV	15 -J		94.39	746.90	237.50	.00	7302.60	20717.58	2414.08	1.14

PIPE MEMBER STRESSES (CONTINUED) RESPONSE SPECT.

PIPE NAME	PIPE TYPE	NODAL PT NAME-END	SECTION DESCRIP	LOCAL X FORCE	LOCAL Y FORCE	LOCAL Z FORCE	LOCAL X MOMENT	LOCAL Y MOMENT	LOCAL Z MOMENT	BENDING STRESS	INTEN FACTR
15 *		15 -I		500.69	73.96	124.96	.00	20717.58	7302.60	2414.08	1.00
15 *		16 -J		500.69	73.96	124.96	.00	14378.60	7271.84	1770.73	1.00
16 *		16 -I		501.23	134.66	266.27	0.00	14378.60	7271.84	1770.73	1.00
16 *		17 -J		501.23	134.66	266.27	0.00	.00	.00	.00	1.00
17 *		12 -I		635.36	619.75	669.81	7607.84	25497.92	5243.69	2980.43	1.00
17 *		18 -J		635.36	619.75	669.81	7607.84	15525.70	20831.51	2975.07	1.00
18 *		18 -I		766.10	278.66	617.31	7607.84	15525.70	20831.51	2975.07	1.00
18 *		19 -J		766.10	278.66	617.31	7607.84	12402.39	9845.74	1930.66	1.00
19 *	CURV	19 -I		922.16	632.69	425.28	7607.84	9845.74	12402.39	1930.66	1.14
19 *	CURV	-C		1068.94	328.69	425.28	3269.06	1558.31	17791.01	1995.25	1.14
19 *	CURV	20 -J		632.69	922.16	425.28	5724.30	8126.28	9984.71	1548.32	1.14
20 *		20 -I		633.30	471.22	1011.76	5724.30	9984.71	8126.28	1548.32	1.00
20 *		21 -J		633.30	471.22	1011.76	5724.30	44680.24	27567.81	5803.79	1.00

MAXIMUM PIPE MEMBER STRESSES RESPONSE SPECT.

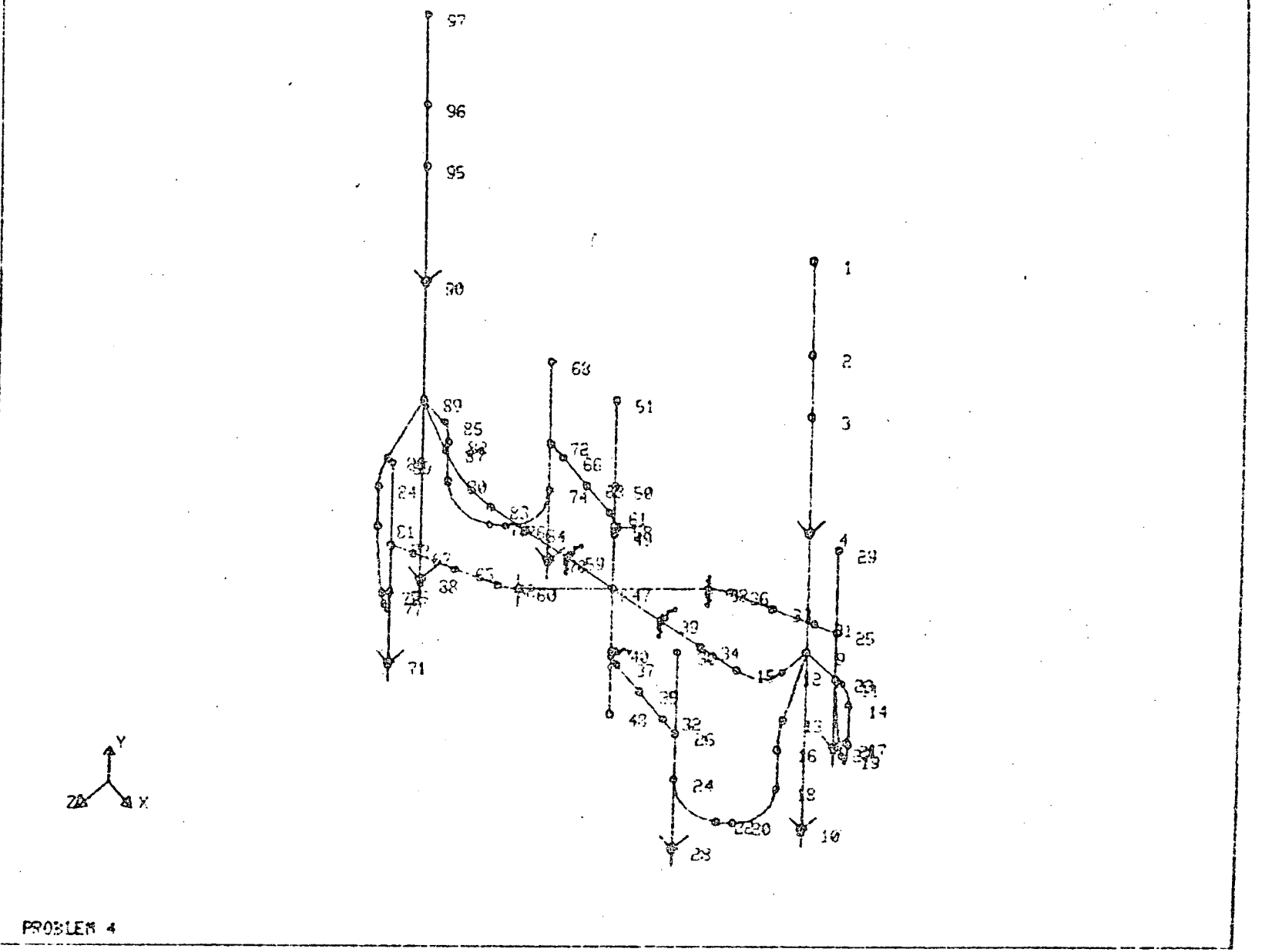
	PIPE NAME		NODAL PT NAME-END	BENDING STRESS(PSI)
1-	9	*	9-I	6012.92
2-	8	*	9-J	6012.92
3-	20	*	21-J	5803.79
4-	1	*	1-I	5347.59
5-	8	*	-C	5230.98
6-	8	*	-C	5230.98
7-	9	*	10-J	4415.61
8-	10	*	10-I	4415.61
9-	11	*	12-J	4086.57
10-	11	*	11-I	3717.53

P I P I N G S Y S T E M R E A C T I O N S RESPONSE SPECT.

NODE NAME		SUPPORT CODE	X FORCE	Y FORCE	Z FORCE	X MOMENT	Y MOMENT	Z MOMENT	COORDINATE SYSTEM
1	*	222111	209.16	154.40	463.32	43125.37	13493.11	18055.05	GLOBAL
7	*	2000	0.00	0.00	1855.91	0.00	0.00	0.00	GLOBAL
9	*	200000	1135.30	0.00	0.00	0.00	0.00	0.00	GLOBAL
11	*	20000	0.00	513.22	0.00	0.00	0.00	0.00	GLOBAL
13	*	20000	0.00	406.25	0.00	0.00	0.00	0.00	GLOBAL
15	*	200000	966.80	0.00	0.00	0.00	0.00	0.00	NON-GLOBAL
17	*	111000	134.66	501.23	266.27	0.00	0.00	0.00	GLOBAL
21	*	111111	1011.76	471.22	633.30	27567.81	44680.24	5724.30	GLOBAL

BENCHMARK
PROBLEM 4

TPIPE VERIFICATION ISOMETRIC



PROBLEM 4

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00000000011111111112222222222333333333344444444445555555555666666666677777777778   CARD
12345678901234567890123456789012345678901234567890123456789012345678901234567890   NUMBER

TPIPE  VERIFICATION  N1-TPIPE   PROB. #4    RAGILES   X2159                  1TIT      1
TSI  1 Y            NONE       PLTPIP4   TTTRAG    441       DWHEELER                  2
   18   78    4          1    7         81    0                 1  1  386.4            3
    101000      01100    0    1    1    30  .01 6.65     15000                         4
 C01    9   11   14  C04      60.00    402.60     10.20    -69.50                      5
 C02    9   12   15   47      117.9    303.40       0.0       0.0                      6
 C03    9   13   16  C05      60.00    402.60     10.20     69.50                      7
 C04  C01   17   19  C06      60.00    402.60    -132.0    -69.50                      8
 C05  C03   18   20  C07      60.00    402.60    -132.0     69.50                      9
 C06  C04   21   23   25      60.00    288.00    -132.0    -156.0                     10
 C07  C05   22   24   26      60.00    288.00    -132.0     156.0                     11
 C08   33   36   38   47      60.00    106.00       0.0    -106.0                     12
 C09   26   37   40   47      60.00    106.00       0.0     106.0                     13
 C10   72   61   58   47      60.00   -106.00       0.0    -106.0                     14
 C11   65   62   60   47      60.00   -106.00       0.0     106.0                     15
 C12  C14   76   74   72      60.00   -288.00    -132.0    -156.0                     16
 C13  C15   77   75   73      60.00   -288.00    -132.0     156.0                     17
 C14  C16   80   78  C12      60.00   -402.60    -132.0    -69.50                     18
 C15  C18   81   79  C13      60.00   -402.60    -132.0     69.50                     19
 C16   89   85   82  C14      60.00   -402.60     10.20    -69.50                     20
 C17   89   87   83   47      117.9   -303.40       0.0       0.0                     21
 C18   89   86   84  C15      60.00   -402.60     10.20     69.50                     22
  47  -0.00001         0.0       0.0                8.010072E5                         23
 F47   0.00001         0.0       0.0                                                   24
   1     384.00     696.00      0.00                2.001552E5                         25
   2     384.00     552.00      0.00                1.000776E5                         26
   3     384.00     456.00      0.00                1.000776E5                         27
   4     384.00     276.00      0.00                3.500784E5                         28
   9     384.00      96.00      0.00                9.003120E4                         29
  10     384.00    -180.00      0.00                                                   30
  11                                                                                   31
  12                                                                                   32
  13                                                                                   33
  14                                                                                   34
  15                                                                                   35
  16                                                                                   36
  17                                                                                   37
  18                                                                                   38
  19                                                                                   39
  20                                                                                   40
  21                                                                                   41
  22                                                                                   42
  23                                                                                   43
  24                                                                                   44
  25     288.00        0.0   -156.00                5.023200E4                         45
  26     288.00        0.0    156.00                5.023200E4                         46
  27     288.00     -180.0   -156.00                                                   47
  28     288.00     -180.0    156.00                                                   48
  29     288.00      126.0   -156.00                1.503096E5                         49
  30     288.00      126.0    156.00                1.503096E5                         50
  31     253.20        0.0   -146.70                                                   51
  32     253.20        0.0    146.70                                                   52
  33     187.30        0.0   -128.50                                                   53
  34     177.00        0.0       0.0                                                   54
  35     187.30        0.0    128.50                                                   55
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0000000001111111111222222222233333333334444444444555555555566666666667777777778   CARD
1234567890123456789012345678901234567890123456789012345678901234567890123456789012  NUMBER

  36                                                                                  56
  37                                                                                  57
  38                                                                                  58
  39      96.00       0.0       0.0                                                   59
  40                                                                                  60
  48        0.0    -192.0       0.0             7.507752E5                           61
  49        0.0      84.0       0.0             5.003880E5                           62
  50        0.0     156.0       0.0             2.001552E5                           63
  51        0.0     288.0       0.0             1.503096E5                           64
  58                                                                                  65
  59     -96.00       0.0       0.0                                                   66
  60                                                                                  67
  61                                                                                  68
  62                                                                                  69
  63     -187.3       0.0    -128.5                                                   70
  64     -177.0       0.0       0.0                                                   71
  65     -187.3       0.0    128.50                                                   72
  66     -253.2       0.0    -146.7                                                   73
  67     -253.2       0.0     146.7                                                   74
  68     -288.0     126.0    -156.0             1.503096E5                           75
  69     -288.0     126.0     156.0             1.503096E5                           76
  70     -288.0    -180.0    -156.0                                                  77
  71     -288.0    -180.0     156.0                                                  78
  72     -288.0       0.0    -156.0             5.023200E4                           79
  73     -288.0       0.0     156.0             5.023200E4                           80
  74                                                                                  81
  75                                                                                  82
  76                                                                                  83
  77                                                                                  84
  78                                                                                  85
  79                                                                                  86
  80                                                                                  87
  81                                                                                  88
  82                                                                                  89
  83                                                                                  90
  84                                                                                  91
  85                                                                                  92
  86                                                                                  93
  87                                                                                  94
  88     -384.0    -180.0       0.0                                                  95
  89     -384.0      96.0       0.0             9.003120E4                           96
  90     -384.0     276.0       0.0             3.500784E5                           97
  95     -384.0     456.0       0.0             1.000776E5                           98
  96     -384.0     552.0       0.0             1.000776E5                           99
  97     -384.0     696.0       0.0             2.001552E5                          100
  40 -.70710678       0.00.70710678        0         1          0                   101
  58 -.70710678       0.00.70710678        0         1          0                   102
  38 0.70710678       0.00.70710678        0         1          0                   103
  60 0.70710678       0.00.70710678        0         1          0                   104
    1  27   10   28   70   71   88                                                   105
FLEX                                                                                106
   4      RR0.200E11          RR0.200E11                                            107
  38      RR0.100E08RR0.500E08                                                      108
  39                RR0.500E08RR0.100E08                                            109
  40      RR0.100E08RR0.500E08                                                      110
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0000000001111111111222222222233333333334444444444555555555566666666677777777778   CARD
1234567890123456789012345678901234567890123456789012345678901234567890123456789012  NUMBER

  58       RR0.100E08RR0.500E08                                                    111
  59                 RR0.500E08RR0.100E08                                          112
  60       RR0.100E08RR0.500E08                                                    113
  90       RR0.200E11           RR0.200E11                                         114
END                                                                               115
    1   29.0E06                              2400         70                      116
    1     144.0      3.0          0.0                                            117
    2      36.0     2.50      .8200E02                                            118
    3      48.0     3.75      .1640E03                                            119
    4      72.0     4.00          0.0                                            120
    5     192.0     8.00          0.0                                            121
    6     135.0      .40          0.0                                            122
    7     100.0      .38          0.0                                            123
   1         1    2      1     1                                                  124
   2         2    3                                                              125
   3         3    4                                                              126
   4         4    9                                                              127
   5         9   10           6                                                  128
   6         9   11           1                                                  129
   7         9   13                                                              130
   8         9   12                                                              131
   9        11   14           2                          C01                     132
  10        12   15           3                          C02                     133
  11        13   16           2                          C03                     134
  12        14   17                                                              135
  13        16   18                                                              136
  14        17   19                                      C04                     137
  15        18   20                                      C05                     138
  16        19   21                                                              139
  17        20   22                                                              140
  18        21   23                                      C06                     141
  19        22   24                                      C07                     142
  20        23   25           4                                                  143
  21        24   26                                                              144
  22        25   27           7                                                  145
  23        26   28                                                              146
  24        25   29           4                                                  147
  25        26   30                                                              148
  26        25   31                                                              149
  27        26   32                                                              150
  28        31   33           2                                                  151
  29        15   34           3                                                  152
  30        32   35           2                                                  153
  31        33   36                                                              154
  32        34   39           3                                                  155
  33        35   37           2                                                  156
  34        36   38                                      C08                     157
  35        37   40                                      C09                     158
  36        38  F47           5                                                  159
  37        39  F47                                                             160
 F37        47  F47                                                             161
  38        40  F47                                                             162
  39       F47   48                                                             163
  40        47   49                                                             164
  41        49   50                                                             165
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00000000011111111112222222222333333333344444444445555555555666666666677777777778   CARD
12345678901234567890123456789012345678901234567890123456789012345678901234567890   NUMBER

  42        50   51                                                                  166
  43        47   58                                                                  167
  44        47   59                                                                  168
  45        47   60                                                                  169
  46        61   58          2                                  C10                  170
  47        62   60                                             C11                  171
  48        61   63                                                                  172
  49        59   64          3                                                       173
  50        62   65          2                                                       174
  51        63   66                                                                  175
  52        64   83          3                                                       176
  53        65   67          2                                                       177
  54        66   72          4                                                       178
  55        67   73                                                                  179
  56        68   72                                                                  180
  57        69   73                                                                  181
  58        70   72          7                                                       182
  59        71   73                                                                  183
  60        72   74          4                                                       184
  61        73   75                                                                  185
  62        76   74          2                                  C12                  186
  63        77   75                                             C13                  187
  64        76   78                                                                  188
  65        77   79                                                                  189
  66        80   78                                             C14                  190
  67        81   79                                             C15                  191
  68        80   82                                                                  192
  69        81   84                                                                  193
  70        85   82                                             C16                  194
  71        87   83          3                                  C17                  195
  72        86   84          2                                  C18                  196
  73        85   89          1                                                       197
  74        87   89                                                                  198
  75        86   89                                                                  199
  76        88   89          6                                                       200
  77        89   90          1                                                       201
  78        90   95                                                                  202
  79        95   96                                                                  203
  80        96   97                                                                  204
    1             38                                                               205
.5000E-02.414078670R.C.DIVIDED BY 386.4                                            206
.1020E-01.414078670                                                                207
.1391E-01.628881990                                                                208
.1700E-01.628881990                                                                209
.1923E-01.439958590                                                                210
.2164E-01.659937890                                                                211
.2439E-01.659937890                                                                212
.2667E-011.05331260                                                                213
.4202E-011.22929610                                                                214
.4609E-011.43633540                                                                215
.5528E-011.68737060                                                                216
.5882E-011.95393370                                                                217
.6711E-011.95393370                                                                218
.7110E-012.23861280                                                                219
.1000E+002.23861280                                                                220
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00000000011111111112222222222333333333344444444455555555556666666666777777777778   CARD
12345678901234567890123456789012345678901234567890123456789012345678901234567890   NUMBER

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 .1413E+003.16252590                                                                  222
 .1482E+002.97619050                                                                  223
 .1534E+003.62060004                                                                  224
 .1876E+003.62060004                                                                  225
 .1923E+002.95031060                                                                  226
 .2268E+002.95031060                                                                  227
 .2392E+002.73550720                                                                  228
 .2924E+002.73550720                                                                  229
 .3049E+002.64751550                                                                  230
 .3175E+002.21273290                                                                  231
 .3460E+002.21273290                                                                  232
 .3571E+002.10144930                                                                  233
 .3922E+002.10144930                                                                  234
 .4167E+002.36542440                                                                  235
 .5208E+002.36542440                                                                  236
 .5263E+002.23861280                                                                  237
 .6173E+002.23861280                                                                  238
 .6250E+002.34213250                                                                  239
 .7813E+002.34213250                                                                  240
 .8696E+001.71325050                                                                  241
 .9524E+001.71325050                                                                  242
 .1000E+011.55279500                                                                  243
D       1    1    1  1.0.6667  1.0        GM     RESPONSE SPECT.GILES                 244
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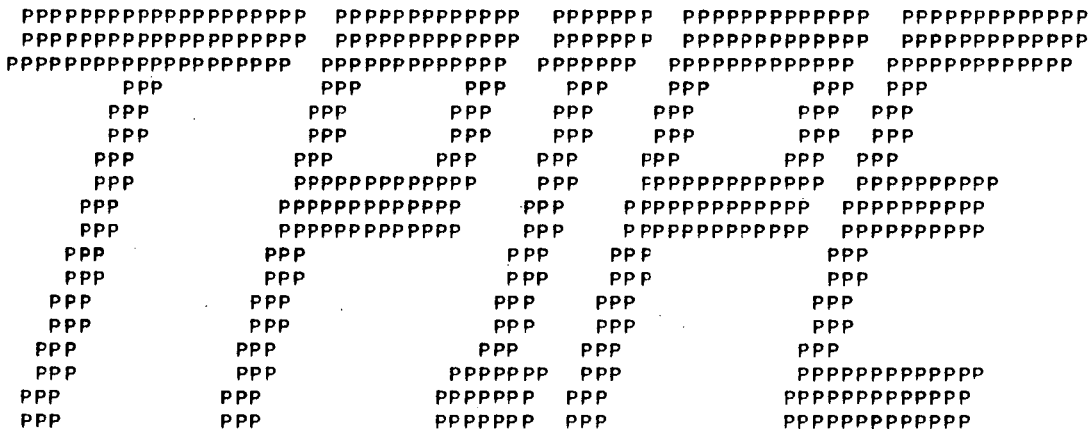


DEVELOPED JOINTLY BY

PMB SYSTEMS ENGINEERING
SAN FRANCISCO, CALIFORNIA, USA

TENNESSEE VALLEY AUTHORITY
KNOXVILLE, TENNESSEE, USA

******* 1976 ******

VERSION 4.4 MAY 1, 1981

EXECUTED AT 13.47.24. ON 07/18/81

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

PIPING SYSTEM GEOMETRY DEFINITION

NUMBER OF CONTROL POINTS	18
NUMBER OF NODAL POINTS	78
NUMBER OF NONGLOBAL COORDINATE SYSTEMS	4
NUMBER OF ADDITIONAL SUPPORT TYPES	0
NUMBER OF MATERIAL PROPERTY TYPES	1
NUMBER OF PIPE CROSS SECTION TYPES	7
NUMBER OF SPECIAL COMPONENT CROSS SECTIONS	0
NUMBER OF PIPE MEMBERS	81
NUMBER OF SPECIAL CONNECTIONS	0
NUMBER OF SPECIAL COMPONENTS	0
NUMBER OF DYNAMIC SPRINGS	0
NUMBER OF MULTIPLE EXCITATION ZONES	0
UNITS OF LENGTH AND WEIGHT	CONSISTENT
GRAVITY	386.40
NODAL POINT COORDINATE CHECK OPTION	NO

PROBLEM DEFINITION

EXECUTION MODE= 101000
1= STRUCTURAL DEFINITION IS FROM DATA CARDS
0= NORMAL DATA CHECKING RUN
1= ANALYSIS REQUESTED
0= NO STRUCTURAL PLOTTING REQUESTED
0= NO POSTPROCESSING REQUESTED
0= NO THERMAL TRANSIENT RESPONSE EXECUTION REQUESTED

ANALYSIS TYPES(01100) REQUESTED

FREQUENCY ANALYSIS

MAXIMUM NUMBER OF MODES REQUESTED	30
NUMBER OF SPRING SUPPORTS IN DYNAM MODEL	0
MINIMUM PERIOD OF HIGHEST MODE(SEC)	.0100
MAXIMUM FREQUENCY FOR MODE PRINTOUT(HZ)	6.7

RESPONSE SPECTRUM ANALYSIS

NUMBER OF SPECTRAL CURVES TO BE INPUT	1
NUMBER OF RESPONSE SPECTRUM LOAD CASES	1

PROGRAM STORAGE 15000

RESTART TAPE GENERATION OPTION.. NONE REQUESTED

C O N T R O L P O I N T S P E C I F I C A T I O N

CONTROL NAME	I-TAN POINT	*CURVE POINTS* I-END	J-END	J-TAN POINT	CURVE RADIUS	******** COORDINATES ******* X-GLOBAL	Y-GLOBAL	Z-GLOBAL	COMMENT
C01 *	9 *	11 *	14 *	C04 *	60.000	402.60	10.20	-69.50	
C02 *	9 *	12 *	15 *	47 *	117.900	303.40	0.00	0.00	
C03 *	9 *	13 *	16 *	C05 *	60.000	402.60	10.20	69.50	
C04 *	C01 *	17 *	19 *	C06 *	60.000	402.60	-132.00	-69.50	
C05 *	C03 *	18 *	20 *	C07 *	60.000	402.60	-132.00	69.50	
C06 *	C04 *	21 *	23 *	25 *	60.000	288.00	-132.00	-156.00	
C07 *	C05 *	22 *	24 *	26 *	60.000	288.00	-132.00	156.00	
C08 *	33 *	36 *	38 *	47 *	60.000	106.00	0.00	-106.00	
C09 *	26 *	37 *	40 *	47 *	60.000	106.00	0.00	106.00	
C10 *	72 *	61 *	58 *	47 *	60.000	-106.00	0.00	-106.00	
C11 *	65 *	62 *	60 *	47 *	60.000	-106.00	0.00	106.00	
C12 *	C14 *	76 *	74 *	72 *	60.000	-288.00	-132.00	-156.00	
C13 *	C15 *	77 *	75 *	73 *	60.000	-288.00	-132.00	156.00	
C14 *	C16 *	80 *	78 *	C12 *	60.000	-402.60	-132.00	-69.50	
C15 *	C18 *	81 *	79 *	C13 *	60.000	-402.60	-132.00	69.50	
C16 *	89 *	85 *	82 *	C14 *	60.000	-402.60	10.20	-69.50	
C17 *	89 *	87 *	83 *	47 *	117.900	-303.40	0.00	0.00	
C18 *	89 *	86 *	84 *	C15 *	60.000	-402.60	10.20	69.50	

NODAL POINT DEFINITION

NODAL POINT	NODE NAME	******** COORDINATES ******* X-GLOBAL	Y-GLOBAL	Z-GLOBAL	LUMPED WEIGHT	DATA SOURCE	COMMENT
1	47 *	-.00	0.00	0.00	801007.2	INPT	
2	F47 *	.00	0.00	0.00	0.0	INPT	
3	1 *	384.00	696.00	0.00	200155.2	INPT	
4	2 *	384.00	552.00	0.00	100077.6	INPT	
5	3 *	384.00	456.00	0.00	100077.6	INPT	
6	4 *	384.00	276.00	0.00	350078.4	INPT	
7	9 *	384.00	96.00	0.00	90031.2	INPT	
8	10 *	384.00	-180.00	0.00	0.0	INPT	
9	11 *	398.97	26.93	-55.95	0.0	CP	
10	12 *	338.74	42.09	0.00	0.0	CP	
11	13 *	398.97	26.93	55.95	0.0	CP	
12	14 *	402.60	-11.63	-69.50	0.0	CP	
13	15 *	248.44	0.00	0.00	0.0	CP	
14	16 *	402.60	-11.63	69.50	0.0	CP	
15	17 *	402.60	-72.00	-69.50	0.0	CP	
16	18 *	402.60	-72.00	69.50	0.0	CP	
17	19 *	354.71	-132.00	-105.65	0.0	CP	
18	20 *	354.71	-132.00	105.65	0.0	CP	
19	21 *	335.89	-132.00	-119.85	0.0	CP	
20	22 *	335.89	-132.00	119.85	0.0	CP	
21	23 *	288.00	-72.00	-156.00	0.0	CP	
22	24 *	288.00	-72.00	156.00	0.0	CP	
23	25 *	288.00	0.00	-156.00	50232.0	INPT	
24	26 *	288.00	0.00	156.00	50232.0	INPT	
25	27 *	288.00	-180.00	-156.00	0.0	INPT	
26	28 *	288.00	-180.00	156.00	0.0	INPT	
27	29 *	288.00	126.00	-156.00	150309.6	INPT	
28	30 *	288.00	126.00	156.00	150309.6	INPT	
29	31 *	253.20	0.00	-146.70	0.0	INPT	
30	32 *	253.20	0.00	146.70	0.0	INPT	
31	33 *	187.30	0.00	-128.50	0.0	INPT	
32	34 *	177.00	0.00	0.00	0.0	INPT	
33	35 *	187.30	0.00	128.50	0.0	INPT	
34	36 *	121.24	0.00	-110.22	0.0	CP	
35	37 *	121.31	0.00	110.21	0.0	CP	
36	38 *	94.82	0.00	-94.82	0.0	CP	
37	39 *	96.00	0.00	0.00	0.0	INPT	
38	40 *	94.78	0.00	94.78	0.0	CP	
39	48 *	0.00	-192.00	0.00	750775.2	INPT	
40	49 *	0.00	84.00	0.00	500388.0	INPT	
41	50 *	0.00	156.00	0.00	200155.2	INPT	
42	51 *	0.00	288.00	0.00	150309.6	INPT	
43	58 *	-94.78	0.00	-94.78	0.0	CP	
44	59 *	-96.00	0.00	0.00	0.0	INPT	
45	60 *	-94.82	0.00	94.82	0.0	CP	
46	61 *	-121.31	0.00	-110.21	0.0	CP	
47	62 *	-121.24	0.00	110.22	0.0	CP	

NODAL POINT DEFINITION (CONTINUED)

NODAL POINT	NODE NAME		******** COORDINATES ******* X-GLOBAL	Y-GLOBAL	Z-GLOBAL	LUMPED WEIGHT	DATA SOURCE	COMMENT
48	63	*	-187.30	0.00	-128.50	0.0	INPT	
49	64	*	-177.00	0.00	0.00	0.0	INPT	
50	65	*	-187.30	0.00	128.50	0.0	INPT	
51	66	*	-253.20	0.00	-146.70	0.0	INPT	
52	67	*	-253.20	0.00	146.70	0.0	INPT	
53	68	*	-288.00	126.00	-156.00	150309.6	INPT	
54	69	*	-288.00	126.00	156.00	150309.6	INPT	
55	70	*	-288.00	-180.00	-156.00	0.0	INPT	
56	71	*	-288.00	-180.00	156.00	0.0	INPT	
57	72	*	-288.00	0.00	-156.00	50232.0	INPT	
58	73	*	-288.00	0.00	156.00	50232.0	INPT	
59	74	*	-288.00	-72.00	-156.00	0.0	CP	
60	75	*	-288.00	-72.00	156.00	0.0	CP	
61	76	*	-335.89	-132.00	-119.85	0.0	CP	
62	77	*	-335.89	-132.00	119.85	0.0	CP	
63	78	*	-354.71	-132.00	-105.65	0.0	CP	
64	79	*	-354.71	-132.00	105.65	0.0	CP	
65	80	*	-402.60	-72.00	-69.50	0.0	CP	
66	81	*	-402.60	-72.00	69.50	0.0	CP	
67	82	*	-402.60	-11.63	-69.50	0.0	CP	
68	83	*	-248.44	0.00	0.00	0.0	CP	
69	84	*	-402.60	-11.63	69.50	0.0	CP	
70	85	*	-398.97	26.93	-55.95	0.0	CP	
71	86	*	-398.97	26.93	55.95	0.0	CP	
72	87	*	-338.74	42.09	0.00	0.0	CP	
73	88	*	-384.00	-180.00	0.00	0.0	INPT	
74	89	*	-384.00	96.00	0.00	90031.2	INPT	
75	90	*	-384.00	276.00	0.00	350078.4	INPT	
76	95	*	-384.00	456.00	0.00	100077.6	INPT	
77	96	*	-384.00	552.00	0.00	100077.6	INPT	
78	97	*	-384.00	696.00	0.00	200155.2	INPT	

N O N - G L O B A L C O O R D I N A T E S Y S T E M D E F I N I T I O N

NODE NAME	DIRECTION COSINES **** NON-GLOBAL XS-AXIS *** X	Y	Z	**** NON-GLOBAL YS-AXIS *** X	Y	Z	**** NON-GLOBAL ZS-AXIS *** X	Y	Z	COMMENT
40 *	-.7071	0.0000	.7071	0.0000	1.0000	0.0000	-.7071	0.0000	-.7071	
58 *	-.7071	0.0000	.7071	0.0000	1.0000	0.0000	-.7071	0.0000	-.7071	
38 *	.7071	0.0000	.7071	0.0000	1.0000	0.0000	-.7071	0.0000	.7071	
60 *	.7071	0.0000	.7071	0.0000	1.0000	0.0000	-.7071	0.0000	.7071	

S U P P O R T T Y P E L I B R A R Y

SUPPORT TYPE	***** RESTRAINT CODES ***** DYNAMIC	GRAVITY	THERMAL	COMMENT
1	111111	111111	111111	
2	111000	111000	111000	
3	111000	111000	101000	
4	111000	110000	110000	
5	111000	110000	100000	
6	111000	101000	101000	
7	111000	100000	100000	
8	111000	11000	11000	
9	111000	11000	1000	
10	111000	10000	10000	
11	111000	10000	0	
12	111000	1000	1000	
13	111000	0	0	
14	110000	110000	110000	
15	110000	110000	100000	
16	110000	100000	100000	
17	110000	10000	10000	
18	110000	10000	0	
19	110000	0	0	
20	101000	101000	101000	
21	101000	100000	100000	
22	101000	11000	1000	
23	101000	10000	0	
24	101000	1000	1000	
25	101000	0	0	
26	100000	110000	100000	
27	100000	100000	100000	
28	100000	10000	0	
29	100000	0	0	
30	11000	11000	11000	
31	11000	11000	1000	
32	11000	10000	10000	
33	11000	10000	0	
34	11000	1000	1000	
35	11000	0	0	
36	10000	10000	10000	
37	10000	10000	0	
38	10000	0	0	
39	1000	11000	1000	
40	1000	10000	0	
41	1000	1000	1000	
42	1000	0	0	
43	0	10000	0	

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

SUPPORT TYPE	RESTRAINED NODAL POINTS 1	2	3	4	5	6	7	8	9	10	11	12	13	14	*** RESTRAINT CODES *** DYNAMIC	GRAVITY	THERMAL	NO MOD
1	27	10	28	70	71	88									111111	111111	111111	1

RESTRAINT SPECIFICATION. DEFAULT STIFFNESSES K(X),K(Y),K(Z)= 1.0E13 K(XX),K(YY),K(ZZ)= 1.0E15

NODE NAME	RESTRAINT TYPE	K(X)	RESTRAINT TYPE	K(Y)	RESTRAINT TYPE	K(Z)	RESTRAINT TYPE	K(XX)	RESTRAINT TYPE	K(YY)	RESTRAINT TYPE	K(ZZ)	*** RESTRAINT CODES *** DYNAMIC	GRAVITY	THERMAL	NO MOD
4	RR	0.200E11			RR	0.200E11							202000	202000	202000	1
38	RR	0.100E08	RR	0.500E08									220000	220000	220000	1
39			RR	0.500E08	RR	0.100E08							22000	22000	22000	1
40	RR	0.100E08	RR	0.500E08									220000	220000	220000	1
58	RR	0.100E08	RR	0.500E08									220000	220000	220000	1
59			RR	0.500E08	RR	0.100E08							22000	22000	22000	1
60	RR	0.100E08	RR	0.500E08									220000	220000	220000	1
90	RR	0.200E11			RR	0.200E11							202000	202000	202000	1

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

MATERIAL NUMBER	COLD ELASTIC MODULUS	POISSONS RATIO	THERMAL EXPANSION COEFFICIENT	INTERNAL PIPE PRESSURE	MEMBER TEMPERATURE	HOT ELASTIC MODULUS	COMMENT
1	29000000.0	.300	0.000000000	2400.0	70.00	29000000.0	

P I P E M E M B E R C R O S S S E C T I O N T Y P E S

SECTION NUMBER	OUTSIDE DIAMETER	WALL THICKNESS	AXIAL AREA	SHEAR AREA	FLEXURAL INERTIA	INPUT FLEXIBILITY	WEIGHT/ LENGTH	SECTION DESCRIPTION
1	144.000	3.0000	1328.89	664.65	3303961.9		0.00	
2	36.000	2.5000	263.11	132.04	37114.7		82.00	
3	48.000	3.7500	521.31	261.90	128510.6		164.00	
4	72.000	4.0000	854.51	428.24	495617.7		0.00	
5	192.000	8.0000	4624.42	2315.12	19607559.4		0.00	
6	135.000	.4000	169.14	84.57	383053.0		0.00	
7	100.000	.3800	118.93	59.46	147533.1		0.00	

P I P E M E M B E R D A T A

MEMBER NAME	NODE I-END	NODE J-END	MAT TYPE	SECT TYPE	INTENS I-END	INTENS J-END	REF TEMP	RELEASE CODE I-END	RELEASE CODE J-END	MEMBER LENGTH	CURVE RADIUS	INTERSECTION X-GLOBAL	INTERSECTION Y-GLOBAL	INTERSECTION Z-GLOBAL	INTER ANGLE	MEMBER NUMBER
1	1	2	1	1	1.000	1.000	70.0	0	0	144.00						1
2	2	3	1	1	1.000	1.000	70.0	0	0	96.00						2
3	3	4	1	1	1.000	1.000	70.0	0	0	180.00						3
4	4	9	1	1	1.000	1.000	70.0	0	0	180.00						4
5	9	10	1	6	1.000	1.000	70.0	0	0	276.00						5
6	9	11	1	1	1.000	1.000	70.0	0	0	90.15						6
7	9	13	1	1	1.000	1.000	70.0	0	0	90.15						7
8	9	12	1	1	1.000	1.000	70.0	0	0	70.39						8
9	11	14	1	2	1.366	1.366	70.0	0	0	41.87	60.000	402.60	10.20	-69.50	39.981	9
10	12	15	1	3	1.000	1.000	70.0	0	0	102.85	117.900	303.40	0.00	0.00	49.984	10
11	13	16	1	2	1.366	1.366	70.0	0	0	41.87	60.000	402.60	10.20	69.50	39.981	11
12	14	17	1	2	1.000	1.000	70.0	0	0	60.37						12
13	16	18	1	2	1.000	1.000	70.0	0	0	60.37						13
14	17	19	1	2	1.366	1.366	70.0	0	0	94.25	60.000	402.60	-132.00	-69.50	90.000	14
15	18	20	1	2	1.366	1.366	70.0	0	0	94.25	60.000	402.60	-132.00	69.50	90.000	15
16	19	21	1	2	1.000	1.000	70.0	0	0	23.58						16
17	20	22	1	2	1.000	1.000	70.0	0	0	23.58						17
18	21	23	1	2	1.366	1.366	70.0	0	0	94.25	60.000	288.00	-132.00	-156.00	90.000	18
19	22	24	1	2	1.366	1.366	70.0	0	0	94.25	60.000	288.00	-132.00	156.00	90.000	19
20	23	25	1	4	1.000	1.000	70.0	0	0	72.00						20
21	24	26	1	4	1.000	1.000	70.0	0	0	72.00						21
22	25	27	1	7	1.000	1.000	70.0	0	0	180.00						22
23	26	28	1	7	1.000	1.000	70.0	0	0	180.00						23
24	25	29	1	4	1.000	1.000	70.0	0	0	126.00						24
25	26	30	1	4	1.000	1.000	70.0	0	0	126.00						25
26	25	31	1	4	1.000	1.000	70.0	0	0	36.02						26
27	26	32	1	4	1.000	1.000	70.0	0	0	36.02						27
28	31	33	1	2	1.000	1.000	70.0	0	0	68.37						28
29	15	34	1	3	1.000	1.000	70.0	0	0	71.44						29
30	32	35	1	2	1.000	1.000	70.0	0	0	68.37						30
31	33	36	1	2	1.000	1.000	70.0	0	0	68.54						31
32	34	39	1	3	1.000	1.000	70.0	0	0	81.00						32
33	35	37	1	2	1.000	1.000	70.0	0	0	68.48						33
34	36	38	1	2	1.366	1.366	70.0	0	0	30.92	60.000	106.00	0.00	-106.00	29.530	34
35	37	40	1	2	1.366	1.366	70.0	0	0	31.04	60.000	106.00	0.00	106.00	29.638	35
36	38	F47	1	5	1.000	1.000	70.0	0	0	134.09						36
37	39	F47	1	5	1.000	1.000	70.0	0	0	96.00						37
F37	47	F47	1	5	1.000	1.000	70.0	0	0	.00						38
38	40	F47	1	5	1.000	1.000	70.0	0	0	134.03						39
39	F47	48	1	5	1.000	1.000	70.0	0	0	192.00						40
40	47	49	1	5	1.000	1.000	70.0	0	0	84.00						41
41	49	50	1	5	1.000	1.000	70.0	0	0	72.00						42
42	50	51	1	5	1.000	1.000	70.0	0	0	132.00						43
43	47	58	1	5	1.000	1.000	70.0	0	0	134.03						44
44	47	59	1	5	1.000	1.000	70.0	0	0	96.00						45
45	47	60	1	5	1.000	1.000	70.0	0	0	134.09						46
46	61	58	1	2	1.366	1.366	70.0	0	0	31.04	60.000	-106.00	0.00	-106.00	29.638	47

P I P E M E M B E R D A T A (CONTINUED)

MEMBER NAME	NODE NAME I-END	NODE NAME J-END	MAT TYPE	SECT TYPE	INTENS FACTOR I-END	INTENS FACTOR J-END	REF TEMP	RELEASE CODE I-END	RELEASE CODE J-END	MEMBER LENGTH	CURVE RADIUS	INTERSECTION X-GLOBAL	INTERSECTION Y-GLOBAL	INTERSECTION Z-GLOBAL	INTER ANGLE	MEMBER NUMBER
47	62	60	1	2	1.366	1.366	70.0	0	0	30.92	60.000	-106.00	0.00	106.00	29.530	48
48	61	63	1	2	1.000	1.000	70.0	0	0	68.48						49
49	59	64	1	3	1.000	1.000	70.0	0	0	81.00						50
50	62	65	1	2	1.000	1.000	70.0	0	0	68.54						51
51	63	66	1	2	1.000	1.000	70.0	0	0	68.37						52
52	64	83	1	3	1.000	1.000	70.0	0	0	71.44						53
53	65	67	1	2	1.000	1.000	70.0	0	0	68.37						54
54	66	72	1	4	1.000	1.000	70.0	0	0	36.02						55
55	67	73	1	4	1.000	1.000	70.0	0	0	36.02						56
56	68	72	1	4	1.000	1.000	70.0	0	0	126.00						57
57	69	73	1	4	1.000	1.000	70.0	0	0	126.00						58
58	70	72	1	7	1.000	1.000	70.0	0	0	180.00						59
59	71	73	1	7	1.000	1.000	70.0	0	0	180.00						60
60	72	74	1	4	1.000	1.000	70.0	0	0	72.00						61
61	73	75	1	4	1.000	1.000	70.0	0	0	72.00						62
62	76	74	1	2	1.366	1.366	70.0	0	0	94.25	60.000	-288.00	-132.00	-156.00	90.000	63
63	77	75	1	2	1.366	1.366	70.0	0	0	94.25	60.000	-288.00	-132.00	156.00	90.000	64
64	76	78	1	2	1.000	1.000	70.0	0	0	23.58						65
65	77	79	1	2	1.000	1.000	70.0	0	0	23.58						66
66	80	78	1	2	1.366	1.366	70.0	0	0	94.25	60.000	-402.60	-132.00	-69.50	90.000	67
67	81	79	1	2	1.366	1.366	70.0	0	0	94.25	60.000	-402.60	-132.00	69.50	90.000	68
68	80	82	1	2	1.000	1.000	70.0	0	0	60.37						69
69	81	84	1	2	1.000	1.000	70.0	0	0	60.37						70
70	85	82	1	2	1.366	1.366	70.0	0	0	41.87	60.000	-402.60	10.20	-69.50	39.981	71
71	87	83	1	3	1.000	1.000	70.0	0	0	102.85	117.900	-303.40	0.00	0.00	49.984	72
72	86	84	1	2	1.366	1.366	70.0	0	0	41.87	60.000	-402.60	10.20	69.50	39.981	73
73	85	89	1	1	1.000	1.000	70.0	0	0	90.15						74
74	87	89	1	1	1.000	1.000	70.0	0	0	70.39						75
75	86	89	1	1	1.000	1.000	70.0	0	0	90.15						76
76	88	89	1	6	1.000	1.000	70.0	0	0	276.00						77
77	89	90	1	1	1.000	1.000	70.0	0	0	180.00						78
78	90	95	1	1	1.000	1.000	70.0	0	0	180.00						79
79	95	96	1	1	1.000	1.000	70.0	0	0	96.00						80
80	96	97	1	1	1.000	1.000	70.0	0	0	144.00						81

M E M B E R L E N G T H - D I R E C T I O N I N F O R M A T I O N

MEMBER NAME	I NODE NAME	J NODE NAME	***DELTA MEMBER LENGTHS*** X	Y	Z	CROSS SECTION DESCRIPTION
1	1	2	0.00	-144.00	0.00	
2	2	3	0.00	-96.00	0.00	
3	3	4	0.00	-180.00	0.00	
4	4	9	0.00	-180.00	0.00	
5	9	10	0.00	-276.00	0.00	
6	9	11	14.97	-69.07	-55.95	
7	9	13	14.97	-69.07	55.95	
8	9	12	-45.26	-53.91	0.00	
9	11	14	3.63	-38.55	-13.55	
10	12	15	-90.30	-42.09	0.00	
11	13	16	3.63	-38.55	13.55	
12	14	17	0.00	-60.37	0.00	
13	16	18	0.00	-60.37	0.00	
14	17	19	-47.89	-60.00	-36.15	
15	18	20	-47.89	-60.00	36.15	
16	19	21	-18.82	0.00	-14.21	
17	20	22	-18.82	0.00	14.21	
18	21	23	-47.89	60.00	-36.15	
19	22	24	-47.89	60.00	36.15	
20	23	25	0.00	72.00	0.00	
21	24	26	0.00	72.00	0.00	
22	25	27	0.00	-180.00	0.00	
23	26	28	0.00	-180.00	0.00	
24	25	29	0.00	126.00	0.00	
25	26	30	0.00	126.00	0.00	
26	25	31	-34.80	0.00	9.30	
27	26	32	-34.80	0.00	-9.30	
28	31	33	-65.90	0.00	18.20	
29	15	34	-71.44	0.00	0.00	
30	32	35	-65.90	0.00	-18.20	
31	33	36	-66.06	0.00	18.28	
32	34	39	-81.00	0.00	0.00	
33	35	37	-65.99	0.00	-18.29	
34	36	38	-26.42	0.00	15.40	
35	37	40	-26.53	0.00	-15.43	
36	38	F47	-94.82	0.00	94.82	
37	39	F47	-96.00	0.00	0.00	
F37	47	F47	.00	0.00	0.00	
38	40	F47	-94.78	0.00	-94.78	
39	F47	48	-.00	-192.00	0.00	
40	47	49	.00	84.00	0.00	
41	49	50	0.00	72.00	0.00	
42	50	51	0.00	132.00	0.00	

MEMBER LENGTH - DIRECTION INFORMATION (CONTINUED)

MEMBER NAME	I NODE NAME	J NODE NAME	***DELTA MEMBER LENGTHS*** X	Y	Z	CROSS SECTION DESCRIPTION
43	47	58	-94.78	0.00	-94.78	
44	47	59	-96.00	0.00	0.00	
45	47	60	-94.82	0.00	94.82	
46	61	58	26.53	0.00	15.43	
47	62	60	26.42	0.00	-15.40	
48	61	63	-65.99	0.00	-18.29	
49	59	64	-81.00	0.00	0.00	
50	62	65	-66.06	0.00	18.28	
51	63	66	-65.90	0.00	-18.20	
52	64	83	-71.44	0.00	0.00	
53	65	67	-65.90	0.00	18.20	
54	66	72	-34.80	0.00	-9.30	
55	67	73	-34.80	0.00	9.30	
56	68	72	0.00	-126.00	0.00	
57	69	73	0.00	-126.00	0.00	
58	70	72	0.00	180.00	0.00	
59	71	73	0.00	180.00	0.00	
60	72	74	0.00	-72.00	0.00	
61	73	75	0.00	-72.00	0.00	
62	76	74	47.89	60.00	-36.15	
63	77	75	47.89	60.00	36.15	
64	76	78	-18.82	0.00	14.21	
65	77	79	-18.82	0.00	-14.21	
66	80	78	47.89	-60.00	-36.15	
67	81	79	47.89	-60.00	36.15	
68	80	82	0.00	60.37	0.00	
69	81	84	0.00	60.37	0.00	
70	85	82	-3.63	-38.55	-13.55	
71	87	83	90.30	-42.09	0.00	
72	86	84	-3.63	-38.55	13.55	
73	85	89	14.97	69.07	55.95	
74	87	89	-45.26	53.91	0.00	
75	86	89	14.97	69.07	-55.95	
76	88	89	0.00	276.00	0.00	
77	89	90	0.00	180.00	0.00	
78	90	95	0.00	180.00	0.00	
79	95	96	0.00	96.00	0.00	
80	96	97	0.00	144.00	0.00	

F R E Q U E N C Y A N A L Y S I S

OVERALL PROBLEM SIZE

TOTAL NUMBER OF EQUATIONS.....	432
HALF BANDWIDTH OF STIFFNESS.....	60
NUMBER OF EQUATION BLOCKS.....	4
NUMBER OF EQUATIONS PER BLOCK.....	120
NUMBER OF MODES REQUIRED.(EST.).....	30
CUT-OFF FREQUENCY.....	100.00
TOTAL MODES TO CUT-OFF FREQUENCY.....	54
NODAL WT./GEN. MASS PRINT CODE (MWPRNT).....	0

PRINT NODAL WT. SUMMARY AND GEN. MASS = 0
SUPPRESS GEN. MASS PRINT = 1
SUPPRESS NODAL WT. SUMMARY PRINT = 2
SUPPRESS BOTH OF ABOVE PRINTS = 3

THE OUT OF CORE SUBSPACE ITERATION ALGORITHM WITH A MAXIMUM ALLOWABLE NUMBER OF ITERATIONS PER GROUP OF 16 IS CHOSEN.
SUBSPACE ITERATION WAS USER REQUESTED.
AN IN CORE SOLUTION WOULD REQUIRE A VALUE OF ABOUT 53572 FOR *MTOT*.

STORAGE ESTIMATES

THE FOLLOWING CONTROL PARAMETERS ARE EITHER USER SUPPLIED OR INTERNALLY ESTIMATED ARE USED TO CALCULATE ESTIMATES OF THE MINIMUM VALUE OF *MTOT*, THE PROGRAM STORAGE PARAMETER, AND THE CORRESPONDING CORE FIELD LENGTH SPECIFICATION REQUIRED FOR THE USERS JOB CARD...

NUMBER OF NODAL POINTS (NUMNP).....	78
NUMBER OF DYNAMIC NODAL RESTRAINTS (NODREA)....	36
NUMBER OF NON-GLOBAL NODES (NNG).....	4
NUMBER OF MODES (NM).....	30
NUMBER OF EQUATIONS PER BLOCK (NEQB).....	120
NUMBER OF SPECTRAL CURVES INPUT (NSC).....	1
NUMBER OF MODAL TIME STEPS (NT).....	100
NUMBER OF FORCING FUNCTIONS (NFN).....	4

EMPLOYING THE ABOVE PARAMETERS,THE FOLLOWING VALUES FOR MTOT AND CORE ARE ESTIMATED...

	MTOT (DECIMAL)	CORE (OCTAL)
RESPONSE SPECTRUM ANALYSIS.....	3969	007601
TIME HISTORY MODAL.....	5340	012334
STRUCTURAL PLOTTING.....	5040	011660
CREATE OR READ RESTART TAPE.....	2296	004370

N O D A L W E I G H T S U M M A R Y

NODE NAME	RESTRAINT CODE	X TRANSLATION	Y TRANSLATION	Z TRANSLATION
47 *	000000	801007.200	801007.200	801007.200
F47 *	000000	0.000	0.000	0.000
1 *	000000	200155.200	200155.200	200155.200
2 *	000000	100077.600	100077.600	100077.600
3 *	000000	100077.600	100077.600	100077.600
4 *	000000	350078.400	350078.400	350078.400
9 *	000000	90031.200	90031.200	90031.200
10 *	111111	0.000	0.000	0.000
11 *	000000	1716.582	1716.582	1716.582
12 *	000000	8434.004	8434.004	8434.004
13 *	000000	1716.582	1716.582	1716.582
14 *	000000	4191.880	4191.880	4191.880
15 *	000000	14292.304	14292.304	14292.304
16 *	000000	4191.880	4191.880	4191.880
17 *	000000	6339.458	6339.458	6339.458
18 *	000000	6339.458	6339.458	6339.458
19 *	000000	4830.967	4830.967	4830.967
20 *	000000	4830.967	4830.967	4830.967
21 *	000000	4830.967	4830.967	4830.967
22 *	000000	4830.967	4830.967	4830.967
23 *	000000	3864.159	3864.159	3864.159
24 *	000000	3864.159	3864.159	3864.159
25 *	000000	50232.000	50232.000	50232.000
26 *	000000	50232.000	50232.000	50232.000
27 *	111111	0.000	0.000	0.000
28 *	111111	0.000	0.000	0.000
29 *	000000	150309.600	150309.600	150309.600
30 *	000000	150309.600	150309.600	150309.600
31 *	000000	2803.048	2803.048	2803.048
32 *	000000	2803.048	2803.048	2803.048
33 *	000000	5613.283	5613.283	5613.283
34 *	000000	12500.301	12500.301	12500.301
35 *	000000	5610.805	5610.805	5610.805
36 *	000000	4078.127	4078.127	4078.127
37 *	000000	4080.284	4080.284	4080.284
38 *	000000	1267.892	1267.892	1267.892
39 *	000000	6642.000	6642.000	6642.000
40 *	000000	1272.527	1272.527	1272.527
48 *	000000	750775.200	750775.200	750775.200
49 *	000000	500388.000	500388.000	500388.000
50 *	000000	200155.200	200155.200	200155.200
51 *	000000	150309.600	150309.600	150309.600
58 *	000000	1272.527	1272.527	1272.527
59 *	000000	6642.000	6642.000	6642.000
60 *	000000	1267.892	1267.892	1267.892
61 *	000000	4080.284	4080.284	4080.284
62 *	000000	4078.127	4078.127	4078.127

N O D A L W E I G H T S U M M A R Y (CONTINUED)

NODE NAME	RESTRAINT CODE	X TRANSLATION	Y TRANSLATION	Z TRANSLATION
63 *	000000	5610.805	5610.805	5610.805
64 *	000000	12500.301	12500.301	12500.301
65 *	000000	5613.283	5613.283	5613.283
66 *	000000	2803.048	2803.048	2803.048
67 *	000000	2803.048	2803.048	2803.048
68 *	000000	150309.600	150309.600	150309.600
69 *	000000	150309.600	150309.600	150309.600
70 *	111111	0.000	0.000	0.000
71 *	111111	0.000	0.000	0.000
72 *	000000	50232.000	50232.000	50232.000
73 *	000000	50232.000	50232.000	50232.000
74 *	000000	3864.159	3864.159	3864.159
75 *	000000	3864.159	3864.159	3864.159
76 *	000000	4830.967	4830.967	4830.967
77 *	000000	4830.967	4830.967	4830.967
78 *	000000	4830.967	4830.967	4830.967
79 *	000000	4830.967	4830.967	4830.967
80 *	000000	6339.458	6339.458	6339.458
81 *	000000	6339.458	6339.458	6339.458
82 *	000000	4191.880	4191.880	4191.880
83 *	000000	14292.304	14292.304	14292.304
84 *	000000	4191.880	4191.880	4191.880
85 *	000000	1716.582	1716.582	1716.582
86 *	000000	1716.582	1716.582	1716.582
87 *	000000	8434.004	8434.004	8434.004
88 *	111111	0.000	0.000	0.000
89 *	000000	90031.200	90031.200	90031.200
90 *	000000	350078.400	350078.400	350078.400
95 *	000000	100077.600	100077.600	100077.600
96 *	000000	100077.600	100077.600	100077.600
97 *	000000	200155.200	200155.200	200155.200

F R E Q U E N C Y D I S T R I B U T I O N B Y G R O U P

SUBSPACE GROUP	NO. MODES IN GROUP	LOWER BOUND HERTZ	LOWER BOUND EIGENVALUE	UPPER BOUND HERTZ	UPPER BOUND EIGENVALUE
1	2	4.419	.7711E+03	6.250	.1542E+04
2	6	6.250	.1542E+04	8.839	.3084E+04
3	2	8.839	.3084E+04	12.500	.6169E+04
4	5	12.500	.6169E+04	15.309	.9253E+04
5	5	15.309	.9253E+04	29.315	.3393E+05
6	5	29.315	.3393E+05	30.619	.3701E+05
7	2	30.619	.3701E+05	35.355	.4935E+05
8	6	35.355	.4935E+05	50.000	.9870E+05

F R E Q U E N C Y A N D C O N V E R G E N C E D A T A - S U B S P A C E I T E R A T I O N

GROUP	NO. MODES	ITERA-TIONS	SHIFT EIGENVALUE	MODE	CIRCULAR FREQUENCY (RAD/SEC)	FREQUENCY (HZ)	PERIOD (SEC)	FREQUENCY TOLERANCE	MODE TOLERANCE	//K*Ø// 2	//K*Ø-EIG *M*Ø// MAX	K*Ø OF MAX NORM
1	2	5	.115659E+04	1	38.5398	6.1338	.1630	.7737E-09	.1531E-03	.3052E+05	.4596E+01	.4596E+01
				2	38.8547	6.1839	.1617	.3113E-08	.1107E-04	.3136E+05	.1679E+00	-.1870E+04
2	6	2	.231319E+04	3	41.2108	6.5589	.1525	.2767E-08	.2647E-04	.3343E+05	.7008E+00	.4982E+04
				4	41.2983	6.5728	.1521	.3558E-08	.1592E-04	.3274E+05	.2175E+00	.4493E+03
				5	41.6725	6.6324	.1508	.8059E-09	.2191E-04	.3475E+05	.7205E+00	-.7205E+00
				6	41.7025	6.6372	.1507	.7234E-09	.6408E-04	.3476E+05	.2098E+01	-.2098E+01
				7	42.2363	6.7221	.1488	.1385E-08	.3051E-04	.4406E+05	.1272E+01	.1733E+05
				8	50.1655	7.9841	.1252	.1000E-06	.1933E-04	.5430E+05	.4190E+00	-.4671E+00
3	2	3	.462638E+04	9	64.1704	10.2130	.0979	.3445E-09	.9503E-05	.1131E+06	.8181E+00	-.5417E+05
				10	73.7327	11.7349	.0852	.2707E-08	.2470E-04	.2001E+06	.4532E+01	-.4532E+01
4	5	2	.771063E+04	11	84.2008	13.4010	.0746	.1832E-09	.1304E-03	.1381E+06	.1319E+02	-.1319E+02
				12	87.3111	13.8960	.0720	.1965E-09	.1186E-06	.1542E+06	.7204E-02	-.7204E-02
				13	89.5223	14.2479	.0702	.5524E-09	.2129E-04	.1917E+06	.3997E+01	.3997E+01
				14	91.0829	14.4963	.0690	.4266E-08	.2523E-05	.1906E+06	.2370E+00	-.2530E+00
				15	92.4246	14.7098	.0680	.6233E-07	.1963E-04	.2234E+06	.3390E+01	.3390E+01
5	5	9	.215898E+05	16	97.9493	15.5891	.0641	.6856E-12	.8370E-04	.3285E+06	.2618E+02	.2618E+02
				17	107.4267	17.0975	.0585	.4439E-12	.1208E-04	.3323E+06	.2458E+01	-.2458E+01
				18	118.8703	18.9188	.0529	.1030E-12	.5168E-04	.5117E+06	.2319E+02	.2319E+02
				19	177.7181	28.2847	.0354	.4803E-07	.6848E-04	.3084E+06	.1253E+02	.9551E+05
				20	177.8711	28.3091	.0353	.3776E-08	.1867E-04	.3167E+06	.3931E+01	.9431E+05
6	5	3	.354689E+05	21	185.4920	29.5220	.0339	.8120E-13	.2463E-06	.8943E+06	.2112E+00	-.4737E+06
				22	187.2135	29.7960	.0336	.1594E-12	.1702E-06	.5605E+06	.6426E-01	.6426E-01
				23	190.4605	30.3127	.0330	.5777E-12	.1088E-06	.1217E+07	.1163E+00	.7291E+06
				24	191.5750	30.4901	.0328	.8750E-10	.1599E-05	.6240E+06	.8966E+00	.8966E+00
				25	191.6218	30.4976	.0328	.1210E-09	.1007E-05	.6240E+06	.5899E+00	-.5899E+00
7	2	1	.431795E+05	26	199.9812	31.8280	.0314	.1228E-08	.2368E-05	.5103E+06	.6699E+00	.7818E+00
				27	200.1227	31.8505	.0314	.2652E-08	.1234E-04	.4493E+06	.3011E+01	-.6417E+01
8	6	6	.740220E+05	28	248.1674	39.4971	.0253	.3914E-07	.1529E-03	.5314E+06	.6750E+02	.6750E+02
				29	253.9558	40.4183	.0247	.7233E-10	.4663E-05	.8228E+06	.3449E+01	-.3449E+01
				30	255.9428	40.7346	.0245	.1649E-08	.1079E-04	.5187E+06	.2382E+01	.5145E+01

G E N E R A L I Z E D M A S S M A T R I X

	1	2	3	4	5	6	7	8	9	10
1	1.00000	-.00000	.00000	.00000	-.00000	.00000	-.00000	-.00000	-.00000	.00000
2	-.00000	1.00000	-.00000	-.00000	-.00000	.00000	.00000	.00000	.00000	-.00000
3	.00000	-.00000	1.00000	.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000
4	.00000	-.00000	.00000	1.00000	.00000	-.00000	-.00000	.00000	.00000	-.00000
5	-.00000	-.00000	-.00000	.00000	1.00000	.00000	.00000	.00000	-.00000	.00000
6	.00000	.00000	.00000	-.00000	.00000	1.00000	-.00000	.00000	-.00000	.00000
7	-.00000	.00000	-.00000	-.00000	.00000	-.00000	1.00000	.00000	-.00000	.00000
8	-.00000	.00000	-.00000	.00000	.00000	.00000	.00000	1.00000	-.00000	.00000
9	-.00000	.00000	.00000	.00000	-.00000	-.00000	-.00000	-.00000	1.00000	-.00000
10	.00000	-.00000	-.00000	-.00000	.00000	.00000	.00000	.00000	-.00000	1.00000
11	-.00000	.00000	.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	.00000
12	-.00000	.00000	.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	.00000
13	-.00000	.00000	.00000	.00000	-.00000	-.00000	-.00000	-.00000	-.00000	.00000
14	-.00000	-.00000	-.00000	-.00000	.00000	.00000	.00000	.00000	.00000	.00000
15	.00000	-.00000	-.00000	-.00000	.00000	.00000	.00000	.00000	-.00000	-.00000
16	.00000	-.00000	.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	-.00000
17	.00000	.00000	.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	.00000
18	-.00000	.00000	-.00000	-.00000	.00000	.00000	.00000	.00000	-.00000	.00000
19	-.00000	.00000	.00000	.00000	-.00000	-.00000	-.00000	-.00000	-.00000	-.00000
20	.00000	-.00000	-.00000	-.00000	.00000	.00000	.00000	.00000	-.00000	-.00000
21	-.00000	.00000	-.00000	-.00000	.00000	.00000	.00000	.00000	-.00000	.00000
22	.00000	-.00000	.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	.00000
23	-.00000	.00000	.00000	.00000	-.00000	-.00000	-.00000	-.00000	-.00000	-.00000
24	-.00000	-.00000	.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	.00000
25	.00000	.00000	-.00000	-.00000	.00000	.00000	.00000	.00000	-.00000	-.00000
26	-.00000	.00000	.00000	.00000	-.00000	-.00000	-.00000	-.00000	-.00000	-.00000
27	-.00000	.00000	-.00000	-.00000	.00000	.00000	.00000	.00000	-.00000	.00000
28	-.00000	.00000	-.00000	-.00000	.00000	.00000	.00000	.00000	.00000	.00000
29	.00000	.00000	-.00000	-.00000	.00000	.00000	.00000	.00000	-.00000	-.00000
30	.00000	-.00000	-.00000	-.00000	.00000	.00000	.00000	.00000	-.00000	-.00000

GENERALIZED MASS MATRIX (CONTINUED)

	11	12	13	14	15	16	17	18	19	20
1	-.00000	-.00000	-.00000	-.00000	.00000	.00000	.00000	-.00000	-.00000	.00000
2	.00000	.00000	.00000	-.00000	-.00000	-.00000	.00000	.00000	.00000	-.00000
3	.00000	.00000	.00000	-.00000	-.00000	.00000	.00000	-.00000	.00000	-.00000
4	.00000	.00000	.00000	-.00000	-.00000	.00000	.00000	-.00000	.00000	-.00000
5	-.00000	-.00000	-.00000	.00000	.00000	-.00000	-.00000	.00000	-.00000	.00000
6	-.00000	-.00000	-.00000	.00000	.00000	-.00000	-.00000	.00000	-.00000	.00000
7	-.00000	-.00000	-.00000	.00000	.00000	-.00000	-.00000	.00000	-.00000	.00000
8	-.00000	-.00000	-.00000	.00000	.00000	-.00000	-.00000	.00000	-.00000	.00000
9	.00000	.00000	-.00000	.00000	-.00000	.00000	.00000	-.00000	-.00000	-.00000
10	.00000	.00000	.00000	.00000	-.00000	-.00000	.00000	.00000	-.00000	-.00000
11	1.00000	-.00000	-.00000	-.00000	.00000	-.00000	-.00000	-.00000	.00000	.00000
12	-.00000	1.00000	.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	.00000
13	-.00000	.00000	1.00000	.00000	-.00000	.00000	.00000	-.00000	.00000	.00000
14	-.00000	.00000	.00000	1.00000	.00000	-.00000	-.00000	-.00000	.00000	.00000
15	.00000	-.00000	-.00000	.00000	1.00000	-.00000	.00000	.00000	-.00000	-.00000
16	-.00000	-.00000	.00000	-.00000	-.00000	1.00000	.00000	.00000	-.00000	-.00000
17	-.00000	-.00000	.00000	-.00000	.00000	.00000	1.00000	-.00000	.00000	.00000
18	-.00000	-.00000	-.00000	-.00000	.00000	.00000	-.00000	1.00000	.00000	-.00000
19	.00000	.00000	.00000	.00000	-.00000	-.00000	.00000	.00000	1.00000	.00000
20	.00000	.00000	.00000	.00000	-.00000	-.00000	.00000	-.00000	.00000	1.00000
21	-.00000	-.00000	-.00000	.00000	.00000	.00000	.00000	.00000	.00000	-.00000
22	-.00000	-.00000	-.00000	-.00000	.00000	.00000	-.00000	.00000	.00000	-.00000
23	.00000	.00000	.00000	.00000	-.00000	-.00000	-.00000	-.00000	-.00000	.00000
24	-.00000	-.00000	-.00000	-.00000	.00000	.00000	.00000	.00000	.00000	-.00000
25	.00000	.00000	.00000	.00000	-.00000	.00000	.00000	.00000	.00001	-.00000
26	.00000	.00000	.00000	.00000	-.00000	-.00000	-.00000	-.00000	-.00000	.00000
27	.00000	.00000	.00000	-.00000	-.00000	.00000	.00000	.00000	.00001	-.00000
28	.00000	-.00000	-.00000	-.00000	.00000	.00000	.00000	.00000	.00004	-.00001
29	-.00000	-.00000	-.00000	-.00000	.00000	-.00000	-.00000	-.00000	-.00003	.00001
30	-.00000	-.00000	-.00000	-.00000	.00000	-.00000	-.00000	-.00000	-.00001	.00000

G E N E R A L I Z E D M A S S M A T R I X (CONTINUED)

	21	22	23	24	25	26	27	28	29	30
1	-.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000	-.00000	.00000	.00000
2	.00000	-.00000	.00000	-.00000	.00000	.00000	.00000	.00000	.00000	-.00000
3	-.00000	.00000	.00000	.00000	-.00000	.00000	-.00000	-.00000	-.00000	-.00000
4	-.00000	.00000	.00000	.00000	-.00000	.00000	-.00000	-.00000	-.00000	-.00000
5	.00000	-.00000	-.00000	-.00000	.00000	-.00000	.00000	.00000	.00000	.00000
6	.00000	-.00000	-.00000	-.00000	.00000	-.00000	.00000	.00000	.00000	.00000
7	.00000	-.00000	-.00000	-.00000	.00000	-.00000	.00000	.00000	.00000	.00000
8	.00000	-.00000	-.00000	-.00000	.00000	-.00000	.00000	.00000	.00000	.00000
9	-.00000	.00000	-.00000	.00000	-.00000	-.00000	-.00000	.00000	-.00000	-.00000
10	.00000	.00000	-.00000	.00000	-.00000	-.00000	.00000	.00000	-.00000	-.00000
11	-.00000	-.00000	.00000	-.00000	.00000	.00000	.00000	.00000	-.00000	-.00000
12	-.00000	-.00000	.00000	-.00000	.00000	.00000	.00000	-.00000	-.00000	-.00000
13	-.00000	-.00000	.00000	-.00000	.00000	.00000	.00000	-.00000	-.00000	-.00000
14	.00000	-.00000	.00000	-.00000	.00000	.00000	-.00000	-.00000	-.00000	-.00000
15	.00000	.00000	-.00000	.00000	-.00000	-.00000	-.00000	.00000	.00000	.00000
16	.00000	.00000	-.00000	.00000	.00000	-.00000	.00000	.00000	-.00000	-.00000
17	.00000	-.00000	-.00000	.00000	.00000	-.00000	.00000	.00000	-.00000	-.00000
18	.00000	.00000	-.00000	.00000	.00000	-.00000	.00000	.00000	-.00000	-.00000
19	.00000	.00000	-.00000	.00000	.00001	-.00000	.00001	.00004	-.00003	-.00001
20	-.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00001	.00001	.00000
21	1.00000	-.00000	-.00000	-.00000	.00000	.00000	.00000	.00000	-.00000	-.00000
22	-.00000	1.00000	-.00000	.00000	-.00000	-.00000	.00000	.00000	-.00000	-.00000
23	-.00000	-.00000	1.00000	-.00000	-.00000	-.00000	.00000	.00000	-.00000	-.00000
24	-.00000	.00000	-.00000	1.00000	-.00000	.00000	-.00000	-.00000	.00000	.00000
25	.00000	-.00000	-.00000	-.00000	1.00000	.00000	-.00000	-.00000	.00000	.00000
26	.00000	-.00000	-.00000	.00000	.00000	1.00000	-.00000	-.00000	.00000	.00000
27	.00000	.00000	.00000	-.00000	-.00000	-.00000	1.00000	.00000	-.00000	-.00000
28	.00000	.00000	.00000	-.00000	-.00000	-.00000	.00000	1.00000	.00000	.00000
29	-.00000	-.00000	-.00000	.00000	.00000	.00000	-.00000	.00000	1.00000	-.00000
30	-.00000	-.00000	-.00000	.00000	.00000	.00000	-.00000	.00000	-.00000	1.00000

MAXIMUM VALUE OF OFF DIAGONAL TERMS = .376E-04
MODE SHAPE NUMBER.. 28
ROW NUMBER..... 19

MAXIMUM ABSOLUTE DIFFERANCE BETWEEN DIAGONAL AND 1 = .14921E-12
MODE SHAPE NUMBER.. 21

F R E Q U E N C Y E R R O R E S T I M A T E S U M M A R Y - S U B S P A C E I T E R A T I O N

CONDITIONING NUMBER = .4355E+10

WARNING CONDITIONING NUMBER GREATER THAN .1E+08

SUMMARY OF WARNINGS

CONDITIONING NUMBER GREATER THAN

PIPING SYSTEM MODE SHAPES (LOWEST 6 MODES PRINTED)

MODE SHAPE NUMBER... 1
FREQUENCY (HZ)..... 6.1338 MAX. NORMALIZING COMPONENT..... .02210

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
47 *	.00000	.00000	-.00000	-.00000	-.00031	.00000	GLOBAL
F47 *	.00000	.00000	-.00000	-.00000	-.00031	.00000	GLOBAL
1 *	-.00000	.00001	-1.00000	-.00251	-.00067	.00000	GLOBAL
2 *	-.00000	.00001	-.62796	-.00242	-.00067	.00000	GLOBAL
3 *	-.00000	.00001	-.38902	-.00226	-.00067	.00000	GLOBAL
4 *	-.00000	.00001	-.00011	-.00168	-.00067	.00000	GLOBAL
9 *	.00000	.00001	.21556	-.00109	-.00067	.00000	GLOBAL
10 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
11 *	.03584	-.06061	.29965	-.00107	-.00067	-.00001	GLOBAL
12 *	.00000	.00001	.24066	-.00107	-.00069	.00000	GLOBAL
13 *	-.03584	.06062	.29965	-.00107	-.00067	.00001	GLOBAL
14 *	.03031	-.07046	.31730	.00010	-.00064	-.00055	GLOBAL
15 *	.00000	.00000	.17466	-.00051	-.00116	.00000	GLOBAL
16 *	-.03031	.07048	.31732	.00010	-.00064	.00055	GLOBAL
17 *	-.01056	-.07097	.29455	.00048	-.00085	-.00064	GLOBAL
18 *	.01054	.07099	.29462	.00048	-.00085	.00064	GLOBAL
19 *	.00460	-.03407	.19349	.00073	-.00136	.00005	GLOBAL
20 *	-.00465	.03413	.19359	.00074	-.00136	-.00005	GLOBAL
21 *	.02402	-.02585	.16711	.00077	-.00138	.00010	GLOBAL
22 *	-.02408	.02591	.16721	.00077	-.00138	-.00010	GLOBAL
23 *	.07681	.00369	.17634	.00196	-.00116	-.00053	GLOBAL
24 *	-.07692	-.00370	.17659	.00197	-.00116	.00053	GLOBAL
25 *	.11507	.00351	.31829	.00203	-.00115	-.00057	GLOBAL
26 *	-.11527	-.00352	.31884	.00203	-.00115	.00058	GLOBAL
27 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
28 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
29 *	.19574	.00352	.59937	.00222	-.00115	-.00064	GLOBAL
30 *	-.19612	-.00353	.60049	.00223	-.00115	.00064	GLOBAL
31 *	.10383	.00463	.27630	.00200	-.00119	-.00057	GLOBAL
32 *	-.10401	-.00465	.27679	.00200	-.00119	.00057	GLOBAL
33 *	.07438	.00470	.17002	.00120	-.00168	-.00032	GLOBAL
34 *	.00000	.00000	.09139	-.00027	-.00095	.00000	GLOBAL
35 *	-.07452	-.00473	.17033	.00121	-.00168	.00032	GLOBAL
36 *	.04279	.00247	.05623	.00041	-.00140	-.00006	GLOBAL
37 *	-.04283	-.00248	.05641	.00041	-.00141	.00006	GLOBAL
38 *	.04050	.00004	.00008	.00000	-.00031	-.00000	NON-GLOBAL
39 *	.00000	.00000	.03007	-.00000	-.00032	.00000	GLOBAL
40 *	.04048	-.00004	-.00008	-.00000	-.00031	-.00000	NON-GLOBAL
48 *	.00000	.00000	-.00000	-.00000	-.00031	.00000	GLOBAL
49 *	.00000	.00000	-.00000	-.00000	-.00031	.00000	GLOBAL
50 *	.00000	.00000	-.00000	-.00000	-.00031	.00000	GLOBAL
51 *	.00000	.00000	-.00000	-.00000	-.00031	.00000	GLOBAL
58 *	-.04048	-.00004	.00008	.00000	-.00031	.00000	NON-GLOBAL
59 *	.00000	.00000	-.03007	.00000	-.00032	-.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 6 MODES PRINTED)

MODE SHAPE NUMBER... 1 (CONTINUED)
FREQUENCY (HZ)..... 6.1338 MAX. NORMALIZING COMPONENT..... .02210

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
60 *	-.04050	.00004	-.00008	-.00000	-.00031	.00000	NON-GLOBAL
61 *	.04283	-.00248	-.05641	-.00041	-.00141	-.00006	GLOBAL
62 *	-.04279	.00247	-.05623	-.00041	-.00140	.00006	GLOBAL
63 *	.07452	-.00473	-.17033	-.00121	-.00168	-.00032	GLOBAL
64 *	-.00000	.00000	-.09139	.00027	-.00095	-.00000	GLOBAL
65 *	-.07438	.00470	-.17002	-.00120	-.00168	.00032	GLOBAL
66 *	.10401	-.00465	-.27679	-.00200	-.00119	-.00057	GLOBAL
67 *	-.10383	.00463	-.27630	-.00200	-.00119	.00057	GLOBAL
68 *	.19612	-.00353	-.60049	-.00223	-.00115	-.00064	GLOBAL
69 *	-.19574	.00352	-.59937	-.00222	-.00115	.00064	GLOBAL
70 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
71 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
72 *	.11527	-.00352	-.31884	-.00203	-.00115	-.00058	GLOBAL
73 *	-.11506	.00351	-.31829	-.00203	-.00115	.00057	GLOBAL
74 *	.07692	-.00370	-.17659	-.00197	-.00116	-.00053	GLOBAL
75 *	-.07681	.00369	-.17634	-.00196	-.00116	.00053	GLOBAL
76 *	.02408	.02591	-.16721	-.00077	-.00138	.00010	GLOBAL
77 *	-.02402	-.02585	-.16711	-.00077	-.00138	-.00010	GLOBAL
78 *	.00465	.03413	-.19359	-.00074	-.00136	.00005	GLOBAL
79 *	-.00460	-.03407	-.19349	-.00073	-.00136	-.00005	GLOBAL
80 *	-.01054	.07099	-.29462	-.00048	-.00085	-.00064	GLOBAL
81 *	.01056	-.07097	-.29455	-.00048	-.00085	.00064	GLOBAL
82 *	.03031	.07048	-.31732	-.00010	-.00064	-.00055	GLOBAL
83 *	-.00000	.00000	-.17466	.00051	-.00116	-.00000	GLOBAL
84 *	-.03031	-.07046	-.31730	-.00010	-.00064	.00055	GLOBAL
85 *	.03584	.06062	-.29965	.00107	-.00067	-.00001	GLOBAL
86 *	-.03584	-.06061	-.29965	.00107	-.00067	.00001	GLOBAL
87 *	.00000	.00001	-.24066	.00107	-.00069	-.00000	GLOBAL
88 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
89 *	.00000	.00001	-.21556	.00109	-.00067	-.00000	GLOBAL
90 *	.00000	.00001	.00011	.00168	-.00067	-.00000	GLOBAL
95 *	.00000	.00001	.38902	.00226	-.00067	-.00000	GLOBAL
96 *	.00000	.00001	.62796	.00242	-.00067	-.00000	GLOBAL
97 *	.00000	.00001	1.00000	.00251	-.00067	-.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 6 MODES PRINTED)

MODE SHAPE NUMBER... 2
FREQUENCY (HZ)..... 6.1839 MAX. NORMALIZING COMPONENT..... .02244

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
47 *	.00001	-.00000	-.04196	-.00000	.00000	-.00000	GLOBAL
F47 *	.00001	-.00000	-.04196	-.00000	.00000	-.00000	GLOBAL
1 *	-.00004	-.00001	1.00000	.00251	.00069	.00000	GLOBAL
2 *	-.00002	-.00001	.62748	.00243	.00069	.00000	GLOBAL
3 *	-.00001	-.00001	.38837	.00226	.00069	.00000	GLOBAL
4 *	-.00000	-.00001	.00012	.00167	.00069	.00000	GLOBAL
9 *	.00001	-.00001	-.21197	.00107	.00069	.00000	GLOBAL
10 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
11 *	-.03688	.05951	-.29500	.00105	.00069	.00001	GLOBAL
12 *	.00001	-.00001	-.23458	.00105	.00071	.00000	GLOBAL
13 *	.03690	-.05952	-.29500	.00105	.00069	-.00001	GLOBAL
14 *	-.02971	.06912	-.31169	-.00013	.00063	.00062	GLOBAL
15 *	.00001	-.00001	-.16529	.00049	.00112	-.00000	GLOBAL
16 *	.02973	-.06914	-.31171	-.00013	.00063	-.00062	GLOBAL
17 *	.01611	.06959	-.28708	-.00051	.00081	.00072	GLOBAL
18 *	-.01607	-.06962	-.28717	-.00051	.00081	-.00072	GLOBAL
19 *	.00758	.02915	-.18698	-.00075	.00129	-.00004	GLOBAL
20 *	-.00749	-.02922	-.18710	-.00075	.00129	.00004	GLOBAL
21 *	-.01077	.02065	-.16200	-.00079	.00131	-.00011	GLOBAL
22 *	.01086	-.02073	-.16212	-.00079	.00131	.00011	GLOBAL
23 *	-.05352	-.00498	-.17251	-.00190	.00111	.00034	GLOBAL
24 *	.05366	.00499	-.17281	-.00190	.00111	-.00035	GLOBAL
25 *	-.07841	-.00481	-.30979	-.00197	.00110	.00039	GLOBAL
26 *	.07867	.00482	-.31046	-.00197	.00111	-.00039	GLOBAL
27 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
28 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
29 *	-.13326	-.00483	-.58227	-.00215	.00110	.00043	GLOBAL
30 *	.13375	.00483	-.58363	-.00216	.00111	-.00044	GLOBAL
31 *	-.06757	-.00052	-.26936	-.00193	.00114	.00039	GLOBAL
32 *	.06781	.00054	-.26996	-.00194	.00115	-.00039	GLOBAL
33 *	-.03924	.00194	-.16767	-.00113	.00157	.00031	GLOBAL
34 *	.00001	-.00000	-.08680	.00026	.00082	-.00000	GLOBAL
35 *	.03942	-.00191	-.16805	-.00113	.00158	-.00032	GLOBAL
36 *	-.01002	-.00059	-.06295	-.00036	.00122	.00011	GLOBAL
37 *	.01010	.00059	-.06312	-.00037	.00122	-.00011	GLOBAL
38 *	-.02915	.00002	-.02975	-.00000	.00000	.00000	NON-GLOBAL
39 *	.00001	-.00000	-.04182	.00000	.00001	-.00000	GLOBAL
40 *	-.02916	-.00002	.02973	.00000	.00000	.00000	NON-GLOBAL
48 *	.00001	-.00000	-.04317	.00000	.00000	-.00000	GLOBAL
49 *	.00001	-.00000	-.04264	-.00000	.00000	-.00000	GLOBAL
50 *	.00001	-.00000	-.04307	-.00000	.00000	-.00000	GLOBAL
51 *	.00001	-.00000	-.04377	-.00000	.00000	-.00000	GLOBAL
58 *	-.02916	.00002	.02973	.00000	-.00000	.00000	NON-GLOBAL
59 *	.00001	.00000	-.04182	.00000	-.00001	-.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 6 MODES PRINTED)

MODE SHAPE NUMBER... 2 (CONTINUED)
FREQUENCY (HZ)..... 6.1839 MAX. NORMALIZING COMPONENT..... .02244

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
60 *	-.02915	-.00002	-.02975	-.00000	-.00000	.00000	NON-GLOBAL
61 *	.01010	-.00059	-.06312	-.00037	-.00122	-.00011	GLOBAL
62 *	-.01002	.00059	-.06295	-.00036	-.00122	.00011	GLOBAL
63 *	.03942	.00191	-.16805	-.00113	-.00158	-.00032	GLOBAL
64 *	.00001	.00000	-.08680	.00026	-.00082	-.00000	GLOBAL
65 *	-.03924	-.00194	-.16767	-.00113	-.00157	.00031	GLOBAL
66 *	.06781	-.00054	-.26996	-.00194	-.00115	-.00039	GLOBAL
67 *	-.06757	.00052	-.26936	-.00193	-.00114	.00039	GLOBAL
68 *	.13375	-.00483	-.58363	-.00216	-.00111	-.00044	GLOBAL
69 *	-.13326	.00483	-.58227	-.00215	-.00110	.00043	GLOBAL
70 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
71 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
72 *	.07867	-.00482	-.31046	-.00197	-.00111	-.00039	GLOBAL
73 *	-.07841	.00481	-.30979	-.00197	-.00110	.00039	GLOBAL
74 *	.05366	-.00499	-.17280	-.00190	-.00111	-.00035	GLOBAL
75 *	-.05352	.00498	-.17251	-.00190	-.00111	.00034	GLOBAL
76 *	.01086	.02073	-.16212	-.00079	-.00131	.00011	GLOBAL
77 *	-.01077	-.02065	-.16200	-.00079	-.00131	-.00011	GLOBAL
78 *	-.00749	.02922	-.18710	-.00075	-.00129	.00004	GLOBAL
79 *	.00757	-.02914	-.18698	-.00075	-.00129	-.00004	GLOBAL
80 *	-.01607	.06962	-.28717	-.00051	-.00081	-.00072	GLOBAL
81 *	.01611	-.06959	-.28708	-.00051	-.00081	.00072	GLOBAL
82 *	.02973	.06914	-.31171	-.00013	-.00063	-.00062	GLOBAL
83 *	.00001	.00001	-.16529	.00049	-.00112	-.00000	GLOBAL
84 *	-.02971	-.06911	-.31169	-.00013	-.00063	.00062	GLOBAL
85 *	.03690	.05952	-.29500	.00105	-.00069	-.00001	GLOBAL
86 *	-.03688	-.05951	-.29500	.00105	-.00069	.00001	GLOBAL
87 *	.00001	.00001	-.23458	.00105	-.00071	.00000	GLOBAL
88 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
89 *	.00001	.00001	-.21196	.00107	-.00069	.00000	GLOBAL
90 *	-.00000	.00001	.00012	.00167	-.00069	.00000	GLOBAL
95 *	-.00001	.00001	.38837	.00226	-.00069	.00000	GLOBAL
96 *	-.00002	.00001	.62748	.00243	-.00069	.00000	GLOBAL
97 *	-.00004	.00001	1.00000	.00251	-.00069	.00000	GLOBAL

PIPING SYSTEM MODE SHAPES (LOWEST 6 MODES PRINTED)

MODE SHAPE NUMBER... 3
FREQUENCY (HZ)..... 6.5589 MAX. NORMALIZING COMPONENT..... .02217

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
47 *	.06385	.00000	-.00009	-.00000	.00000	-.00002	GLOBAL
F47 *	.06385	.00000	-.00009	-.00000	.00000	-.00002	GLOBAL
1 *	-.26722	-.01218	-.00407	-.00001	-.00000	.00067	GLOBAL
2 *	-.16668	-.01214	-.00254	-.00001	-.00000	.00065	GLOBAL
3 *	-.10244	-.01210	-.00156	-.00001	-.00000	.00060	GLOBAL
4 *	-.00003	-.01200	-.00000	-.00001	-.00000	.00042	GLOBAL
9 *	.04986	-.01181	.00075	-.00000	-.00000	.00024	GLOBAL
10 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
11 *	.06526	-.01010	.00265	-.00002	.00000	.00023	GLOBAL
12 *	.06193	-.02187	.00078	-.00000	-.00000	.00023	GLOBAL
13 *	.06488	-.00971	-.00056	.00001	-.00001	.00023	GLOBAL
14 *	.06518	-.01436	.01705	-.00050	.00017	-.00001	GLOBAL
15 *	.06426	-.02098	.00044	-.00000	-.00000	-.00011	GLOBAL
16 *	.06484	-.01396	-.01503	.00051	-.00018	-.00000	GLOBAL
17 *	.06375	-.01528	.05151	-.00049	.00035	.00009	GLOBAL
18 *	.06388	-.01489	-.05014	.00050	-.00036	.00010	GLOBAL
19 *	.08043	-.04302	.07520	.00073	-.00008	.00075	GLOBAL
20 *	.08089	-.04333	-.07482	-.00074	.00007	.00076	GLOBAL
21 *	.08130	-.04703	.07400	.00105	-.00019	.00082	GLOBAL
22 *	.08164	-.04745	-.07377	-.00106	.00018	.00082	GLOBAL
23 *	.11946	.00539	.20126	.00371	-.00157	-.00114	GLOBAL
24 *	.11991	.00545	-.20255	-.00374	.00158	-.00115	GLOBAL
25 *	.20234	.00506	.47113	.00376	-.00165	-.00120	GLOBAL
26 *	.20342	.00511	-.47468	-.00379	.00166	-.00121	GLOBAL
27 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
28 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
29 *	.37136	.00508	.99216	.00412	-.00165	-.00134	GLOBAL
30 *	.37366	.00513	-1.00000	-.00415	.00166	-.00134	GLOBAL
31 *	.18578	.01151	.40927	.00370	-.00174	-.00117	GLOBAL
32 *	.18676	.01158	-.41245	-.00373	.00175	-.00118	GLOBAL
33 *	.13713	.01323	.23389	.00226	-.00281	-.00057	GLOBAL
34 *	.06409	-.01034	.00011	-.00000	-.00000	-.00012	GLOBAL
35 *	.13778	.01333	-.23588	-.00228	.00283	-.00058	GLOBAL
36 *	.08331	.00474	.04028	.00079	-.00227	-.00006	GLOBAL
37 *	.08352	.00483	-.04098	-.00080	.00229	-.00007	GLOBAL
38 *	.04488	-.00109	-.04505	-.00001	-.00001	-.00002	NON-GLOBAL
39 *	.06388	-.00174	-.00008	-.00000	-.00000	-.00002	GLOBAL
40 *	-.04501	-.00105	-.04492	-.00001	.00001	.00002	NON-GLOBAL
48 *	.06277	.00000	-.00004	-.00000	.00000	-.00001	GLOBAL
49 *	.06637	.00000	-.00011	-.00000	.00000	-.00002	GLOBAL
50 *	.06829	.00000	-.00013	-.00000	.00000	-.00002	GLOBAL
51 *	.07163	.00000	-.00016	-.00000	.00000	-.00002	GLOBAL
58 *	-.04501	.00105	-.04492	-.00001	-.00001	.00002	NON-GLOBAL
59 *	.06388	.00174	-.00008	-.00000	.00000	-.00002	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 6 MODES PRINTED)

MODE SHAPE NUMBER... 3 (CONTINUED)
FREQUENCY (HZ)..... 6.5589 MAX. NORMALIZING COMPONENT..... .02217

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
60 *	.04488	.00109	-.04505	-.00001	.00001	-.00002	NON-GLOBAL
61 *	.08352	-.00483	-.04098	-.00080	-.00229	-.00007	GLOBAL
62 *	.08331	-.00474	.04028	.00079	.00227	-.00006	GLOBAL
63 *	.13778	-.01333	-.23588	-.00228	-.00283	-.00058	GLOBAL
64 *	.06409	.01034	.00011	-.00000	.00000	-.00012	GLOBAL
65 *	.13713	-.01323	.23389	.00226	.00281	-.00057	GLOBAL
66 *	.18676	-.01157	-.41245	-.00373	-.00175	-.00118	GLOBAL
67 *	.18578	-.01151	.40928	.00370	.00174	-.00117	GLOBAL
68 *	.37365	-.00513	-1.00000	-.00415	-.00166	-.00134	GLOBAL
69 *	.37137	-.00508	.99216	.00412	.00165	-.00134	GLOBAL
70 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
71 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
72 *	.20342	-.00511	-.47468	-.00379	-.00166	-.00121	GLOBAL
73 *	.20235	-.00506	.47113	.00376	.00165	-.00120	GLOBAL
74 *	.11991	-.00545	-.20255	-.00374	-.00158	-.00115	GLOBAL
75 *	.11946	-.00539	.20126	.00371	.00157	-.00114	GLOBAL
76 *	.08165	.04745	-.07377	-.00106	-.00018	.00082	GLOBAL
77 *	.08130	.04703	.07400	.00105	.00019	.00082	GLOBAL
78 *	.08089	.04334	-.07482	-.00074	-.00007	.00076	GLOBAL
79 *	.08043	.04302	.07520	.00073	.00008	.00075	GLOBAL
80 *	.06388	.01489	-.05014	.00050	.00036	.00010	GLOBAL
81 *	.06375	.01528	.05151	-.00049	-.00035	.00009	GLOBAL
82 *	.06484	.01396	-.01503	.00051	.00018	-.00000	GLOBAL
83 *	.06426	.02098	.00044	-.00000	.00000	-.00011	GLOBAL
84 *	.06518	.01436	.01705	-.00050	-.00017	-.00001	GLOBAL
85 *	.06488	.00971	-.00056	.00001	.00001	.00023	GLOBAL
86 *	.06526	.01010	.00265	-.00002	-.00000	.00023	GLOBAL
87 *	.06193	.02187	.00078	-.00000	.00000	.00023	GLOBAL
88 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
89 *	.04986	.01181	.00075	-.00000	.00000	.00024	GLOBAL
90 *	-.00003	.01200	-.00000	-.00001	.00000	.00042	GLOBAL
95 *	-.10244	.01210	-.00156	-.00001	.00000	.00060	GLOBAL
96 *	-.16668	.01214	-.00254	-.00001	.00000	.00065	GLOBAL
97 *	-.26722	.01218	-.00407	-.00001	.00000	.00067	GLOBAL

PIPING SYSTEM MODE SHAPES (LOWEST 6 MODES PRINTED)

MODE SHAPE NUMBER... 4
FREQUENCY (HZ)..... 6.5728 MAX. NORMALIZING COMPONENT..... .02358

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
47 *	-.00000	.00061	.00000	-.00000	-.00000	.00000	GLOBAL
F47 *	-.00000	.00061	.00000	-.00000	-.00000	.00000	GLOBAL
1 *	-.00849	.01251	.00429	.00001	.00000	.00002	GLOBAL
2 *	-.00529	.01247	.00267	.00001	.00000	.00002	GLOBAL
3 *	-.00325	.01243	.00164	.00001	.00000	.00002	GLOBAL
4 *	-.00000	.01232	.00000	.00001	.00000	.00001	GLOBAL
9 *	.00124	.01213	-.00079	.00000	.00000	.00001	GLOBAL
10 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
11 *	.00245	.01405	-.00279	.00002	.00000	.00001	GLOBAL
12 *	.00128	.01189	-.00082	.00000	.00000	.00001	GLOBAL
13 *	.00284	.01364	.00060	-.00001	.00001	.00001	GLOBAL
14 *	.00439	.01900	-.01890	.00056	-.00008	-.00004	GLOBAL
15 *	.00108	.00925	-.00047	.00000	.00000	.00006	GLOBAL
16 *	.00475	.01859	.01680	-.00057	.00009	-.00005	GLOBAL
17 *	-.00093	.01979	-.05794	.00056	-.00023	-.00020	GLOBAL
18 *	-.00108	.01938	.05654	-.00057	.00024	-.00021	GLOBAL
19 *	-.02993	.04870	-.07519	-.00083	.00024	-.00074	GLOBAL
20 *	-.03046	.04905	.07482	.00083	-.00023	-.00075	GLOBAL
21 *	-.03311	.05059	-.07109	-.00116	.00034	-.00079	GLOBAL
22 *	-.03353	.05105	.07087	.00117	-.00033	-.00080	GLOBAL
23 *	-.07258	-.00684	-.19877	-.00372	.00159	.00091	GLOBAL
24 *	-.07314	-.00689	.20016	.00375	-.00160	.00092	GLOBAL
25 *	-.13919	-.00656	-.46957	-.00376	.00166	.00096	GLOBAL
26 *	-.14045	-.00661	.47341	.00380	-.00167	.00097	GLOBAL
27 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
28 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
29 *	-.27282	-.00658	-.99152	-.00413	.00166	.00106	GLOBAL
30 *	-.27544	-.00663	1.00000	.00416	-.00167	.00107	GLOBAL
31 *	-.12260	-.00511	-.40762	-.00370	.00175	.00095	GLOBAL
32 *	-.12375	-.00519	.41103	.00374	-.00176	.00095	GLOBAL
33 *	-.07430	-.00370	-.23336	-.00221	.00279	.00059	GLOBAL
34 *	.00061	.00417	-.00014	.00000	.00000	.00006	GLOBAL
35 *	-.07509	-.00380	.23546	.00223	-.00281	.00060	GLOBAL
36 *	-.02111	-.00281	-.04181	-.00074	.00224	.00014	GLOBAL
37 *	-.02141	-.00286	.04246	.00075	-.00227	.00015	GLOBAL
38 *	-.00247	.00049	-.00016	-.00000	.00001	.00001	NON-GLOBAL
39 *	.00007	.00064	.00003	.00000	-.00000	.00000	GLOBAL
40 *	.00259	.00049	-.00017	-.00000	-.00001	-.00001	NON-GLOBAL
48 *	.00000	.00062	.00000	-.00000	-.00000	.00000	GLOBAL
49 *	-.00000	.00061	.00000	-.00000	-.00000	.00000	GLOBAL
50 *	-.00000	.00062	.00000	-.00000	-.00000	.00000	GLOBAL
51 *	-.00000	.00062	.00000	-.00000	-.00000	.00000	GLOBAL
58 *	-.00259	.00049	.00017	.00000	-.00001	.00001	NON-GLOBAL
59 *	-.00007	.00064	-.00003	-.00000	-.00000	-.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 6 MODES PRINTED)

MODE SHAPE NUMBER... 4 (CONTINUED)
FREQUENCY (HZ)..... 6.5728 MAX. NORMALIZING COMPONENT..... .02358

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
60 *	.00247	.00049	.00017	.00000	.00001	-.00001	NON-GLOBAL
61 *	.02141	-.00286	-.04246	-.00075	-.00227	-.00015	GLOBAL
62 *	.02111	-.00281	.04181	.00074	.00224	-.00014	GLOBAL
63 *	.07509	-.00380	-.23546	-.00223	-.00281	-.00060	GLOBAL
64 *	-.00061	.00417	.00014	-.00000	.00000	-.00006	GLOBAL
65 *	.07430	-.00370	.23336	.00221	.00279	-.00059	GLOBAL
66 *	.12375	-.00519	-.41103	-.00374	-.00176	-.00095	GLOBAL
67 *	.12260	-.00511	.40762	.00370	.00175	-.00095	GLOBAL
68 *	.27544	-.00663	-1.00000	-.00416	-.00167	-.00107	GLOBAL
69 *	.27282	-.00658	.99152	.00413	.00166	-.00106	GLOBAL
70 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
71 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
72 *	.14045	-.00661	-.47341	-.00380	-.00167	-.00097	GLOBAL
73 *	.13918	-.00656	.46957	.00376	.00166	-.00096	GLOBAL
74 *	.07314	-.00689	-.20015	-.00375	-.00160	-.00092	GLOBAL
75 *	.07257	-.00684	.19877	.00372	.00159	-.00091	GLOBAL
76 *	.03353	.05105	-.07087	-.00117	-.00033	.00080	GLOBAL
77 *	.03311	.05059	.07109	.00116	.00034	.00079	GLOBAL
78 *	.03046	.04905	-.07482	-.00083	-.00023	.00075	GLOBAL
79 *	.02992	.04870	.07519	.00083	.00024	.00074	GLOBAL
80 *	.00108	.01938	-.05654	.00057	.00024	.00021	GLOBAL
81 *	.00093	.01979	.05794	-.00056	-.00023	.00020	GLOBAL
82 *	-.00475	.01859	-.01680	.00057	.00009	.00005	GLOBAL
83 *	-.00108	.00925	.00047	-.00000	.00000	-.00006	GLOBAL
84 *	-.00439	.01901	.01890	-.00056	-.00008	.00004	GLOBAL
85 *	-.00284	.01364	-.00060	.00001	.00001	-.00001	GLOBAL
86 *	-.00245	.01405	.00279	-.00002	.00000	-.00001	GLOBAL
87 *	-.00128	.01190	.00082	-.00000	.00000	-.00001	GLOBAL
88 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
89 *	-.00125	.01213	.00079	-.00000	.00000	-.00001	GLOBAL
90 *	.00000	.01233	-.00000	-.00001	.00000	-.00001	GLOBAL
95 *	.00325	.01243	-.00164	-.00001	.00000	-.00002	GLOBAL
96 *	.00529	.01247	-.00267	-.00001	.00000	-.00002	GLOBAL
97 *	.00849	.01251	-.00429	-.00001	.00000	-.00002	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 6 MODES PRINTED)

MODE SHAPE NUMBER... 5
FREQUENCY (HZ)..... 6.6324 MAX. NORMALIZING COMPONENT..... .01962

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
47 *	.00061	-.00000	.03217	.00006	-.00000	-.00000	GLOBAL
F47 *	.00061	-.00000	.03217	.00006	-.00000	-.00000	GLOBAL
1 *	-.00272	-.00006	.78220	.00198	.00071	.00001	GLOBAL
2 *	-.00169	-.00006	.48732	.00190	.00071	.00001	GLOBAL
3 *	-.00104	-.00006	.29906	.00176	.00071	.00001	GLOBAL
4 *	-.00000	-.00006	.00010	.00122	.00071	.00000	GLOBAL
9 *	.00049	-.00006	-.14083	.00068	.00071	.00000	GLOBAL
10 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
11 *	-.03875	.03584	-.19554	.00065	.00072	.00001	GLOBAL
12 *	.00061	-.00016	-.14249	.00067	.00073	.00000	GLOBAL
13 *	.04004	-.03591	-.19555	.00065	.00072	-.00001	GLOBAL
14 *	-.03704	.03543	-.18504	-.00086	.00074	.00058	GLOBAL
15 *	.00062	-.00015	-.07251	.00032	.00095	-.00000	GLOBAL
16 *	.03834	-.03554	-.18518	-.00086	.00074	-.00058	GLOBAL
17 *	.00867	.03465	-.11530	-.00110	.00103	.00090	GLOBAL
18 *	-.00747	-.03476	-.11575	-.00110	.00103	-.00090	GLOBAL
19 *	.04720	-.03942	-.01849	.00064	.00066	.00113	GLOBAL
20 *	-.04596	.03905	-.01924	.00064	.00066	-.00112	GLOBAL
21 *	.03768	-.05028	-.00525	.00107	.00053	.00114	GLOBAL
22 *	-.03645	.04984	-.00600	.00106	.00053	-.00113	GLOBAL
23 *	.05439	.00736	.17136	.00391	-.00128	-.00097	GLOBAL
24 *	-.05279	-.00731	.16930	.00387	-.00127	.00096	GLOBAL
25 *	.12584	.00707	.45643	.00392	-.00139	-.00100	GLOBAL
26 *	-.12328	-.00703	.45159	.00388	-.00137	.00099	GLOBAL
27 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
28 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
29 *	.26535	.00710	.99999	.00430	-.00139	-.00110	GLOBAL
30 *	-.26077	-.00706	.98975	.00425	-.00137	.00109	GLOBAL
31 *	.11183	.00587	.40406	.00386	-.00147	-.00099	GLOBAL
32 *	-.10944	-.00571	.39987	.00382	-.00146	.00098	GLOBAL
33 *	.06854	.00615	.24766	.00231	-.00255	-.00065	GLOBAL
34 *	.00062	-.00007	-.00712	.00020	.00068	-.00000	GLOBAL
35 *	-.06666	-.00595	.24534	.00229	-.00252	.00065	GLOBAL
36 *	.01936	.00750	.07032	.00080	-.00208	-.00018	GLOBAL
37 *	-.01800	-.00742	.07012	.00079	-.00206	.00018	GLOBAL
38 *	.02415	.00403	.02248	.00004	-.00001	-.00005	NON-GLOBAL
39 *	.00061	-.00001	.02966	.00006	.00001	-.00000	GLOBAL
40 *	.02331	-.00404	-.02334	-.00004	-.00001	-.00005	NON-GLOBAL
48 *	.00062	-.00000	.02196	.00006	-.00000	-.00000	GLOBAL
49 *	.00063	-.00000	.03763	.00006	-.00000	-.00000	GLOBAL
50 *	.00064	-.00000	.04219	.00006	-.00000	-.00000	GLOBAL
51 *	.00066	-.00000	.05045	.00006	-.00000	-.00000	GLOBAL
58 *	.02330	.00404	-.02334	-.00004	.00001	-.00005	NON-GLOBAL
59 *	.00061	.00001	.02965	.00006	-.00001	-.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 6 MODES PRINTED)

MODE SHAPE NUMBER... 5 (CONTINUED)
FREQUENCY (HZ)..... 6.6324 MAX. NORMALIZING COMPONENT..... .01962

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
60 *	.02415	-.00403	.02248	.00004	.00001	-.00005	NON-GLOBAL
61 *	-.01800	.00742	.07012	.00079	.00206	.00018	GLOBAL
62 *	.01936	-.00750	.07032	.00080	.00208	-.00018	GLOBAL
63 *	-.06666	.00595	.24534	.00229	.00252	.00065	GLOBAL
64 *	.00062	.00007	-.00712	.00020	-.00068	-.00000	GLOBAL
65 *	.06854	-.00615	.24766	.00231	.00255	-.00065	GLOBAL
66 *	-.10944	.00571	.39987	.00382	.00146	.00098	GLOBAL
67 *	.11183	-.00587	.40406	.00386	.00147	-.00099	GLOBAL
68 *	-.26077	.00706	.98976	.00425	.00137	.00109	GLOBAL
69 *	.26535	-.00710	1.00000	.00430	.00139	-.00110	GLOBAL
70 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
71 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
72 *	-.12328	.00703	.45159	.00388	.00137	.00099	GLOBAL
73 *	.12584	-.00707	.45644	.00392	.00139	-.00100	GLOBAL
74 *	-.05279	.00731	.16930	.00387	.00127	.00096	GLOBAL
75 *	.05439	-.00736	.17136	.00391	.00128	-.00097	GLOBAL
76 *	-.03645	-.04984	-.00600	.00106	-.00053	-.00113	GLOBAL
77 *	.03768	.05028	-.00525	.00107	-.00053	.00114	GLOBAL
78 *	-.04596	-.03905	-.01924	.00064	-.00066	-.00112	GLOBAL
79 *	.04720	.03942	-.01849	.00064	-.00066	.00113	GLOBAL
80 *	-.00747	.03476	-.11575	-.00110	-.00103	-.00090	GLOBAL
81 *	.00867	-.03465	-.11530	-.00110	-.00103	.00090	GLOBAL
82 *	.03834	.03554	-.18518	-.00086	-.00074	-.00058	GLOBAL
83 *	.00062	.00015	-.07251	.00032	-.00095	-.00000	GLOBAL
84 *	-.03704	-.03543	-.18504	-.00086	-.00074	.00058	GLOBAL
85 *	.04004	.03591	-.19556	.00065	-.00072	-.00001	GLOBAL
86 *	-.03875	-.03584	-.19554	.00065	-.00072	.00001	GLOBAL
87 *	.00061	.00016	-.14249	.00067	-.00073	.00000	GLOBAL
88 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
89 *	.00049	.00006	-.14083	.00068	-.00071	.00000	GLOBAL
90 *	-.00000	.00006	.00010	.00122	-.00071	.00000	GLOBAL
95 *	-.00104	.00006	.29906	.00176	-.00071	.00001	GLOBAL
96 *	-.00169	.00006	.48732	.00190	-.00071	.00001	GLOBAL
97 *	-.00272	.00006	.78221	.00198	-.00071	.00001	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 6 MODES PRINTED)

MODE SHAPE NUMBER... 6
FREQUENCY (HZ)..... 6.6372 MAX. NORMALIZING COMPONENT..... .01922

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
47 *	.00000	.00000	-.00000	.00000	.00016	-.00000	GLOBAL
F47 *	.00000	.00000	-.00000	.00000	.00016	-.00000	GLOBAL
1 *	-.00007	.00009	-.82452	-.00209	-.00073	.00000	GLOBAL
2 *	-.00004	.00009	-.51364	-.00201	-.00073	.00000	GLOBAL
3 *	-.00003	.00009	-.31518	-.00185	-.00073	.00000	GLOBAL
4 *	-.00000	.00009	-.00011	-.00129	-.00073	.00000	GLOBAL
9 *	.00001	.00008	.14814	-.00071	-.00073	.00000	GLOBAL
10 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
11 *	.04012	-.03770	.20540	-.00069	-.00073	-.00001	GLOBAL
12 *	.00001	.00008	.15074	-.00070	-.00074	.00000	GLOBAL
13 *	-.04008	.03789	.20543	-.00069	-.00073	.00001	GLOBAL
14 *	.03719	-.03744	.19462	.00090	-.00074	-.00064	GLOBAL
15 *	.00001	.00006	.07930	-.00031	-.00094	.00000	GLOBAL
16 *	-.03711	.03770	.19486	.00089	-.00074	.00064	GLOBAL
17 *	-.01264	-.03664	.12183	.00116	-.00103	-.00097	GLOBAL
18 *	.01265	.03691	.12261	.00115	-.00102	.00097	GLOBAL
19 *	-.05506	.04159	.02141	-.00061	-.00065	-.00114	GLOBAL
20 *	.05467	-.04093	.02243	-.00060	-.00066	.00113	GLOBAL
21 *	-.04563	.05308	.00825	-.00104	-.00052	-.00114	GLOBAL
22 *	.04520	-.05239	.00920	-.00102	-.00053	.00113	GLOBAL
23 *	-.06708	-.00624	-.16824	-.00392	.00132	.00107	GLOBAL
24 *	.06612	.00614	-.16552	-.00387	.00129	-.00106	GLOBAL
25 *	-.14557	-.00595	-.45452	-.00394	.00142	.00110	GLOBAL
26 *	.14371	.00585	-.44802	-.00389	.00140	-.00109	GLOBAL
27 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
28 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
29 *	-.29888	-.00597	-1.00000	-.00431	.00142	.00121	GLOBAL
30 *	.29522	.00588	-.98620	-.00425	.00140	-.00120	GLOBAL
31 *	-.13124	-.00765	-.40094	-.00388	.00151	.00108	GLOBAL
32 *	.12962	.00760	-.39532	-.00383	.00148	-.00107	GLOBAL
33 *	-.08697	-.00788	-.24073	-.00233	.00262	.00062	GLOBAL
34 *	.00000	.00003	.01554	-.00016	-.00062	.00000	GLOBAL
35 *	.08603	.00787	-.23758	-.00230	.00258	-.00061	GLOBAL
36 *	-.03608	-.00448	-.05695	-.00079	.00220	.00012	GLOBAL
37 *	.03583	.00445	-.05658	-.00078	.00217	-.00012	GLOBAL
38 *	-.02247	-.00005	-.00017	-.00000	.00017	.00001	NON-GLOBAL
39 *	.00000	.00000	-.01335	-.00000	.00015	.00000	GLOBAL
40 *	-.02242	.00006	.00017	.00000	.00017	.00001	NON-GLOBAL
48 *	-.00000	.00000	-.00000	.00000	.00016	-.00000	GLOBAL
49 *	.00000	.00000	-.00000	-.00000	.00016	-.00000	GLOBAL
50 *	.00000	.00000	-.00000	-.00000	.00016	-.00000	GLOBAL
51 *	.00000	.00000	-.00000	-.00000	.00016	-.00000	GLOBAL
58 *	.02242	.00006	-.00017	-.00000	.00017	-.00001	NON-GLOBAL
59 *	-.00000	.00000	.01335	.00000	.00015	-.00000	GLOBAL

PIPING SYSTEM MODE SHAPES (LOWEST 6 MODES PRINTED)

MODE SHAPE NUMBER... 6 (CONTINUED)
FREQUENCY (HZ)..... 6.6372 MAX. NORMALIZING COMPONENT..... .01922

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
60 *	.02247	-.00005	.00017	.00000	.00017	-.00001	NON-GLOBAL
61 *	-.03583	.00445	.05658	.00078	.00217	.00012	GLOBAL
62 *	.03608	-.00447	.05695	.00079	.00220	-.00012	GLOBAL
63 *	-.08603	.00787	.23758	.00230	.00258	.00061	GLOBAL
64 *	-.00000	.00003	-.01554	.00016	-.00062	-.00000	GLOBAL
65 *	.08697	-.00788	.24073	.00233	.00262	-.00062	GLOBAL
66 *	-.12962	.00760	.39532	.00383	.00148	.00107	GLOBAL
67 *	.13124	-.00765	.40094	.00388	.00151	-.00108	GLOBAL
68 *	-.29522	.00587	.98619	.00425	.00140	.00120	GLOBAL
69 *	.29887	-.00597	.99999	.00431	.00142	-.00121	GLOBAL
70 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
71 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
72 *	-.14371	.00585	.44801	.00389	.00140	.00109	GLOBAL
73 *	.14557	-.00595	.45452	.00394	.00142	-.00110	GLOBAL
74 *	-.06612	.00614	.16552	.00387	.00129	.00106	GLOBAL
75 *	.06708	-.00624	.16824	.00392	.00132	-.00107	GLOBAL
76 *	-.04520	-.05239	-.00920	.00102	-.00053	-.00113	GLOBAL
77 *	.04563	.05308	-.00825	.00104	-.00052	.00114	GLOBAL
78 *	-.05467	-.04093	-.02243	.00060	-.00066	-.00113	GLOBAL
79 *	.05506	.04159	-.02142	.00061	-.00065	.00114	GLOBAL
80 *	-.01265	.03691	-.12261	-.00115	-.00102	-.00097	GLOBAL
81 *	.01264	-.03664	-.12183	-.00116	-.00103	.00097	GLOBAL
82 *	.03711	.03770	-.19486	-.00089	-.00074	-.00064	GLOBAL
83 *	-.00001	.00006	-.07930	.00031	-.00094	-.00000	GLOBAL
84 *	-.03719	-.03744	-.19462	-.00090	-.00074	.00064	GLOBAL
85 *	.04007	.03789	-.20543	.00069	-.00073	-.00001	GLOBAL
86 *	-.04012	-.03770	-.20540	.00069	-.00073	.00001	GLOBAL
87 *	-.00001	.00008	-.15074	.00070	-.00074	-.00000	GLOBAL
88 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
89 *	-.00001	.00008	-.14814	.00071	-.00073	-.00000	GLOBAL
90 *	.00000	.00008	.00011	.00129	-.00073	-.00000	GLOBAL
95 *	.00003	.00009	.31518	.00185	-.00073	-.00000	GLOBAL
96 *	.00004	.00009	.51364	.00201	-.00073	-.00000	GLOBAL
97 *	.00007	.00009	.82451	.00209	-.00073	-.00000	GLOBAL

S P E C T R A L C U R V E D A T A

IDENT NUMBER 1
CURVE TITLE .....
CURVE TYPE ..... PERIOD VS. ACCELERATION
CURVE SCALE ..... LINEAR
NUMBER OF POINTS .. 38

POINT	PERIOD (SECS)	ACCELERATION (G)	***** COMMENT ******
1	.0050	.4141	R.C.DIVIDED BY 386.4
2	.0102	.4141	
3	.0139	.6289	
4	.0170	.6289	
5	.0192	.4400	
6	.0216	.6599	
7	.0244	.6599	
8	.0267	1.0533	
9	.0420	1.2293	
10	.0461	1.4363	
11	.0553	1.6874	
12	.0588	1.9539	
13	.0671	1.9539	
14	.0711	2.2386	
15	.1000	2.2386	
16	.1156	3.1625	
17	.1413	3.1625	
18	.1482	2.9762	
19	.1534	3.6206	
20	.1876	3.6206	
21	.1923	2.9503	
22	.2268	2.9503	
23	.2392	2.7355	
24	.2924	2.7355	
25	.3049	2.6475	
26	.3175	2.2127	
27	.3460	2.2127	
28	.3571	2.1014	
29	.3922	2.1014	
30	.4167	2.3654	
31	.5208	2.3654	
32	.5263	2.2386	
33	.6173	2.2386	
34	.6250	2.3421	
35	.7813	2.3421	

S P E C T R A L C U R V E D A T A (CONTINUED)

SPECTRAL DATA POINTS FOR CURVE 1 (CONTINUED)

POINT	PERIOD (SECS)	ACCELERATION (G)	***** COMMENT ******
36	.8696	1.7133	
37	.9524	1.7133	
38	1.0000	1.5528	

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

MODE NUMBER	PARTICIPATION FACTORS X DIR	Y DIR	Z DIR
1	.000	.001	-.000
2	.011	.000	.395
3	16.584	.000	-.299
4	-.000	1.227	.000
5	.089	-.000	61.622
6	.000	.007	-.000
7	8.711	-.000	-.065
8	.000	1.754	-.000
9	-94.703	-.000	-.010
10	.015	-.000	-70.618
11	-.000	-.006	.000
12	-.000	28.848	.000
13	.024	.000	.001
14	-.000	-64.561	.000
15	-.007	-.000	-35.089
16	.002	-.000	-9.915
17	-39.967	.000	-.000
18	.979	.000	-.003
19	-.000	.005	.000
20	-.001	.000	23.184
21	-.000	-78.630	-.000
22	-1.370	.000	-.008
23	.000	44.231	-.000
24	.000	-.067	-.000
25	.001	.000	-8.149
26	.000	9.822	.000
27	1.907	-.000	.001
28	-.000	-.001	.000
29	5.561	-.000	.001
30	.000	1.374	-.000

R E S P O N S E S P E C T R U M A N A L Y S I S

TITLE..... RESPONSE SPECT.
FILE LABEL..... GILES
SPECTRAL CURVES
X-DIRECTION..... 1
Y-DIRECTION..... 1
Z-DIRECTION..... 1
CURVE SCALE FACTORS
X-SCALE..... 1.000
Y-SCALE..... .667
Z-SCALE..... 1.000

SPECTRA COMBINATION CODE... VECTORIAL SUM
MODE COMBINATION CODE..... MODIFIED NRC GROUPING METHOD WITH FR= .1
NODAL PRINT THRESHOLD (G)
VERTICAL ACCELERATION.... 0
HORIZONTAL ACCELERATION.. 0
SAVE RESULTS PARAMETER..... 0

APPLIED SPECTRAL ACCELERATION SUMMARY RESPONSE SPECT.

FREQUENCY NUMBER	PERIOD (SEC)	ZONE NUMBER	SPECTRAL ACCELERATIONS (G) X TRANS	Y TRANS	Z TRANS	XX ROT	YY ROT	ZZ ROT
1	.163	1	3.621	2.414	3.621			
2	.162	1	3.621	2.414	3.621			
3	.152	1	3.505	2.337	3.505			
4	.152	1	3.465	2.310	3.465			
5	.151	1	3.295	2.197	3.295			
6	.151	1	3.282	2.188	3.282			
7	.149	1	3.046	2.031	3.046			
8	.125	1	3.163	2.108	3.163			
9	.098	1	2.239	1.492	2.239			
10	.085	1	2.239	1.492	2.239			
11	.075	1	2.239	1.492	2.239			
12	.072	1	2.239	1.492	2.239			
13	.070	1	2.173	1.449	2.173			
14	.069	1	2.088	1.392	2.088			
15	.068	1	2.016	1.344	2.016			
16	.064	1	1.954	1.303	1.954			
17	.058	1	1.929	1.286	1.929			
18	.053	1	1.621	1.081	1.621			
19	.035	1	1.153	.769	1.153			
20	.035	1	1.153	.768	1.153			
21	.034	1	1.136	.757	1.136			

APPLIED SPECTRAL ACCELERATION SUMMARY(CONTINUED) RESPONSE SPECT.

FREQUENCY NUMBER	PERIOD (SEC)	ZONE NUMBER	SPECTRAL ACCELERATIONS (G) X TRANS	Y TRANS	Z TRANS	XX ROT	YY ROT	ZZ ROT
22	.034	1	1.132	.755	1.132			
23	.033	1	1.126	.751	1.126			
24	.033	1	1.124	.749	1.124			
25	.033	1	1.123	.749	1.123			
26	.031	1	1.108	.739	1.108			
27	.031	1	1.108	.738	1.108			
28	.025	1	.820	.547	.820			
29	.025	1	.721	.480	.721			
30	.025	1	.687	.458	.687			

N O D A L A C C E L E R A T I O N S

NODE NAME	****** ACCELERATIONS ******* X-GLOBAL (G)	Y-GLOBAL (G)	Z-GLOBAL (G)	******* THRESHOLD ACCELERATIONS ******* VERTICAL (G)	EXCEED	HORIZONTAL (G)	EXCEED	
47 *	1.468	.719	1.565	.719	YES	2.146	YES	GLOBAL
F47 *	1.468	.719	1.565	.719	YES	2.146	YES	GLOBAL
1 *	3.191	1.576	3.163	1.576	YES	4.493	YES	GLOBAL
2 *	1.849	1.552	1.968	1.552	YES	2.700	YES	GLOBAL
3 *	1.034	1.527	1.209	1.527	YES	1.591	YES	GLOBAL
4 *	.001	1.465	.001	1.465	YES	.001	YES	GLOBAL
9 *	.668	1.353	.699	1.353	YES	.967	YES	GLOBAL
10 *	0.000	0.000	0.000	0.000	YES	0.000	YES	GLOBAL
11 *	.977	1.380	.996	1.380	YES	1.395	YES	GLOBAL
12 *	.934	1.350	.760	1.350	YES	1.204	YES	GLOBAL
13 *	.979	1.380	.993	1.380	YES	1.394	YES	GLOBAL
14 *	1.101	1.416	1.537	1.416	YES	1.891	YES	GLOBAL
15 *	1.288	1.034	.956	1.034	YES	1.604	YES	GLOBAL
16 *	1.103	1.416	1.534	1.416	YES	1.889	YES	GLOBAL
17 *	1.572	1.415	3.346	1.415	YES	3.697	YES	GLOBAL
18 *	1.571	1.414	3.342	1.414	YES	3.693	YES	GLOBAL
19 *	2.170	1.242	4.819	1.242	YES	5.285	YES	GLOBAL
20 *	2.168	1.243	4.816	1.243	YES	5.281	YES	GLOBAL
21 *	2.083	1.260	4.514	1.260	YES	4.971	YES	GLOBAL
22 *	2.081	1.261	4.511	1.261	YES	4.968	YES	GLOBAL
23 *	1.499	1.554	2.399	1.554	YES	2.829	YES	GLOBAL
24 *	1.497	1.557	2.395	1.557	YES	2.825	YES	GLOBAL
25 *	1.834	1.550	2.868	1.550	YES	3.404	YES	GLOBAL
26 *	1.830	1.553	2.854	1.553	YES	3.390	YES	GLOBAL
27 *	0.000	0.000	0.000	0.000	YES	0.000	YES	GLOBAL
28 *	0.000	0.000	0.000	0.000	YES	0.000	YES	GLOBAL
29 *	5.526	1.663	5.756	1.663	YES	7.979	YES	GLOBAL
30 *	5.520	1.666	5.726	1.666	YES	7.954	YES	GLOBAL
31 *	1.779	1.645	2.500	1.645	YES	3.068	YES	GLOBAL
32 *	1.775	1.649	2.488	1.649	YES	3.057	YES	GLOBAL
33 *	1.607	1.546	1.680	1.546	YES	2.325	YES	GLOBAL
34 *	1.367	.634	1.274	.634	YES	1.869	YES	GLOBAL
35 *	1.605	1.548	1.674	1.548	YES	2.319	YES	GLOBAL
36 *	1.478	.783	1.436	.783	YES	2.060	YES	GLOBAL
37 *	1.477	.783	1.435	.783	YES	2.059	YES	GLOBAL
38 *	1.440	.592	1.540					NON-GLOBAL
39 *	1.456	.594	1.495	.594	YES	2.087	YES	GLOBAL
40 *	1.439	.592	1.540					NON-GLOBAL
48 *	1.696	.797	2.228	.797	YES	2.800	YES	GLOBAL
49 *	1.529	.756	1.493	.756	YES	2.138	YES	GLOBAL
50 *	1.569	.769	1.431	.769	YES	2.124	YES	GLOBAL
51 *	1.636	.780	1.361	.780	YES	2.128	YES	GLOBAL
58 *	1.439	.592	1.540					NON-GLOBAL
59 *	1.456	.594	1.495	.594	YES	2.087	YES	GLOBAL
60 *	1.440	.592	1.540					NON-GLOBAL
61 *	1.477	.783	1.435	.783	YES	2.059	YES	GLOBAL
62 *	1.478	.783	1.436	.783	YES	2.060	YES	GLOBAL

N O D A L A C C E L E R A T I O N S (CONTINUED)

NODE NAME	****** ACCELERATIONS ****** X-GLOBAL (G)	Y-GLOBAL (G)	Z-GLOBAL (G)	******* THRESHOLD ACCELERATIONS ******* VERTICAL (G)	EXCEED	HORIZONTAL (G)	EXCEED	
63 *	1.605	1.548	1.674	1.548	YES	2.319	YES	GLOBAL
64 *	1.367	.634	1.274	.634	YES	1.869	YES	GLOBAL
65 *	1.607	1.546	1.680	1.546	YES	2.325	YES	GLOBAL
66 *	1.775	1.649	2.488	1.649	YES	3.057	YES	GLOBAL
67 *	1.779	1.645	2.500	1.645	YES	3.068	YES	GLOBAL
68 *	5.520	1.666	5.726	1.666	YES	7.954	YES	GLOBAL
69 *	5.526	1.663	5.756	1.663	YES	7.979	YES	GLOBAL
70 *	0.000	0.000	0.000	0.000	YES	0.000	YES	GLOBAL
71 *	0.000	0.000	0.000	0.000	YES	0.000	YES	GLOBAL
72 *	1.830	1.553	2.854	1.553	YES	3.390	YES	GLOBAL
73 *	1.834	1.550	2.868	1.550	YES	3.404	YES	GLOBAL
74 *	1.497	1.557	2.395	1.557	YES	2.825	YES	GLOBAL
75 *	1.499	1.554	2.399	1.554	YES	2.829	YES	GLOBAL
76 *	2.081	1.261	4.511	1.261	YES	4.968	YES	GLOBAL
77 *	2.083	1.260	4.514	1.260	YES	4.971	YES	GLOBAL
78 *	2.168	1.243	4.816	1.243	YES	5.281	YES	GLOBAL
79 *	2.170	1.242	4.819	1.242	YES	5.285	YES	GLOBAL
80 *	1.571	1.414	3.342	1.414	YES	3.693	YES	GLOBAL
81 *	1.572	1.415	3.346	1.415	YES	3.697	YES	GLOBAL
82 *	1.103	1.416	1.534	1.416	YES	1.889	YES	GLOBAL
83 *	1.288	1.034	.956	1.034	YES	1.604	YES	GLOBAL
84 *	1.101	1.416	1.537	1.416	YES	1.891	YES	GLOBAL
85 *	.979	1.380	.993	1.380	YES	1.394	YES	GLOBAL
86 *	.977	1.380	.996	1.380	YES	1.395	YES	GLOBAL
87 *	.934	1.350	.760	1.350	YES	1.204	YES	GLOBAL
88 *	0.000	0.000	0.000	0.000	YES	0.000	YES	GLOBAL
89 *	.668	1.353	.699	1.353	YES	.967	YES	GLOBAL
90 *	.001	1.465	.001	1.465	YES	.001	YES	GLOBAL
95 *	1.034	1.527	1.209	1.527	YES	1.591	YES	GLOBAL
96 *	1.849	1.552	1.968	1.552	YES	2.700	YES	GLOBAL
97 *	3.191	1.576	3.163	1.576	YES	4.493	YES	GLOBAL

N O D A L D I S P L A C E M E N T S RESPONSE SPECT.

NODE NAME	NODAL TRANSLATIONS X	Y	Z	NODAL ROTATIONS XX	YY	ZZ	COORDINATE SYSTEM
47 *	.1357	.0081	.1120	.000169	.000000	.000040	GLOBAL
F47 *	.1357	.0081	.1120	.000169	.000000	.000040	GLOBAL
1 *	.3548	.0764	.7032	.001778	.000686	.000945	GLOBAL
2 *	.2104	.0752	.4381	.001710	.000686	.000879	GLOBAL
3 *	.1216	.0741	.2689	.001579	.000686	.000756	GLOBAL
4 *	.0001	.0712	.0001	.001098	.000686	.000356	GLOBAL
9 *	.0644	.0660	.1270	.000613	.000686	.000292	GLOBAL
10 *	0.0000	0.0000	0.0000	0.000000	0.000000	0.000000	GLOBAL
11 *	.1086	.0770	.1769	.000595	.000688	.000290	GLOBAL
12 *	.0886	.0642	.1300	.000601	.000700	.000326	GLOBAL
13 *	.1094	.0770	.1763	.000593	.000690	.000288	GLOBAL
14 *	.1089	.0780	.1743	.001053	.000788	.000731	GLOBAL
15 *	.1198	.0558	.0891	.000317	.000941	.000325	GLOBAL
16 *	.1097	.0780	.1738	.001052	.000788	.000730	GLOBAL
17 *	.0903	.0777	.1336	.001306	.001092	.001070	GLOBAL
18 *	.0897	.0777	.1336	.001305	.001091	.001072	GLOBAL
19 *	.1209	.0685	.1007	.001436	.000783	.001385	GLOBAL
20 *	.1203	.0684	.1010	.001433	.000780	.001381	GLOBAL
21 *	.1146	.0714	.0964	.001807	.000716	.001419	GLOBAL
22 *	.1139	.0711	.0966	.001802	.000715	.001414	GLOBAL
23 *	.1250	.0229	.2271	.004846	.001755	.001974	GLOBAL
24 *	.1239	.0229	.2256	.004821	.001743	.001568	GLOBAL
25 *	.2393	.0229	.5747	.004870	.001870	.002047	GLOBAL
26 *	.2378	.0229	.5714	.004845	.001858	.002041	GLOBAL
27 *	0.0000	0.0000	0.0000	0.000000	0.000000	0.000000	GLOBAL
28 *	0.0000	0.0000	0.0000	0.000000	0.000000	0.000000	GLOBAL
29 *	.5362	.0239	1.2486	.005344	.001870	.002474	GLOBAL
30 *	.5339	.0239	1.2417	.005315	.001858	.002468	GLOBAL
31 *	.2253	.0478	.5061	.004790	.001981	.001558	GLOBAL
32 *	.2239	.0478	.5032	.004765	.001968	.001952	GLOBAL
33 *	.1835	.0746	.3091	.002847	.003315	.000813	GLOBAL
34 *	.1267	.0253	.0882	.000229	.000677	.000350	GLOBAL
35 *	.1825	.0746	.3076	.002832	.003295	.000810	GLOBAL
36 *	.1455	.0316	.1228	.001017	.002698	.000596	GLOBAL
37 *	.1449	.0317	.1228	.001014	.002687	.000597	GLOBAL
38 *	.1233	.0154	.1301	.000121	.000024	.000131	NON-GLOBAL
39 *	.1346	.0072	.1068	.000169	.000015	.000035	GLOBAL
40 *	.1230	.0154	.1304	.000121	.000024	.000130	NON-GLOBAL
48 *	.1556	.0090	.1569	.000218	.000000	.000074	GLOBAL
49 *	.1380	.0085	.1066	.000160	.000000	.000033	GLOBAL
50 *	.1388	.0087	.1015	.000158	.000000	.000033	GLOBAL
51 *	.1396	.0088	.0940	.000157	.000000	.000034	GLOBAL
58 *	.1230	.0154	.1304	.000121	.000024	.000130	NON-GLOBAL
59 *	.1346	.0072	.1068	.000169	.000015	.000035	GLOBAL
60 *	.1233	.0154	.1301	.000121	.000024	.000131	NON-GLOBAL
61 *	.1449	.0317	.1228	.001014	.002687	.000597	GLOBAL
62 *	.1455	.0316	.1228	.001017	.002698	.000596	GLOBAL

N O D A L D I S P L A C E M E N T S (CONTINUED) RESPONSE SPECT.

NODE NAME	NODAL TRANSLATIONS X	Y	Z	NODAL ROTATIONS XX	YY	ZZ	COORDINATE SYSTEM
63 *	.1825	.0746	.3076	.002832	.003295	.000810	GLOBAL
64 *	.1267	.0253	.0882	.000229	.000677	.000350	GLOBAL
65 *	.1835	.0746	.3091	.002847	.003315	.000813	GLOBAL
66 *	.2239	.0478	.5033	.004765	.001968	.001952	GLOBAL
67 *	.2253	.0478	.5061	.004790	.001981	.001958	GLOBAL
68 *	.5339	.0239	1.2417	.005315	.001858	.002468	GLOBAL
69 *	.5362	.0239	1.2486	.005344	.001870	.002474	GLOBAL
70 *	0.0000	0.0000	0.0000	0.000000	0.000000	0.000000	GLOBAL
71 *	0.0000	0.0000	0.0000	0.000000	0.000000	0.000000	GLOBAL
72 *	.2378	.0229	.5714	.004845	.001858	.002041	GLOBAL
73 *	.2393	.0229	.5747	.004870	.001870	.002047	GLOBAL
74 *	.1239	.0229	.2256	.004821	.001743	.001968	GLOBAL
75 *	.1250	.0229	.2271	.004846	.001755	.001974	GLOBAL
76 *	.1139	.0711	.0966	.001802	.000715	.001414	GLOBAL
77 *	.1146	.0714	.0964	.001807	.000716	.001419	GLOBAL
78 *	.1203	.0684	.1010	.001433	.000780	.001381	GLOBAL
79 *	.1209	.0685	.1007	.001436	.000783	.001385	GLOBAL
80 *	.0897	.0777	.1336	.001305	.001091	.001072	GLOBAL
81 *	.0903	.0777	.1336	.001306	.001092	.001070	GLOBAL
82 *	.1097	.0780	.1738	.001052	.000788	.000730	GLOBAL
83 *	.1198	.0558	.0891	.000317	.000941	.000325	GLOBAL
84 *	.1089	.0780	.1743	.001053	.000788	.000731	GLOBAL
85 *	.1094	.0770	.1763	.000593	.000690	.000288	GLOBAL
86 *	.1086	.0770	.1769	.000595	.000688	.000290	GLOBAL
87 *	.0886	.0642	.1300	.000601	.000700	.000326	GLOBAL
88 *	0.0000	0.0000	0.0000	0.000000	0.000000	0.000000	GLOBAL
89 *	.0644	.0660	.1270	.000613	.000686	.000292	GLOBAL
90 *	.0001	.0712	.0001	.001098	.000686	.000356	GLOBAL
95 *	.1216	.0741	.2689	.001579	.000686	.000756	GLOBAL
96 *	.2104	.0752	.4381	.001710	.000686	.000879	GLOBAL
97 *	.3548	.0764	.7032	.001778	.000686	.000945	GLOBAL

F R E Q U E N C Y S P A C I N G N R C G R O U P I N G M E T H O D

FREQUENCY NUMBER	SPACING NUMBER	FREQUENCY (CPS)
1	1	6.1338
2	1	6.1839
3	1	6.5589
4	1	6.5728
5	1	6.6324
6	1	6.6372
7	1	6.7221
8	2	7.9841
9	3	10.2130
10	4	11.7349
11	5	13.4010
12	5	13.8960
13	5	14.2479
14	5	14.4963
15	5	14.7098
16	6	15.5891
17	6	17.0975
18	7	18.9188
19	8	28.2847
20	8	28.3091
21	8	29.5220
22	8	29.7960
23	8	30.3127
24	8	30.4901
25	8	30.4976
26	9	31.8280
27	9	31.8505
28	10	39.4971
29	10	40.4183
30	10	40.7346

P I P E M E M B E R S T R E S S E S RESPONSE SPECT.

PIPE NAME		PIPE TYPE	NODAL PT NAME-END	SECTION DESCRIP	LOCAL X FORCE	LOCAL Y FORCE	LOCAL Z FORCE	LOCAL X MOMENT	LOCAL Y MOMENT	LOCAL Z MOMENT	BENDING STRESS	INTEN FACTR
1	*		1 -I		315526.51	638786.15	633039.60	0.00	.00	.00	.00	1.00
1	*		2 -J		315526.51	638786.15	633039.60	0.00	**********	**********	2822.13	1.00
2	*		2 -I		470797.73	823712.22	829897.62	0.00	**********	**********	2822.13	1.00
2	*		3 -J		470797.73	823712.22	829897.62	0.00	**********	**********	5268.23	1.00
3	*		3 -I		623590.54	926990.55	950564.00	.00	**********	**********	5268.23	1.00
3	*		4 -J		623590.54	926990.55	950564.00	.00	**********	**********	10475.89	1.00
4	*		4 -I		1136547.57	1494681.09	927336.65	.00	**********	**********	10475.89	1.00
4	*		9 -J		1136547.57	1494681.09	927336.65	.00	**********	**********	4197.34	1.00
5	*		9 -I		1172215.30	232259.69	470097.25	**********	**********	**********	17962.68	1.00
5	*		10 -J		1172215.30	232259.69	470097.25	**********	**********	**********	8772.86	1.00
6	*		9 -I		78079.80	223051.71	104358.73	**********	**********	**********	939.54	1.00
6	*		11 -J		78079.80	223051.71	104358.73	**********	9658413.75	**********	483.83	1.00
7	*		9 -I		78220.31	222138.81	104684.04	**********	**********	**********	938.17	1.00
7	*		13 -J		78220.31	222138.81	104684.04	**********	9687250.90	**********	483.91	1.00
8	*		9 -I		1271658.35	1113656.48	221420.14	3068557.54	**********	**********	2480.78	1.00
8	*		12 -J		1271658.35	1113656.48	221420.14	3068557.54	**********	**********	809.19	1.00
9	*	CURV	11 -I		78759.69	224130.35	105375.02	**********	9658413.75	**********	11033.51	1.37
9	*	CURV	-C		94298.48	218051.04	105375.02	7213459.07	**********	**********	8785.48	1.37
9	*	CURV	14 -J		146249.60	188480.50	105375.02	4397067.90	9531084.54	8511481.00	6715.81	1.37
10	*	CURV	12 -I		1268173.19	1108753.47	224477.91	3068557.54	**********	**********	6934.63	1.00
10	*	CURV	-C		1613970.01	479641.79	224477.91	4240419.20	7690566.85	**********	3268.56	1.00
10	*	CURV	15 -J		1659952.27	281983.84	224477.91	4550841.01	5913835.06	**********	3703.20	1.00
11	*	CURV	13 -I		78899.15	223220.12	105706.21	**********	9687250.90	**********	11035.54	1.37
11	*	CURV	-C		93780.30	217360.53	105706.21	7217503.93	**********	**********	8786.27	1.37
11	*	CURV	16 -J		145426.65	188100.91	105706.21	4384866.75	9569712.82	8512401.94	6727.68	1.37
12	*		14 -I		148080.27	80167.14	199466.79	4397067.90	**********	7823047.20	6574.13	1.00
12	*		17 -J		148080.27	80167.14	199466.79	4397067.90	3936692.39	6274451.31	4177.63	1.00
13	*		16 -I		147267.30	80623.42	199337.31	4384866.75	**********	7826199.32	6577.23	1.00
13	*		18 -J		147267.30	80623.42	199337.31	4384866.75	3926506.28	6256271.06	4165.93	1.00
14	*	CURV	17 -I		150913.44	144873.58	155038.93	4397067.90	5970416.99	4276900.12	4253.94	1.37
14	*	CURV	-C		116061.06	174720.76	155038.53	9489174.18	7558296.82	5075318.11	6535.21	1.37
14	*	CURV	19 -J		144873.58	150913.44	155038.93	**********	5201263.24	**********	9520.09	1.37

P I P E M E M B E R S T R E S S E S (CONTINUED) RESPONSE SPECT.

PIPE NAME		PIPE TYPE	NODAL PT NAME-END	SECTION DESCRIP	LOCAL X FORCE	LOCAL Y FORCE	LOCAL Z FORCE	LOCAL X MOMENT	LOCAL Y MOMENT	LOCAL Z MOMENT	BENDING STRESS	INTEN FACTR
15	*	CURV	18 -I		150115.92	144856.84	154359.24	4384866.75	5946548.97	4274227.56	4241.89	1.37
15	*	CURV	-C		116536.09	174544.08	154359.24	9448717.44	7521208.04	5087649.77	6512.49	1.37
15	*	CURV	20 -J		144856.84	150115.92	154359.24	**********	5174618.63	**********	9487.45	1.37
16	*		19 -I		145624.25	150974.41	155133.49	**********	5201263.24	**********	9290.63	1.00
16	*		21 -J		145624.25	150974.41	155133.49	**********	8767189.89	**********	10701.74	1.00
17	*		20 -I		145633.81	150186.83	154515.13	**********	5174618.63	**********	9258.77	1.00
17	*		22 -J		145633.81	150186.83	154515.13	**********	8724246.16	**********	10661.02	1.00
18	*	CURV	21 -I		147121.54	150523.13	158439.60	**********	8767189.89	**********	10966.06	1.37
18	*	CURV	-C		173143.47	118181.02	158439.60	**********	3638443.29	**********	13091.17	1.37
18	*	CURV	23 -J		150523.13	147121.54	158439.60	**********	6102223.28	**********	12943.27	1.37
19	*	CURV	22 -I		147156.88	149745.63	157825.30	**********	8724246.16	**********	10924.33	1.37
19	*	CURV	-C		173012.20	118677.22	157825.30	**********	3629551.56	**********	13029.16	1.37
19	*	CURV	24 -J		149745.63	147156.88	157825.30	**********	6078216.12	**********	12872.77	1.37
20	*		23 -I		150677.15	75057.03	201946.50	**********	**********	**********	1880.18	1.00
20	*		25 -J		150677.15	75057.03	201946.50	**********	**********	**********	1952.73	1.00
21	*		24 -I		149900.91	75637.18	201894.12	**********	**********	**********	1869.71	1.00
21	*		26 -J		149900.91	75637.18	201894.12	**********	**********	**********	1944.64	1.00
22	*		25 -I		437976.68	275450.29	379991.17	**********	**********	**********	35365.77	1.00
22	*		27 -J		437976.68	275450.29	379991.17	**********	**********	**********	55354.67	1.00
23	*		26 -I		438209.78	273504.55	377561.39	**********	**********	**********	35238.36	1.00
23	*		28 -J		438209.78	273504.55	377561.39	**********	**********	**********	55032.69	1.00
24	*		25 -I		249933.03	830557.86	865185.07	0.00	**********	**********	10976.46	1.00
24	*		29 -J		249933.03	830557.86	865185.07	0.00	.00	.00	.00	1.00
25	*		26 -I		250457.81	829782.63	860657.40	0.00	**********	**********	10941.68	1.00
25	*		30 -J		250457.81	829782.63	860657.40	0.00	.00	.00	.00	1.00
26	*		25 -I		1024815.47	284022.44	438822.34	**********	**********	**********	5368.55	1.00
26	*		31 -J		1024815.47	284022.44	438822.34	**********	**********	**********	4119.17	1.00
27	*		26 -I		1024711.25	283951.35	435831.71	**********	**********	**********	5349.39	1.00
27	*		32 -J		1024711.25	283951.35	435831.71	**********	**********	**********	4105.68	1.00
28	*		31 -I		1027927.57	285998.84	445327.98	**********	**********	**********	27502.30	1.00
28	*		33 -J		1027927.57	285998.84	445327.98	**********	5907403.63	**********	14450.96	1.00

P I P E M E M B E R S T R E S S E S (CONTINUED) RESPONSE SPECT.

PIPE NAME		PIPE TYPE	NODAL PT NAME-END	SECTION DESCRIP	LOCAL X FORCE	LOCAL Y FORCE	LOCAL Z FORCE	LOCAL X MOMENT	LOCAL Y MOMENT	LOCAL Z MOMENT	BENDING STRESS	INTEN FACTR
29	*		15 -I		1643241.02	292283.53	222505.35	4550841.01	5913835.06	**********	3703.20	1.00
29	*		34 -J		1643241.02	292283.53	222505.35	4550841.01	**********	7023063.52	4352.18	1.00
30	*		32 -I		1027825.91	285928.72	442288.64	**********	**********	**********	27412.07	1.00
30	*		35 -J		1027825.91	285928.72	442288.64	**********	5908805.71	**********	14401.33	1.00
31	*		33 -I		1033405.40	292226.20	452487.29	**********	5907403.63	**********	14451.03	1.00
31	*		36 -J		1033405.40	292226.20	452487.29	**********	**********	3548693.73	16879.43	1.00
32	*		34 -I		1627612.73	296286.66	216406.07	4550841.01	**********	7023063.52	4352.18	1.00
32	*		39 -J		1627612.73	296286.66	216406.07	4550841.01	**********	**********	9071.11	1.00
33	*		35 -I		1033295.29	292156.27	449408.22	**********	5908805.71	**********	14401.46	1.00
33	*		37 -J		1033295.29	292156.27	449408.22	**********	**********	3512670.41	16748.57	1.00
34	*	CURV	36 -I		1036752.53	453097.45	293818.32	**********	3548693.73	**********	17296.32	1.37
34	*	CURV	-C		1006326.08	516678.94	293818.32	**********	7884392.46	**********	20240.34	1.37
34	*	CURV	38 -J		924161.90	652360.40	293818.32	**********	**********	**********	23585.70	1.37
35	*	CURV	37 -I		1036677.07	449939.54	293754.25	**********	3547588.97	**********	17162.23	1.37
35	*	CURV	-C		1006432.19	513555.77	293754.25	**********	7840567.17	**********	20096.31	1.37
35	*	CURV	40 -J		923865.28	650475.39	293754.25	**********	**********	**********	23436.88	1.37
36	*		38 -I		924989.47	638392.00	1191802.24	**********	**********	**********	232.37	1.00
36	*		F47 -J		924989.47	638392.00	1191802.24	**********	**********	**********	957.88	1.00
37	*		39 -I		1618699.17	483489.76	1199889.30	4550841.01	**********	**********	237.81	1.00
37	*		F47 -J		1618699.17	483489.76	1199889.30	4550841.01	**********	**********	790.42	1.00
F37	*		47 -I		976722.42	439486.09	492734.28	**********	**********	**********	2513.74	1.00
F37	*		F47 -J		976722.42	439486.09	492734.28	**********	**********	**********	2513.74	1.00
38	*		40 -I		924697.40	638674.86	1192656.12	**********	**********	**********	230.90	1.00
38	*		F47 -J		924697.40	638674.86	1192656.12	**********	**********	**********	958.02	1.00
39	*		F47 -I		598176.43	1273447.82	1672487.25	.00	**********	**********	1976.08	1.00
39	*		48 -J		598176.43	1273447.82	1672487.25	.00	.00	.00	.00	1.00
40	*		47 -I		649308.14	1323684.33	1228214.85	.00	**********	**********	1207.53	1.00
40	*		49 -J		649308.14	1323684.33	1228214.85	.00	**********	**********	467.76	1.00
41	*		49 -I		271106.36	559417.40	487734.08	0.00	**********	**********	467.76	1.00
41	*		50 -J		271106.36	559417.40	487734.08	0.00	**********	**********	206.68	1.00

P I P E M E M B E R S T R E S S E S (CONTINUED) RESPONSE SPECT.

PIPE NAME		PIPE TYPE	NODAL PT NAME-END	SECTION DESCRIP	LOCAL X FORCE	LOCAL Y FORCE	LOCAL Z FORCE	LOCAL X MOMENT	LOCAL Y MOMENT	LOCAL Z MOMENT	BENDING STRESS	INTEN FACTR
42	*		50 -I		117174.77	245854.70	204512.10	0.00	**********		206.68	1.00
42	*		51 -J		117174.77	245854.70	204512.10	0.00	.00	.00	.00	1.00
43	*		47 -I		924700.32	638674.40	1192656.05	**********			958.02	1.00
43	*		58 -J		924700.32	638674.40	1192656.05	**********			230.90	1.00
44	*		47 -I		1618699.09	483489.92	1199888.91	4550876.94	**********		790.42	1.00
44	*		59 -J		1618699.09	483489.92	1199888.91	4550876.94	**********		237.81	1.00
45	*		47 -I		924990.18	638393.78	1191802.10	**********			957.88	1.00
45	*		60 -J		924990.18	638393.78	1191802.10	**********			232.37	1.00
46	*	CURV	61 -I		1036676.39	449942.20	293754.42	**********	3547617.10	**********	17162.34	1.37
46	*	CURV	-C		1006433.34	513554.72	293754.42	**********	7840537.69	**********	20096.43	1.37
46	*	CURV	58 -J		923868.16	650472.24	293754.42	**********			23436.97	1.37
47	*	CURV	62 -I		1036752.58	453099.74	293818.90	**********	3548705.85	**********	17296.41	1.37
47	*	CURV	-C		1006326.43	516680.51	293818.90	**********	7884397.89	**********	20240.43	1.37
47	*	CURV	60 -J		924162.57	652361.24	293818.90	**********			23585.80	1.37
48	*		61 -I		1033294.64	292156.43	449410.88	**********		3512697.84	16748.68	1.00
48	*		63 -J		1033294.64	292156.43	449410.88	**********	5908814.52	**********	14401.51	1.00
49	*		59 -I		1627612.65	296286.48	216406.95	4550876.94	**********		9071.12	1.00
49	*		64 -J		1627612.65	296286.48	216406.95	4550876.94	**********	7023047.63	4352.19	1.00
50	*		62 -I		1033405.46	292226.79	452489.57	**********		3548705.85	16879.51	1.00
50	*		65 -J		1033405.46	292226.79	452489.57	**********	5907434.39	**********	14451.09	1.00
51	*		63 -I		1027825.28	285928.89	442291.33	**********	5908814.52	**********	14401.39	1.00
51	*		66 -J		1027825.28	285928.89	442291.33	**********			27412.17	1.00
52	*		64 -I		1643240.94	292283.32	222506.11	4550876.94	**********	7023047.63	4352.19	1.00
52	*		83 -J		1643240.94	292283.32	222506.11	4550876.94	5913821.05	**********	3703.20	1.00
53	*		65 -I		1027927.64	285999.41	445330.22	**********	5907434.39	**********	14451.02	1.00
53	*		67 -J		1027927.64	285999.41	445330.22	**********			27502.40	1.00
54	*		66 -I		1024710.59	283951.52	435834.51	**********			4105.69	1.00
54	*		72 -J		1024710.59	283951.52	435834.51	**********			5349.41	1.00
55	*		67 -I		1024815.52	284022.99	438824.55	**********			4119.19	1.00
55	*		73 -J		1024815.52	284022.99	438824.55	**********			5368.57	1.00

P I P E M E M B E R S T R E S S E S (CONTINUED) RESPONSE SPECT.

PIPE NAME	PIPE TYPE	NODAL PT NAME-END	SECTION DESCRIP	LOCAL X FORCE	LOCAL Y FORCE	LOCAL Z FORCE	LOCAL X MOMENT	LOCAL Y MOMENT	LOCAL Z MOMENT	BENDING STRESS	INTEN FACTR
56 *		68 -I		250457.47	829780.21	860664.58	0.00	.00	.00	.00	1.00
56 *		72 -J		250457.47	829780.21	860664.58	0.00	**********		10941.71	1.00
57 *		69 -I		249932.67	830557.51	865189.51	0.00	.00	.00	.00	1.00
57 *		73 -J		249932.67	830557.51	865189.51	0.00	**********		10976.48	1.00
58 *		70 -I		438210.82	273506.52	377561.14	**********			55032.93	1.00
58 *		72 -J		438210.82	273506.52	377561.14	**********			35238.56	1.00
59 *		71 -I		437976.16	275451.32	379992.50	**********			55354.92	1.00
59 *		73 -J		437976.16	275451.32	379992.50	**********			35365.90	1.00
60 *		72 -I		149900.45	75637.36	201895.73	**********			1944.64	1.00
60 *		74 -J		149900.45	75637.36	201895.73	**********			1869.71	1.00
61 *		73 -I		150677.73	75057.03	201947.47	**********			1952.73	1.00
61 *		75 -J		150677.73	75057.03	201947.47	**********			1880.19	1.00
62 *	CURV	76 -I		147157.72	149745.18	157826.23	**********	8724282.05	**********	10924.39	1.37
62 *	CURV	-C		173012.66	118677.54	157826.23	**********	3629552.28	**********	13029.20	1.37
62 *	CURV	74 -J		149745.18	147157.72	157826.23	**********	6078239.11	**********	12872.80	1.37
63 *	CURV	77 -I		147122.19	150523.69	158440.37	**********	8767233.85	**********	10966.11	1.37
63 *	CURV	-C		173144.45	118181.01	158440.37	**********	3638449.83	**********	13091.24	1.37
63 *	CURV	75 -J		150523.69	147122.19	158440.37	**********	6102239.29	**********	12943.32	1.37
64 *		76 -I		145634.62	150186.43	154515.99	**********	8724282.05	**********	10661.07	1.00
64 *		78 -J		145634.62	150186.43	154515.99	**********	5174632.49	**********	9258.83	1.00
65 *		77 -I		145624.93	150974.96	155134.31	**********	8767233.85	**********	10701.80	1.00
65 *		79 -J		145624.93	150974.96	155134.31	**********	5201285.77	**********	9290.67	1.00
66 *	CURV	80 -I		150115.59	144857.64	154359.93	4384892.56	5946598.80	4274204.15	4241.91	1.37
66 *	CURV	-C		116536.39	174544.62	154359.93	9448786.92	7521257.45	5087706.83	6512.54	1.37
66 *	CURV	78 -J		144857.64	150115.59	154359.93	**********	5174632.49	**********	9487.51	1.37
67 *	CURV	81 -I		150913.96	144874.32	155039.73	4397091.19	5970442.18	4276920.56	4253.96	1.37
67 *	CURV	-C		116061.15	174721.74	155039.73	9489224.31	7558334.39	5075331.09	6535.24	1.37
67 *	CURV	79 -J		144874.32	150913.96	155039.73	**********	5201285.77	**********	9520.14	1.37
68 *		80 -I		147267.09	80623.64	199338.57	4384892.56	3926541.67	6256282.83	4165.95	1.00
68 *		82 -J		147267.09	80623.64	199338.57	4384892.56	**********	7826230.91	6577.25	1.00
69 *		81 -I		148080.73	80167.32	199467.83	4397091.19	3936697.33	6274486.46	4177.65	1.00
69 *		84 -J		148080.73	80167.32	199467.83	4397091.19	**********	7823106.03	6574.16	1.00

P I P E M E M B E R S T R E S S E S (CONTINUED) RESPONSE SPECT.

PIPE NAME		PIPE TYPE	NODAL PT NAME-END	SECTION DESCRIP	LOCAL X FORCE	LOCAL Y FORCE	LOCAL Z FORCE	LOCAL X MOMENT	LOCAL Y MOMENT	LOCAL Z MOMENT	BENDING STRESS	INTEN FACTR
70	*	CURV	85 -I		78899.37	223220.67	105706.72	**********	9687291.55	**********	11035.58	1.37
70	*	CURV	-C		93779.97	217361.35	105706.72	7217552.08	**********	**********	8786.30	1.37
70	*	CURV	82 -J		145426.52	188101.90	105706.72	4384892.56	9569767.47	8512399.80	6727.70	1.37
71	*	CURV	87 -I		1268173.21	1108753.42	224478.55	3068563.23	**********	**********	6934.63	1.00
71	*	CURV	-C		1613970.02	479641.71	224478.55	4240437.03	7690622.93	**********	3268.56	1.00
71	*	CURV	83 -J		1659952.19	281983.62	224478.55	4550876.94	5913821.05	**********	3703.20	1.00
72	*	CURV	86 -I		78759.90	224131.43	105375.48	**********	9658472.57	**********	11033.56	1.37
72	*	CURV	-C		94298.56	218052.13	105375.48	7213500.03	**********	**********	8785.52	1.37
72	*	CURV	84 -J		146250.02	188481.45	105375.48	4397091.19	9531135.31	8511512.96	6715.84	1.37
73	*		85 -I		78220.54	222139.40	104684.56	**********	9687291.55	**********	483.92	1.00
73	*		89 -J		78220.54	222139.40	104684.56	**********	**********	**********	938.17	1.00
74	*		87 -I		1271658.37	1113656.44	221420.76	3068563.23	**********	**********	809.19	1.00
74	*		89 -J		1271658.37	1113656.44	221420.76	3068563.23	**********	**********	2480.78	1.00
75	*		86 -I		78080.03	223052.79	104359.19	**********	9658472.57	**********	483.83	1.00
75	*		89 -J		78080.03	223052.79	104359.19	**********	**********	**********	939.54	1.00
76	*		88 -I		1172215.12	232259.65	470100.36	**********	**********	**********	8772.90	1.00
76	*		89 -J		1172215.12	232259.65	470100.36	**********	**********	**********	17962.77	1.00
77	*		89 -I		1136547.31	1494681.21	927342.37	.00	**********	**********	4197.36	1.00
77	*		90 -J		1136547.31	1494681.21	927342.37	.00	**********	**********	10475.93	1.00
78	*		90 -I		623590.04	926990.43	950569.56	.00	**********	**********	10475.93	1.00
78	*		95 -J		623590.04	926990.43	950569.56	.00	**********	**********	5268.24	1.00
79	*		95 -I		470797.27	823712.30	829902.49	0.00	**********	**********	5268.24	1.00
79	*		96 -J		470797.27	823712.30	829902.49	0.00	**********	**********	2822.14	1.00
80	*		96 -I		315526.16	638786.38	633043.35	0.00	**********	**********	2822.14	1.00
80	*		97 -J		315526.16	638786.38	633043.35	0.00	.00	.00	.00	1.00

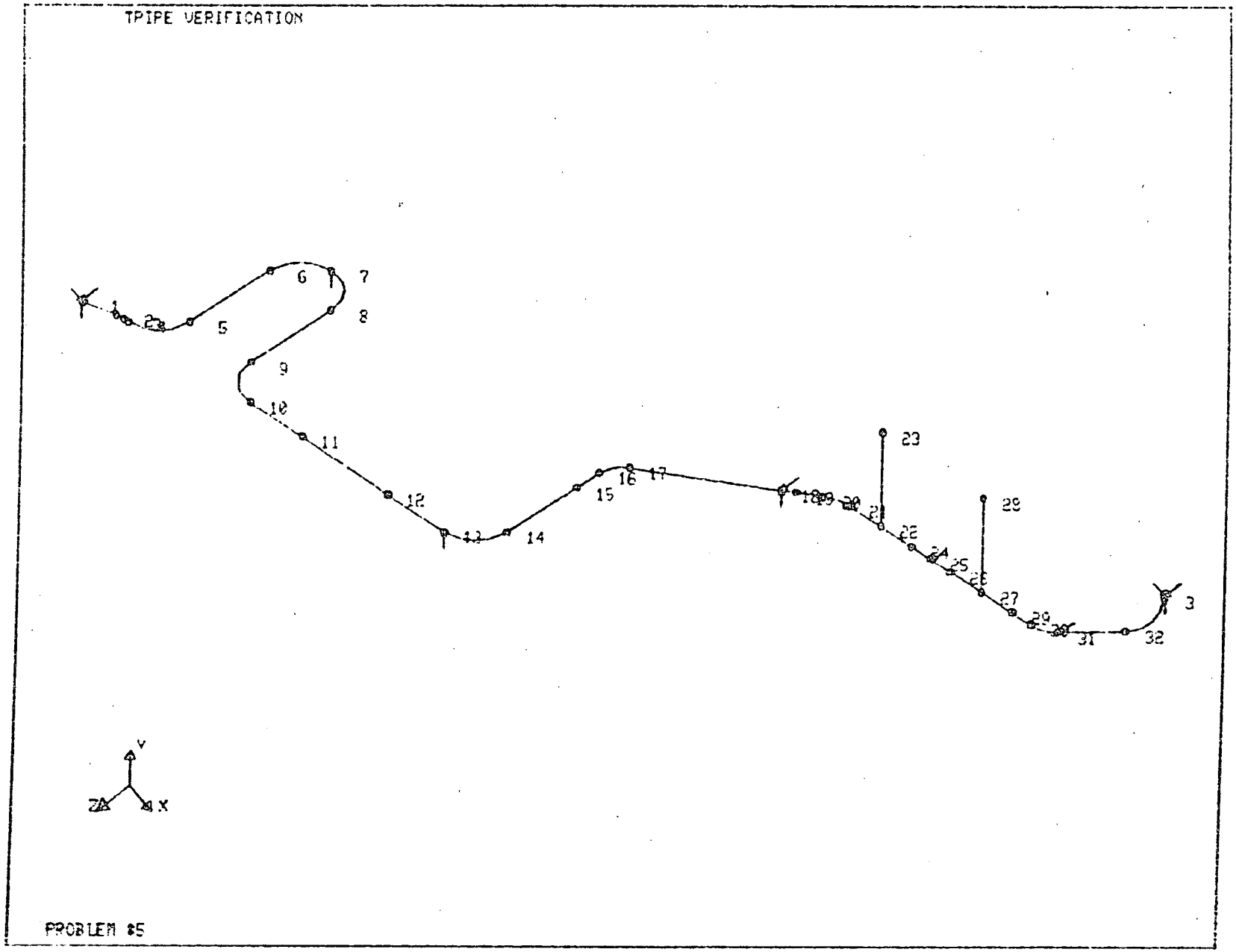
M A X I M U M P I P E M E M B E R S T R E S S E S RESPONSE SPECT.

	PIPE NAME		NODAL PT NAME-END	BENDING STRESS(PSI)
1-	59	*	71-I	55354.92
2-	22	*	27-J	55354.67
3-	58	*	70-I	55032.93
4-	23	*	28-J	55032.69
5-	59	*	73-J	35365.90
6-	22	*	25-I	35365.77
7-	58	*	72-J	35238.56
8-	23	*	26-I	35238.36
9-	53	*	67-J	27502.40
10-	28	*	31-I	27502.30

P I P I N G S Y S T E M R E A C T I O N S RESPONSE SPECT.

NODE NAME		SUPPORT CODE	X FORCE	Y FORCE	Z FORCE	X MOMENT	Y MOMENT	Z MOMENT	COORDINATE SYSTEM
4	*	202000	2416955.30	0.00	1877101.11	0.00	0.00	0.00	GLOBAL
10	*	111111	232259.69	1172215.30	470097.25	40184235.67	21233217.56	20319796.45	GLOBAL
27	*	111111	275450.29	437976.68	379991.17	147584308.33	34198109.25	61048764.93	GLOBAL
28	*	111111	273504.55	438209.78	377561.39	146742174.91	33966886.15	60672328.60	GLOBAL
38	*	220000	1233035.82	768660.96	0.00	0.00	0.00	0.00	NON-GLOBAL
39	*	22000	0.00	359653.71	1067996.33	0.00	0.00	0.00	GLOBAL
40	*	220000	1230026.31	768757.21	0.00	0.00	0.00	0.00	NON-GLOBAL
58	*	220000	1230025.17	768756.68	0.00	0.00	0.00	0.00	NON-GLOBAL
59	*	22000	0.00	359654.50	1067995.88	0.00	0.00	0.00	GLOBAL
60	*	220000	1233035.69	768661.31	0.00	0.00	0.00	0.00	NON-GLOBAL
70	*	111111	273506.52	438210.82	377561.14	146742902.27	33967077.88	60672372.07	GLOBAL
71	*	111111	275451.32	437976.16	379992.50	147585042.71	34198279.93	61048901.54	GLOBAL
88	*	111111	232259.65	1172215.12	470100.36	40184499.42	21233261.83	20319791.74	GLOBAL
90	*	202000	2416955.31	0.00	1877112.31	0.00	0.00	0.00	GLOBAL

BENCHMARK
PROBLEM 5


TPIPE VERIFICATION
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Y
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X
PROBLEM #5

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00000000011111111112222222222333333333344444444445555555555666666666677777777778   CARD
12345678901234567890123456789012345678901234567890123456789012345678901234567890   NUMBER

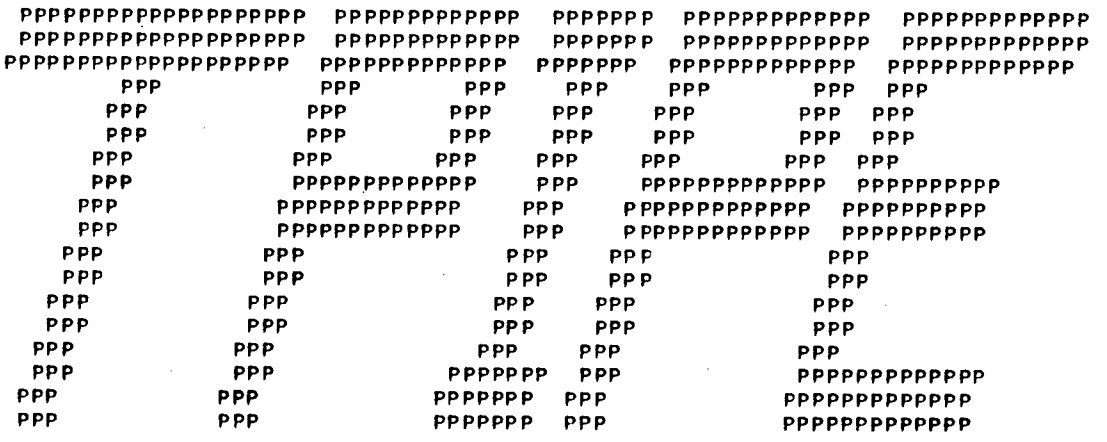
TPIPE VERIFICATION  N1-TPIPE    PROB. #5    RAGILES   X2159                1TIT      1
TSI  1 Y            NONE       PLTPIP5   TTTRAG    441       DWHEELER                2
   11   33    2          3    4         32    0                 1  1  386.4          3
    101000      01100         1    1   11  .02 100.      8000                        4
 C01    1    2    3  C02       21.      21.000      0.000     -4.920                 5
 C02  C01    4    5  C03       21.      47.4        0         -4.92                  6
 C03  C02    6    7  C04       21.      47.4        0       -100.92                  7
 C04  C03    7    8  C05       21.      89.4        0       -100.92                  8
 C05  C04    9   10  C06       21.      89.4        0         -4.92                  9
 C06  C05   13   14  C07       21.     266.4        0         -4.92                 10
 C07  C06   16   17  C08       21.     266.4        0        -96.48                 11
 C08  C07   20   21  C09       18.     342.144    -18.264   -173.856                 12
 C09  C08   30   31  C10       18.     479.844    -18.264   -173.856                 13
 C10  C09   32   33  C11       18.     519.84     -18.264   -215.04                  14
 C11                                   519.84      1.264    -215.04                  15
   1      0.000      0.000      0.000                                                16
   2                                                                                 17
   3                                                                                 18
   4                                                  1086.40220                     19
   5                                                                                 20
   6                                                                                 21
   7                                                  1562.29250                     22
   8                                                                                 23
   9                                                                                 24
  10                                                  984.894960                     25
  11     146.4        0.        -4.92                543.394320                     26
  12     206.4        0.        -4.92                560.395920                     27
  13                                                  721.988400                     28
  14                                                                                 29
  15     266.4        0.       -72.48                1103.79020                     30
  16                                                                                 31
  17                                                                                 32
  18     323.28     -13.68    -154.56                782.305440                     33
  19     327.96     -14.76    -159.36                                               34
  20                                                                                 35
  21                                                                                 36
  22     370.884    -18.264   -173.856               2621.99450                     37
  23     370.884     30.696   -173.856               245.000780                     38
  24     391.884    -18.264   -173.856                                              39
  25     404.844    -18.264   -173.856               229.401820                     40
  26     417.804    -18.264   -173.856                                              41
  27     438.804    -18.264   -173.856               2686.98700                     42
  28     438.804     30.696   -173.856               245.000780                     43
  29     459.804    -18.264   -173.856                                              44
  30                                                                                 45
  31                                                  1444.98140                     46
  32                                                                                 47
  33                                                                                 48
  25       0.      .0867097   .9962336                                              49
  31       0.      .0840745   .9964595                                              50
    1    1   33                                                                      51
FLEX                                                                                 52
   7                  RR   .10E08                                                   53
  18                  RR   .10E08RR   .10E08                                        54
  13                  RR   .45E03                                                   55
```

```
00000000011111111112222222222333333333344444444445555555555666666666677777777778   CARD
12345678901234567890123456789012345678901234567890123456789012345678901234567890  NUMBER

  25       RR  .80E03                                                                 56
  31       RR  .60E03                                                                 57
END                                                                                  58
    1   26.2E06                                                                      59
    2   25.2E06                                                                      60
    3   75.6E06                                                                      61
    1     14.00      .4380        0.0                                                62
    2     12.75      .3750        0.0                                                63
    3     12.75     1.3120        0.0                                                64
    4     12.75     2.0000        0.0                                                65
   1         1     2     1     1                                                     66
   2         2     3                                          C01                    67
   3         3     4                                                                 68
   4         4     5                                          C02                    69
   5         5     6                                                                 70
   6         6     7                                          C03                    71
   7         7     8                                          C04                    72
   8         8     9                                                                 73
   9         9    10                                          C05                    74
  10        10    11                                                                 75
  11        11    12                                                                 76
  12        12    13                                                                 77
  13        13    14                                          C06                    78
  14        14    15                                                                 79
  15        15    16                                                                 80
  16        16    17                                          C07                    81
  17        17    18                                                                 82
  18        18    19                                                                 83
  19        19    20                                                                 84
  20        20    21           2                              C08                    85
  21        21    22     3     3                                                     86
  22        22    23     2     4                                                     87
  23        22    24     3     3                                                     88
  24        24    25     2                                                           89
  25        25    26                                                                 90
  26        26    27     3                                                           91
  27        27    28     2     4                                                     92
  28        27    29     3     3                                                     93
  29        29    30     2                                                           94
  30        30    31                                          C09                    95
  31        31    32                                                                 96
  32        32    33                                          C10                    97
    1             13                                                                 98
 0.       0.9600E-01                                                                 99
 .2500E-010.9600E-01                                                                100
 .8500E-01 0.120E-00                                                                101
 .1400E+00 0.300E-00                                                                102
 .1550E+00  0.50E-00                                                                103
.1550000010.1100E+01                                                                104
 .1900E+000.1100E+01                                                                105
.190000001 0.480E-00                                                                106
 .2000E+00 0.300E-00                                                                107
 .2500E+00 0.120E-00                                                                108
 .3300E+000.7200E-01                                                                109
 .6000E+000.2400E-01                                                                110
```

```
000000000111111111122222222233333333334444444445555555556666666667777777778   CARD
123456789012345678901234567890123456789012345678901234567890123456789012345678   NUMBER

 .1000E+01 0.120E-01                                                              111
D        1    1    1  1.0.6667  1.0        SR                                    112
```



DEVELOPED JOINTLY BY

PMB SYSTEMS ENGINEERING
SAN FRANCISCO, CALIFORNIA, USA

TENNESSEE VALLEY AUTHORITY
KNOXVILLE, TENNESSEE, USA

******* 1976 ******

VERSION 4.4 MAY 1, 1981

EXECUTED AT 13.48.17. ON 07/18/81

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

PIPING SYSTEM GEOMETRY DEFINITION

```
NUMBER OF CONTROL POINTS.....................      11
NUMBER OF NODAL POINTS.......................      33
NUMBER OF NONGLOBAL COORDINATE SYSTEMS......       2
NUMBER OF ADDITIONAL SUPPORT TYPES..........       0
NUMBER OF MATERIAL PROPERTY TYPES...........       3
NUMBER OF PIPE CROSS SECTION TYPES..........       4
NUMBER OF SPECIAL COMPONENT CROSS SECTIONS..       0
NUMBER OF PIPE MEMBERS.......................      32
NUMBER OF SPECIAL CONNECTIONS................       0
NUMBER OF SPECIAL COMPONENTS.................       0
NUMBER OF DYNAMIC SPRINGS....................       0
NUMBER OF MULTIPLE EXCITATION ZONES.........       0
UNITS OF LENGTH AND WEIGHT...................CONSISTENT
GRAVITY.....................................    386.40
NODAL POINT COORDINATE CHECK OPTION.........      NO
```

PROBLEM DEFINITION

```
EXECUTION MODE=  101000
                 1= STRUCTURAL DEFINITION IS FROM DATA CARDS
                 0= NORMAL DATA CHECKING RUN
                 1= ANALYSIS REQUESTED
                 0= NO STRUCTURAL PLOTTING REQUESTED
                 0= NO POSTPROCESSING REQUESTED
                 0= NO THERMAL TRANSIENT RESPONSE EXECUTION REQUESTED


ANALYSIS TYPES(01100) REQUESTED

                 FREQUENCY ANALYSIS
                            MAXIMUM NUMBER OF MODES REQUESTED.......   11
                            NUMBER OF SPRING SUPPORTS IN DYNAM MODEL    0
                            MINIMUM PERIOD OF HIGHEST MODE(SEC).....  .0200
                            MAXIMUM FREQUENCY FOR MODE PRINTOUT(HZ).  100.0
                 RESPONSE SPECTRUM ANALYSIS
                            NUMBER OF SPECTRAL CURVES TO BE INPUT...    1
                            NUMBER OF RESPONSE SPECTRUM LOAD CASES..    1


PROGRAM STORAGE.................  8000

RESTART TAPE GENERATION OPTION..  NONE REQUESTED
```

C O N T R O L P O I N T S P E C I F I C A T I O N

CONTROL NAME	I-TAN POINT	*CURVE POINTS* I-END	J-END	J-TAN POINT	CURVE RADIUS	******** COORDINATES ******* X-GLOBAL	Y-GLOBAL	Z-GLOBAL	COMMENT
C01 *	1 *	2 *	3 *	C02 *	21.000	21.00	0.00	-4.92	
C02 *	C01 *	4 *	5 *	C03 *	21.000	47.40	0.00	-4.92	
C03 *	C02 *	6 *	7 *	C04 *	21.000	47.40	0.00	-100.92	
C04 *	C03 *	7 *	8 *	C05 *	21.000	89.40	0.00	-100.92	
C05 *	C04 *	9 *	10 *	C06 *	21.000	89.40	0.00	-4.92	
C06 *	C05 *	13 *	14 *	C07 *	21.000	266.40	0.00	-4.92	
C07 *	C06 *	16 *	17 *	C08 *	21.000	266.40	0.00	-96.48	
C08 *	C07 *	20 *	21 *	C09 *	18.000	342.14	-18.26	-173.86	
C09 *	C08 *	30 *	31 *	C10 *	18.000	479.84	-18.26	-173.86	
C10 *	C09 *	32 *	33 *	C11 *	18.000	519.84	-18.26	-215.04	
C11 *	*	*	*	*	0.000	519.84	1.26	-215.04	

N O D A L P O I N T D E F I N I T I O N

NODAL POINT	NODE NAME	******** COORDINATES ******* X-GLOBAL	Y-GLOBAL	Z-GLOBAL	LUMPED WEIGHT	DATA SOURCE	COMMENT
1	1 *	0.00	0.00	0.00	0.0	INPT	
2	2 *	18.64	0.00	-4.37	0.0	CP	
3	3 *	23.43	0.00	-4.92	0.0	CP	
4	4 *	26.40	0.00	-4.92	1086.4	CP	
5	5 *	47.40	0.00	-25.92	0.0	CP	
6	6 *	47.40	0.00	-79.92	0.0	CP	
7	7 *	68.40	0.00	-100.92	1562.3	CP	
8	8 *	89.40	0.00	-79.92	0.0	CP	
9	9 *	89.40	0.00	-25.92	0.0	CP	
10	10 *	110.40	0.00	-4.92	984.9	CP	
11	11 *	146.40	0.00	-4.92	543.4	INPT	
12	12 *	206.40	0.00	-4.92	560.4	INPT	
13	13 *	245.40	0.00	-4.92	722.0	CP	
14	14 *	266.40	0.00	-25.92	0.0	CP	
15	15 *	266.40	0.00	-72.48	1103.8	INPT	
16	16 *	266.40	0.00	-87.74	0.0	CP	
17	17 *	272.43	-1.45	-102.64	0.0	CP	
18	18 *	323.28	-13.68	-154.56	782.3	INPT	
19	19 *	327.96	-14.76	-159.36	0.0	INPT	
20	20 *	336.82	-16.98	-168.42	0.0	CP	
21	21 *	349.86	-18.26	-173.86	0.0	CP	
22	22 *	370.88	-18.26	-173.86	2622.0	INPT	
23	23 *	370.88	30.70	-173.86	245.0	INPT	
24	24 *	391.88	-18.26	-173.86	0.0	INPT	
25	25 *	404.84	-18.26	-173.86	229.4	INPT	
26	26 *	417.80	-18.26	-173.86	0.0	INPT	
27	27 *	438.80	-18.26	-173.86	2687.0	INPT	
28	28 *	438.80	30.70	-173.86	245.0	INPT	
29	29 *	459.80	-18.26	-173.86	0.0	INPT	
30	30 *	472.23	-18.26	-173.86	0.0	CP	
31	31 *	485.15	-18.26	-179.32	1445.0	CP	
32	32 *	507.30	-18.26	-202.13	0.0	CP	
33	33 *	519.84	-.26	-215.04	0.0	CP	

N O N - G L O B A L C O O R D I N A T E S Y S T E M D E F I N I T I O N

NODE NAME	DIRECTION COSINES **** NON-GLOBAL XS-AXIS *** X	Y	Z	**** NON-GLOBAL YS-AXIS *** X	Y	Z	**** NON-GLOBAL ZS-AXIS *** X	Y	Z	COMMENT
25 *	0.0000	.0867	.9962	0.0000	.9962	-.0867	-1.0000	0.0000	0.0000	
31 *	0.0000	.0841	.9965	0.0000	.9965	-.0841	-1.0000	0.0000	0.0000	

S U P P O R T T Y P E L I B R A R Y

SUPPORT TYPE	***** RESTRAINT CODES ***** DYNAMIC	GRAVITY	THERMAL	COMMENT
1	111111	111111	111111	
2	111000	111000	111000	
3	111000	111000	101000	
4	111000	110000	110000	
5	111000	110000	100000	
6	111000	101000	101000	
7	111000	100000	100000	
8	111000	11000	11000	
9	111000	11000	1000	
10	111000	10000	10000	
11	111000	10000	0	
12	111000	1000	1000	
13	111000	0	0	
14	110000	110000	110000	
15	110000	110000	100000	
16	110000	100000	100000	
17	110000	10000	10000	
18	110000	10000	0	
19	110000	0	0	
20	101000	101000	101000	
21	101000	100000	100000	
22	101000	11000	1000	
23	101000	10000	0	
24	101000	1000	1000	
25	101000	0	0	
26	100000	110000	100000	
27	100000	100000	100000	
28	100000	10000	0	
29	100000	0	0	
30	11000	11000	11000	
31	11000	11000	1000	
32	11000	10000	10000	
33	11000	10000	0	
34	11000	1000	1000	
35	11000	0	0	
36	10000	10000	10000	
37	10000	10000	0	
38	10000	0	0	
39	1000	11000	1000	
40	1000	10000	0	
41	1000	1000	1000	
42	1000	0	0	
43	0	10000	0	

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

SUPPORT TYPE	RESTRAINED NODAL POINTS 1	2	3	4	5	6	7	8	9	10	11	12	13	14	*** RESTRAINT CODES *** DYNAMIC	GRAVITY	THERMAL	NO MOD
1	1	33													111111	111111	111111	1

RESTRAINT SPECIFICATION. DEFAULT STIFFNESSES K(X),K(Y),K(Z)= 1.0E13 K(XX),K(YY),K(ZZ)= 1.0E15

NODE NAME	RESTRAINT TYPE	K(X)	RESTRAINT TYPE	K(Y)	RESTRAINT TYPE	K(Z)	RESTRAINT TYPE	K(XX)	RESTRAINT TYPE	K(YY)	RESTRAINT TYPE	K(ZZ)	*** RESTRAINT CODES *** DYNAMIC	GRAVITY	THERMAL	NO MOD
7			RR	.10E08									20000	20000	20000	1
18			RR	.10E08	RR	.10E08							22000	22000	22000	1
13			RR	.45E03									20000	20000	20000	1
25	RR	.80E03											200000	200000	200000	1
31	RR	.60E03											200000	200000	200000	1

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

MATERIAL NUMBER	COLD ELASTIC MODULUS	POISSONS RATIO	THERMAL EXPANSION COEFFICIENT	INTERNAL PIPE PRESSURE	MEMBER TEMPERATURE	HOT ELASTIC MODULUS	COMMENT
1	26200000.0	.300	0.000000000	0.0	0.00	26200000.0	
2	25200000.0	.300	0.000000000	0.0	0.00	25200000.0	
3	75600000.0	.300	0.000000000	0.0	0.00	75600000.0	

P I P E M E M B E R C R O S S S E C T I O N T Y P E S

SECTION NUMBER	OUTSIDE DIAMETER	WALL THICKNESS	AXIAL AREA	SHEAR AREA	FLEXURAL INERTIA	INPUT FLEXIBILITY	WEIGHT/ LENGTH	SECTION DESCRIPTION
1	14.000	.4380	18.66	9.34	429.5		0.00	
2	12.750	.3750	14.58	7.29	279.3		0.00	
3	12.750	1.3120	47.14	23.78	781.1		0.00	
4	12.750	2.0000	67.54	34.54	1009.5		0.00	

P I P E M E M B E R D A T A

MEMBER NAME	* NODE NAME * I-END	J-END	MAT TYPE	SECT TYPE	INTENS FACTOR I-END	J-END	REF TEMP	RELEASE CODE I-END	J-END	MEMBER LENGTH	CURVE RADIUS	******* INTERSECTION ******* X-GLOBAL	Y-GLOBAL	Z-GLOBAL	INTER ANGLE	MEMBER NUMBER
1 *	1 *	2 *	1	1	1.000	1.000	70.0	0	0	19.14						1
2 *	2 *	3 *	1	1	2.631	2.631	70.0	0	0	4.83	21.000	21.00	0.00	-4.92	13.186	2
3 *	3 *	4 *	1	1	1.000	1.000	70.0	0	0	2.97						3
4 *	4 *	5 *	1	1	2.631	2.631	70.0	0	0	32.99	21.000	47.40	0.00	-4.92	90.000	4
5 *	5 *	6 *	1	1	1.000	1.000	70.0	0	0	54.00						5
6 *	6 *	7 *	1	1	2.631	2.631	70.0	0	0	32.99	21.000	47.40	0.00	-100.92	90.000	6
7 *	7 *	8 *	1	1	2.631	2.631	70.0	0	0	32.99	21.000	89.40	0.00	-100.92	90.000	7
8 *	8 *	9 *	1	1	1.000	1.000	70.0	0	0	54.00						8
9 *	9 *	10 *	1	1	2.631	2.631	70.0	0	0	32.99	21.000	89.40	0.00	-4.92	90.000	9
10 *	10 *	11 *	1	1	1.000	1.000	70.0	0	0	36.00						10
11 *	11 *	12 *	1	1	1.000	1.000	70.0	0	0	60.00						11
12 *	12 *	13 *	1	1	1.000	1.000	70.0	0	0	39.00						12
13 *	13 *	14 *	1	1	2.631	2.631	70.0	0	0	32.99	21.000	266.40	0.00	-4.92	90.000	13
14 *	14 *	15 *	1	1	1.000	1.000	70.0	0	0	46.56						14
15 *	15 *	16 *	1	1	1.000	1.000	70.0	0	0	15.26						15
16 *	16 *	17 *	1	1	2.631	2.631	70.0	0	0	16.57	21.000	266.40	0.00	-96.48	45.199	16
17 *	17 *	18 *	1	1	1.000	1.000	70.0	0	0	73.70						17
18 *	18 *	19 *	1	1	1.000	1.000	70.0	0	0	6.79						18
19 *	19 *	20 *	1	1	1.000	1.000	70.0	0	0	12.87						19
20 *	20 *	21 *	1	2	2.862	2.862	70.0	0	0	14.57	18.000	342.14	-18.26	-173.86	46.387	20
21 *	21 *	22 *	3	3	1.000	1.000	70.0	0	0	21.03						21
22 *	22 *	23 *	2	4	1.000	1.000	70.0	0	0	48.96						22
23 *	22 *	24 *	3	3	1.000	1.000	70.0	0	0	21.00						23
24 *	24 *	25 *	2	3	1.000	1.000	70.0	0	0	12.96						24
25 *	25 *	26 *	2	3	1.000	1.000	70.0	0	0	12.96						25
26 *	26 *	27 *	3	3	1.000	1.000	70.0	0	0	21.00						26
27 *	27 *	28 *	2	4	1.000	1.000	70.0	0	0	48.96						27
28 *	27 *	29 *	3	3	1.000	1.000	70.0	0	0	21.00						28
29 *	29 *	30 *	2	3	1.000	1.000	70.0	0	0	12.43						29
30 *	30 *	31 *	2	3	1.118	1.118	70.0	0	0	14.40	18.000	479.84	-18.26	-173.86	45.838	30
31 *	31 *	32 *	2	3	1.000	1.000	70.0	0	0	31.80						31
32 *	32 *	33 *	2	3	1.118	1.118	70.0	0	0	28.27	18.000	519.84	-18.26	-215.04	90.000	32

MEMBER LENGTH - DIRECTION INFORMATION

MEMBER NAME	I NODE NAME	J NODE NAME	***DELTA MEMBER LENGTHS*** X	Y	Z	CROSS SECTION DESCRIPTION
1 *	1 *	2 *	18.64	0.00	-4.37	
2 *	2 *	3 *	4.79	0.00	-.55	
3 *	3 *	4 *	2.97	0.00	0.00	
4 *	4 *	5 *	21.00	0.00	-21.00	
5 *	5 *	6 *	0.00	0.00	-54.00	
6 *	6 *	7 *	21.00	0.00	-21.00	
7 *	7 *	8 *	21.00	0.00	21.00	
8 *	8 *	9 *	0.00	0.00	54.00	
9 *	9 *	10 *	21.00	0.00	21.00	
10 *	10 *	11 *	36.00	0.00	0.00	
11 *	11 *	12 *	60.00	0.00	0.00	
12 *	12 *	13 *	39.00	0.00	0.00	
13 *	13 *	14 *	21.00	0.00	-21.00	
14 *	14 *	15 *	0.00	0.00	-46.56	
15 *	15 *	16 *	0.00	0.00	-15.26	
16 *	16 *	17 *	6.03	-1.45	-14.90	
17 *	17 *	18 *	50.85	-12.23	-51.92	
18 *	18 *	19 *	4.68	-1.08	-4.80	
19 *	19 *	20 *	8.86	-2.22	-9.06	
20 *	20 *	21 *	13.03	-1.28	-5.43	
21 *	21 *	22 *	21.03	0.00	0.00	
22 *	22 *	23 *	0.00	48.96	0.00	
23 *	22 *	24 *	21.00	0.00	0.00	
24 *	24 *	25 *	12.96	0.00	0.00	
25 *	25 *	26 *	12.96	0.00	0.00	
26 *	26 *	27 *	21.00	0.00	0.00	
27 *	27 *	28 *	0.00	48.96	0.00	
28 *	27 *	29 *	21.00	0.00	0.00	
29 *	29 *	30 *	12.43	0.00	0.00	
30 *	30 *	31 *	12.91	0.00	-5.46	
31 *	31 *	32 *	22.15	0.00	-22.81	
32 *	32 *	33 *	12.54	18.00	-12.91	

F R E Q U E N C Y A N A L Y S I S

OVERALL PROBLEM SIZE

TOTAL NUMBER OF EQUATIONS.....	186
HALF BANDWIDTH OF STIFFNESS.....	18
NUMBER OF EQUATION BLOCKS.....	2
NUMBER OF EQUATIONS PER BLOCK.....	94
NUMBER OF MODES REQUIRED.(EST.).....	11
CUT-OFF FREQUENCY.....	50.00
TOTAL MODES TO CUT-OFF FREQUENCY.....	12
NODAL WT./GEN. MASS PRINT CODE (MWPRNT).....	0

PRINT NODAL WT. SUMMARY AND GEN. MASS = 0
SUPPRESS GEN. MASS PRINT = 1
SUPPRESS NODAL WT. SUMMARY PRINT = 2
SUPPRESS BOTH OF ABOVE PRINTS = 3

THE OUT OF CORE SUBSPACE ITERATION ALGORITHM WITH A MAXIMUM ALLOWABLE NUMBER OF ITERATIONS PER GROUP OF 16 IS CHOSEN.
SUBSPACE ITERATION WAS USER REQUESTED.
AN IN CORE SOLUTION WOULD REQUIRE A VALUE OF ABOUT 7444 FOR *MTOT*.

STORAGE ESTIMATES

THE FOLLOWING CONTROL PARAMETERS ARE EITHER USER SUPPLIED OR INTERNALLY ESTIMATED ARE USED TO CALCULATE ESTIMATES OF THE MINIMUM VALUE OF *MTOT*, THE PROGRAM STORAGE PARAMETER, AND THE CORRESPONDING CORE FIELD LENGTH SPECIFICATION REQUIRED FOR THE USERS JOB CARD...

NUMBER OF NODAL POINTS (NUMNP).....	33
NUMBER OF DYNAMIC NODAL RESTRAINTS (NODREA)....	12
NUMBER OF NON-GLOBAL NODES (NNG).....	2
NUMBER OF MODES (NM).....	11
NUMBER OF EQUATIONS PER BLOCK (NEQB).....	94
NUMBER OF SPECTRAL CURVES INPUT (NSC).....	1
NUMBER OF MODAL TIME STEPS (NT).....	100
NUMBER OF FORCING FUNCTIONS (NFN).....	2

EMPLOYING THE ABOVE PARAMETERS,THE FOLLOWING VALUES FOR MTOT AND CORE ARE ESTIMATED...

	MTOT (DECIMAL)	CORE (OCTAL)
RESPONSE SPECTRUM ANALYSIS.....	1545	003011
TIME HISTORY MODAL.....	1810	003422
STRUCTURAL PLOTTING.....	1646	003156
CREATE OR READ RESTART TAPE.....	1051	002033

N O D A L W E I G H T S U M M A R Y

NODE NAME		RESTRAINT CODE	X TRANSLATION	Y TRANSLATION	Z TRANSLATION
1	*	111111	0.000	0.000	0.000
2	*	000000	0.000	0.000	0.000
3	*	000000	0.000	0.000	0.000
4	*	000000	1086.402	1086.402	1086.402
5	*	000000	0.000	0.000	0.000
6	*	000000	0.000	0.000	0.000
7	*	000000	1562.293	1562.293	1562.293
8	*	000000	0.000	0.000	0.000
9	*	000000	0.000	0.000	0.000
10	*	000000	984.895	984.895	984.895
11	*	000000	543.394	543.394	543.394
12	*	000000	560.396	560.396	560.396
13	*	000000	721.988	721.988	721.988
14	*	000000	0.000	0.000	0.000
15	*	000000	1103.790	1103.790	1103.790
16	*	000000	0.000	0.000	0.000
17	*	000000	0.000	0.000	0.000
18	*	000000	782.305	782.305	782.305
19	*	000000	0.000	0.000	0.000
20	*	000000	0.000	0.000	0.000
21	*	000000	0.000	0.000	0.000
22	*	000000	2621.995	2621.995	2621.995
23	*	000000	245.001	245.001	245.001
24	*	000000	0.000	0.000	0.000
25	*	000000	229.402	229.402	229.402
26	*	000000	0.000	0.000	0.000
27	*	000000	2686.987	2686.987	2686.987
28	*	000000	245.001	245.001	245.001
29	*	000000	0.000	0.000	0.000
30	*	000000	0.000	0.000	0.000
31	*	000000	1444.981	1444.981	1444.981
32	*	000000	0.000	0.000	0.000
33	*	111111	0.000	0.000	0.000

FREQUENCY DISTRIBUTION BY GROUP

SUBSPACE GROUP	NO. MODES IN GROUP	LOWER BOUND HERTZ	LOWER BOUND EIGENVALUE	UPPER BOUND HERTZ	UPPER BOUND EIGENVALUE
1	4	0.000	0.	12.500	.6169E+04
2	3	12.500	.6169E+04	25.000	.2467E+05
3	2	25.000	.2467E+05	35.355	.4935E+05
4	3	35.355	.4935E+05	50.000	.9870E+05

F R E Q U E N C Y A N D C O N V E R G E N C E D A T A - S U B S P A C E I T E R A T I O N

GROUP	NO. MODES	ITERATIONS	SHIFT EIGENVALUE	MODE	CIRCULAR FREQUENCY (RAD/SEC)	FREQUENCY (HZ)	PERIOD (SEC)	FREQUENCY TOLERANCE	MODE TOLERANCE	//K*Ø// 2	//K*Ø-EIG *M*Ø// MAX	K*Ø OF MAX NORM
1	4	7	.308425E+04	1	25.3633	4.0367	.2477	.1554E-09	.9695E-05	.9136E+03	.4758E-02	-.3816E+03
				2	26.7509	4.2575	.2349	.5097E-08	.4308E-04	.1203E+04	.2778E-01	-.4143E+02
				3	57.2791	9.1163	.1097	0.	.7860E-10	.5509E+04	.1490E-06	-.1490E-06
				4	70.3056	11.1895	.0894	.1602E-11	.2228E-06	.7880E+04	.9411E-03	.3963E+04
2	3	4	.154213E+05	5	107.5132	17.1113	.0584	.8208E-12	.9551E-07	.2346E+05	.1456E-02	.4641E+04
				6	114.2159	18.1780	.0550	.6247E-13	.1389E-07	.2887E+05	.2605E-03	.1533E+05
				7	140.6279	22.3816	.0447	.4436E-08	.5726E-05	.4106E+05	.1524E+00	-.5726E+04
3	2	2	.370110E+05	8	170.8758	27.1957	.0368	.6937E-12	.5424E-07	.5248E+05	.1458E-02	-.4595E+04
				9	176.0253	28.0153	.0357	.2365E-08	.2447E-05	.5422E+05	.6773E-01	-.1815E+05
4	3	3	.740220E+05	10	238.7157	37.9928	.0263	.5271E-12	.1877E-07	.9157E+05	.1008E-02	-.2277E+05
				11	257.5153	40.9848	.0244	.7373E-12	.4747E-07	.1329E+06	.3595E-02	.4185E+05

G E N E R A L I Z E D M A S S M A T R I X

	1	2	3	4	5	6	7	8	9	10
1	1.00000	.00000	-.00000	.00000	-.00000	.00000	.00000	-.00000	-.00000	.00000
2	.00000	1.00000	.00000	-.00000	.00000	-.00000	-.00000	.00000	.00000	-.00000
3	-.00000	.00000	1.00000	-.00000	-.00000	.00000	.00000	-.00000	.00000	.00000
4	.00000	-.00000	-.00000	1.00000	-.00000	.00000	.00000	-.00000	-.00000	.00000
5	-.00000	.00000	-.00000	-.00000	1.00000	.00000	-.00000	-.00000	-.00000	-.00000
6	.00000	-.00000	.00000	.00000	.00000	1.00000	.00000	.00000	.00000	.00000
7	.00000	-.00000	.00000	.00000	-.00000	.00000	1.00000	.00000	.00000	.00000
8	-.00000	.00000	-.00000	-.00000	-.00000	.00000	.00000	1.00000	.00000	-.00000
9	-.00000	.00000	.00000	-.00000	-.00000	.00000	.00000	.00000	1.00000	-.00000
10	.00000	-.00000	.00000	.00000	-.00000	.00000	.00000	-.00000	-.00000	1.00000
11	-.00000	.00000	-.00000	-.00000	-.00000	.00000	.00000	-.00000	-.00000	-.00000

G E N E R A L I Z E D M A S S M A T R I X (CONTINUED)

	11
1	-.00000
2	.00000
3	-.00000
4	-.00000
5	-.00000
6	.00000
7	.00000
8	-.00000
9	-.00000
10	-.00000
11	1.00000

MAXIMUM VALUE OF OFF DIAGONAL TERMS = .938E-06
MODE SHAPE NUMBER.. 9
ROW NUMBER..... 2

MAXIMUM ABSOLUTE DIFFERANCE BETWEEN DIAGONAL AND 1 = .71054E-13
MODE SHAPE NUMBER.. 7

F R E Q U E N C Y E R R O R E S T I M A T E S U M M A R Y - S U B S P A C E I T E R A T I O N

CONDITIONING NUMBER = .9601E+06

SUMMARY OF WARNINGS

-NONE-

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 11 MODES PRINTED)

MODE SHAPE NUMBER... 1
FREQUENCY (HZ)..... 4.0367 MAX. NORMALIZING COMPONENT..... .39940

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	.00016	-.00281	.00064	.00009	-.00006	-.00027	GLOBAL
3 *	.00022	-.00520	.00122	.00006	-.00017	-.00071	GLOBAL
4 *	.00022	-.00741	.00175	.00008	-.00018	-.00074	GLOBAL
5 *	.01239	-.03744	.01058	.00030	-.00076	-.00179	GLOBAL
6 *	.05549	-.00773	.01061	.00093	-.00082	-.00228	GLOBAL
7 *	.07301	-.00004	.02796	.00337	-.00079	-.00169	GLOBAL
8 *	.05939	-.15034	.04293	.00619	-.00056	-.00322	GLOBAL
9 *	.03022	-.50325	.04295	.00673	-.00052	-.00314	GLOBAL
10 *	.02035	-.71345	.05196	.00691	-.00036	-.00272	GLOBAL
11 *	.02035	-.80749	.06442	.00692	-.00033	-.00246	GLOBAL
12 *	.02035	-.93712	.08167	.00692	-.00024	-.00183	GLOBAL
13 *	.02035	-1.00000	.09004	.00693	-.00019	-.00141	GLOBAL
14 *	.01924	-.86010	.09099	.00738	.00018	-.00005	GLOBAL
15 *	.00966	-.51988	.09098	.00717	.00023	.00043	GLOBAL
16 *	.00598	-.41108	.09097	.00704	.00025	.00058	GLOBAL
17 *	.00256	-.31101	.08010	.00598	.00026	.00046	GLOBAL
18 *	-.00452	-.00027	.00003	.00444	.00032	.00081	GLOBAL
19 *	-.00519	.02439	-.00618	.00427	.00032	.00081	GLOBAL
20 *	-.00631	.06871	-.01814	.00394	.00032	.00082	GLOBAL
21 *	-.00696	.08341	-.02305	.00240	-.00010	-.00078	GLOBAL
22 *	-.00696	.06686	-.02089	.00229	-.00010	-.00079	GLOBAL
23 *	.03165	.06686	.09114	.00229	-.00010	-.00079	GLOBAL
24 *	-.00696	.05028	-.01868	.00217	-.00011	-.00079	GLOBAL
25 *	-.01372	.04146	.00696	-.00078	-.00004	-.00196	NON-GLOBAL
26 *	-.00696	.03015	-.01580	.00174	-.00011	-.00075	GLOBAL
27 *	-.00696	.01445	-.01338	.00163	-.00012	-.00074	GLOBAL
28 *	.02916	.01445	.06634	.00163	-.00012	-.00074	GLOBAL
29 *	-.00696	-.00082	-.01093	.00151	-.00012	-.00071	GLOBAL
30 *	-.00696	-.00943	-.00946	.00130	-.00012	-.00066	GLOBAL
31 *	-.00882	-.01041	.00631	-.00058	-.00007	-.00106	NON-GLOBAL
32 *	-.00358	-.00228	-.00526	.00059	-.00012	-.00031	GLOBAL
33 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 11 MODES PRINTED)

MODE SHAPE NUMBER... 2
FREQUENCY (HZ)..... 4.2575 MAX. NORMALIZING COMPONENT..... .28908

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	-.00225	-.00038	-.00882	.00001	.00084	-.00004	GLOBAL
3 *	-.00308	-.00071	-.01680	.00001	.00240	-.00010	GLOBAL
4 *	-.00312	-.00102	-.02422	.00001	.00252	-.00010	GLOBAL
5 *	-.17649	-.00512	-.14958	.00005	.01080	-.00025	GLOBAL
6 *	-.78159	-.00065	-.14991	.00013	.01126	-.00032	GLOBAL
7 *	-1.00000	-.00002	-.34690	.00045	.00761	-.00026	GLOBAL
8 *	-.91883	-.02088	-.46228	.00081	.00181	-.00046	GLOBAL
9 *	-.84468	-.06656	-.46250	.00086	.00110	-.00045	GLOBAL
10 *	-.83321	-.09170	-.46702	.00073	-.00027	-.00029	GLOBAL
11 *	-.83329	-.10153	-.45319	.00069	-.00054	-.00024	GLOBAL
12 *	-.83333	-.11230	-.40207	.00061	-.00121	-.00011	GLOBAL
13 *	-.83328	-.11437	-.34467	.00056	-.00174	.00000	GLOBAL
14 *	-.74839	-.09698	-.27986	.00060	-.00519	.00036	GLOBAL
15 *	-.49714	-.07007	-.27984	.00055	-.00551	.00053	GLOBAL
16 *	-.41229	-.06183	-.27981	.00053	-.00554	.00058	GLOBAL
17 *	-.32967	-.05137	-.24769	.00043	-.00528	.00060	GLOBAL
18 *	-.06443	-.00004	-.00029	.00024	-.00437	.00068	GLOBAL
19 *	-.04298	.00423	.01960	.00022	-.00424	.00067	GLOBAL
20 *	-.00422	.01197	.05549	.00018	-.00397	.00065	GLOBAL
21 *	.00992	.01603	.07705	.00018	.00032	-.00007	GLOBAL
22 *	.00993	.01454	.06950	.00016	.00039	-.00007	GLOBAL
23 *	.01361	.01454	.07750	.00016	.00039	-.00008	GLOBAL
24 *	.00995	.01288	.06063	.00015	.00044	-.00008	GLOBAL
25 *	.05504	.00699	-.00998	-.00005	.00052	-.00012	NON-GLOBAL
26 *	.01001	.01047	.04702	.00010	.00057	-.00010	GLOBAL
27 *	.01002	.00831	.03481	.00008	.00058	-.00010	GLOBAL
28 *	.01511	.00831	.03894	.00008	.00058	-.00010	GLOBAL
29 *	.01004	.00611	.02252	.00007	.00058	-.00010	GLOBAL
30 *	.01007	.00480	.01542	.00004	.00054	-.00010	GLOBAL
31 *	.00952	.00283	-.00767	-.00007	.00039	-.00001	NON-GLOBAL
32 *	.00069	.00139	.00233	-.00004	.00023	-.00007	GLOBAL
33 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 11 MODES PRINTED)

MODE SHAPE NUMBER... 3
FREQUENCY (HZ)..... 9.1163 MAX. NORMALIZING COMPONENT..... .25605

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	.00196	.00084	.00879	.00003	-.00079	.00006	GLOBAL
3 *	.00268	.00139	.01633	.00004	-.00221	.00014	GLOBAL
4 *	.00267	.00185	.02324	.00005	-.00231	.00015	GLOBAL
5 *	.15275	.00970	.13299	.00010	-.00958	.00030	GLOBAL
6 *	.70726	.01243	.13363	-.00006	-.01103	.00029	GLOBAL
7 *	1.00000	-.00002	.47031	-.00106	-.01845	-.00034	GLOBAL
8 *	.55149	.02232	.89694	-.00183	-.02174	-.00027	GLOBAL
9 *	-.59031	.12798	.89688	-.00203	-.01962	-.00051	GLOBAL
10 *	-.83105	.15611	.99302	-.00195	.00506	-.00107	GLOBAL
11 *	-.83160	.11479	.74896	-.00198	.00814	-.00121	GLOBAL
12 *	-.83205	.03994	.16284	-.00202	.01048	-.00121	GLOBAL
13 *	-.83202	-.00445	-.24438	-.00204	.00983	-.00101	GLOBAL
14 *	-.86490	-.04613	-.35742	-.00129	-.00354	.00032	GLOBAL
15 *	-.65075	-.10295	-.35853	-.00108	-.00537	.00090	GLOBAL
16 *	-.56427	-.11872	-.35878	-.00098	-.00568	.00109	GLOBAL
17 *	-.46828	-.11622	-.32010	.00017	-.00653	.00177	GLOBAL
18 *	-.10987	.00009	.00059	.00037	-.00605	.00197	GLOBAL
19 *	-.07848	.01116	.02850	.00036	-.00594	.00195	GLOBAL
20 *	-.02077	.03156	.07959	.00033	-.00564	.00188	GLOBAL
21 *	.00119	.04480	.11130	.00009	.00053	-.00002	GLOBAL
22 *	.00126	.04402	.09897	.00008	.00064	-.00006	GLOBAL
23 *	.00413	.04403	.10303	.00009	.00064	-.00006	GLOBAL
24 *	.00134	.04236	.08447	.00006	.00072	-.00010	GLOBAL
25 *	.07733	.03404	-.00147	-.00009	.00084	-.00002	NON-GLOBAL
26 *	.00160	.03802	.06257	-.00002	.00090	-.00023	GLOBAL
27 *	.00167	.03285	.04343	-.00004	.00090	-.00026	GLOBAL
28 *	.01447	.03286	.04180	-.00003	.00090	-.00026	GLOBAL
29 *	.00175	.02709	.02452	-.00006	.00087	-.00028	GLOBAL
30 *	.00187	.02332	.01405	-.00010	.00075	-.00031	GLOBAL
31 *	.00817	.01759	.00061	-.00033	.00038	.00015	NON-GLOBAL
32 *	-.00441	.00616	.00250	-.00019	.00009	-.00035	GLOBAL
33 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 11 MODES PRINTED)

MODE SHAPE NUMBER... 4
FREQUENCY (HZ)..... 11.1895 MAX. NORMALIZING COMPONENT..... .43013

NODE NAME		*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1	*	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
2	*	.00010	-.00622	.00039	-.00015	-.00004	-.00045	GLOBAL
3	*	.00015	-.01047	.00081	-.00026	-.00013	-.00111	GLOBAL
4	*	.00015	-.01405	.00122	-.00028	-.00014	-.00116	GLOBAL
5	*	.01146	-.07297	.00896	-.00056	-.00075	-.00243	GLOBAL
6	*	.05422	-.08228	.00895	.00064	-.00082	-.00250	GLOBAL
7	*	.07226	-.00022	.02739	.00776	-.00090	.00171	GLOBAL
8	*	.05177	-.17611	.04715	.01271	-.00096	.00147	GLOBAL
9	*	.00283	-.89648	.04708	.01340	-.00078	.00340	GLOBAL
10	*	.00070	-1.00000	.03764	.00846	.00118	.01047	GLOBAL
11	*	.00062	-.59562	-.00905	.00732	.00137	.01184	GLOBAL
12	*	.00048	.15096	-.09503	.00540	.00142	.01246	GLOBAL
13	*	.00038	.62518	-.14847	.00416	.00131	.01156	GLOBAL
14	*	-.01643	.80409	-.16960	-.00259	.00048	.00401	GLOBAL
15	*	-.03348	.65258	-.16951	-.00399	.00019	.00174	GLOBAL
16	*	-.03546	.58697	-.16940	-.00441	.00005	.00100	GLOBAL
17	*	-.02845	.49562	-.15544	-.00774	-.00099	-.00098	GLOBAL
18	*	.01065	.00047	-.00021	-.00688	-.00125	-.00237	GLOBAL
19	*	.01404	-.04338	.01299	-.00666	-.00124	-.00237	GLOBAL
20	*	.01980	-.12317	.03821	-.00622	-.00120	-.00235	GLOBAL
21	*	.02238	-.15657	.05119	-.00360	.00010	.00104	GLOBAL
22	*	.02237	-.13424	.04892	-.00342	.00012	.00109	GLOBAL
23	*	-.03140	-.13426	-.11936	-.00344	.00012	.00110	GLOBAL
24	*	.02236	-.11058	.04601	-.00324	.00015	.00115	GLOBAL
25	*	.03526	-.09841	-.02235	.00125	.00010	.00290	NON-GLOBAL
26	*	.02233	-.07838	.04057	-.00255	.00027	.00130	GLOBAL
27	*	.02232	-.05064	.03464	-.00237	.00030	.00133	GLOBAL
28	*	-.04296	-.05065	-.08183	-.00238	.00030	.00134	GLOBAL
29	*	.02231	-.02258	.02808	-.00218	.00032	.00133	GLOBAL
30	*	.02229	-.00609	.02377	-.00184	.00036	.00128	GLOBAL
31	*	.01863	-.00012	-.01999	.00123	.00033	.00143	NON-GLOBAL
32	*	.00995	-.00070	.00885	-.00075	.00040	.00076	GLOBAL
33	*	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 11 MODES PRINTED)

MODE SHAPE NUMBER... 5
FREQUENCY (HZ)..... 17.1113 MAX. NORMALIZING COMPONENT..... .23124

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	.00068	-.00297	.00430	-.00000	-.00022	-.00024	GLOBAL
3 *	.00082	-.00519	.00614	-.00004	-.00031	-.00061	GLOBAL
4 *	.00078	-.00713	.00738	-.00004	-.00031	-.00064	GLOBAL
5 *	-.02827	-.03606	-.00191	-.00002	.00258	-.00144	GLOBAL
6 *	-.17246	-.02552	-.00080	.00058	.00238	-.00166	GLOBAL
7 *	-.18234	-.00043	.02042	.00354	-.00248	-.00029	GLOBAL
8 *	-.24350	-.10251	.08261	.00523	-.00271	-.00036	GLOBAL
9 *	-.39135	-.38629	.08362	.00484	-.00294	.00065	GLOBAL
10 *	-.47469	-.35872	.18109	-.00123	-.00499	.00632	GLOBAL
11 *	-.47347	-.11478	.35845	-.00294	-.00471	.00708	GLOBAL
12 *	-.47048	.32377	.62217	-.00579	-.00423	.00712	GLOBAL
13 *	-.46791	.59046	.79089	-.00764	-.00497	.00655	GLOBAL
14 *	-.17086	.48698	1.00000	-.01147	-.01777	.00387	GLOBAL
15 *	.63257	-.04935	.99718	-.01091	-.01448	.00438	GLOBAL
16 *	.83742	-.21260	.99523	-.01022	-.01184	.00454	GLOBAL
17 *	.83721	-.28169	.96714	-.00235	.01423	.00538	GLOBAL
18 *	-.06858	.00393	-.00020	.00129	.02090	.00710	GLOBAL
19 *	-.16163	.04700	-.10173	.00150	.02083	.00730	GLOBAL
20 *	-.33346	.13159	-.29266	.00156	.02039	.00741	GLOBAL
21 *	-.41294	.20920	-.46961	-.00195	.00386	.00230	GLOBAL
22 *	-.41280	.25589	-.54631	-.00213	.00316	.00203	GLOBAL
23 *	-.51847	.25594	-.65891	-.00236	.00316	.00221	GLOBAL
24 *	-.41245	.29387	-.60298	-.00221	.00216	.00156	GLOBAL
25 *	-.58980	.36101	.41181	.00064	.00007	.00235	NON-GLOBAL
26 *	-.41113	.31060	-.60726	-.00248	-.00205	-.00035	GLOBAL
27 *	-.41076	.29760	-.55170	-.00256	-.00330	-.00091	GLOBAL
28 *	-.37098	.29766	-.68536	-.00279	-.00330	-.00078	GLOBAL
29 *	-.41019	.27198	-.46866	-.00252	-.00446	-.00144	GLOBAL
30 *	-.40916	.24816	-.40050	-.00245	-.00614	-.00217	GLOBAL
31 *	-.27783	.22049	.36004	-.00427	-.00918	.00250	NON-GLOBAL
32 *	-.12715	.05690	-.07085	-.00139	-.00886	-.00436	GLOBAL
33 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 11 MODES PRINTED)

MODE SHAPE NUMBER... 6
FREQUENCY (HZ)..... 18.1780 MAX. NORMALIZING COMPONENT..... .22354

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	-.00037	-.00276	-.00224	.00014	.00013	-.00028	GLOBAL
3 *	-.00045	-.00523	-.00335	.00012	.00022	-.00075	GLOBAL
4 *	-.00043	-.00755	-.00416	.00015	.00022	-.00078	GLOBAL
5 *	.00658	-.03701	-.00423	.00048	-.00074	-.00194	GLOBAL
6 *	.04610	.00323	-.00475	.00110	-.00053	-.00256	GLOBAL
7 *	.03271	-.00078	-.03727	.00308	.00253	-.00250	GLOBAL
8 *	.10316	-.14434	-.10245	.00406	.00350	-.00302	GLOBAL
9 *	.29057	-.34786	-.10275	.00289	.00336	-.00224	GLOBAL
10 *	.34677	-.28483	-.14525	-.00656	.00092	.00495	GLOBAL
11 *	.34601	-.08830	-.17050	-.00941	.00057	.00596	GLOBAL
12 *	.34397	.31389	-.20644	-.01417	.00102	.00731	GLOBAL
13 *	.34212	.61422	-.26668	-.01727	.00247	.00827	GLOBAL
14 *	.08514	.43896	-.43579	-.02002	.01613	.01231	GLOBAL
15 *	-.65968	-.50239	-.43430	-.01942	.01418	.01635	GLOBAL
16 *	-.86441	-.79270	-.43331	-.01863	.01248	.01767	GLOBAL
17 *	-.90611	-.88912	-.42343	-.01060	-.00347	.02343	GLOBAL
18 *	-.26530	.00969	-.00167	-.00507	-.00737	.02856	GLOBAL
19 *	-.19788	.12799	.03796	-.00458	-.00733	.02892	GLOBAL
20 *	-.06578	.35766	.11190	-.00438	-.00713	.02886	GLOBAL
21 *	-.00407	.60187	.17728	-.01148	-.00101	.00850	GLOBAL
22 *	-.00407	.77465	.19698	-.01184	-.00080	.00753	GLOBAL
23 *	-.37801	.77484	-.38818	-.01199	-.00080	.00768	GLOBAL
24 *	-.00405	.91830	.21092	-.01213	-.00052	.00606	GLOBAL
25 *	.29851	.95680	.00401	.00309	-.00028	.01266	NON-GLOBAL
26 *	-.00397	1.00000	.21112	-.01318	.00051	-.00001	GLOBAL
27 *	-.00395	.98179	.19744	-.01347	.00079	-.00178	GLOBAL
28 *	.08433	.98203	-.46857	-.01365	.00079	-.00181	GLOBAL
29 *	-.00393	.92511	.17792	-.01367	.00101	-.00328	GLOBAL
30 *	-.00390	.86819	.16297	-.01402	.00125	-.00505	GLOBAL
31 *	.20213	.68501	.01219	-.00764	.00223	.01467	NON-GLOBAL
32 *	-.04880	.18645	.10759	-.01216	.00145	-.00800	GLOBAL
33 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 11 MODES PRINTED)

MODE SHAPE NUMBER... 7
FREQUENCY (HZ)..... 22.3816 MAX. NORMALIZING COMPONENT..... .29751

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	-.00183	.00137	-.00993	-.00002	.00059	.00012	GLOBAL
3 *	-.00227	.00243	-.01504	-.00000	.00109	.00030	GLOBAL
4 *	-.00222	.00338	-.01892	-.00001	.00110	.00031	GLOBAL
5 *	.01446	.01672	-.02857	-.00006	-.00254	.00072	GLOBAL
6 *	.16095	.00791	-.03063	-.00033	-.00235	.00088	GLOBAL
7 *	.15906	.00027	-.06980	-.00156	.00320	.00042	GLOBAL
8 *	.20313	.05168	-.13069	-.00217	.00089	.00047	GLOBAL
9 *	.24138	.16626	-.13213	-.00183	.00082	.00000	GLOBAL
10 *	.27889	.13804	-.18260	.00175	.00246	-.00306	GLOBAL
11 *	.27753	.02008	-.26592	.00279	.00201	-.00336	GLOBAL
12 *	.27430	-.17765	-.36240	.00452	.00147	-.00295	GLOBAL
13 *	.27158	-.28013	-.42663	.00564	.00244	-.00237	GLOBAL
14 *	-.00078	-.16438	-.59927	.00726	.01722	-.00092	GLOBAL
15 *	-.78218	.16268	-.59643	.00618	.01399	-.00146	GLOBAL
16 *	-.97694	.25175	-.59445	.00544	.01154	-.00163	GLOBAL
17 *	-1.00000	.27122	-.57807	-.00132	-.00882	-.00252	GLOBAL
18 *	-.49959	-.00260	-.01385	-.00253	-.00758	-.00361	GLOBAL
19 *	-.47101	-.03275	.01942	-.00244	-.00657	-.00372	GLOBAL
20 *	-.42963	-.08911	.07108	-.00221	-.00507	-.00378	GLOBAL
21 *	-.43983	-.13150	.02050	.00069	.00777	-.00062	GLOBAL
22 *	-.43971	-.14343	-.14400	.00081	.00757	-.00042	GLOBAL
23 *	-.42816	-.14348	-.10645	.00075	.00757	-.00017	GLOBAL
24 *	-.43922	-.15027	-.29804	.00096	.00688	-.00022	GLOBAL
25 *	-.39028	-.11732	.43830	.00061	.00498	-.00124	NON-GLOBAL
26 *	-.43732	-.14581	-.43189	.00152	.00270	.00059	GLOBAL
27 *	-.43679	-.13108	-.47453	.00167	.00115	.00082	GLOBAL
28 *	-.48705	-.13113	-.40099	.00144	.00115	.00110	GLOBAL
29 *	-.43587	-.11255	-.48045	.00194	-.00050	.00087	GLOBAL
30 *	-.43425	-.10122	-.45598	.00241	-.00323	.00077	GLOBAL
31 *	-.37566	-.04683	.38940	-.00054	-.00950	-.00289	NON-GLOBAL
32 *	-.13002	-.01063	-.12201	.00343	-.01022	-.00127	GLOBAL
33 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 11 MODES PRINTED)

MODE SHAPE NUMBER... 8
FREQUENCY (HZ)..... 27.1957 MAX. NORMALIZING COMPONENT..... .29869

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	.02106	-.00112	.10878	.00002	-.00674	-.00010	GLOBAL
3 *	.02634	-.00200	.16735	.00001	-.01301	-.00025	GLOBAL
4 *	.02594	-.00281	.21282	.00002	-.01327	-.00026	GLOBAL
5 *	.00788	-.01355	.41765	.00009	.01672	-.00062	GLOBAL
6 *	-1.00000	-.00415	.43797	.00031	.01622	-.00077	GLOBAL
7 *	-.96886	-.00026	.72106	.00121	-.01884	-.00051	GLOBAL
8 *	-.93722	-.04422	.92101	.00162	.01643	-.00055	GLOBAL
9 *	.07491	-.12768	.93192	.00126	.01808	-.00018	GLOBAL
10 *	.26843	-.09734	.87439	-.00203	-.00052	.00251	GLOBAL
11 *	.27036	-.00094	.87138	-.00300	.00206	.00269	GLOBAL
12 *	.27223	.14773	.52668	-.00461	.00928	.00197	GLOBAL
13 *	.27252	.20825	.08841	-.00565	.01213	.00123	GLOBAL
14 *	.01584	.07126	-.18962	-.00671	.00904	-.00010	GLOBAL
15 *	-.34569	-.22278	-.19239	-.00520	.00589	.00053	GLOBAL
16 *	-.42312	-.29450	-.19280	-.00433	.00469	.00073	GLOBAL
17 *	-.43091	-.29871	-.18947	.00152	-.00286	.00327	GLOBAL
18 *	-.15920	-.00161	.00228	.00401	-.00589	.00155	GLOBAL
19 *	-.12761	.02379	.02710	.00413	-.00604	.00125	GLOBAL
20 *	-.06774	.07013	.07379	.00446	-.00604	.00073	GLOBAL
21 *	-.04396	.08185	.10610	.00492	.00091	-.00272	GLOBAL
22 *	-.04380	.02377	.08522	.00508	.00111	-.00276	GLOBAL
23 *	.09442	.02379	.34451	.00538	.00111	-.00285	GLOBAL
24 *	-.04360	-.03406	.05934	.00509	.00130	-.00268	GLOBAL
25 *	.03440	-.07089	.04323	-.00220	.00168	-.00511	NON-GLOBAL
26 *	-.04285	-.09591	.01979	.00514	.00155	-.00187	GLOBAL
27 *	-.04264	-.13225	-.01294	.00515	.00150	-.00153	GLOBAL
28 *	.03319	-.13232	.24698	.00537	.00150	-.00156	GLOBAL
29 *	-.04239	-.15997	-.04352	.00506	.00134	-.00117	GLOBAL
30 *	-.04194	-.17064	-.05832	.00490	.00088	-.00069	GLOBAL
31 *	-.07309	-.14090	.04084	.00010	-.00058	-.00478	NON-GLOBAL
32 *	-.01481	-.03456	-.03719	.00360	-.00118	.00058	GLOBAL
33 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 11 MODES PRINTED)

MODE SHAPE NUMBER... 9
FREQUENCY (HZ)..... 28.0153 MAX. NORMALIZING COMPONENT..... .42086

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	-.00473	-.00355	-.02441	.00009	.00152	-.00032	GLOBAL
3 *	-.00593	-.00639	-.03762	.00006	.00295	-.00082	GLOBAL
4 *	-.00584	-.00896	-.04790	.00007	.00301	-.00085	GLOBAL
5 *	-.00633	-.04304	-.09644	.00031	-.00341	-.00200	GLOBAL
6 *	.19945	-.01110	-.10094	.00102	-.00324	-.00251	GLOBAL
7 *	.18302	-.00084	-.17485	.00381	.00481	-.00177	GLOBAL
8 *	.20029	-.14295	-.23761	.00504	-.00218	-.00194	GLOBAL
9 *	.05382	-.40074	-.23969	.00383	-.00274	-.00077	GLOBAL
10 *	.01580	-.30037	-.21449	-.00689	-.00144	.00790	GLOBAL
11 *	.01514	.00342	-.15391	-.01005	-.00200	.00845	GLOBAL
12 *	.01394	.46666	-.01294	-.01531	-.00234	.00602	GLOBAL
13 *	.01312	.64819	.07059	-.01874	-.00171	.00363	GLOBAL
14 *	-.03464	.19332	.05595	-.02185	.00363	-.00031	GLOBAL
15 *	-.20051	-.76049	.05608	-.01671	.00290	.00193	GLOBAL
16 *	-.23955	-.98931	.05596	-.01383	.00238	.00266	GLOBAL
17 *	-.23994	-1.00000	.05473	.00578	-.00064	.00970	GLOBAL
18 *	-.05486	-.00267	.00040	.01381	-.00212	.00619	GLOBAL
19 *	-.03774	.09165	-.00427	.01420	-.00220	.00550	GLOBAL
20 *	-.00587	.26637	-.01620	.01496	-.00226	.00422	GLOBAL
21 *	.00284	.33069	-.02512	.01339	.00049	-.00721	GLOBAL
22 *	.00290	.17586	-.03575	.01362	.00053	-.00750	GLOBAL
23 *	.38273	.17596	.65290	.01423	.00053	-.00785	GLOBAL
24 *	.00291	.01668	-.04721	.01357	.00055	-.00747	GLOBAL
25 *	-.06118	-.07455	-.00293	-.00686	.00113	-.01348	NON-GLOBAL
26 *	.00296	-.16620	-.06121	.01338	.00047	-.00600	GLOBAL
27 *	.00297	-.28617	-.07066	.01333	.00041	-.00524	GLOBAL
28 *	.26852	-.28633	.60179	.01389	.00041	-.00549	GLOBAL
29 *	.00294	-.38551	-.07862	.01301	.00034	-.00432	GLOBAL
30 *	.00290	-.42904	-.08204	.01244	.00020	-.00293	GLOBAL
31 *	-.11417	-.37219	-.00306	-.00020	-.00017	-.01207	NON-GLOBAL
32 *	.01143	-.10231	-.07400	.00887	-.00051	.00206	GLOBAL
33 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 11 MODES PRINTED)

MODE SHAPE NUMBER... 10
FREQUENCY (HZ)..... 37.9928 MAX. NORMALIZING COMPONENT..... .68266

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	.00253	-.00062	.01257	.00009	-.00079	-.00008	GLOBAL
3 *	.00318	-.00129	.01950	.00009	-.00157	-.00022	GLOBAL
4 *	.00314	-.00198	.02493	.00011	-.00161	-.00023	GLOBAL
5 *	.01667	-.00851	.05690	.00031	.00076	-.00062	GLOBAL
6 *	-.03437	.01251	.05892	.00045	.00075	-.00051	GLOBAL
7 *	-.02029	-.00032	.09178	.00046	-.00167	-.00144	GLOBAL
8 *	-.03142	-.04759	.11175	.00035	.00001	-.00172	GLOBAL
9 *	-.02019	-.05597	.11143	-.00024	.00048	-.00164	GLOBAL
10 *	.01441	-.02448	.05865	-.00374	.00350	.00060	GLOBAL
11 *	.01417	.00118	-.06948	-.00485	.00315	.00081	GLOBAL
12 *	.01362	.05738	-.19343	-.00670	.00054	.00103	GLOBAL
13 *	.01317	.10155	-.17438	-.00791	-.00108	.00142	GLOBAL
14 *	.03648	.00754	-.13530	-.00672	.00042	.00524	GLOBAL
15 *	.00589	-.28563	-.13257	-.00507	.00052	.00799	GLOBAL
16 *	-.00152	-.35178	-.13100	-.00438	.00025	.00889	GLOBAL
17 *	.03355	-.33483	-.11315	-.00243	-.00273	.01064	GLOBAL
18 *	.20349	-.00725	-.01397	-.00701	.00391	.00833	GLOBAL
19 *	.18649	-.00751	-.03141	-.00771	.00500	.00773	GLOBAL
20 *	.14346	-.02258	-.07157	-.00888	.00614	.00697	GLOBAL
21 *	.10457	-.07397	-.14710	-.01520	.00159	-.00074	GLOBAL
22 *	.10438	-.08960	-.17759	-.01555	.00095	-.00058	GLOBAL
23 *	.14123	-.08970	-1.00000	-.01726	.00095	-.00082	GLOBAL
24 *	.10393	-.09748	-.18732	-.01509	.00005	-.00016	GLOBAL
25 *	-.18477	-.07890	-.10309	.00050	-.00148	.01424	NON-GLOBAL
26 *	.10221	-.08126	-.14870	-.01338	-.00274	.00143	GLOBAL
27 *	.10174	-.04683	-.08417	-.01292	-.00331	.00185	GLOBAL
28 *	.01187	-.04688	-.76326	-.01422	-.00331	.00183	GLOBAL
29 *	.10103	-.00337	-.00923	-.01184	-.00348	.00220	GLOBAL
30 *	.09976	.02777	.03563	-.00991	-.00290	.00260	GLOBAL
31 *	.05994	.01881	-.10386	.00368	-.00022	.00733	NON-GLOBAL
32 *	.06981	-.01860	.03071	-.00355	.00174	.00329	GLOBAL
33 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

P I P I N G S Y S T E M M O D E S H A P E S (LOWEST 11 MODES PRINTED)

MODE SHAPE NUMBER... 11
FREQUENCY (HZ)..... 40.9848 MAX. NORMALIZING COMPONENT..... .28327

NODE NAME	*** NODAL TRANSLATIONS **** X	Y	Z	***** NODAL ROTATIONS ***** XX	YY	ZZ	COORDINATE SYSTEM
1 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL
2 *	-.01067	-.00182	-.05262	.00013	.00332	-.00019	GLOBAL
3 *	-.01340	-.00345	-.08156	.00013	.00657	-.00050	GLOBAL
4 *	-.01328	-.00499	-.10427	.00015	.00672	-.00052	GLOBAL
5 *	-.07726	-.02177	-.24081	.00048	-.00254	-.00129	GLOBAL
6 *	.10207	.01315	-.24891	.00083	-.00262	-.00178	GLOBAL
7 *	.04572	-.00065	-.37330	.00153	.00586	-.00227	GLOBAL
8 *	.09652	-.09487	-.44147	.00162	.00151	-.00262	GLOBAL
9 *	.14413	-.16416	-.43852	.00052	-.00044	-.00220	GLOBAL
10 *	.00348	-.08935	-.20217	-.00689	-.01581	.00301	GLOBAL
11 *	.00422	.02842	.36878	-.00918	-.01345	.00319	GLOBAL
12 *	.00541	.18914	.81484	-.01298	.00056	.00174	GLOBAL
13 *	.00615	.23243	.58588	-.01546	.00891	.00103	GLOBAL
14 *	-.23263	-.04257	.29254	-.01292	.00407	.00566	GLOBAL
15 *	-.33059	-.57298	.28068	-.00767	.00059	.01050	GLOBAL
16 *	-.32512	-.65957	.27514	-.00535	.00045	.01208	GLOBAL
17 *	-.35945	-.56014	.23219	.00355	.00769	.01538	GLOBAL
18 *	-.39796	-.03093	.03499	-.01600	-.00688	.00439	GLOBAL
19 *	-.34614	-.11706	.10479	-.01912	-.00942	.00238	GLOBAL
20 *	-.22833	-.33192	.27237	-.02282	-.01194	.00016	GLOBAL
21 *	-.14714	-.59337	.49683	-.02967	-.00262	.00070	GLOBAL
22 *	-.14640	-.57271	.54533	-.02985	-.00130	.00225	GLOBAL
23 *	-.27592	-.57341	-.98612	-.03181	-.00130	.00279	GLOBAL
24 *	-.14521	-.50196	.55209	-.02909	.00051	.00431	GLOBAL
25 *	.48558	-.46552	.14301	.00791	.00277	.02769	NON-GLOBAL
26 *	-.14074	-.30006	.45932	-.02628	.00598	.01052	GLOBAL
27 *	-.13952	-.06412	.32035	-.02552	.00702	.01170	GLOBAL
28 *	-.76682	-.06420	-1.00000	-.02750	.00702	.01322	GLOBAL
29 *	-.13773	.18624	.16374	-.02381	.00723	.01176	GLOBAL
30 *	-.13455	.33261	.07212	-.02077	.00589	.01087	GLOBAL
31 *	.05871	.35345	.14098	.00763	-.00088	.01760	NON-GLOBAL
32 *	-.07555	.12697	.07898	-.01100	-.00276	.00088	GLOBAL
33 *	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	GLOBAL

S P E C T R A L C U R V E D A T A

IDENT NUMBER 1
CURVE TITLE .....
CURVE TYPE ..... PERIOD VS. ACCELERATION
CURVE SCALE ..... LINEAR
NUMBER OF POINTS .. 13

POINT	PERIOD (SECS)	ACCELERATION (G)	***** COMMENT ******
1	0.0000	.0960	
2	.0250	.0960	
3	.0850	.1200	
4	.1400	.3000	
5	.1550	.5000	
6	.1550	1.1000	
7	.1900	1.1000	
8	.1900	.4800	
9	.2000	.3000	
10	.2500	.1200	
11	.3300	.0720	
12	.6000	.0240	
13	1.0000	.0120	

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

MODE NUMBER	PARTICIPATION FACTORS X DIR	Y DIR	Z DIR
1	.151	-2.836	.285
2	-3.317	-.221	-1.293
3	-1.037	.253	1.393
4	.245	-.691	-.070
5	-2.385	1.253	-.826
6	-.016	3.511	.004
7	-2.654	-.706	-3.105
8	-1.158	-.511	2.393
9	.258	-1.438	-.678
10	1.651	-1.101	-2.264
11	-1.361	-1.373	1.824

R E S P O N S E S P E C T R U M A N A L Y S I S

TITLE.....	
FILE LABEL.....	
SPECTRAL CURVES	
X-DIRECTION.....	1
Y-DIRECTION.....	1
Z-DIRECTION.....	1
CURVE SCALE FACTORS	
X-SCALE.....	1.000
Y-SCALE.....	.667
Z-SCALE.....	1.000
SPECTRA COMBINATION CODE...	VECTORIAL SUM
MODE COMBINATION CODE.....	VECTORIAL SUM
NODAL PRINT THRESHOLD (G)	
VERTICAL ACCELERATION....	0
HORIZONTAL ACCELERATION..	0
SAVE RESULTS PARAMETER.....	0

APPLIED SPECTRAL ACCELERATION SUMMARY

FREQUENCY NUMBER	PERIOD (SEC)	ZONE NUMBER	SPECTRAL ACCELERATIONS (G) X TRANS	Y TRANS	Z TRANS	XX ROT	YY ROT	ZZ ROT
1	.248	1	.128	.085	.128			
2	.235	1	.174	.116	.174			
3	.110	1	.201	.134	.201			
4	.089	1	.134	.090	.134			
5	.058	1	.109	.073	.109			
6	.055	1	.108	.072	.108			
7	.045	1	.104	.069	.104			
8	.037	1	.101	.067	.101			
9	.036	1	.100	.067	.100			
10	.026	1	.097	.064	.097			
11	.024	1	.096	.064	.096			

N O D A L A C C E L E R A T I O N S

NODE NAME	****** ACCELERATIONS ******* X-GLOBAL (G)	Y-GLOBAL (G)	Z-GLOBAL (G)	******* THRESHOLD ACCELERATIONS ******* VERTICAL (G)	EXCEED	HORIZONTAL (G)	EXCEED	
1 *	0.000	0.000	0.000	0.000	YES	0.000	YES	GLOBAL
2 *	.002	.001	.010	.001	YES	.010	YES	GLOBAL
3 *	.002	.001	.016	.001	YES	.016	YES	GLOBAL
4 *	.002	.001	.020	.001	YES	.020	YES	GLOBAL
5 *	.035	.007	.049	.007	YES	.060	YES	GLOBAL
6 *	.176	.004	.051	.004	YES	.183	YES	GLOBAL
7 *	.217	.000	.101	.000	YES	.239	YES	GLOBAL
8 *	.191	.025	.144	.025	YES	.239	YES	GLOBAL
9 *	.167	.076	.144	.076	YES	.221	YES	GLOBAL
10 *	.176	.088	.145	.088	YES	.229	YES	GLOBAL
11 *	.176	.085	.137	.085	YES	.223	YES	GLOBAL
12 *	.176	.106	.125	.106	YES	.216	YES	GLOBAL
13 *	.176	.128	.114	.128	YES	.210	YES	GLOBAL
14 *	.157	.102	.126	.102	YES	.201	YES	GLOBAL
15 *	.161	.104	.125	.104	YES	.204	YES	GLOBAL
16 *	.176	.122	.125	.122	YES	.216	YES	GLOBAL
17 *	.171	.119	.118	.119	YES	.208	YES	GLOBAL
18 *	.083	.003	.004	.003	YES	.083	YES	GLOBAL
19 *	.076	.013	.013	.013	YES	.078	YES	GLOBAL
20 *	.067	.038	.035	.038	YES	.076	YES	GLOBAL
21 *	.066	.062	.058	.062	YES	.088	YES	GLOBAL
22 *	.066	.067	.068	.067	YES	.095	YES	GLOBAL
23 *	.078	.067	.214	.067	YES	.228	YES	GLOBAL
24 *	.066	.071	.078	.071	YES	.102	YES	GLOBAL
25 *	.082	.071	.066					NON-GLOBAL
26 *	.066	.069	.082	.069	YES	.105	YES	GLOBAL
27 *	.066	.065	.077	.065	YES	.101	YES	GLOBAL
28 *	.085	.065	.180	.065	YES	.200	YES	GLOBAL
29 *	.066	.063	.071	.063	YES	.096	YES	GLOBAL
30 *	.065	.064	.065	.064	YES	.092	YES	GLOBAL
31 *	.055	.053	.059					NON-GLOBAL
32 *	.024	.016	.020	.016	YES	.031	YES	GLOBAL
33 *	0.000	0.000	0.000	0.000	YES	0.000	YES	GLOBAL

N O D A L D I S P L A C E M E N T S

NODE NAME	NODAL TRANSLATIONS X	Y	Z	NODAL ROTATIONS XX	YY	ZZ	COORDINATE SYSTEM
1 *	0.0000	0.0000	0.0000	0.000000	0.000000	0.000000	GLOBAL
2 *	.0002	.0002	.0009	.000005	.000082	.000016	GLOBAL
3 *	.0003	.0003	.0017	.000004	.000235	.000043	GLOBAL
4 *	.0003	.0005	.0024	.000005	.000246	.000045	GLOBAL
5 *	.0172	.0023	.0146	.000018	.001053	.000109	GLOBAL
6 *	.0763	.0005	.0146	.000056	.001100	.000138	GLOBAL
7 *	.0977	.0000	.0341	.000205	.000766	.000103	GLOBAL
8 *	.0894	.0091	.0459	.000375	.000292	.000196	GLOBAL
9 *	.0822	.0305	.0459	.000408	.000236	.000191	GLOBAL
10 *	.0813	.0431	.0466	.000415	.000065	.000166	GLOBAL
11 *	.0813	.0487	.0449	.000415	.000104	.000151	GLOBAL
12 *	.0813	.0563	.0394	.000415	.000163	.000115	GLOBAL
13 *	.0813	.0601	.0340	.000415	.000200	.000091	GLOBAL
14 *	.0732	.0516	.0281	.000442	.000509	.000044	GLOBAL
15 *	.0488	.0315	.0281	.000429	.000541	.000066	GLOBAL
16 *	.0406	.0251	.0281	.000421	.000543	.000075	GLOBAL
17 *	.0326	.0192	.0249	.000356	.000518	.000080	GLOBAL
18 *	.0065	.0000	.0001	.000264	.000433	.000099	GLOBAL
19 *	.0045	.0015	.0020	.000254	.000419	.000099	GLOBAL
20 *	.0015	.0043	.0056	.000235	.000393	.000098	GLOBAL
21 *	.0018	.0053	.0078	.000146	.000038	.000049	GLOBAL
22 *	.0018	.0045	.0071	.000140	.000044	.000049	GLOBAL
23 *	.0029	.0045	.0096	.000140	.000044	.000050	GLOBAL
24 *	.0018	.0037	.0063	.000133	.000048	.000049	GLOBAL
25 *	.0057	.0032	.0018	.000047	.000053	.000121	NON-GLOBAL
26 *	.0018	.0028	.0050	.000108	.000057	.000046	GLOBAL
27 *	.0018	.0022	.0039	.000102	.000059	.000045	GLOBAL
28 *	.0027	.0022	.0059	.000102	.000059	.000046	GLOBAL
29 *	.0018	.0018	.0028	.000095	.000058	.000044	GLOBAL
30 *	.0018	.0018	.0022	.000083	.000056	.000042	GLOBAL
31 *	.0016	.0015	.0015	.000039	.000050	.000069	NON-GLOBAL
32 *	.0005	.0004	.0006	.000043	.000040	.000026	GLOBAL
33 *	0.0000	0.0000	0.0000	0.000000	0.000000	0.000000	GLOBAL

P I P E M E M B E R S T R E S S E S

PIPE NAME		PIPE TYPE	NODAL PT NAME-END	SECTION DESCRIP	LOCAL X FORCE	LOCAL Y FORCE	LOCAL Z FORCE	LOCAL X MOMENT	LOCAL Y MOMENT	LOCAL Z MOMENT	BENDING STRESS	INTEN FACTR
1	*		1 -I		473.92	120.88	463.93	3976.86	52434.68	9741.95	871.63	1.00
1	*		2 -J		473.92	120.88	463.93	3976.86	44150.57	7434.26	732.58	1.00
2	*	CURV	2 -I		473.92	463.93	120.88	3976.86	7434.26	44150.57	1445.73	2.63
2	*	CURV	-C		511.01	422.73	120.88	3119.14	7549.19	43185.74	1413.67	2.63
2	*	CURV	3 -J		543.59	379.92	120.88	2256.66	7564.93	42362.83	1386.03	2.63
3	*		3 -I		543.59	120.88	379.92	2256.66	42362.83	7564.93	702.33	1.00
3	*		4 -J		543.59	120.88	379.92	2256.66	41448.20	7207.54	686.66	1.00
4	*	CURV	4 -I		543.33	363.91	119.95	2256.66	7207.54	41448.20	1355.10	2.63
4	*	CURV	-C		271.41	594.96	119.95	5948.82	1748.18	33800.47	1105.31	2.63
4	*	CURV	5 -J		363.91	543.33	119.95	4709.62	4737.02	24084.25	803.90	2.63
5	*		5 -I		363.91	119.95	543.33	4709.62	24084.25	4737.02	407.35	1.00
5	*		6 -J		363.91	119.95	543.33	4709.62	6698.06	11194.42	226.05	1.00
6	*	CURV	6 -I		363.91	543.33	119.95	4709.62	11194.42	6698.06	446.10	2.63
6	*	CURV	-C		271.41	594.96	119.95	11967.27	6400.17	15504.40	662.74	2.63
6	*	CURV	7 -J		543.33	363.91	119.95	13710.67	2258.78	22776.59	858.16	2.63
7	*	CURV	7 -I		302.91	225.64	147.73	13710.67	2258.78	22776.59	858.16	2.63
7	*	CURV	-C		357.69	121.34	147.73	9080.35	9073.31	24068.18	877.36	2.63
7	*	CURV	8 -J		225.64	302.91	147.73	1252.20	10652.73	21406.88	770.13	2.63
8	*		8 -I		225.64	147.73	302.91	1252.20	21406.88	10652.73	390.24	1.00
8	*		9 -J		225.64	147.73	302.91	1252.20	11588.25	3208.67	197.03	1.00
9	*	CURV	9 -I		225.64	302.91	147.73	1252.20	3208.67	11588.25	388.84	2.63
9	*	CURV	-C		357.69	121.34	147.73	1971.06	2127.58	12101.22	400.25	2.63
9	*	CURV	10 -J		302.91	225.64	147.73	2131.28	4157.35	13395.62	456.31	2.63
10	*		10 -I		151.12	75.56	153.41	2131.28	13395.62	4157.35	231.22	1.00
10	*		11 -J		151.12	75.56	153.41	2131.28	13430.04	6550.53	246.00	1.00
11	*		11 -I		103.09	41.55	147.64	2131.28	13430.04	6550.53	246.00	1.00
11	*		12 -J		103.09	41.55	147.64	2131.28	14464.59	8274.50	273.81	1.00
12	*		12 -I		131.21	35.68	152.52	2131.28	14464.59	8274.50	273.81	1.00
12	*		13 -J		131.21	35.68	152.52	2131.28	16172.27	7502.46	292.63	1.00
13	*	CURV	13 -I		233.21	174.69	96.86	2131.28	7502.46	16172.27	577.50	2.63
13	*	CURV	-C		250.00	149.68	96.86	5456.00	4235.80	15547.85	547.21	2.63
13	*	CURV	14 -J		174.69	233.21	96.86	6343.16	2086.17	13046.32	471.40	2.63

P I P E M E M B E R S T R E S S E S (CONTINUED)

PIPE NAME		PIPE TYPE	NODAL PT NAME-END	SECTION DESCRIP	LOCAL X FORCE	LOCAL Y FORCE	LOCAL Z FORCE	LOCAL X MOMENT	LOCAL Y MOMENT	LOCAL Z MOMENT	BENDING STRESS	INTEN FACTR
14	*		14 -I		174.69	96.86	233.21	6343.16	13046.32	2086.17	238.86	1.00
14	*		15 -J		174.69	96.86	233.21	6343.16	8259.80	5782.69	194.15	1.00
15	*		15 -I		264.10	141.22	295.94	6343.16	8259.80	5782.69	194.15	1.00
15	*		16 -J		264.10	141.22	295.94	6343.16	7144.59	7411.87	197.08	1.00
16	*	CURV	16 -I		264.10	286.49	159.53	6343.16	7289.92	7268.97	388.93	2.63
16	*	CURV	-C		270.90	280.07	159.53	8411.19	5932.19	7429.98	408.30	2.63
16	*	CURV	17 -J		280.21	270.76	159.53	9917.60	3936.81	7626.23	421.85	2.63
17	*		17 -I		280.23	146.48	278.01	9917.97	7476.42	4213.51	213.76	1.00
17	*		18 -J		280.23	146.48	278.01	9917.97	22404.85	13343.54	454.72	1.00
18	*		18 -I		419.11	215.80	201.50	9844.93	22425.39	13363.12	454.72	1.00
18	*		19 -J		419.11	215.80	201.50	9844.93	22581.42	12870.20	452.99	1.00
19	*		19 -I		418.72	216.52	201.55	9957.62	22540.27	12855.63	452.99	1.00
19	*		20 -J		418.72	216.52	201.55	9957.62	23048.78	12370.25	456.18	1.00
20	*	CURV	20 -I		418.89	202.57	215.23	9916.99	12011.48	23255.13	1371.33	2.86
20	*	CURV	-C		389.22	254.97	215.23	13510.85	7653.70	23186.87	1367.24	2.86
20	*	CURV	21 -J		317.31	340.32	215.23	15068.16	4356.73	22251.50	1333.83	2.86
21	*		21 -I		317.31	215.81	339.95	15068.16	22230.54	4462.44	222.19	1.00
21	*		22 -J		317.31	215.81	339.95	15068.16	19421.17	8024.91	211.03	1.00
22	*		22 -I		16.38	19.21	52.34	0.00	2562.47	940.58	17.24	1.00
22	*		23 -J		16.38	19.21	52.34	0.00	.00	.00	.00	1.00
23	*		22 -I		408.37	79.84	283.96	15201.84	19421.17	8188.82	212.09	1.00
23	*		24 -J		408.37	79.84	283.96	15201.84	15939.61	8760.24	193.46	1.00
24	*		24 -I		408.37	79.84	283.96	15201.84	15939.61	8760.24	193.46	1.00
24	*		25 -J		408.37	79.84	283.96	15201.84	14614.48	9247.95	187.92	1.00
25	*		25 -I		418.47	75.83	277.91	15201.84	14614.48	9247.95	187.92	1.00
25	*		26 -J		418.47	75.83	277.91	15201.84	13978.70	9628.10	185.96	1.00
26	*		26 -I		418.47	75.83	277.91	15201.84	13978.70	9628.10	185.96	1.00
26	*		27 -J		418.47	75.83	277.91	15201.84	14867.00	10412.91	193.23	1.00
27	*		27 -I		15.87	20.94	44.19	0.00	2163.76	1025.43	15.12	1.00
27	*		28 -J		15.87	20.94	44.19	0.00	.00	.00	.00	1.00

P I P E M E M B E R S T R E S S E S (CONTINUED)

PIPE NAME		PIPE TYPE	NODAL PT NAME-END	SECTION DESCRIP	LOCAL X FORCE	LOCAL Y FORCE	LOCAL Z FORCE	LOCAL X MOMENT	LOCAL Y MOMENT	LOCAL Z MOMENT	BENDING STRESS	INTEN FACTR
28	*		27 -I		568.21	175.93	309.74	15626.23	14867.00	10384.88	195.37	1.00
28	*		29 -J		568.21	175.93	309.74	15626.23	13662.51	8033.43	181.65	1.00
29	*		29 -I		568.21	175.93	309.74	15626.23	13662.51	8033.43	181.65	1.00
29	*		30 -J		568.21	175.93	309.74	15626.23	14359.29	7194.62	182.88	1.00
30	*	CURV	30 -I		568.21	309.74	175.93	15626.23	7194.62	14359.29	182.88	1.12
30	*	CURV	-C		577.41	292.24	175.93	16547.95	3956.70	14389.35	181.86	1.12
30	*	CURV	31 -J		518.38	387.41	175.93	15194.27	7021.55	13104.68	173.49	1.12
31	*		31 -I		526.25	233.79	497.13	15194.27	13104.68	7021.55	173.49	1.00
31	*		32 -J		526.25	233.79	497.13	15194.27	11899.00	7328.64	168.48	1.00
32	*	CURV	32 -I		526.25	233.79	497.13	15194.27	11899.00	7328.64	168.48	1.12
32	*	CURV	-C		389.61	424.03	497.13	16267.41	15261.62	9417.30	197.60	1.12
32	*	CURV	33 -J		233.79	526.25	497.13	18602.49	16660.69	13376.76	231.21	1.12

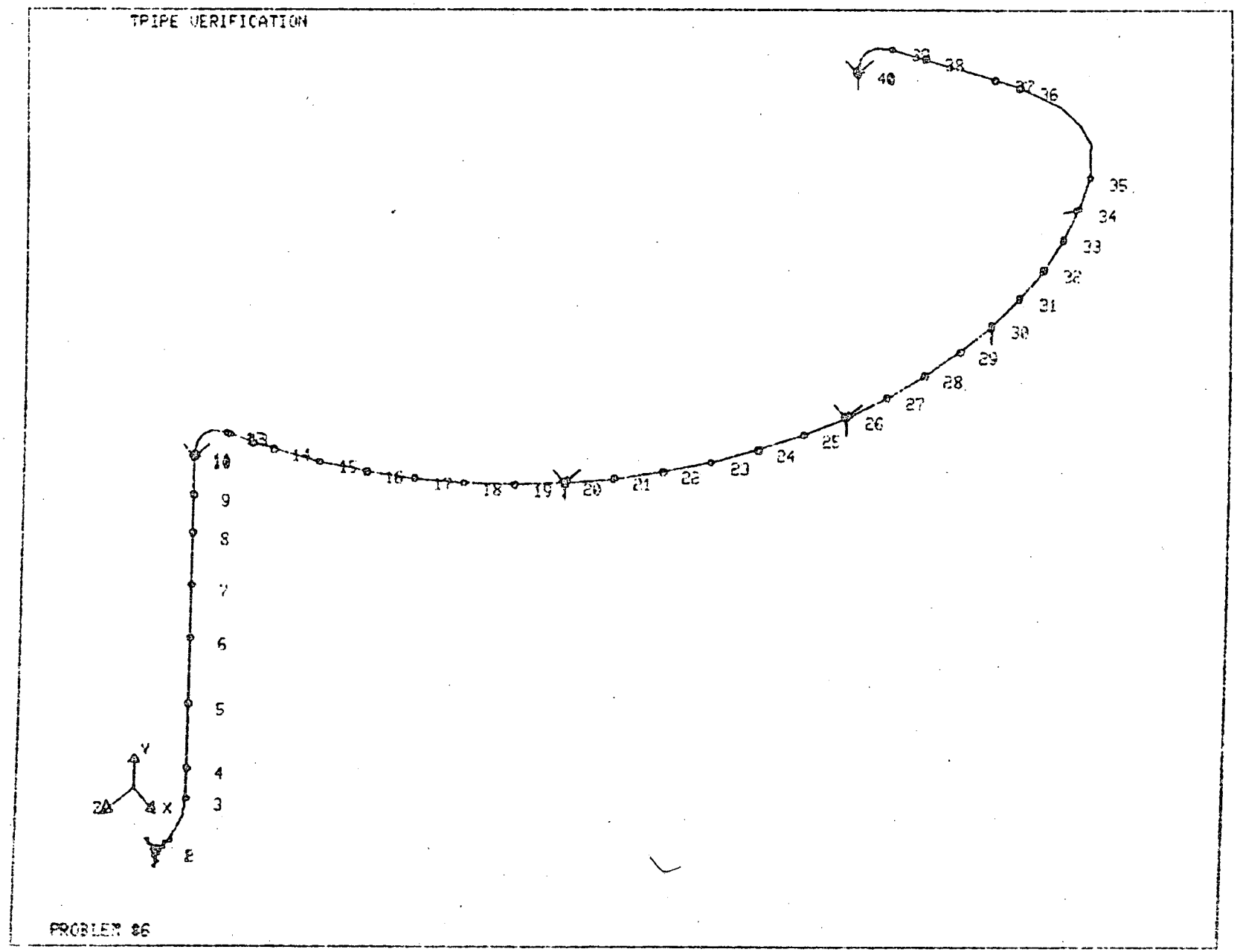
M A X I M U M P I P E M E M B E R S T R E S S E S

	PIPE NAME		NODAL PT NAME-END	BENDING STRESS(PSI)
1-	2	*	2-I	1445.73
2-	2	*	2-I	1445.73
3-	2	*	-C	1413.67
4-	2	*	-C	1413.67
5-	2	*	3-J	1386.03
6-	20	*	20-I	1371.33
7-	20	*	20-I	1371.33
8-	20	*	-C	1367.24
9-	20	*	-C	1367.24
10-	4	*	4-I	1355.10

P I P I N G S Y S T E M R E A C T I O N S

NODE NAME		SUPPORT CODE	X FORCE	Y FORCE	Z FORCE	X MOMENT	Y MOMENT	Z MOMENT	COORDINATE SYSTEM
1	*	111111	543.59	120.88	379.92	1688.37	52434.68	10386.07	GLOBAL
7	*	20000	0.00	34.18	0.00	0.00	0.00	0.00	GLOBAL
13	*	20000	0.00	27.03	0.00	0.00	0.00	0.00	GLOBAL
18	*	22000	0.00	298.98	502.13	0.00	0.00	0.00	GLOBAL
25	*	200000	4.59	0.00	0.00	0.00	0.00	0.00	NON-GLOBAL
31	*	200000	.95	0.00	0.00	0.00	0.00	0.00	NON-GLOBAL
33	*	111111	642.28	233.79	333.99	15872.74	18602.49	14302.88	GLOBAL

BENCHMARK
PROBLEM 6
(Grouping Method Solution)


TRIPE VERIFICATION
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PROBLEM 86

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00000000011111111112222222222333333333344444444445555555555666666666677777777778   CARD
12345678901234567890123456789012345678901234567890123456789012345678901234567890   NUMBER

TPIPE VERIFICATION  N1-TPIPE    PROB. #6    RAGILES   X2159                  1TIT     1
TSI  1 Y            NONE       PLTPIP6   TTTRAG    441       DWHEELER                  2
    7   41    2          2    2        40    0                  1  1  386.4            3
    101000      01100          1    3   31.0100 .034      8000                         4
 C01    1    2    3  C02       45.      126.00   483.996   659.640                     5
 C02  C01   11   12   13       45.      126.00  1013.196   659.640                     6
 C03  C05   35   36  C06      150.   487.056    1013.196-485.196                       7
 C04  C07   39   40   41       45.   179.160    1013.196-379.188                       8
 C05                                600.       1013.196-308.11178                     9
 C06                                239.52239  1013.196-400.                         10
 C07                                250.       1013.196-403.58733                    11
   1      126.0   483.996   705.840                                                  12
   2                                                                                 13
   3                                                                                 14
   4      126.0   567.996   659.640                  3835.02                         15
   5      126.0   651.996   659.640                2107.0392                         16
   6      126.0   735.996   659.640                1888.7232                         17
   7      126.0   802.596   659.640                2275.1232                         18
   8      126.0   869.196   659.640                                                  19
   9      126.0   917.196   659.640                2076.1272                         20
  10      126.0   965.196   659.640                                                  21
  11                                               1526.28                           22
  12                                               938.952                           23
  13    173.928  1013.196   648.624                1522.8024                         24
  14    229.836  1013.196   630.996                                                  25
  15    283.992  1013.196   608.556                2940.1949                         26
  16    335.988  1013.196   581.484                                                  27
  17    385.428  1013.196   550.080                2940.1949                         28
  18    431.940  1013.196   514.392                                                  29
  19    475.164  1013.196   474.780                2941.2768                         30
  20    514.776  1013.196   431.556                                                  31
  21    550.464  1013.196   385.044                2940.8904                         32
  22    581.964  1013.196   335.604                                                  33
  23    609.036  1013.196   283.608                2940.8904                         34
  24    631.474  1013.196   229.452                                                  35
  25    649.104  1013.196   173.544                2940.8904                         36
  26    661.788  1013.196   116.304                                                  37
  27    669.444  1013.196    58.176                2940.8904                         38
  28    672.000  1013.196     -.396                                                  39
  29    669.444  1013.196   -58.968                2940.8904                         40
  30    661.788  1013.196  -117.096                                                  41
  31    649.104  1013.196  -174.336                2940.8904                         42
  32    631.476  1013.196  -230.244                                                  43
  33    609.036  1013.196  -284.400                2937.0264                         44
  34    581.964  1013.196  -336.396                                                  45
  35                                               3977.2152                         46
  36                                               2904.9552                         47
  37    345.576  1013.196  -436.500                1498.0728                         48
  38    262.368  1013.196  -407.844                4068.0192                         49
  39                                                                                 50
  40                                                                                 51
  41    179.160   968.172  -379.188                                                  52
  34 .2589693  0.0        -.9658855 0.0       1.0       0.0                         53
  41 .99971212 .023993091 0.0       .0        1.0       0.0                         54
FLEX                                                                                 55
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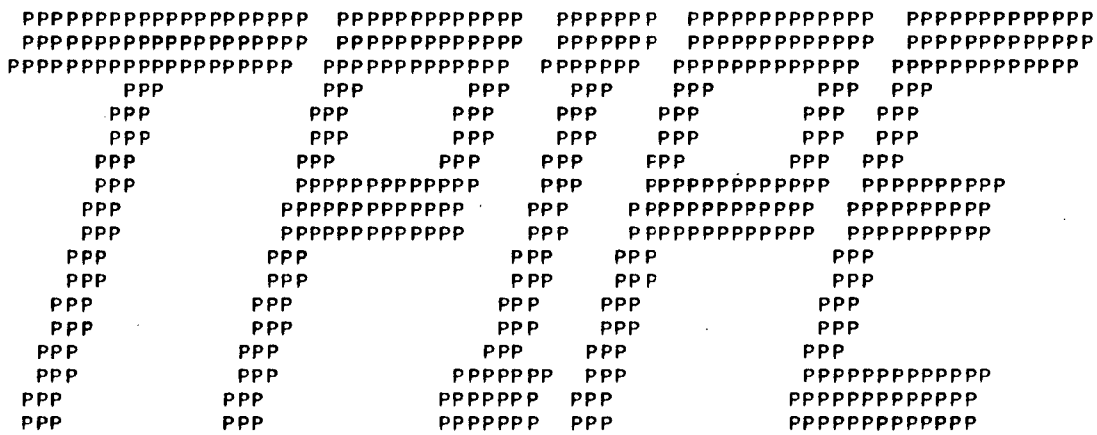
00000000011111111112222222222333333333344444444445555555555666666666677777777778   CARD
12345678901234567890123456789012345678901234567890123456789012345678901234567890   NUMBER

   1      RR  .10E20RR  .10E20RR  .10E20RR  .10E20RR  .10E20RR  .10E20              56
  10      RR  .10E07          RR  .10E07                                            57
  20      RR  .25E06RR  .20E07RR  .25E06                                            58
  26      RR  .45E06RR  .20E07RR  .45E06                                            59
  30                RR  .20E07                                                      60
  34      RR0.800E06                                                                61
  41      RR  .10E10RR  .10E10RR  .10E10RR  .10E12RR  .10E12RR  .10E12              62
END                                                                                 63
    1   29.9E06                                                                     64
    2   29.9E06                                                                     65
    1     30.00      .8500       0.0                                                66
    2     32.00      .9050       0.0                                                67
   1        1    2     1    1                                                       68
   2        2    3                                                  C01             69
   3        3    4                                                                  70
   4        4    5                                                                  71
   5        5    6                                                                  72
   6        6    7                                                                  73
   7        7    8                                                                  74
   8        8    9                                                                  75
   9        9   10                                                                  76
  10       10   11                                                                  77
  11       11   12                                                  C02             78
  12       12   13                                                                  79
  13       13   14                                                                  80
  14       14   15                                                                  81
  15       15   16                                                                  82
  16       16   17                                                                  83
  17       17   18                                                                  84
  18       18   19                                                                  85
  19       19   20                                                                  86
  20       20   21                                                                  87
  21       21   22                                                                  88
  22       22   23                                                                  89
  23       23   24                                                                  90
  24       24   25                                                                  91
  25       25   26                                                                  92
  26       26   27                                                                  93
  27       27   28                                                                  94
  28       28   29                                                                  95
  29       29   30                                                                  96
  30       30   31                                                                  97
  31       31   32                                                                  98
  32       32   33                                                                  99
  33       33   34                                                                 100
  34       34   35                                                                 101
  35       35   36                                                  C03            102
  36       36   37                                                                 103
  37       37   38                                                                 104
  38       38   39                                                                 105
  39       39   40     2    2                                       C04            106
  40       40   41                                                                 107
    1             6                                                                108
0.        .104001035                                                               109
 .1249E+00.209989650                                                               110
```

```
000000000111111111122222222223333333333444444444455555555556666666666777777777778   CARD
123456789012345678901234567890123456789012345678901234567890123456789012345678901234   NUMBER

 .1250E+001.67986540                                                                    111
 .8990E+001.67986540                                                                    112
 .9000E+00.349896480                                                                    113
 .2000E+01.070005176                                                                    114
    2               6                                                                   115
0.        .190010350                                                                    116
 .2100E+00.190010350                                                                    117
.2100000013.07971010                                                                    118
 .6400E+003.07971010                                                                    119
.640000001.370082820                                                                    120
 .2000E+01.280020700                                                                    121
    3               6                                                                   122
0.        .104001035                                                                    123
 .1249E+00.209989650                                                                    124
 .1250E+001.67986540                                                                    125
 .8990E+001.67986540                                                                    126
 .9000E+00.349896480                                                                    127
 .2000E+01.070005176                                                                    128
D       1    2    3   1.   1.   1.        GM                                           129
```



DEVELOPED JOINTLY BY

PMB SYSTEMS ENGINEERING
SAN FRANCISCO, CALIFORNIA, USA

TENNESSEE VALLEY AUTHORITY
KNOXVILLE, TENNESSEE, USA

******* 1976 ******

VERSION 4.4 MAY 1, 1981

EXECUTED AT 13.47.58. ON 07/18/81

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

PIPING SYSTEM GEOMETRY DEFINITION

NUMBER OF CONTROL POINTS	7
NUMBER OF NODAL POINTS	41
NUMBER OF NONGLOBAL COORDINATE SYSTEMS	2
NUMBER OF ADDITIONAL SUPPORT TYPES	0
NUMBER OF MATERIAL PROPERTY TYPES	2
NUMBER OF PIPE CROSS SECTION TYPES	2
NUMBER OF SPECIAL COMPONENT CROSS SECTIONS	0
NUMBER OF PIPE MEMBERS	40
NUMBER OF SPECIAL CONNECTIONS	0
NUMBER OF SPECIAL COMPONENTS	0
NUMBER OF DYNAMIC SPRINGS	0
NUMBER OF MULTIPLE EXCITATION ZONES	0
UNITS OF LENGTH AND WEIGHT	CONSISTENT
GRAVITY	386.40
NODAL POINT COORDINATE CHECK OPTION	NO

PROBLEM DEFINITION

EXECUTION MODE= 101000
1= STRUCTURAL DEFINITION IS FROM DATA CARDS
0= NORMAL DATA CHECKING RUN
1= ANALYSIS REQUESTED
0= NO STRUCTURAL PLOTTING REQUESTED
0= NO POSTPROCESSING REQUESTED
0= NO THERMAL TRANSIENT RESPONSE EXECUTION REQUESTED

ANALYSIS TYPES(01100) REQUESTED

FREQUENCY ANALYSIS

MAXIMUM NUMBER OF MODES REQUESTED	31
NUMBER OF SPRING SUPPORTS IN DYNAM MODEL	0
MINIMUM PERIOD OF HIGHEST MODE(SEC)	.0100
MAXIMUM FREQUENCY FOR MODE PRINTOUT(HZ)	.0

RESPONSE SPECTRUM ANALYSIS

NUMBER OF SPECTRAL CURVES TO BE INPUT	3
NUMBER OF RESPONSE SPECTRUM LOAD CASES	1

PROGRAM STORAGE 8000

RESTART TAPE GENERATION OPTION.. NONE REQUESTED

C O N T R O L P O I N T S P E C I F I C A T I O N

CONTROL NAME	I-TAN POINT	*CURVE POINTS* I-END	J-END	J-TAN POINT	CURVE RADIUS	******** COORDINATES ******* X-GLOBAL	Y-GLOBAL	Z-GLOBAL	COMMENT
C01 *	1 *	2 *	3 *	C02 *	45.000	126.00	484.00	659.64	
C02 *	C01 *	11 *	12 *	13 *	45.000	126.00	1013.20	659.64	
C03 *	C05 *	35 *	36 *	C06 *	150.000	487.06	1013.20	-485.20	
C04 *	C07 *	39 *	40 *	41 *	45.000	179.16	1013.20	-379.19	
C05 *	*	*	*	*	0.000	600.00	1013.20	-308.11	
C06 *	*	*	*	*	0.000	239.52	1013.20	-400.00	
C07 *	*	*	*	*	0.000	250.00	1013.20	-403.59	

N O D A L P O I N T D E F I N I T I O N

NODAL POINT	NODE NAME		******** COORDINATES ******* X-GLOBAL	Y-GLOBAL	Z-GLOBAL	LUMPED WEIGHT	DATA SOURCE	COMMENT
1	1	*	126.00	484.00	705.84	0.0	INPT	
2	2	*	126.00	484.00	704.64	0.0	CP	
3	3	*	126.00	529.00	659.64	0.0	CP	
4	4	*	126.00	568.00	659.64	3835.0	INPT	
5	5	*	126.00	652.00	659.64	2107.0	INPT	
6	6	*	126.00	736.00	659.64	1888.7	INPT	
7	7	*	126.00	802.60	659.64	2275.1	INPT	
8	8	*	126.00	869.20	659.64	0.0	INPT	
9	9	*	126.00	917.20	659.64	2076.1	INPT	
10	10	*	126.00	965.20	659.64	0.0	INPT	
11	11	*	126.00	968.20	659.64	1526.3	CP	
12	12	*	169.86	1013.20	649.56	939.0	CP	
13	13	*	173.93	1013.20	648.62	1522.8	INPT	
14	14	*	229.84	1013.20	631.00	0.0	INPT	
15	15	*	283.99	1013.20	608.56	2940.2	INPT	
16	16	*	335.99	1013.20	581.48	0.0	INPT	
17	17	*	385.43	1013.20	550.08	2940.2	INPT	
18	18	*	431.94	1013.20	514.39	0.0	INPT	
19	19	*	475.16	1013.20	474.78	2941.3	INPT	
20	20	*	514.78	1013.20	431.56	0.0	INPT	
21	21	*	550.46	1013.20	385.04	2940.9	INPT	
22	22	*	581.96	1013.20	335.60	0.0	INPT	
23	23	*	609.04	1013.20	283.61	2940.9	INPT	
24	24	*	631.47	1013.20	229.45	0.0	INPT	
25	25	*	649.10	1013.20	173.54	2940.9	INPT	
26	26	*	661.79	1013.20	116.30	0.0	INPT	
27	27	*	669.44	1013.20	58.18	2940.9	INPT	
28	28	*	672.00	1013.20	-.40	0.0	INPT	
29	29	*	669.44	1013.20	-58.97	2940.9	INPT	
30	30	*	661.79	1013.20	-117.10	0.0	INPT	
31	31	*	649.10	1013.20	-174.34	2940.9	INPT	
32	32	*	631.48	1013.20	-230.24	0.0	INPT	
33	33	*	609.04	1013.20	-284.40	2937.0	INPT	
34	34	*	581.96	1013.20	-336.40	0.0	INPT	
35	35	*	550.60	1013.20	-385.56	3977.2	CP	
36	36	*	375.32	1013.20	-446.74	2905.0	CP	
37	37	*	345.58	1013.20	-436.50	1498.1	INPT	
38	38	*	262.37	1013.20	-407.84	4068.0	INPT	
39	39	*	221.71	1013.20	-393.84	0.0	CP	
40	40	*	179.16	968.20	-379.19	0.0	CP	
41	41	*	179.16	968.17	-379.19	0.0	INPT	

N O N - G L O B A L C O O R D I N A T E S Y S T E M D E F I N I T I O N

NODE NAME	**** NON-GLOBAL XS-AXIS ***			DIRECTION COSINES **** NON-GLOBAL YS-AXIS ***			**** NON-GLOBAL ZS-AXIS ***			COMMENT
	X	Y	Z	X	Y	Z	X	Y	Z	
34 *	.2590	0.0000	-.9659	0.0000	1.0000	0.0000	.9659	0.0000	.2590	
41 *	.9997	.0240	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	.9997	

S U P P O R T T Y P E L I B R A R Y

SUPPORT TYPE	***** RESTRAINT CODES ***** DYNAMIC	GRAVITY	THERMAL	COMMENT
1	111111	111111	111111	
2	111000	111000	111000	
3	111000	111000	101000	
4	111000	110000	110000	
5	111000	110000	100000	
6	111000	101000	101000	
7	111000	100000	100000	
8	111000	11000	11000	
9	111000	11000	1000	
10	111000	10000	10000	
11	111000	10000	0	
12	111000	1000	1000	
13	111000	0	0	
14	110000	110000	110000	
15	110000	110000	100000	
16	110000	100000	100000	
17	110000	10000	10000	
18	110000	10000	0	
19	110000	0	0	
20	101000	101000	101000	
21	101000	100000	100000	
22	101000	11000	1000	
23	101000	10000	0	
24	101000	1000	1000	
25	101000	0	0	
26	100000	110000	100000	
27	100000	100000	100000	
28	100000	10000	0	
29	100000	0	0	
30	11000	11000	11000	
31	11000	11000	1000	
32	11000	10000	10000	
33	11000	10000	0	
34	11000	1000	1000	
35	11000	0	0	
36	10000	10000	10000	
37	10000	10000	0	
38	10000	0	0	
39	1000	11000	1000	
40	1000	10000	0	
41	1000	1000	1000	
42	1000	0	0	
43	0	10000	0	

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

SUPPORT TYPE	RESTRAINED NODAL POINTS 1	2	3	4	5	6	7	8	9	10	11	12	13	14	*** RESTRAINT CODES *** DYNAMIC	GRAVITY	THERMAL	NO MOD

RESTRAINT SPECIFICATION. DEFAULT STIFFNESSES K(X),K(Y),K(Z)= 1.0E13 K(XX),K(YY),K(ZZ)= 1.0E15

NODE NAME	RESTRAINT TYPE	K(X)	RESTRAINT TYPE	K(Y)	RESTRAINT TYPE	K(Z)	RESTRAINT TYPE	K(XX)	RESTRAINT TYPE	K(YY)	RESTRAINT TYPE	K(ZZ)	*** RESTRAINT CODES *** DYNAMIC	GRAVITY	THERMAL	NO MOD
1	RR	.10E20	RR	.10E20	RR	.10E20	RR	.10E20	RR	.10E20	RR	.10E20	222222	222222	222222	1
10	RR	.10E07			RR	.10E07							202000	202000	202000	1
20	RR	.25E06	RR	.20E07	RR	.25E06							222000	222000	222000	1
26	RR	.45E06	RR	.20E07	RR	.45E06							222000	222000	222000	1
30			RR	.20E07									20000	20000	20000	1
34	RR	0.800E06											200000	200000	200000	1
41	RR	.10E10	RR	.10E10	RR	.10E10	RR	.10E12	RR	.10E12	RR	.10E12	222222	222222	222222	1

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

MATERIAL NUMBER	COLD ELASTIC MODULUS	POISSONS RATIO	THERMAL EXPANSION COEFFICIENT	INTERNAL PIPE PRESSURE	MEMBER TEMPERATURE	HOT ELASTIC MODULUS	COMMENT
1	29900000.0	.300	0.000000000	0.0	0.00	29900000.0	
2	29900000.0	.300	0.000000000	0.0	0.00	29900000.0	

P I P E M E M B E R C R O S S S E C T I O N T Y P E S

SECTION NUMBER	OUTSIDE DIAMETER	WALL THICKNESS	AXIAL AREA	SHEAR AREA	FLEXURAL INERTIA	INPUT FLEXIBILITY	WEIGHT/ LENGTH	SECTION DESCRIPTION
1	30.000	.8500	77.84	38.94	8274.9		0.00	
2	32.000	.9050	88.41	44.23	10694.2		0.00	

P I P E M E M B E R D A T A

MEMBER NAME	NODE I-END	NAME J-END	MAT TYPE	SECT TYPE	INTENS I-END	FACTOR J-END	REF TEMP	RELEASE CODE I-END	RELEASE CODE J-END	MEMBER LENGTH	CURVE RADIUS	INTERSECTION X-GLOBAL	INTERSECTION Y-GLOBAL	INTERSECTION Z-GLOBAL	INTER ANGLE	MEMBER NUMBER
1	1	2	1	1	1.000	1.000	70.0	0	0	1.20						1
2	2	3	1	1	2.822	2.822	70.0	0	0	70.69	45.000	126.00	484.00	659.64	90.000	2
3	3	4	1	1	1.000	1.000	70.0	0	0	39.00						3
4	4	5	1	1	1.000	1.000	70.0	0	0	84.00						4
5	5	6	1	1	1.000	1.000	70.0	0	0	84.00						5
6	6	7	1	1	1.000	1.000	70.0	0	0	66.60						6
7	7	8	1	1	1.000	1.000	70.0	0	0	66.60						7
8	8	9	1	1	1.000	1.000	70.0	0	0	48.00						8
9	9	10	1	1	1.000	1.000	70.0	0	0	48.00						9
10	10	11	1	1	1.000	1.000	70.0	0	0	3.00						10
11	11	12	1	1	2.822	2.822	70.0	0	0	70.69	45.000	126.00	1013.20	659.64	90.000	11
12	12	13	1	1	1.000	1.000	70.0	0	0	4.18						12
13	13	14	1	1	1.000	1.000	70.0	0	0	58.62						13
14	14	15	1	1	1.000	1.000	70.0	0	0	58.62						14
15	15	16	1	1	1.000	1.000	70.0	0	0	58.62						15
16	16	17	1	1	1.000	1.000	70.0	0	0	58.57						16
17	17	18	1	1	1.000	1.000	70.0	0	0	58.63						17
18	18	19	1	1	1.000	1.000	70.0	0	0	58.63						18
19	19	20	1	1	1.000	1.000	70.0	0	0	58.63						19
20	20	21	1	1	1.000	1.000	70.0	0	0	58.63						20
21	21	22	1	1	1.000	1.000	70.0	0	0	58.62						21
22	22	23	1	1	1.000	1.000	70.0	0	0	58.62						22
23	23	24	1	1	1.000	1.000	70.0	0	0	58.62						23
24	24	25	1	1	1.000	1.000	70.0	0	0	58.62						24
25	25	26	1	1	1.000	1.000	70.0	0	0	58.63						25
26	26	27	1	1	1.000	1.000	70.0	0	0	58.63						26
27	27	28	1	1	1.000	1.000	70.0	0	0	58.63						27
28	28	29	1	1	1.000	1.000	70.0	0	0	58.63						28
29	29	30	1	1	1.000	1.000	70.0	0	0	58.63						29
30	30	31	1	1	1.000	1.000	70.0	0	0	58.63						30
31	31	32	1	1	1.000	1.000	70.0	0	0	58.62						31
32	32	33	1	1	1.000	1.000	70.0	0	0	58.62						32
33	33	34	1	1	1.000	1.000	70.0	0	0	58.62						33
34	34	35	1	1	1.000	1.000	70.0	0	0	58.32						34
35	35	36	1	1	1.265	1.265	70.0	0	0	200.18	150.000	487.06	1013.20	-485.20	76.463	35
36	36	37	1	1	1.000	1.000	70.0	0	0	31.45						36
37	37	38	1	1	1.000	1.000	70.0	0	0	88.00						37
38	38	39	1	1	1.000	1.000	70.0	0	0	43.00						38
39	39	40	2	2	2.950	2.950	70.0	0	0	70.69	45.000	179.16	1013.20	-379.19	90.000	39
40	40	41	2	2	1.000	1.000	70.0	0	0	.02						40

MEMBER LENGTH - DIRECTION INFORMATION

MEMBER NAME	I NODE NAME	J NODE NAME	***DELTA MEMBER LENGTHS*** X	Y	Z	CROSS SECTION DESCRIPTION
1	1	2	0.00	0.00	-1.20	
2	2	3	0.00	45.00	-45.00	
3	3	4	0.00	39.00	0.00	
4	4	5	0.00	84.00	0.00	
5	5	6	0.00	84.00	0.00	
6	6	7	0.00	66.60	0.00	
7	7	8	0.00	66.60	0.00	
8	8	9	0.00	48.00	0.00	
9	9	10	0.00	48.00	0.00	
10	10	11	0.00	3.00	0.00	
11	11	12	43.86	45.00	-10.08	
12	12	13	4.07	0.00	-.94	
13	13	14	55.91	0.00	-17.63	
14	14	15	54.16	0.00	-22.44	
15	15	16	52.00	0.00	-27.07	
16	16	17	49.44	0.00	-31.40	
17	17	18	46.51	0.00	-35.69	
18	18	19	43.22	0.00	-39.61	
19	19	20	39.61	0.00	-43.22	
20	20	21	35.69	0.00	-46.51	
21	21	22	31.50	0.00	-49.44	
22	22	23	27.07	0.00	-52.00	
23	23	24	22.44	0.00	-54.16	
24	24	25	17.63	0.00	-55.91	
25	25	26	12.68	0.00	-57.24	
26	26	27	7.66	0.00	-58.13	
27	27	28	2.56	0.00	-58.57	
28	28	29	-2.56	0.00	-58.57	
29	29	30	-7.66	0.00	-58.13	
30	30	31	-12.68	0.00	-57.24	
31	31	32	-17.63	0.00	-55.91	
32	32	33	-22.44	0.00	-54.16	
33	33	34	-27.07	0.00	-52.00	
34	34	35	-31.36	0.00	-49.17	
35	35	36	-175.28	0.00	-61.17	
36	36	37	-29.74	0.00	10.24	
37	37	38	-83.21	0.00	28.66	
38	38	39	-40.66	0.00	14.00	
39	39	40	-42.55	-45.00	14.65	
40	40	41	0.00	-.02	0.00	

F R E Q U E N C Y A N A L Y S I S

OVERALL PROBLEM SIZE

TOTAL NUMBER OF EQUATIONS.....	246
HALF BANDWIDTH OF STIFFNESS.....	12
NUMBER OF EQUATION BLOCKS.....	2
NUMBER OF EQUATIONS PER BLOCK.....	124
NUMBER OF MODES REQUIRED.(EST.).....	31
CUT-OFF FREQUENCY.....	100.00
TOTAL MODES TO CUT-OFF FREQUENCY.....	31
NODAL WT./GEN. MASS PRINT CODE (MWPRNT).....	0

PRINT NODAL WT. SUMMARY AND GEN. MASS = 0
SUPPRESS GEN. MASS PRINT = 1
SUPPRESS NODAL WT. SUMMARY PRINT = 2
SUPPRESS BOTH OF ABOVE PRINTS = 3

THE OUT OF CORE SUBSPACE ITERATION ALGORITHM WITH A MAXIMUM ALLOWABLE NUMBER OF ITERATIONS PER GROUP OF 16 IS CHOSEN.
SUBSPACE ITERATION WAS USER REQUESTED.
AN IN CORE SOLUTION WOULD REQUIRE A VALUE OF ABOUT 12470 FOR *MTOT*.

STORAGE ESTIMATES

THE FOLLOWING CONTROL PARAMETERS ARE EITHER USER SUPPLIED OR INTERNALLY ESTIMATED ARE USED TO CALCULATE ESTIMATES OF THE MINIMUM VALUE OF *MTOT*, THE PROGRAM STORAGE PARAMETER, AND THE CORRESPONDING CORE FIELD LENGTH SPECIFICATION REQUIRED FOR THE USERS JOB CARD...

NUMBER OF NODAL POINTS (NUMNP).....	41
NUMBER OF DYNAMIC NODAL RESTRAINTS (NODREA)....	0
NUMBER OF NON-GLOBAL NODES (NNG).....	2
NUMBER OF MODES (NM).....	31
NUMBER OF EQUATIONS PER BLOCK (NEQB).....	124
NUMBER OF SPECTRAL CURVES INPUT (NSC).....	3
NUMBER OF MODAL TIME STEPS (NT).....	100
NUMBER OF FORCING FUNCTIONS (NFN).....	3

EMPLOYING THE ABOVE PARAMETERS,THE FOLLOWING VALUES FOR MTOT AND CORE ARE ESTIMATED...

	MTOT (DECIMAL)	CORE (OCTAL)
RESPONSE SPECTRUM ANALYSIS.....	3223	006227
TIME HISTORY MODAL.....	5642	013012
STRUCTURAL PLOTTING.....	4600	010770
CREATE OR READ RESTART TAPE.....	1227	002313

N O D A L W E I G H T S U M M A R Y

NODE NAME		RESTRAINT CODE	X TRANSLATION	Y TRANSLATION	Z TRANSLATION
1	*	000000	0.000	0.000	0.000
2	*	000000	0.000	0.000	0.000
3	*	000000	0.000	0.000	0.000
4	*	000000	3835.020	3835.020	3835.020
5	*	000000	2107.039	2107.039	2107.039
6	*	000000	1888.723	1888.723	1888.723
7	*	000000	2275.123	2275.123	2275.123
8	*	000000	0.000	0.000	0.000
9	*	000000	2076.127	2076.127	2076.127
10	*	000000	0.000	0.000	0.000
11	*	000000	1526.280	1526.280	1526.280
12	*	000000	938.952	938.952	938.952
13	*	000000	1522.802	1522.802	1522.802
14	*	000000	0.000	0.000	0.000
15	*	000000	2940.195	2940.195	2940.195
16	*	000000	0.000	0.000	0.000
17	*	000000	2940.195	2940.195	2940.195
18	*	000000	0.000	0.000	0.000
19	*	000000	2941.277	2941.277	2941.277
20	*	000000	0.000	0.000	0.000
21	*	000000	2940.890	2940.890	2940.890
22	*	000000	0.000	0.000	0.000
23	*	000000	2940.890	2940.890	2940.890
24	*	000000	0.000	0.000	0.000
25	*	000000	2940.890	2940.890	2940.890
26	*	000000	0.000	0.000	0.000
27	*	000000	2940.890	2940.890	2940.890
28	*	000000	0.000	0.000	0.000
29	*	000000	2940.890	2940.890	2940.890
30	*	000000	0.000	0.000	0.000
31	*	000000	2940.890	2940.890	2940.890
32	*	000000	0.000	0.000	0.000
33	*	000000	2937.026	2937.026	2937.026
34	*	000000	0.000	0.000	0.000
35	*	000000	3977.215	3977.215	3977.215
36	*	000000	2904.955	2904.955	2904.955
37	*	000000	1498.073	1498.073	1498.073
38	*	000000	4068.019	4068.019	4068.019
39	*	000000	0.000	0.000	0.000
40	*	000000	0.000	0.000	0.000
41	*	000000	0.000	0.000	0.000

F R E Q U E N C Y D I S T R I B U T I O N B Y G R O U P

SUBSPACE GROUP	NO. MODES IN GROUP	LOWER BOUND HERTZ	LOWER BOUND EIGENVALUE	UPPER BOUND HERTZ	UPPER BOUND EIGENVALUE
1	2	6.250	.1542E+04	12.500	.6169E+04
2	4	12.500	.6169E+04	17.678	.1234E+05
3	3	17.678	.1234E+05	25.000	.2467E+05
4	4	25.000	.2467E+05	35.355	.4935E+05
5	3	35.355	.4935E+05	43.301	.7402E+05
6	2	43.301	.7402E+05	50.000	.9870E+05
7	4	50.000	.9870E+05	61.237	.1480E+06
8	2	61.237	.1480E+06	70.711	.1974E+06
9	4	70.711	.1974E+06	86.603	.2961E+06
10	3	86.603	.2961E+06	100.000	.3948E+06

F R E Q U E N C Y A N D C O N V E R G E N C E D A T A - S U B S P A C E I T E R A T I O N

GROUP	NO. MODES	ITERATIONS	SHIFT EIGENVALUE	MODE	CIRCULAR FREQUENCY (RAD/SEC)	FREQUENCY (HZ)	PERIOD (SEC)	FREQUENCY TOLERANCE	MODE TOLERANCE	//K*Ø// 2	//K*Ø-EIG *M*Ø// MAX	K*Ø OF MAX NORM
1	2	6	.385531E+04	1	40.1577	6.3913	.1565	.3246E-08	.1616E-04	.4735E+04	.3043E-01	-.1371E+01
				2	62.7902	9.9934	.1001	0.	.2613E-09	.1105E+05	.1647E-05	-.1647E-05
2	4	4	.925275E+04	3	83.4070	13.2746	.0753	.1506E-12	.5895E-07	.1750E+05	.4911E-03	-.1211E+04
				4	91.0118	14.4850	.0690	.4779E-12	.4843E-07	.2064E+05	.4700E-03	-.8583E+03
				5	96.3036	15.3272	.0652	0.	.1064E-09	.2462E+05	.1275E-05	-.1275E-05
				6	109.9549	17.4999	.0571	.5956E-08	.1097E-04	.3237E+05	.1651E+00	-.4898E+04
3	3	2	.185055E+05	7	119.9495	19.0906	.0524	.3135E-09	.1919E-05	.3951E+05	.4187E-01	-.4029E+03
				8	123.3003	19.6239	.0510	.9847E-11	.3073E-06	.4323E+05	.5993E-02	-.1169E+03
				9	134.6909	21.4367	.0466	.3020E-08	.4397E-06	.4853E+05	.1276E-01	-.3477E+04
4	4	4	.370110E+05	10	180.3841	28.7090	.0348	.8494E-09	.3210E-05	.9329E+05	.1585E+00	-.1977E+04
				11	187.6699	29.8686	.0335	.8376E-11	.1134E-06	.9369E+05	.4116E-02	-.1882E+04
				12	197.8314	31.4858	.0318	.5144E-10	.3329E-06	.1011E+06	.1610E-01	.1706E+04
				13	201.1307	32.0109	.0312	.1509E-08	.2369E-05	.1048E+06	.1382E+00	-.2237E+05
5	3	4	.616850E+05	14	228.5078	36.3681	.0275	.1088E-10	.5344E-06	.1423E+06	.2567E-01	-.3828E+05
				15	257.4953	40.9817	.0244	.6696E-09	.1608E-05	.1880E+06	.1063E+00	.5545E+05
				16	259.9282	41.3689	.0242	.3155E-10	.4589E-06	.1873E+06	.3247E-01	.5981E+04
6	2	4	.863590E+05	17	297.7860	47.3941	.0211	.9977E-13	.6727E-08	.2506E+06	.7914E-03	-.2870E+04
				18	312.6944	49.7669	.0201	.1236E-07	.1147E-04	.2654E+06	.1407E+01	.3006E+05
7	4	3	.123370E+06	19	314.9452	50.1251	.0200	.2817E-12	.6157E-07	.2719E+06	.6463E-02	.3054E+05
				20	332.5716	52.9304	.0189	.9852E-12	.5133E-07	.2925E+06	.6836E-02	-.1291E+06
				21	357.5093	56.8994	.0176	.2343E-10	.1221E-06	.3614E+06	.1698E-01	-.1005E+05
				22	367.6187	58.5083	.0171	.2129E-07	.9481E-05	.3772E+06	.1376E+01	.7265E+05
8	2	4	.172718E+06	23	423.9102	67.4674	.0148	.7204E-12	.3682E-07	.4923E+06	.7884E-02	.2722E+05
				24	442.7192	70.4609	.0142	.2984E-07	.2405E-04	.5291E+06	.5498E+01	-.1721E+05
9	4	6	.246740E+06	25	473.7997	75.4076	.0133	.2489E-13	.1076E-07	.6059E+06	.1831E-02	-.4369E+04
				26	497.5207	79.1829	.0126	0.	.4139E-10	.6623E+06	.1544E-04	.1544E-04
				27	507.3144	80.7416	.0124	.1809E-13	.1150E-08	.6827E+06	.2263E-03	-.4644E+05
				28	541.0007	86.1029	.0116	.6770E-07	.5248E-04	.7685E+06	.1192E+02	-.3471E+05
10	3	6	.345436E+06	29	554.6855	88.2809	.0113	.6054E-13	.3683E-07	.8973E+06	.1403E-01	-.3761E+05
				30	582.6791	92.7363	.0108	0.	.7663E-11	.9446E+06	.4295E-05	.4295E-05
				31	624.2899	99.3588	.0101	.7831E-07	.3915E-04	.1073E+07	.1706E+02	.4696E+05

G E N E R A L I Z E D M A S S M A T R I X

	1	2	3	4	5	6	7	8	9	10
1	1.00000	.00000	-.00000	.00000	-.00000	.00000	.00000	-.00000	-.00000	-.00000
2	.00000	1.00000	-.00000	-.00000	-.00000	-.00000	.00000	-.00000	-.00000	.00000
3	-.00000	-.00000	1.00000	.00000	.00000	-.00000	.00000	-.00000	.00000	.00000
4	.00000	-.00000	.00000	1.00000	-.00000	-.00000	-.00000	.00000	-.00000	-.00000
5	-.00000	-.00000	.00000	-.00000	1.00000	-.00000	-.00000	.00000	-.00000	-.00000
6	.00000	-.00000	-.00000	-.00000	-.00000	1.00000	.00000	-.00000	.00000	.00000
7	.00000	.00000	.00000	-.00000	-.00000	.00000	1.00000	.00000	-.00000	-.00000
8	-.00000	-.00000	-.00000	.00000	.00000	-.00000	.00000	1.00000	-.00000	.00000
9	-.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000	1.00000	-.00000
10	-.00000	.00000	.00000	-.00000	-.00000	.00000	-.00000	.00000	-.00000	1.00000
11	-.00000	.00000	-.00000	.00000	.00000	-.00000	.00000	-.00000	.00000	.00000
12	-.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000	.00000	.00000	-.00000
13	.00000	-.00000	-.00000	.00000	-.00000	-.00000	-.00000	.00000	.00000	-.00000
14	.00000	-.00000	.00000	-.00000	.00000	.00000	-.00000	.00000	-.00000	-.00000
15	.00000	.00000	.00000	-.00000	-.00000	.00000	-.00000	.00000	-.00000	.00000
16	-.00000	.00000	-.00000	.00000	.00000	-.00000	.00000	-.00000	-.00000	.00000
17	-.00000	.00000	.00000	-.00000	-.00000	.00000	.00000	-.00000	.00000	.00000
18	.00000	-.00000	.00000	-.00000	.00000	.00000	.00000	-.00000	-.00000	.00000
19	-.00000	-.00000	.00000	-.00000	.00000	.00000	.00000	-.00000	-.00000	-.00000
20	.00000	-.00000	.00000	-.00000	.00000	.00000	.00000	-.00000	.00000	.00000
21	.00000	-.00000	-.00000	.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000
22	-.00000	.00000	.00000	-.00000	-.00000	.00000	.00000	-.00000	.00000	-.00000
23	.00000	-.00000	-.00000	.00000	-.00000	-.00000	-.00000	.00000	-.00000	.00000
24	.00000	.00000	-.00000	.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000
25	-.00000	-.00000	-.00000	.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000
26	-.00000	-.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000	.00000	.00000
27	-.00000	-.00000	.00000	-.00000	.00000	.00000	.00000	-.00000	.00000	-.00000
28	-.00000	.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000	-.00000
29	.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000	.00000	-.00000	-.00000
30	.00000	-.00000	.00000	-.00000	-.00000	.00000	.00000	-.00000	.00000	.00000
31	-.00000	-.00000	-.00000	.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000

G E N E R A L I Z E D M A S S M A T R I X (CONTINUED)

	11	12	13	14	15	16	17	18	19	20
1	-.00000	-.00000	.00000	.00000	.00000	-.00000	-.00000	.00000	-.00000	.00000
2	.00000	-.00000	-.00000	-.00000	.00000	.00000	.00000	-.00000	-.00000	-.00000
3	-.00000	.00000	-.00000	.00000	.00000	-.00000	.00000	.00000	.00000	.00000
4	.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000	-.00000	-.00000
5	.00000	-.00000	-.00000	.00000	-.00000	.00000	-.00000	.00000	.00000	.00000
6	-.00000	.00000	-.00000	.00000	.00000	-.00000	.00000	.00000	.00000	.00000
7	.00000	-.00000	-.00000	-.00000	-.00000	.00000	.00000	.00000	.00000	.00000
8	-.00000	.00000	.00000	.00000	.00000	-.00000	-.00000	-.00000	-.00000	-.00000
9	.00000	.00000	.00000	-.00000	-.00000	-.00000	.00000	-.00000	-.00000	.00000
10	.00000	-.00000	-.00000	-.00000	.00000	.00000	.00000	.00000	-.00000	.00000
11	1.00000	.00000	.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	-.00000
12	.00000	1.00000	.00000	.00000	-.00000	.00000	-.00000	-.00000	.00000	.00000
13	.00000	.00000	1.00000	.00000	-.00000	.00000	-.00000	.00000	-.00000	.00000
14	.00000	.00000	.00000	1.00000	.00000	-.00000	.00000	-.00000	.00000	.00000
15	-.00000	-.00000	-.00000	.00000	1.00000	.00000	-.00000	.00000	-.00000	-.00000
16	-.00000	.00000	.00000	-.00000	.00000	1.00000	.00000	-.00000	.00000	.00000
17	-.00000	-.00000	-.00000	.00000	-.00000	.00000	1.00000	.00000	.00000	-.00000
18	-.00000	-.00000	.00000	-.00000	.00000	-.00000	.00000	1.00000	.00000	.00000
19	.00000	.00000	-.00000	.00000	-.00000	.00000	.00000	.00000	1.00000	-.00000
20	-.00000	.00000	.00000	.00000	-.00000	.00000	-.00000	.00000	-.00000	1.00000
21	.00000	.00000	.00000	-.00000	.00000	-.00000	.00000	-.00000	-.00000	.00000
22	.00000	-.00000	-.00000	-.00000	.00000	-.00000	.00000	-.00000	-.00000	.00000
23	-.00000	.00000	.00000	.00000	-.00000	.00000	.00000	-.00001	-.00000	-.00000
24	.00000	.00000	-.00000	.00000	-.00000	-.00000	-.00000	.00001	.00000	.00000
25	.00000	.00000	.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000
26	.00000	-.00000	-.00000	.00000	-.00000	-.00000	-.00000	.00000	-.00000	-.00000
27	.00000	-.00000	-.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000
28	.00000	-.00000	-.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000
29	-.00000	.00000	.00000	-.00000	.00000	.00000	-.00000	.00000	.00000	.00000
30	-.00000	.00000	.00000	-.00000	.00000	.00000	-.00000	.00000	.00000	.00000
31	.00000	-.00000	-.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000

GENERALIZED MASS MATRIX (CONTINUED)

	21	22	23	24	25	26	27	28	29	30
1	.00000	-.00000	.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	.00000
2	-.00000	.00000	-.00000	.00000	-.00000	-.00000	-.00000	.00000	-.00000	-.00000
3	-.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	-.00000	.00000	.00000
4	.00000	-.00000	.00000	.00000	.00000	.00000	-.00000	.00000	-.00000	-.00000
5	.00000	-.00000	-.00000	.00000	.00000	-.00000	.00000	-.00000	-.00000	-.00000
6	-.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	-.00000	.00000	.00000
7	-.00000	.00000	-.00000	-.00000	-.00000	.00000	.00000	.00000	-.00000	.00000
8	.00000	-.00000	.00000	.00000	.00000	-.00000	-.00000	-.00000	.00000	-.00000
9	-.00000	.00000	-.00000	-.00000	-.00000	.00000	.00000	-.00000	-.00000	.00000
10	-.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000	-.00000	.00000
11	.00000	.00000	-.00000	.00000	.00000	.00000	.00000	.00000	-.00000	-.00000
12	.00000	-.00000	.00000	.00000	.00000	-.00000	-.00000	-.00000	.00000	.00000
13	.00000	-.00000	.00000	-.00000	.00000	-.00000	-.00000	-.00000	.00000	.00000
14	-.00000	-.00000	.00000	.00000	-.00000	.00000	-.00000	-.00000	-.00000	-.00000
15	.00000	.00000	-.00000	-.00000	.00000	-.00000	.00000	.00000	.00000	.00000
16	-.00000	-.00000	.00000	-.00000	-.00000	-.00000	-.00000	-.00000	.00000	.00000
17	.00000	.00000	.00000	-.00000	-.00000	-.00000	-.00000	-.00000	-.00000	-.00000
18	-.00000	-.00000	-.00001	.00001	.00000	.00000	.00000	.00000	.00000	.00000
19	-.00000	-.00000	-.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	.00000
20	.00000	.00000	-.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	.00000
21	1.00000	-.00000	-.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	.00000
22	-.00000	1.00000	-.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	.00000
23	-.00000	-.00000	1.00000	-.00000	-.00000	-.00000	-.00000	.00000	-.00000	.00000
24	.00000	.00000	-.00000	1.00000	.00000	.00001	.00000	-.00001	.00003	-.00001
25	-.00000	-.00000	-.00000	.00000	1.00000	-.00000	-.00000	.00000	-.00000	.00000
26	-.00000	-.00000	-.00000	.00001	-.00000	1.00000	.00000	.00000	-.00000	.00000
27	-.00000	-.00000	-.00000	.00000	-.00000	.00000	1.00000	.00000	-.00000	.00000
28	-.00000	-.00000	.00000	-.00001	.00000	.00000	.00000	1.00000	.00000	-.00000
29	.00000	.00000	-.00000	.00003	-.00000	-.00000	-.00000	.00000	1.00000	-.00000
30	.00000	.00000	.00000	-.00001	.00000	.00000	.00000	-.00000	-.00000	1.00000
31	-.00000	-.00000	-.00000	.00000	-.00000	.00000	-.00000	.00008	.00000	-.00000

G E N E R A L I Z E D M A S S M A T R I X (CONTINUED)

	31
1	-.00000
2	-.00000
3	-.00000
4	.00000
5	.00000
6	-.00000
7	-.00000
8	.00000
9	-.00000
10	-.00000
11	.00000
12	-.00000
13	-.00000
14	-.00000
15	.00000
16	-.00000
17	-.00000
18	.00000
19	-.00000
20	-.00000
21	-.00000
22	-.00000
23	-.00000
24	.00000
25	-.00000
26	.00000
27	-.00000
28	.00008
29	.00000
30	-.00000
31	1.00000

MAXIMUM VALUE OF OFF DIAGONAL TERMS = .770E-04
MODE SHAPE NUMBER.. 31
ROW NUMBER..... 28

MAXIMUM ABSOLUTE DIFFERANCE BETWEEN DIAGONAL AND 1 = .71054E-13
MODE SHAPE NUMBER.. 14

F R E Q U E N C Y E R R O R E S T I M A T E S U M M A R Y - S U B S P A C E I T E R A T I O N

CONDITIONING NUMBER = .2756E+06

SUMMARY OF WARNINGS

-NONE-

S P E C T R A L C U R V E D A T A

IDENT NUMBER 1
CURVE TITLE .....
CURVE TYPE ..... PERIOD VS. ACCELERATION
CURVE SCALE ..... LINEAR
NUMBER OF POINTS .. 6

POINT	PERIOD (SECS)	ACCELERATION (G)	***** COMMENT ******
1	0.0000	.1040	
2	.1249	.2100	
3	.1250	1.6799	
4	.8990	1.6799	
5	.9000	.3499	
6	2.0000	.0700	

S P E C T R A L C U R V E D A T A (CONTINUED)

IDENT NUMBER 2
CURVE TITLE .....
CURVE TYPE ..... PERIOD VS. ACCELERATION
CURVE SCALE ..... LINEAR
NUMBER OF POINTS .. 6

POINT	PERIOD (SECS)	ACCELERATION (G)	***** COMMENT ******
1	0.0000	.1900	
2	.2100	.1900	
3	.2100	3.0797	
4	.6400	3.0797	
5	.6400	.3701	
6	2.0000	.2800	

S P E C T R A L C U R V E D A T A (CONTINUED)

IDENT NUMBER 3
CURVE TITLE .....
CURVE TYPE ..... PERIOD VS. ACCELERATION
CURVE SCALE ..... LINEAR
NUMBER OF POINTS .. 6

POINT	PERIOD (SECS)	ACCELERATION (G)	***** COMMENT ******
1	0.0000	.1040	
2	.1249	.2100	
3	.1250	1.6799	
4	.8990	1.6799	
5	.9000	.3499	
6	2.0000	.0700	

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

MODE NUMBER	PARTICIPATION FACTORS X DIR	Y DIR	Z DIR
1	-.609	5.977	.123
2	5.761	.200	2.996
3	.560	3.153	1.950
4	2.036	.100	-3.541
5	-3.312	.001	-7.388
6	-4.789	3.025	2.999
7	3.712	.129	3.636
8	-1.373	-.020	.348
9	5.872	1.796	-4.261
10	-.559	.429	2.992
11	.157	6.778	-.890
12	.951	.899	1.068
13	1.045	-.137	1.526
14	-1.943	-.112	1.564
15	-3.199	1.092	1.981
16	.002	.615	-.003
17	.743	1.711	-1.778
18	1.393	4.444	.383
19	-1.404	2.162	-.158
20	-.002	.513	-1.092
21	-.863	2.135	-.352
22	.173	-2.132	-.091
23	-.617	.795	-1.389
24	.504	.302	-.066
25	-.489	-.101	.277
26	-.870	-1.095	.892
27	.951	.114	.646
28	.716	-.217	.914
29	1.405	1.393	-.697
30	.406	.343	-.221
31	.798	.162	-.029

R E S P O N S E S P E C T R U M A N A L Y S I S

TITLE.....
FILE LABEL.....
SPECTRAL CURVES
X-DIRECTION..... 1
Y-DIRECTION..... 2
Z-DIRECTION..... 3
CURVE SCALE FACTORS
X-SCALE..... 1.000
Y-SCALE..... 1.000
Z-SCALE..... 1.000

SPECTRA COMBINATION CODE... VECTORIAL SUM
MODE COMBINATION CODE..... MODIFIED NRC GROUPING METHOD WITH FR= .1
NODAL PRINT THRESHOLD (G)
VERTICAL ACCELERATION.... 0
HORIZONTAL ACCELERATION.. 0
SAVE RESULTS PARAMETER..... 0

APPLIED SPECTRAL ACCELERATION SUMMARY

FREQUENCY NUMBER	PERIOD (SEC)	ZONE NUMBER	SPECTRAL ACCELERATIONS (G) X TRANS	Y TRANS	Z TRANS	XX ROT	YY ROT	ZZ ROT
1	.156	1	1.680	.190	1.680			
2	.100	1	.189	.190	.189			
3	.075	1	.168	.190	.168			
4	.069	1	.163	.190	.163			
5	.065	1	.159	.190	.159			
6	.057	1	.152	.190	.152			
7	.052	1	.148	.190	.148			
8	.051	1	.147	.190	.147			
9	.047	1	.144	.190	.144			
10	.035	1	.134	.190	.134			
11	.033	1	.132	.190	.132			
12	.032	1	.131	.190	.131			
13	.031	1	.131	.190	.131			
14	.027	1	.127	.190	.127			
15	.024	1	.125	.190	.125			
16	.024	1	.125	.190	.125			
17	.021	1	.122	.190	.122			
18	.020	1	.121	.190	.121			
19	.020	1	.121	.190	.121			
20	.019	1	.120	.190	.120			
21	.018	1	.119	.190	.119			

APPLIED SPECTRAL ACCELERATION SUMMARY(CONTINUED)

FREQUENCY NUMBER	PERIOD (SEC)	ZONE NUMBER	SPECTRAL ACCELERATIONS (G) X TRANS	Y TRANS	Z TRANS	XX ROT	YY ROT	ZZ ROT
22	.017	1	.119	.190	.119			
23	.015	1	.117	.190	.117			
24	.014	1	.116	.190	.116			
25	.013	1	.115	.190	.115			
26	.013	1	.115	.190	.115			
27	.012	1	.115	.190	.115			
28	.012	1	.114	.190	.114			
29	.011	1	.114	.190	.114			
30	.011	1	.113	.190	.113			
31	.010	1	.113	.190	.113			

N O D A L A C C E L E R A T I O N S

NODE NAME	****** ACCELERATIONS ******* X-GLOBAL (G)	Y-GLOBAL (G)	Z-GLOBAL (G)	******* THRESHOLD ACCELERATIONS ******* VERTICAL (G)	EXCEED	HORIZONTAL (G)	EXCEED	
1 *	.000	.000	.000	.000	YES	.000	YES	GLOBAL
2 *	.000	.001	.000	.001	YES	.000	YES	GLOBAL
3 *	.098	.116	.106	.116	YES	.144	YES	GLOBAL
4 *	.139	.119	.151	.119	YES	.206	YES	GLOBAL
5 *	.215	.125	.226	.125	YES	.311	YES	GLOBAL
6 *	.246	.130	.256	.130	YES	.355	YES	GLOBAL
7 *	.222	.133	.254	.133	YES	.337	YES	GLOBAL
8 *	.168	.136	.224	.136	YES	.280	YES	GLOBAL
9 *	.128	.137	.196	.137	YES	.234	YES	GLOBAL
10 *	.108	.138	.167	.138	YES	.199	YES	GLOBAL
11 *	.109	.138	.167	.138	YES	.200	YES	GLOBAL
12 *	.162	.161	.208	.161	YES	.263	YES	GLOBAL
13 *	.163	.163	.205	.163	YES	.261	YES	GLOBAL
14 *	.173	.215	.204	.215	YES	.267	YES	GLOBAL
15 *	.190	.267	.249	.267	YES	.313	YES	GLOBAL
16 *	.201	.273	.262	.273	YES	.330	YES	GLOBAL
17 *	.200	.257	.240	.257	YES	.312	YES	GLOBAL
18 *	.191	.214	.195	.214	YES	.273	YES	GLOBAL
19 *	.193	.146	.173	.146	YES	.259	YES	GLOBAL
20 *	.200	.083	.163	.083	YES	.258	YES	GLOBAL
21 *	.215	.189	.159	.189	YES	.267	YES	GLOBAL
22 *	.216	.293	.146	.293	YES	.261	YES	GLOBAL
23 *	.226	.340	.141	.340	YES	.267	YES	GLOBAL
24 *	.224	.293	.138	.293	YES	.264	YES	GLOBAL
25 *	.197	.196	.133	.196	YES	.238	YES	GLOBAL
26 *	.152	.129	.124	.129	YES	.197	YES	GLOBAL
27 *	.175	.233	.121	.233	YES	.213	YES	GLOBAL
28 *	.216	.270	.121	.270	YES	.248	YES	GLOBAL
29 *	.252	.243	.122	.243	YES	.280	YES	GLOBAL
30 *	.260	.151	.123	.151	YES	.287	YES	GLOBAL
31 *	.260	.192	.122	.192	YES	.287	YES	GLOBAL
32 *	.249	.232	.115	.232	YES	.274	YES	GLOBAL
33 *	.230	.242	.106	.242	YES	.253	YES	GLOBAL
34 *	.091	.265	.187					NON-GLOBAL
35 *	.164	.352	.122	.352	YES	.204	YES	GLOBAL
36 *	.117	.309	.204	.309	YES	.235	YES	GLOBAL
37 *	.116	.257	.185	.257	YES	.218	YES	GLOBAL
38 *	.120	.153	.139	.153	YES	.184	YES	GLOBAL
39 *	.112	.093	.106	.093	YES	.154	YES	GLOBAL
40 *	.000	.000	.000	.000	YES	.000	YES	GLOBAL
41 *	.000	.000	.000					NON-GLOBAL

N O D A L D I S P L A C E M E N T S

NODE NAME	NODAL TRANSLATIONS X	Y	Z	NODAL ROTATIONS XX	YY	ZZ	COORDINATE SYSTEM
1 *	.0000	.0000	.0000	.000000	.000000	.000000	GLOBAL
2 *	.0000	.0000	.0000	.000000	.000000	.000000	GLOBAL
3 *	.0032	.0024	.0031	.000069	.000057	.000056	GLOBAL
4 *	.0055	.0024	.0057	.000064	.000056	.000054	GLOBAL
5 *	.0094	.0024	.0100	.000038	.000053	.000033	GLOBAL
6 *	.0108	.0025	.0116	.000010	.000052	.000005	GLOBAL
7 *	.0097	.0025	.0104	.000034	.000052	.000031	GLOBAL
8 *	.0068	.0025	.0073	.000056	.000054	.000052	GLOBAL
9 *	.0043	.0026	.0043	.000065	.000056	.000060	GLOBAL
10 *	.0025	.0026	.0015	.000067	.000059	.000064	GLOBAL
11 *	.0025	.0026	.0015	.000067	.000059	.000064	GLOBAL
12 *	.0050	.0038	.0047	.000048	.000052	.000065	GLOBAL
13 *	.0050	.0040	.0049	.000047	.000052	.000065	GLOBAL
14 *	.0057	.0067	.0074	.000045	.000042	.000058	GLOBAL
15 *	.0063	.0087	.0091	.000046	.000026	.000044	GLOBAL
16 *	.0067	.0093	.0097	.000050	.000013	.000028	GLOBAL
17 *	.0066	.0085	.0092	.000055	.000023	.000019	GLOBAL
18 *	.0059	.0063	.0078	.000058	.000039	.000024	GLOBAL
19 *	.0051	.0034	.0063	.000056	.000047	.000028	GLOBAL
20 *	.0048	.0009	.0050	.000047	.000044	.000030	GLOBAL
21 *	.0055	.0025	.0045	.000034	.000035	.000029	GLOBAL
22 *	.0062	.0041	.0042	.000021	.000022	.000026	GLOBAL
23 *	.0064	.0046	.0041	.000013	.000016	.000025	GLOBAL
24 *	.0057	.0039	.0039	.000020	.000030	.000028	GLOBAL
25 *	.0046	.0023	.0038	.000029	.000049	.000035	GLOBAL
26 *	.0051	.0014	.0038	.000033	.000070	.000044	GLOBAL
27 *	.0090	.0035	.0040	.000029	.000085	.000051	GLOBAL
28 *	.0139	.0049	.0041	.000003	.000083	.000057	GLOBAL
29 *	.0184	.0036	.0040	.000052	.000066	.000061	GLOBAL
30 *	.0215	.0020	.0038	.000132	.000041	.000066	GLOBAL
31 *	.0227	.0130	.0035	.000212	.000021	.000067	GLOBAL
32 *	.0220	.0278	.0032	.000268	.000038	.000060	GLOBAL
33 *	.0196	.0448	.0034	.000302	.000063	.000046	GLOBAL
34 *	.0017	.0620	.0167	.000101	.000083	.000303	NON-GLOBAL
35 *	.0122	.0779	.0073	.000320	.000092	.000023	GLOBAL
36 *	.0079	.0689	.0146	.000240	.000052	.000278	GLOBAL
37 *	.0074	.0580	.0130	.000233	.000063	.000293	GLOBAL
38 *	.0061	.0262	.0077	.000205	.000079	.000311	GLOBAL
39 *	.0057	.0109	.0052	.000187	.000077	.000305	GLOBAL
40 *	.0000	.0000	.0000	.000001	.000001	.000002	GLOBAL
41 *	.0000	.0000	.0000	.000001	.000001	.000002	NON-GLOBAL

F R E Q U E N C Y S P A C I N G N R C G R O U P I N G M E T H O D

FREQUENCY NUMBER	SPACING NUMBER	FREQUENCY (CPS)
1	1	6.3913
2	2	9.9934
3	3	13.2746
4	3	14.4850
5	4	15.3272
6	5	17.4999
7	5	19.0906
8	6	19.6239
9	6	21.4367
10	7	28.7090
11	7	29.8686
12	7	31.4858
13	8	32.0109
14	9	36.3681
15	10	40.9817
16	10	41.3689
17	11	47.3941
18	11	49.7669
19	11	50.1251
20	12	52.9304
21	12	56.8994
22	13	58.5083
23	14	67.4674
24	14	70.4609
25	15	75.4076
26	15	79.1829
27	15	80.7416
28	16	86.1029
29	16	88.2809
30	16	92.7363
31	17	99.3588

P I P E M E M B E R S T R E S S E S

PIPE NAME		PIPE TYPE	NODAL PT NAME-END	SECTION DESCRIP	LOCAL X FORCE	LOCAL Y FORCE	LOCAL Z FORCE	LOCAL X MOMENT	LOCAL Y MOMENT	LOCAL Z MOMENT	BENDING STRESS	INTEN FACTR
1	*		1 -I		1102.04	2296.59	1166.33	63173.14	43853.09	87767.26	211.53	1.00
1	*		2 -J		1102.04	2296.59	1166.33	63173.14	42534.97	85378.39	207.39	1.00
2	*	CURV	2 -I		1102.04	2296.59	1166.33	63173.14	42534.97	85378.39	439.02	2.82
2	*	CURV	-C		1735.96	1877.24	1166.33	36075.38	35492.88	29092.10	224.00	2.82
2	*	CURV	3 -J		2296.59	1102.04	1166.33	20665.25	13284.18	36242.96	168.01	2.82
3	*		3 -I		2296.59	1166.33	1102.04	20665.25	36242.96	13284.18	79.37	1.00
3	*		4 -J		2296.59	1166.33	1102.04	20665.25	63277.56	37031.10	138.08	1.00
4	*		4 -I		1876.81	695.34	708.42	20665.25	63277.56	37031.10	138.08	1.00
4	*		5 -J		1876.81	695.34	708.42	20665.25	107376.08	92180.56	259.25	1.00
5	*		5 -I		1643.16	294.11	401.31	20665.25	107376.08	92180.56	259.25	1.00
5	*		6 -J		1643.16	294.11	401.31	20665.25	124877.46	113092.77	307.69	1.00
6	*		6 -I		1434.00	283.69	334.51	20665.25	124877.46	113092.77	307.69	1.00
6	*		7 -J		1434.00	283.69	334.51	20665.25	111509.02	101054.74	275.35	1.00
7	*		7 -I		1217.08	731.05	742.24	20665.25	111509.02	101054.74	275.35	1.00
7	*		8 -J		1217.08	731.05	742.24	20665.25	65845.83	62809.15	169.15	1.00
8	*		8 -I		1217.08	731.05	742.24	20665.25	65845.83	62809.15	169.15	1.00
8	*		9 -J		1217.08	731.05	742.24	20665.25	37638.21	48932.72	118.01	1.00
9	*		9 -I		1042.90	945.27	998.87	20665.25	37638.21	48932.72	118.01	1.00
9	*		10 -J		1042.90	945.27	998.87	20665.25	32005.42	64241.49	135.39	1.00
10	*		10 -I		1042.90	1928.45	938.76	20665.25	32005.42	64241.49	135.39	1.00
10	*		11 -J		1042.90	1928.45	938.76	20665.25	29497.74	59687.18	126.37	1.00
11	*	CURV	11 -I		942.25	1761.51	874.79	20665.25	37521.56	57789.77	276.03	2.82
11	*	CURV	-C		1542.53	1307.66	874.79	19562.98	12307.67	29135.36	142.71	2.82
11	*	CURV	12 -J		1761.51	942.25	874.79	21131.39	27419.18	35566.31	190.45	2.82
12	*		12 -I		1629.16	842.96	733.94	21131.39	27419.18	35566.31	89.97	1.00
12	*		13 -J		1629.16	842.96	733.94	21131.39	29807.72	36260.30	93.31	1.00
13	*		13 -I		1400.88	710.49	615.00	20441.69	29807.72	36411.05	93.00	1.00
13	*		14 -J		1400.88	710.49	615.00	20441.69	59705.75	55387.67	152.21	1.00
14	*		14 -I		1372.91	710.49	675.42	17732.79	59705.75	56005.46	151.83	1.00
14	*		15 -J		1372.91	710.49	675.42	17732.79	97456.61	92150.11	245.24	1.00

P I P E M E M B E R S T R E S S E S (CONTINUED)

PIPE NAME	PIPE TYPE	NODAL PT NAME-END	SECTION DESCRIP	LOCAL X FORCE	LOCAL Y FORCE	LOCAL Z FORCE	LOCAL X MOMENT	LOCAL Y MOMENT	LOCAL Z MOMENT	BENDING STRESS	INTEN FACTR
15	*	15 -I		1056.85	306.54	210.51	14223.41	97456.61	92257.32	244.63	1.00
15	*	16 -J		1056.85	306.54	210.51	14223.41	93316.65	88551.07	234.62	1.00
16	*	16 -I		1054.06	306.54	225.05	15801.58	93316.65	88103.73	234.39	1.00
16	*	17 -J		1054.06	306.54	225.05	15801.58	93810.41	88220.57	235.18	1.00
17	*	17 -I		974.24	789.39	734.24	20583.24	93810.41	87207.33	235.16	1.00
17	*	18 -J		974.24	789.39	734.24	20583.24	53751.77	49879.30	138.06	1.00
18	*	18 -I		1015.82	789.39	668.72	23187.44	53751.77	48827.72	138.18	1.00
18	*	19 -J		1015.82	789.39	668.72	23187.44	27813.22	41865.13	100.34	1.00
19	*	19 -I		1226.74	1113.09	1000.07	22728.64	27813.22	42189.10	100.44	1.00
19	*	20 -J		1226.74	1113.09	1000.07	22728.64	45761.92	86009.06	181.35	1.00
20	*	20 -I		895.03	1058.09	784.17	18376.32	45761.92	87032.69	181.33	1.00
20	*	21 -J		895.03	1058.09	784.17	18376.32	58750.77	71260.26	170.70	1.00
21	*	21 -I		881.49	579.80	470.28	13412.62	58750.77	72349.48	170.68	1.00
21	*	22 -J		881.49	579.80	470.28	13412.62	71745.75	76812.08	192.07	1.00
22	*	22 -I		876.87	579.80	482.25	9903.61	71745.75	77331.37	192.06	1.00
22	*	23 -J		876.87	579.80	482.25	9903.61	90287.00	94917.99	238.14	1.00
23	*	23 -I		990.11	658.51	548.60	11732.35	90287.00	94722.21	238.16	1.00
23	*	24 -J		990.11	658.51	548.60	11732.35	86479.68	71492.91	204.50	1.00
24	*	24 -I		975.21	658.51	599.64	16818.08	86479.68	70477.39	204.51	1.00
24	*	25 -J		975.21	658.51	599.64	16818.08	94285.26	63832.54	208.64	1.00
25	*	25 -I		1190.89	1161.48	1062.90	21785.56	94285.26	62311.65	208.64	1.00
25	*	26 -J		1190.89	1161.48	1062.90	21785.56	118341.69	90592.34	273.03	1.00
26	*	26 -I		1088.55	2130.67	1513.84	26341.26	118341.69	89349.27	273.00	1.00
26	*	27 -J		1088.55	2130.67	1513.84	26341.26	40170.97	66737.95	149.06	1.00
27	*	27 -I		895.51	1981.58	1152.29	21632.40	40170.97	68372.68	149.00	1.00
27	*	28 -J		895.51	1981.58	1152.29	21632.40	49278.34	168590.95	320.80	1.00
28	*	28 -I		944.82	1981.58	1112.56	8705.23	49278.34	169753.19	320.80	1.00
28	*	29 -J		944.82	1981.58	1112.56	8705.23	110584.47	282290.82	549.80	1.00
29	*	29 -I		859.89	2081.31	547.70	19206.17	110584.47	281771.75	549.80	1.00
29	*	30 -J		859.89	2081.31	547.70	19206.17	133168.96	393828.33	754.41	1.00

P I P E M E M B E R S T R E S S E S (CONTINUED)

PIPE NAME	PIPE TYPE	NODAL PT NAME-END	SECTION DESCRIP	LOCAL X FORCE	LOCAL Y FORCE	LOCAL Z FORCE	LOCAL X MOMENT	LOCAL Y MOMENT	LOCAL Z MOMENT	BENDING STRESS	INTEN FACTR
30 *		30 -I		887.97	2033.76	501.59	52449.22	133168.96	390798.15	754.42	1.00
30 *		31 -J		887.97	2033.76	501.59	52449.22	156126.03	276897.92	584.02	1.00
31 *		31 -I		801.81	1785.27	533.31	76188.63	156126.03	271326.66	584.01	1.00
31 *		32 -J		801.81	1785.27	533.31	76188.63	136982.02	168119.32	416.66	1.00
32 *		32 -I		778.71	1785.27	565.96	90377.25	136982.02	160935.43	416.66	1.00
32 *		33 -J		778.71	1785.27	565.96	90377.25	121198.72	62904.05	296.83	1.00
33 *		33 -I		753.65	1282.92	1047.19	94861.74	121198.72	55902.61	296.83	1.00
33 *		34 -J		753.65	1282.92	1047.19	94861.74	87541.82	31282.38	240.76	1.00
34 *		34 -I		568.19	1282.92	1021.17	92340.67	87541.82	38075.80	240.76	1.00
34 *		35 -J		568.19	1282.92	1021.17	92340.67	44544.70	108252.28	270.27	1.00
35 *	CURV	35 -I		625.43	1207.55	237.60	92346.15	108247.61	44544.70	270.27	1.26
35 *	CURV	-C		1128.83	756.51	237.60	18678.11	134112.03	75280.12	280.84	1.26
35 *	CURV	36 -J		1272.91	476.62	237.60	76442.64	107478.52	106278.74	307.04	1.26
36 *		36 -I		1355.83	923.65	646.98	76447.24	106278.74	107475.24	307.04	1.00
36 *		37 -J		1355.83	923.65	646.98	76447.24	89726.54	79980.38	258.22	1.00
37 *		37 -I		1423.42	1292.53	851.67	76458.28	89726.54	79969.82	258.22	1.00
37 *		38 -J		1423.42	1292.53	851.67	76458.28	40423.44	44809.38	176.57	1.00
38 *		38 -I		1657.47	1741.58	1231.82	76459.31	40423.44	44807.62	176.57	1.00
38 *		39 -J		1657.47	1741.58	1231.82	76459.31	49304.51	110978.62	260.13	1.00
39 *	CURV	39 -I		1657.41	1741.58	1231.90	76452.31	49304.51	110983.44	475.09	2.95
39 *	CURV	-C		1706.57	1695.38	1231.90	93173.04	57915.73	164217.92	653.83	2.95
39 *	CURV	40 -J		1741.58	1657.41	1231.90	96371.91	79971.76	195560.01	768.81	2.95
40 *		40 -I		1741.58	1875.10	866.82	96371.91	132191.68	164816.05	347.44	1.00
40 *		41 -J		1741.58	1875.10	866.82	96371.91	132195.69	164832.74	347.46	1.00

M A X I M U M P I P E M E M B E R S T R E S S E S

	PIPE NAME		NODAL PT NAME-END	BENDING STRESS(PSI)
1-	39	*	40-J	768.81
2-	30	*	30-I	754.42
3-	29	*	30-J	754.41
4-	39	*	-C	653.83
5-	39	*	-C	653.83
6-	30	*	31-J	584.02
7-	31	*	31-I	584.01
8-	29	*	29-I	549.80
9-	28	*	29-J	549.80
10-	39	*	39-I	475.09

P I P I N G S Y S T E M R E A C T I O N S

NODE NAME		SUPPORT CODE	X FORCE	Y FORCE	Z FORCE	X MOMENT	Y MOMENT	Z MOMENT	COORDINATE SYSTEM
1	*	222222	1166.33	2296.59	1102.04	87767.26	43853.09	63173.14	GLOBAL
10	*	202000	2520.88	0.00	1532.19	0.00	0.00	0.00	GLOBAL
20	*	222000	1197.88	1708.21	1256.89	0.00	0.00	0.00	GLOBAL
26	*	222000	2300.73	2734.08	1704.06	0.00	0.00	0.00	GLOBAL
30	*	20000	0.00	4067.10	0.00	0.00	0.00	0.00	GLOBAL
34	*	200000	1350.31	0.00	0.00	0.00	0.00	0.00	NON-GLOBAL
41	*	222222	1875.19	1741.58	866.57	132579.07	96371.91	164785.29	NON-GLOBAL

BENCHMARK
PROBLEM 6
(Nonclustered Solution)

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00000000011111111112222222222333333333344444444445555555555666666666677777777778   CARD
12345678901234567890123456789012345678901234567890123456789012345678901234567890   NUMBER

TPIPE VERIFICATION  N1-TPIPE    PROB. #6    RAGILES   X2159                1TIT     1
TSI  1 Y            NONE      PLTPIP6   TTTRAG    441       DWHEELER                 2
    7   41    2          2    2         40    0                 1  1  386.4          3
    101000     01100         1    3   31.0100 .034       8000                       4
 C01    1    2    3  C02      45.      126.00   483.996   659.640                   5
 C02  C01   11   12   13      45.      126.00  1013.196   659.640                   6
 C03  C05   35   36  C06     150.   487.056    1013.196-485.196                     7
 C04  C07   39   40   41      45.   179.160    1013.196-379.188                     8
 C05                                600.       1013.196-308.11178                   9
 C06                                239.52239  1013.196-400.                       10
 C07                                250.       1013.196-403.58733                  11
   1      126.0   483.996   705.840                                                12
   2                                                                               13
   3                                                                               14
   4      126.0   567.996   659.640                  3835.02                       15
   5      126.0   651.996   659.640                2107.0392                       16
   6      126.0   735.996   659.640                1888.7232                       17
   7      126.0   802.596   659.640                2275.1232                       18
   8      126.0   869.196   659.640                                                19
   9      126.0   917.196   659.640                2076.1272                       20
  10      126.0   965.196   659.640                                                21
  11                                               1526.28                         22
  12                                               938.952                         23
  13    173.928  1013.196   648.624                1522.8024                       24
  14    229.836  1013.196   630.996                                                25
  15    283.992  1013.196   608.556                2940.1949                       26
  16    335.988  1013.196   581.484                                                27
  17    385.428  1013.196   550.080                2940.1949                       28
  18    431.940  1013.196   514.392                                                29
  19    475.164  1013.196   474.780                2941.2768                       30
  20    514.776  1013.196   431.556                                                31
  21    550.464  1013.196   385.044                2940.8904                       32
  22    581.964  1013.196   335.604                                                33
  23    609.036  1013.196   283.608                2940.8904                       34
  24    631.474  1013.196   229.452                                                35
  25    649.104  1013.196   173.544                2940.8904                       36
  26    661.788  1013.196   116.304                                                37
  27    669.444  1013.196    58.176                2940.8904                       38
  28    672.000  1013.196     -.396                                                39
  29    669.444  1013.196   -58.968                2940.8904                       40
  30    661.788  1013.196  -117.096                                                41
  31    649.104  1013.196  -174.336                2940.8904                       42
  32    631.476  1013.196  -230.244                                                43
  33    609.036  1013.196  -284.400                2937.0264                       44
  34    581.964  1013.196  -336.396                                                45
  35                                               3977.2152                       46
  36                                               2904.9552                       47
  37    345.576  1013.196  -436.500                1498.0728                       48
  38    262.368  1013.196  -407.844                4068.0192                       49
  39                                                                               50
  40                                                                               51
  41    179.160   968.172  -379.188                                                52
  34 .2589693  0.0       -.9658855 0.0       1.0       0.0                         53
  41 .99971212 .023993091 0.0       .0       1.0       0.0                         54
FLEX                                                                               55
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00000000011111111112222222222333333333344444444445555555555666666666677777777778   CARD
12345678901234567890123456789012345678901234567890123456789012345678901234567890   NUMBER

   1      RR  .10E20RR  .10E20RR  .10E20RR  .10E20RR  .10E20RR  .10E20              56
  10      RR  .10E07          RR  .10E07                                             57
  20      RR  .25E06RR  .20E07RR  .25E06                                             58
  26      RR  .45E06RR  .20E07RR  .45E06                                             59
  30                RR  .20E07                                                      60
  34      RR0.800E06                                                                61
  41      RR  .10E10RR  .10E10RR  .10E10RR  .10E12RR  .10E12RR  .10E12              62
END                                                                                  63
   1   29.9E06                                                                       64
   2   29.9E06                                                                       65
   1     30.00      .8500       0.0                                                  66
   2     32.00      .9050       0.0                                                  67
   1        1    2     1    1                                                        68
   2        2    3                                                  C01              69
   3        3    4                                                                   70
   4        4    5                                                                   71
   5        5    6                                                                   72
   6        6    7                                                                   73
   7        7    8                                                                   74
   8        8    9                                                                   75
   9        9   10                                                                   76
  10       10   11                                                                   77
  11       11   12                                                  C02              78
  12       12   13                                                                   79
  13       13   14                                                                   80
  14       14   15                                                                   81
  15       15   16                                                                   82
  16       16   17                                                                   83
  17       17   18                                                                   84
  18       18   19                                                                   85
  19       19   20                                                                   86
  20       20   21                                                                   87
  21       21   22                                                                   88
  22       22   23                                                                   89
  23       23   24                                                                   90
  24       24   25                                                                   91
  25       25   26                                                                   92
  26       26   27                                                                   93
  27       27   28                                                                   94
  28       28   29                                                                   95
  29       29   30                                                                   96
  30       30   31                                                                   97
  31       31   32                                                                   98
  32       32   33                                                                   99
  33       33   34                                                                  100
  34       34   35                                                                  101
  35       35   36                                                  C03             102
  36       36   37                                                                  103
  37       37   38                                                                  104
  38       38   39                                                                  105
  39       39   40     2    2                                        C04             106
  40       40   41                                                                  107
   1            6                                                                   108
0.       .104001035                                                                 109
 .1249E+00.209989650                                                                110
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0000000001111111111222222222233333333334444444445555555556666666666777777778   CARD
1234567890123456789012345678901234567890123456789012345678901234567890123456789  NUMBER

  .1250E+001.67986540                                                            111
  .8990E+001.67986540                                                            112
  .9000E+00.349896480                                                            113
  .2000E+01.070005176                                                            114
     2               6                                                           115
0.         .190010350                                                           116
  .2100E+00.190010350                                                            117
.2100000013.07971010                                                             118
  .6400E+003.07971010                                                            119
.6400000001.370092920                                                            120
  .2000E+01.280020700                                                            121
     3               6                                                           122
0.         .104001035                                                           123
  .1249E+00.209989650                                                            124
  .1250E+001.67986540                                                            125
  .8990E+001.67986540                                                            126
  .9000E+00.349896480                                                            127
  .2000E+01.070005176                                                            128
D         1    2    3   1.   1.   1.        SR                                   129
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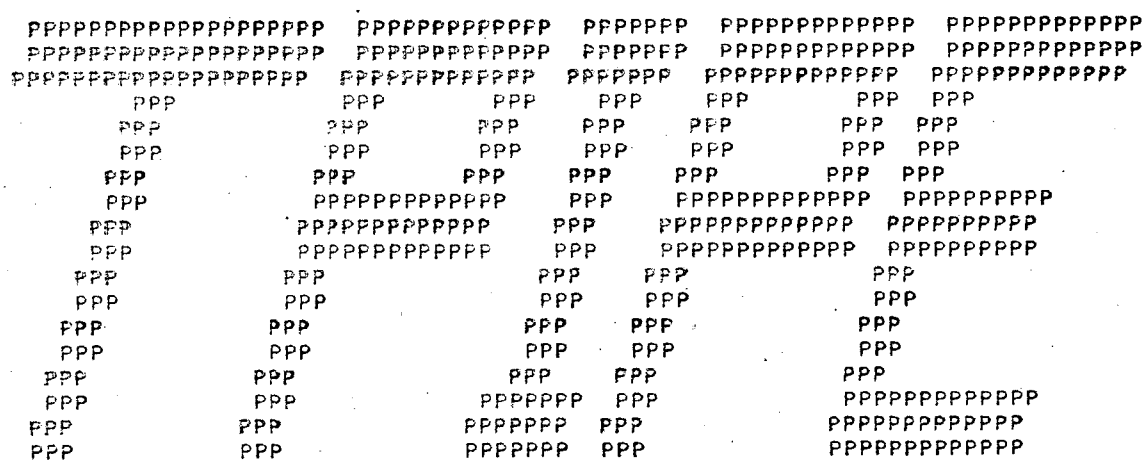


DEVELOPED JOINTLY BY

PMB SYSTEMS ENGINEERING
SAN FRANCISCO, CALIFORNIA, USA

TENNESSEE VALLEY AUTHORITY
KNOXVILLE, TENNESSEE, USA

******* 1976 ******

VERSION 4.4 MAY 1, 1981

EXECUTED AT 14.47.41. ON 07/18/81

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

PIPING SYSTEM GEOMETRY DEFINITION

NUMBER OF CONTROL POINTS	7
NUMBER OF NODAL POINTS	41
NUMBER OF NONGLOBAL COORDINATE SYSTEMS	2
NUMBER OF ADDITIONAL SUPPORT TYPES	0
NUMBER OF MATERIAL PROPERTY TYPES	2
NUMBER OF PIPE CROSS SECTION TYPES	2
NUMBER OF SPECIAL COMPONENT CROSS SECTIONS	0
NUMBER OF PIPE MEMBERS	40
NUMBER OF SPECIAL CONNECTIONS	0
NUMBER OF SPECIAL COMPONENTS	0
NUMBER OF DYNAMIC SPRINGS	0
NUMBER OF MULTIPLE EXCITATION ZONES	0
UNITS OF LENGTH AND WEIGHT	CONSISTENT
GRAVITY	386.40
NODAL POINT COORDINATE CHECK OPTION	NO

PROBLEM DEFINITION

EXECUTION MODE= 10100

1= STRUCTURAL DEFINITION IS FROM DATA CARDS
0= NORMAL DATA CHECKING RUN
1= ANALYSIS REQUESTED
0= NO STRUCTURAL PLOTTING REQUESTED
0= NO POSTPROCESSING REQUESTED
0= NO THERMAL TRANSIENT RESPONSE EXECUTION REQUESTED

ANALYSIS TYPES(C1100) REQUESTED

FREQUENCY ANALYSIS

MAXIMUM NUMBER OF MODES REQUESTED	31
NUMBER OF SPRING SUPPORTS IN DYNAM MODEL	0
MININUM PERIOD OF HIGHEST MODE(SEC)	.0100
MAXIMUM FREQUENCY FOR MODE PRINTOUT(HZ)	.0

RESPONSE SPECTRUM ANALYSIS

NUMBER OF SPECTRAL CURVES TO BE INPUT	3
NUMBER OF RESPONSE SPECTRUM LOAD CASES	1

PROGRAM STORAGE 8000

RESTART TAPE GENERATION OPTION NONE REQUESTED

C O N T R O L P O I N T S P E C I F I C A T I O N

CONTROL NAME	I-TAN POINT	*CURVE POINTS* I-END	J-END	J-TAN POINT	CURVE RADIUS	******** COORDINATES ******* X-GLOBAL	Y-GLOBAL	Z-GLOBAL	COMMENT
C01 *	1 *	2 *	3 *	C02 *	45.000	126.00	484.00	659.64	
C02 *	C01 *	11 *	12 *	13 *	45.000	126.00	1013.20	659.64	
C03 *	C05 *	35 *	36 *	C06 *	150.000	487.06	1013.20	-485.20	
C04 *	C07 *	39 *	40 *	41 *	45.000	179.16	1013.20	-379.19	
C05 *	*	*	*	*	0.000	600.00	1013.20	-308.11	
C06 *	*	*	*	*	0.000	239.52	1013.20	-400.00	
C07 *	*	*	*	*	0.000	250.00	1013.20	-403.59	

N O D A L P O I N T D E F I N I T I O N

NODAL POINT	NODE NAME	******** COORDINATES ******* X-GLOBAL	Y-GLOBAL	Z-GLOBAL	LUMPED WEIGHT	DATA SOURCE	COMMENT
1	1 *	126.00	484.00	705.84	0.0	INPT	
2	2 *	126.00	484.00	704.64	0.0	CP	
3	3 *	126.00	529.00	659.64	0.0	CP	
4	4 *	126.00	568.00	659.64	3835.0	INPT	
5	5 *	126.00	652.00	659.64	2107.0	INPT	
6	6 *	126.00	736.00	659.64	1888.7	INPT	
7	7 *	126.00	802.60	659.64	2275.1	INPT	
8	8 *	126.00	869.20	659.64	0.0	INPT	
9	9 *	126.00	917.20	659.64	2076.1	INPT	
10	10 *	126.00	965.20	659.64	0.0	INPT	
11	11 *	126.00	968.20	659.64	1526.3	CP	
12	12 *	169.86	1013.20	649.56	939.0	CP	
13	13 *	173.93	1013.20	648.62	1522.8	INPT	
14	14 *	229.84	1013.20	631.00	0.0	INPT	
15	15 *	283.99	1013.20	606.56	2940.2	INPT	
16	16 *	335.99	1013.20	581.48	0.0	INPT	
17	17 *	385.43	1013.20	550.08	2940.2	INPT	
18	18 *	431.94	1013.20	514.39	0.0	INPT	
19	19 *	475.16	1013.20	474.78	2941.3	INPT	
20	20 *	514.78	1013.20	431.56	0.0	INPT	
21	21 *	550.46	1013.20	385.04	2940.9	INPT	
22	22 *	581.96	1013.20	335.60	0.0	INPT	
23	23 *	609.04	1013.20	283.61	2940.9	INPT	
24	24 *	631.47	1013.20	229.45	0.0	INPT	
25	25 *	649.10	1013.20	173.54	2940.9	INPT	
26	26 *	661.79	1013.20	116.30	0.0	INPT	
27	27 *	669.44	1013.20	58.18	2940.9	INPT	
28	28 *	672.00	1013.20	-.40	0.0	INPT	
29	29 *	669.44	1013.20	-58.97	2940.9	INPT	
30	30 *	661.79	1013.20	-117.10	0.0	INPT	
31	31 *	649.10	1013.20	-174.34	2940.9	INPT	
32	32 *	631.48	1013.20	-230.24	0.0	INPT	
33	33 *	609.04	1013.20	-284.40	2937.0	INPT	
34	34 *	581.96	1013.20	-336.40	0.0	INPT	
35	35 *	550.60	1013.20	-385.56	3977.2	CP	
36	36 *	375.32	1013.20	-446.74	2905.0	CP	
37	37 *	345.58	1013.20	-436.50	1498.1	INPT	
38	38 *	262.37	1013.20	-407.84	4068.0	INPT	
39	39 *	221.71	1013.20	-393.84	0.0	CP	
40	40 *	179.16	968.20	-379.19	0.0	CP	
41	41 *	179.16	968.17	-379.19	0.0	INPT	

N O N - G L O B A L C O O R D I N A T E S Y S T E M D E F I N I T I O N

NODE NAME	DIRECTION COSINES **** NON-GLOBAL XS-AXIS *** X	Y	Z	**** NON-GLOBAL YS-AXIS *** X	Y	Z	**** NON-GLOBAL ZS-AXIS *** X	Y	Z	COMMENT
34 *	.2590	0.0000	-.9659	0.0000	1.0000	0.0000	.9659	0.0000	.2590	
41 *	.9997	.0240	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	.9997	

SUPPORT TYPE LIBRARY

SUPPORT TYPE	***** RESTRAINT CODES ***** DYNAMIC	GRAVITY	THERMAL	COMMENT
1	111111	111111	111111	
2	111000	111000	111000	
3	111000	111000	101000	
4	111000	110000	110000	
5	111000	110000	100000	
6	111000	101000	101000	
7	111000	100000	100000	
8	111000	11000	11000	
9	111000	11000	1000	
10	111000	10000	10000	
11	111000	10000	0	
12	111000	1000	1000	
13	111000	0	0	
14	110000	110000	110000	
15	110000	110000	100000	
16	110000	100000	100000	
17	110000	10000	10000	
18	110000	10000	0	
19	110000	0	0	
20	101000	101000	101000	
21	101000	100000	100000	
22	101000	11000	1000	
23	101000	10000	0	
24	101000	1000	1000	
25	101000	0	0	
26	100000	110000	100000	
27	100000	100000	100000	
28	100000	10000	0	
29	100000	0	0	
30	11000	11000	11000	
31	11000	11000	1000	
32	11000	10000	10000	
33	11000	10000	0	
34	11000	1000	1000	
35	11000	0	0	
36	10000	10000	10000	
37	10000	10000	0	
38	10000	0	0	
39	1000	11000	1000	
40	1000	10000	0	
41	1000	1000	1000	
42	1000	0	0	
43	0	10000	0	

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

SUPPORT ********** RESTRAINED NODAL POINTS ********** *** RESTRAINT CODES *** NO
TYPE 1 2 3 4 5 6 7 8 9 10 11 12 13 14 DYNAMIC GRAVITY THERMAL MOD

RESTRAINT SPECIFICATION. DEFAULT STIFFNESSES K(X),K(Y),K(Z)= 1.0E13 K(XX),K(YY),K(ZZ)= 1.0E15

NODE NAME	RESTRAINT TYPE	K(X)	RESTRAINT TYPE	K(Y)	RESTRAINT TYPE	K(Z)	RESTRAINT TYPE	K(XX)	RESTRAINT TYPE	K(YY)	RESTRAINT TYPE	K(ZZ)	*** RESTRAINT CODES *** DYNAMIC	GRAVITY	THERMAL	NO MOD
1	RR	.10E20	RR	.10E20	RR	.10E20	RR	.10E20	RR	.10E20	RR	.10E20	222222	222222	222222	1
10	RR	.10E07			RR	.10E07							202000	202000	202000	1
20	RR	.25E06	RR	.20E07	RR	.25E06							222000	222000	222000	1
26	RR	.45E06	RR	.20E07	RR	.45E06							222000	222000	222000	1
30			RR	.20E07									20000	20000	20000	1
34	RR	0.800E06											200000	200000	200000	1
41	RR	.10E10	RR	.10E10	RR	.10E10	RR	.10E12	RR	.10E12	RR	.10E12	222222	222222	222222	1

MATERIAL PROPERTIES

MATERIAL NUMBER	COLD ELASTIC MODULUS	POISSONS RATIO	THERMAL EXPANSION COEFFICIENT	INTERNAL PIPE PRESSURE	MEMBER TEMPERATURE	HOT ELASTIC MODULUS	COMMENT
1	29900000.0	.300	0.000000000	0.0	0.00	29900000.0	
2	29900000.0	.300	0.000000000	0.0	0.00	29900000.0	

P I P E M E M B E R C R O S S S E C T I O N T Y P E S

SECTION NUMBER	OUTSIDE DIAMETER	WALL THICKNESS	AXIAL AREA	SHEAR AREA	FLEXURAL INERTIA	INPUT FLEXIBILITY	WEIGHT/ LENGTH	SECTION DESCRIPTION
1	30.000	.8500	77.84	38.94	8274.9		0.00	
2	32.000	.9050	88.41	44.23	10694.2		0.00	

P I P E M E M B E R D A T A

MEMBER NAME	NODE NAME I-END	NODE NAME J-END	MAT TYPE	SECT TYPE	INTENS FACTOR I-END	INTENS FACTOR J-END	REF TEMP	RELEASE CODE I-END	RELEASE CODE J-END	MEMBER LENGTH	CURVE RADIUS	INTERSECTION X-GLOBAL	INTERSECTION Y-GLOBAL	INTERSECTION Z-GLOBAL	INTER ANGLE	MEMBER NUMBER
1 *	1 *	2 *	1	1	1.000	1.000	70.0	0	0	1.20						1
2 *	2 *	3 *	1	1	2.822	2.822	70.0	0	0	70.69	45.000	126.00	484.00	659.64	90.000	2
3 *	3 *	4 *	1	1	1.000	1.000	70.0	0	0	39.00						3
4 *	4 *	5 *	1	1	1.000	1.000	70.0	0	0	84.00						4
5 *	5 *	6 *	1	1	1.000	1.000	70.0	0	0	84.00						5
6 *	6 *	7 *	1	1	1.000	1.000	70.0	0	0	66.60						6
7 *	7 *	8 *	1	1	1.000	1.000	70.0	0	0	66.60						7
8 *	8 *	9 *	1	1	1.000	1.000	70.0	0	0	48.00						8
9 *	9 *	10 *	1	1	1.000	1.000	70.0	0	0	48.00						9
10 *	10 *	11 *	1	1	1.000	1.000	70.0	0	0	3.00						10
11 *	11 *	12 *	1	1	2.822	2.822	70.0	0	0	70.69	45.000	126.00	1013.20	659.64	90.000	11
12 *	12 *	13 *	1	1	1.000	1.000	70.0	0	0	4.18						12
13 *	13 *	14 *	1	1	1.000	1.000	70.0	0	0	58.62						13
14 *	14 *	15 *	1	1	1.000	1.000	70.0	0	0	58.62						14
15 *	15 *	16 *	1	1	1.000	1.000	70.0	0	0	58.62						15
16 *	16 *	17 *	1	1	1.000	1.000	70.0	0	0	58.57						16
17 *	17 *	18 *	1	1	1.000	1.000	70.0	0	0	58.63						17
18 *	18 *	19 *	1	1	1.000	1.000	70.0	0	0	58.63						18
19 *	19 *	20 *	1	1	1.000	1.000	70.0	0	0	58.63						19
20 *	20 *	21 *	1	1	1.000	1.000	70.0	0	0	58.63						20
21 *	21 *	22 *	1	1	1.000	1.000	70.0	0	0	58.62						21
22 *	22 *	23 *	1	1	1.000	1.000	70.0	0	0	58.62						22
23 *	23 *	24 *	1	1	1.000	1.000	70.0	0	0	58.62						23
24 *	24 *	25 *	1	1	1.000	1.000	70.0	0	0	58.62						24
25 *	25 *	26 *	1	1	1.000	1.000	70.0	0	0	58.63						25
26 *	26 *	27 *	1	1	1.000	1.000	70.0	0	0	58.63						26
27 *	27 *	28 *	1	1	1.000	1.000	70.0	0	0	58.63						27
28 *	28 *	29 *	1	1	1.000	1.000	70.0	0	0	58.63						28
29 *	29 *	30 *	1	1	1.000	1.000	70.0	0	0	58.63						29
30 *	30 *	31 *	1	1	1.000	1.000	70.0	0	0	58.63						30
31 *	31 *	32 *	1	1	1.000	1.000	70.0	0	0	58.62						31
32 *	32 *	33 *	1	1	1.000	1.000	70.0	0	0	58.62						32
33 *	33 *	34 *	1	1	1.000	1.000	70.0	0	0	58.62						33
34 *	34 *	35 *	1	1	1.000	1.000	70.0	0	0	58.32						34
35 *	35 *	36 *	1	1	1.265	1.265	70.0	0	0	200.18	150.000	487.06	1013.20	-485.20	76.463	35
36 *	36 *	37 *	1	1	1.000	1.000	70.0	0	0	31.45						36
37 *	37 *	38 *	1	1	1.000	1.000	70.0	0	0	88.00						37
38 *	38 *	39 *	1	1	1.000	1.000	70.0	0	0	43.00						38
39 *	39 *	40 *	2	2	2.950	2.950	70.0	0	0	70.69	45.000	179.16	1013.20	-379.19	90.000	39
40 *	40 *	41 *	2	2	1.000	1.000	70.0	0	0	.02						40

MEMBER LENGTH - DIRECTION INFORMATION

MEMBER NAME	I NODE NAME	J NODE NAME	***DELTA MEMBER LENGTHS*** X	Y	Z	CROSS SECTION DESCRIPTION
1 *	1 *	2 *	0.00	0.00	-1.20	
2 *	2 *	3 *	0.00	45.00	-45.00	
3 *	3 *	4 *	0.00	39.00	0.00	
4 *	4 *	5 *	0.00	84.00	0.00	
5 *	5 *	6 *	0.00	84.00	0.00	
6 *	6 *	7 *	0.00	66.60	0.00	
7 *	7 *	8 *	0.00	66.60	0.00	
8 *	8 *	9 *	0.00	48.00	0.00	
9 *	9 *	10 *	0.00	48.00	0.00	
10 *	10 *	11 *	0.00	3.00	0.00	
11 *	11 *	12 *	43.86	45.00	-10.08	
12 *	12 *	13 *	4.07	0.00	-.94	
13 *	13 *	14 *	55.91	0.00	-17.63	
14 *	14 *	15 *	54.16	0.00	-22.44	
15 *	15 *	16 *	52.00	0.00	-27.07	
16 *	16 *	17 *	49.44	0.00	-31.40	
17 *	17 *	18 *	46.51	0.00	-35.69	
18 *	18 *	19 *	43.22	0.00	-39.61	
19 *	19 *	20 *	39.61	0.00	-43.22	
20 *	20 *	21 *	35.69	0.00	-46.51	
21 *	21 *	22 *	31.50	0.00	-49.44	
22 *	22 *	23 *	27.07	0.00	-52.00	
23 *	23 *	24 *	22.44	0.00	-54.16	
24 *	24 *	25 *	17.63	0.00	-55.91	
25 *	25 *	26 *	12.68	0.00	-57.24	
26 *	26 *	27 *	7.66	0.00	-58.13	
27 *	27 *	28 *	2.56	0.00	-58.57	
28 *	28 *	29 *	-2.56	0.00	-58.57	
29 *	29 *	30 *	-7.66	0.00	-58.13	
30 *	30 *	31 *	-12.68	0.00	-57.24	
31 *	31 *	32 *	-17.63	0.00	-55.91	
32 *	32 *	33 *	-22.44	0.00	-54.16	
33 *	33 *	34 *	-27.07	0.00	-52.00	
34 *	34 *	35 *	-31.36	0.00	-49.17	
35 *	35 *	36 *	-175.28	0.00	-61.17	
36 *	36 *	37 *	-29.74	0.00	10.24	
37 *	37 *	38 *	-83.21	0.00	28.66	
38 *	38 *	39 *	-40.66	0.00	14.00	
39 *	39 *	40 *	-42.55	-45.00	14.65	
40 *	40 *	41 *	0.00	-.02	0.00	

F R E Q U E N C Y A N A L Y S I S

OVERALL PROBLEM SIZE

TOTAL NUMBER OF EQUATIONS.....	246
HALF BANDWIDTH OF STIFFNESS.....	12
NUMBER OF EQUATION BLOCKS.....	2
NUMBER OF EQUATIONS PER BLOCK.....	124
NUMBER OF MODES REQUIRED.(EST.).....	31
CUT-OFF FREQUENCY.....	100.00
TOTAL MODES TO CUT-OFF FREQUENCY.....	31
NODAL WT./GEN. MASS PRINT CODE (MWPRNT).....	0

PRINT NODAL WT. SUMMARY AND GEN. MASS = 0
SUPPRESS GEN. MASS PRINT = 1
SUPPRESS NODAL WT. SUMMARY PRINT = 2
SUPPRESS BOTH OF ABOVE PRINTS = 3

THE OUT OF CORE SUBSPACE ITERATION ALGORITHM WITH A MAXIMUM ALLOWABLE NUMBER OF ITERATIONS PER GROUP OF 16 IS CHOSEN.
SUBSPACE ITERATION WAS USER REQUESTED.
AN IN CORE SOLUTION WOULD REQUIRE A VALUE OF ABOUT 12470 FOR *MTOT*.

STORAGE ESTIMATES

THE FOLLOWING CONTROL PARAMETERS ARE EITHER USER SUPPLIED OR INTERNALLY ESTIMATED ARE USED TO CALCULATE ESTIMATES OF THE MINIMUM VALUE OF *MTOT*, THE PROGRAM STORAGE PARAMETER, AND THE CORRESPONDING CORE FIELD LENGTH SPECIFICATION REQUIRED FOR THE USERS JOB CARD...

NUMBER OF NODAL POINTS (NUMNP).....	41
NUMBER OF DYNAMIC NODAL RESTRAINTS (NODREA)....	0
NUMBER OF NON-GLOBAL NODES (NNG).....	2
NUMBER OF MODES (NM).....	31
NUMBER OF EQUATIONS PER BLOCK (NEQB).....	124
NUMBER OF SPECTRAL CURVES INPUT (NSC).....	3
NUMBER OF MODAL TIME STEPS (NT).....	100
NUMBER OF FORCING FUNCTIONS (NFN).....	3

EMPLOYING THE ABOVE PARAMETERS,THE FOLLOWING VALUES FOR MTOT AND CORE ARE ESTIMATED...

	MTOT (DECIMAL)	CORE (OCTAL)
RESPONSE SPECTRUM ANALYSIS.....	3223	006227
TIME HISTORY MODAL.....	5642	013012
STRUCTURAL PLOTTING.....	4600	010770
CREATE OR READ RESTART TAPE.....	1227	002313

N O D A L W E I G H T S U M M A R Y

NODE NAME	RESTRAINT CODE	X TRANSLATION	Y TRANSLATION	Z TRANSLATION
1 *	000000	0.000	0.000	0.000
2 *	000000	0.000	0.000	0.000
3 *	000000	0.000	0.000	0.000
4 *	000000	3835.020	3835.020	3835.020
5 *	000000	2107.039	2107.039	2107.039
6 *	000000	1888.723	1888.723	1888.723
7 *	000000	2275.123	2275.123	2275.123
8 *	000000	0.000	0.000	0.000
9 *	000000	2076.127	2076.127	2076.127
10 *	000000	0.000	0.000	0.000
11 *	000000	1526.280	1526.280	1526.280
12 *	000000	938.952	938.952	938.952
13 *	000000	1522.802	1522.802	1522.802
14 *	000000	0.000	0.000	0.000
15 *	000000	2940.195	2940.195	2940.195
16 *	000000	0.000	0.000	0.000
17 *	000000	2940.195	2940.195	2940.195
18 *	000000	0.000	0.000	0.000
19 *	000000	2941.277	2941.277	2941.277
20 *	000000	0.000	0.000	0.000
21 *	000000	2940.890	2940.890	2940.890
22 *	000000	0.000	0.000	0.000
23 *	000000	2940.890	2940.890	2940.890
24 *	000000	0.000	0.000	0.000
25 *	000000	2940.890	2940.890	2940.890
26 *	000000	0.000	0.000	0.000
27 *	000000	2940.890	2940.890	2940.890
28 *	000000	0.000	0.000	0.000
29 *	000000	2940.890	2940.890	2940.890
30 *	000000	0.000	0.000	0.000
31 *	000000	2940.890	2940.890	2940.890
32 *	000000	0.000	0.000	0.000
33 *	000000	2937.026	2937.026	2937.026
34 *	000000	0.000	0.000	0.000
35 *	000000	3977.215	3977.215	3977.215
36 *	000000	2904.955	2904.955	2904.955
37 *	000000	1498.073	1498.073	1498.073
38 *	000000	4068.019	4068.019	4068.019
39 *	000000	0.000	0.000	0.000
40 *	000000	0.000	0.000	0.000
41 *	000000	0.000	0.000	0.000

F R E Q U E N C Y D I S T R I B U T I O N B Y G R O U P

SUBSPACE GROUP	NO. MODES IN GROUP	LOWER BOUND HERTZ	LOWER BOUND EIGENVALUE	UPPER BOUND HERTZ	UPPER BOUND EIGENVALUE
1	2	6.250	.1542E+04	12.500	.6169E+04
2	4	12.500	.6169E+04	17.678	.1234E+05
3	3	17.678	.1234E+05	25.000	.2467E+05
4	4	25.000	.2467E+05	35.355	.4935E+05
5	3	35.355	.4935E+05	43.301	.7402E+05
6	2	43.301	.7402E+05	50.000	.9870E+05
7	4	50.000	.9870E+05	61.237	.1480E+06
8	2	61.237	.1480E+06	70.711	.1974E+06
9	4	70.711	.1974E+06	86.603	.2961E+06
10	3	86.603	.2961E+06	100.000	.3948E+06

F R E Q U E N C Y A N D C O N V E R G E N C E D A T A - S U B S P A C E I T E R A T I O N

GROUP	NO. MODES	ITERA-TIONS	SHIFT EIGENVALUE	MODE	CIRCULAR FREQUENCY (RAD/SEC)	FREQUENCY (HZ)	PERIOD (SEC)	FREQUENCY TOLERANCE	MODE TOLERANCE	//K*U// 2	//K*U-EIG *M*U// MAX	K*U OF MAX NORM
1	2	6	.385531E+04	1	40.1577	6.3913	.1565	.3246E-08	.1616E-04	.4735E+04	.3043E-01	-.1371E+01
				2	62.7902	9.9934	.1001	0.	.2613E-09	.1105E+05	.1647E-05	-.1647E-05
2	4	4	.925275E+04	3	83.4070	13.2746	.0753	.1506E-12	.5895E-07	.1750E+05	.4911E-03	-.1211E+04
				4	91.0118	14.4850	.0690	.4779E-12	.4843E-07	.2064E+05	.4700E-03	-.8583E+03
				5	96.3036	15.3272	.0652	0.	.1064E-09	.2462E+05	.1275E-05	-.1275E-05
				6	109.9549	17.4999	.0571	.5956E-08	.1097E-04	.3237E+05	.1651E+00	-.4898E+04
3	3	2	.185055E+05	7	119.9495	19.0906	.0524	.3135E-09	.1919E-05	.3951E+05	.4187E-01	-.4029E+03
				8	123.3003	19.6239	.0510	.9847E-11	.3073E-06	.4323E+05	.5993E-02	-.1169E+03
				9	134.6909	21.4367	.0466	.3020E-08	.4397E-06	.4853E+05	.1276E-01	-.3477E+04
4	4	4	.370110E+05	10	180.3841	28.7090	.0348	.8494E-09	.3210E-05	.9329E+05	.1585E+00	-.1977E+04
				11	187.6699	29.8686	.0335	.8376E-11	.1134E-06	.9369E+05	.4116E-02	-.1882E+04
				12	197.8314	31.4858	.0318	.5144E-10	.3329E-06	.1011E+06	.1610E-01	.1706E+04
				13	201.1307	32.0109	.0312	.1509E-08	.2369E-05	.1048E+06	.1382E+00	-.2237E+05
5	3	4	.616850E+05	14	228.5078	36.3681	.0275	.1088E-10	.5344E-06	.1423E+06	.2567E-01	-.3828E+05
				15	257.4953	40.9817	.0244	.6696E-09	.1608E-05	.1880E+06	.1063E+00	.5545E+05
				16	259.9282	41.3689	.0242	.3155E-10	.4589E-06	.1873E+06	.3247E-01	.5981E+04
6	2	4	.863590E+05	17	297.7860	47.3941	.0211	.9977E-13	.6727E-08	.2506E+06	.7914E-03	-.2870E+04
				18	312.6944	49.7669	.0201	.1236E-07	.1147E-04	.2654E+06	.1407E+01	.3006E+05
7	4	3	.123370E+06	19	314.9452	50.1251	.0200	.2817E-12	.6157E-07	.2719E+06	.6463E-02	.3054E+05
				20	332.5716	52.9304	.0189	.9852E-12	.5133E-07	.2925E+06	.6836E-02	-.1291E+06
				21	357.5093	56.8994	.0176	.2343E-10	.1221E-06	.3614E+06	.1698E-01	-.1005E+05
				22	367.6187	58.5083	.0171	.2129E-07	.9481E-05	.3772E+06	.1376E+01	.7265E+05
8	2	4	.172718E+06	23	423.9102	67.4674	.0148	.7204E-12	.3682E-07	.4923E+06	.7884E-02	.2722E+05
				24	442.7192	70.4609	.0142	.2984E-07	.2405E-04	.5291E+06	.5498E+01	-.1721E+05
9	4	6	.246740E+06	25	473.7997	75.4076	.0133	.2489E-13	.1076E-07	.6059E+06	.1831E-02	-.4369E+04
				26	497.5207	79.1829	.0126	0.	.4139E-10	.6623E+06	.1544E-04	.1544E-04
				27	507.3144	80.7416	.0124	.1809E-13	.1150E-08	.6827E+06	.2263E-03	-.4644E+05
				28	541.0007	86.1029	.0116	.6770E-07	.5248E-04	.7685E+06	.1192E+02	-.3471E+05
10	3	6	.345436E+06	29	554.6855	88.2809	.0113	.6054E-13	.3683E-07	.8973E+06	.1403E-01	-.3761E+05
				30	582.6791	92.7363	.0108	0.	.7663E-11	.9446E+06	.4295E-05	.4295E-05
				31	624.2899	99.3588	.0101	.7831E-07	.3915E-04	.1073E+07	.1706E+02	.4696E+05

G E N E R A L I Z E D M A S S M A T R I X

	1	2	3	4	5	6	7	8	9	10
1	1.00000	.00000	-.00000	.00000	-.00000	.00000	.00000	-.00000	-.00000	-.00000
2	.00000	1.00000	-.00000	-.00000	-.00000	-.00000	.00000	-.00000	-.00000	.00000
3	-.00000	-.00000	1.00000	.00000	.00000	-.00000	.00000	-.00000	.00000	.00000
4	.00000	-.00000	.00000	1.00000	-.00000	-.00000	-.00000	.00000	-.00000	-.00000
5	-.00000	-.00000	.00000	-.00000	1.00000	-.00000	-.00000	.00000	-.00000	-.00000
6	.00000	-.00000	-.00000	-.00000	-.00000	1.00000	.00000	-.00000	.00000	.00000
7	.00000	.00000	.00000	-.00000	-.00000	.00000	1.00000	.00000	-.00000	-.00000
8	-.00000	-.00000	-.00000	.00000	.00000	-.00000	.00000	1.00000	-.00000	.00000
9	-.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000	1.00000	-.00000
10	-.00000	.00000	.00000	-.00000	-.00000	.00000	-.00000	.00000	-.00000	1.00000
11	-.00000	.00000	-.00000	.00000	.00000	-.00000	.00000	-.00000	.00000	.00000
12	-.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000	.00000	.00000	-.00000
13	.00000	-.00000	-.00000	.00000	-.00000	-.00000	-.00000	.00000	.00000	-.00000
14	.00000	-.00000	.00000	-.00000	.00000	.00000	-.00000	.00000	-.00000	-.00000
15	.00000	.00000	.00000	-.00000	-.00000	.00000	-.00000	.00000	-.00000	.00000
16	-.00000	.00000	-.00000	.00000	.00000	-.00000	.00000	-.00000	-.00000	.00000
17	-.00000	.00000	.00000	-.00000	-.00000	.00000	.00000	-.00000	.00000	.00000
18	.00000	-.00000	.00000	-.00000	.00000	.00000	.00000	-.00000	-.00000	.00000
19	-.00000	-.00000	.00000	-.00000	.00000	.00000	.00000	-.00000	-.00000	-.00000
20	.00000	-.00000	.00000	-.00000	.00000	.00000	.00000	-.00000	.00000	.00000
21	.00000	-.00000	-.00000	.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000
22	-.00000	.00000	.00000	-.00000	-.00000	.00000	.00000	-.00000	.00000	-.00000
23	.00000	-.00000	-.00000	.00000	-.00000	-.00000	-.00000	.00000	-.00000	.00000
24	.00000	.00000	-.00000	.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000
25	-.00000	-.00000	-.00000	.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000
26	-.00000	-.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000	.00000	.00000
27	-.00000	-.00000	.00000	-.00000	.00000	.00000	.00000	-.00000	.00000	-.00000
28	-.00000	.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000	-.00000
29	.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000	.00000	-.00000	-.00000
30	.00000	-.00000	.00000	-.00000	-.00000	.00000	.00000	-.00000	.00000	.00000
31	-.00000	-.00000	-.00000	.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000

G E N E R A L I Z E D M A S S M A T R I X (CONTINUED)

	11	12	13	14	15	16	17	18	19	20
1	-.00000	-.00000	.00000	.00000	.00000	-.00000	-.00000	.00000	-.00000	.00000
2	.00000	-.00000	-.00000	-.00000	.00000	.00000	.00000	-.00000	-.00000	-.00000
3	-.00000	.00000	-.00000	.00000	.00000	-.00000	.00000	.00000	.00000	.00000
4	.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000	-.00000	-.00000
5	.00000	-.00000	-.00000	.00000	-.00000	.00000	-.00000	.00000	.00000	.00000
6	-.00000	.00000	-.00000	.00000	.00000	-.00000	.00000	.00000	.00000	.00000
7	.00000	-.00000	-.00000	-.00000	-.00000	.00000	.00000	.00000	.00000	.00000
8	-.00000	.00000	.00000	.00000	.00000	-.00000	-.00000	-.00000	-.00000	-.00000
9	.00000	.00000	.00000	-.00000	-.00000	-.00000	.00000	-.00000	-.00000	.00000
10	.00000	-.00000	-.00000	-.00000	.00000	.00000	.00000	.00000	-.00000	.00000
11	1.00000	.00000	.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	-.00000
12	.00000	1.00000	.00000	.00000	-.00000	.00000	-.00000	-.00000	.00000	.00000
13	.00000	.00000	1.00000	.00000	-.00000	.00000	-.00000	.00000	-.00000	.00000
14	.00000	.00000	.00000	1.00000	.00000	-.00000	.00000	-.00000	.00000	.00000
15	-.00000	-.00000	-.00000	.00000	1.00000	.00000	-.00000	.00000	-.00000	-.00000
16	-.00000	.00000	.00000	-.00000	.00000	1.00000	.00000	-.00000	.00000	.00000
17	-.00000	-.00000	-.00000	.00000	-.00000	.00000	1.00000	.00000	.00000	-.00000
18	-.00000	-.00000	.00000	-.00000	.00000	-.00000	.00000	1.00000	.00000	.00000
19	.00000	.00000	-.00000	.00000	-.00000	.00000	.00000	.00000	1.00000	-.00000
20	-.00000	.00000	.00000	.00000	-.00000	.00000	-.00000	.00000	-.00000	1.00000
21	.00000	.00000	.00000	-.00000	.00000	-.00000	.00000	-.00000	-.00000	.00000
22	.00000	-.00000	-.00000	-.00000	.00000	-.00000	.00000	-.00000	-.00000	.00000
23	-.00000	.00000	.00000	.00000	-.00000	.00000	.00000	-.00001	-.00000	-.00000
24	.00000	.00000	-.00000	.00000	-.00000	-.00000	-.00000	.00001	.00000	.00000
25	.00000	.00000	.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000
26	.00000	-.00000	-.00000	.00000	-.00000	-.00000	-.00000	.00000	-.00000	-.00000
27	.00000	-.00000	-.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000
28	.00000	-.00000	-.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000
29	-.00000	.00000	.00000	-.00000	.00000	.00000	-.00000	.00000	.00000	.00000
30	-.00000	.00000	.00000	-.00000	.00000	.00000	-.00000	.00000	.00000	.00000
31	.00000	-.00000	-.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000

G E N E R A L I Z E D M A S S · M A T R I X (CONTINUED)

	21	22	23	24	25	26	27	28	29	30
1	.00000	-.00000	.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	.00000
2	-.00000	.00000	-.00000	.00000	-.00000	-.00000	-.00000	.00000	-.00000	-.00000
3	-.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	-.00000	.00000	.00000
4	.00000	-.00000	.00000	.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000
5	.00000	-.00000	-.00000	.00000	.00000	-.00000	.00000	-.00000	-.00000	-.00000
6	-.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	-.00000	.00000	.00000
7	-.00000	.00000	-.00000	-.00000	-.00000	.00000	.00000	.00000	-.00000	.00000
8	.00000	-.00000	.00000	.00000	.00000	-.00000	-.00000	-.00000	.00000	-.00000
9	-.00000	.00000	-.00000	-.00000	-.00000	.00000	.00000	-.00000	-.00000	.00000
10	-.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000	-.00000	.00000
11	.00000	.00000	-.00000	.00000	.00000	.00000	.00000	.00000	-.00000	-.00000
12	.00000	-.00000	.00000	.00000	.00000	-.00000	-.00000	-.00000	.00000	.00000
13	.00000	-.00000	.00000	-.00000	.00000	-.00000	-.00000	-.00000	.00000	.00000
14	-.00000	-.00000	.00000	.00000	-.00000	.00000	-.00000	-.00000	-.00000	-.00000
15	.00000	.00000	-.00000	-.00000	.00000	-.00000	.00000	.00000	.00000	-.00000
16	-.00000	-.00000	.00000	-.00000	-.00000	-.00000	-.00000	-.00000	.00000	.00000
17	.00000	.00000	.00000	-.00000	-.00000	-.00000	-.00000	-.00000	-.00000	-.00000
18	-.00000	-.00000	-.00001	.00001	.00000	.00000	.00000	.00000	.00000	.00000
19	-.00000	-.00000	-.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	-.00000
20	.00000	.00000	-.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	.00000
21	1.00000	-.00000	-.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	.00000
22	-.00000	1.00000	-.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	.00000
23	-.00000	-.00000	1.00000	-.00000	-.00000	-.00000	-.00000	.00000	-.00000	.00000
24	.00000	.00000	-.00000	1.00000	.00000	.00001	.00000	-.00001	.00003	-.00001
25	-.00000	-.00000	-.00000	.00000	1.00000	-.00000	-.00000	.00000	-.00000	.00000
26	-.00000	-.00000	-.00000	.00001	-.00000	1.00000	.00000	.00000	-.00000	.00000
27	-.00000	-.00000	-.00000	.00000	-.00000	.00000	1.00000	.00000	-.00000	.00000
28	-.00000	-.00000	.00000	-.00001	.00000	.00000	.00000	1.00000	.00000	-.00000
29	.00000	.00000	-.00000	.00003	-.00000	-.00000	-.00000	.00000	1.00000	-.00000
30	.00000	.00000	.00000	-.00001	.00000	.00000	.00000	-.00000	-.00000	1.00000
31	-.00000	-.00000	-.00000	.00000	-.00000	.00000	-.00000	.00008	.00000	-.00000

G E N E R A L I Z E D M A S S M A T R I X (CONTINUED)

	31
1	-.00000
2	-.00000
3	-.00000
4	.00000
5	.00000
6	-.00000
7	-.00000
8	.00000
9	-.00000
10	-.00000
11	.00000
12	-.00000
13	-.00000
14	-.00000
15	.00000
16	-.00000
17	-.00000
18	.00000
19	-.00000
20	-.00000
21	-.00000
22	-.00000
23	-.00000
24	.00000
25	-.00000
26	.00000
27	-.00000
28	.00008
29	.00000
30	-.00000
31	1.00000

MAXIMUM VALUE OF OFF DIAGONAL TERMS = .770E-04
MODE SHAPE NUMBER.. 31
ROW NUMBER..... 28

MAXIMUM ABSOLUTE DIFFERANCE BETWEEN DIAGONAL AND 1 = .71054E-13
MODE SHAPE NUMBER.. 14

F R E Q U E N C Y E R R O R E S T I M A T E S U M M A R Y - S U B S P A C E I T E R A T I O N

CONDITIONING NUMBER = .2756E+06

SUMMARY OF WARNINGS

-NONE-

S P E C T R A L C U R V E D A T A

IDENT NUMBER 1
CURVE TITLE .....
CURVE TYPE ..... PERIOD VS. ACCELERATION
CURVE SCALE ..... LINEAR
NUMBER OF POINTS .. 6

POINT	PERIOD (SECS)	ACCELERATION (G)	***** COMMENT ******
1	0.0000	.1040	
2	.1249	.2100	
3	.1250	1.6799	
4	.6990	1.6799	
5	.9000	.3499	
6	2.0000	.0700	

S P E C T R A L C U R V E D A T A (CONTINUED)

IDENT NUMBER 2
CURVE TITLE .....
CURVE TYPE ..... PERIOD VS. ACCELERATION
CURVE SCALE ..... LINEAR
NUMBER OF POINTS .. 6

POINT	PERIOD (SECS)	ACCELERATION (G)	****** COMMENT ******
1	0.0000	.1900	
2	.2100	.1900	
3	.2100	3.0797	
4	.6400	3.0797	
5	.6400	.3701	
6	2.0000	.2800	

S P E C T R A L C U R V E D A T A (CONTINUED)

IDENT NUMBER 3
CURVE TITLE .....
CURVE TYPE ..... PERIOD VS. ACCELERATION
CURVE SCALE ..... LINEAR
NUMBER OF POINTS .. 6

POINT	PERIOD (SECS)	ACCELERATION (G)	***** COMMENT ******
1	0.0000	.1040	
2	.1249	.2100	
3	.1250	1.6799	
4	.8990	1.6799	
5	.9000	.3499	
6	2.0000	.0700	

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

MODE NUMBER	PARTICIPATION FACTORS X DIR	Y DIR	Z DIR
1	-.609	5.977	.123
2	5.761	.200	2.996
3	.560	3.153	1.950
4	2.036	.100	-3.541
5	-3.312	.001	-7.388
6	-4.789	3.025	2.999
7	3.712	.129	3.636
8	-1.373	-.020	.348
9	5.872	1.796	-4.261
10	-.559	.429	2.992
11	.157	6.778	-.890
12	.951	.899	1.068
13	1.045	-.137	1.526
14	-1.943	-.112	1.564
15	-3.199	1.092	1.981
16	.002	.615	-.003
17	.743	1.711	-1.778
18	1.393	4.444	.383
19	-1.404	2.162	-.158
20	-.002	.513	-1.092
21	-.863	2.135	-.352
22	.173	-2.132	-.091
23	-.617	.795	-1.389
24	.504	.302	-.066
25	-.489	-.101	.277
26	-.870	-1.095	.892
27	.951	.114	.646
28	.716	-.217	.914
29	1.405	1.393	-.697
30	.406	.343	-.221
31	.793	.162	-.029

R E S P O N S E S P E C T R U M A N A L Y S I S

TITLE.....	
FILE LABEL.....	
SPECTRAL CURVES	
X-DIRECTION.....	1
Y-DIRECTION.....	2
Z-DIRECTION.....	3
CURVE SCALE FACTORS	
X-SCALE.....	1.000
Y-SCALE.....	1.000
Z-SCALE.....	1.000
SPECTRA COMBINATION CODE...	VECTORIAL SUM
MODE COMBINATION CODE.....	VECTORIAL SUM
NODAL PRINT THRESHOLD (G)	
VERTICAL ACCELERATION....	0
HORIZONTAL ACCELERATION..	0
SAVE RESULTS PARAMETER.....	0

APPLIED SPECTRAL ACCELERATION SUMMARY

FREQUENCY NUMBER	PERIOD (SEC)	ZONE NUMBER	SPECTRAL ACCELERATIONS (G) X TRANS	Y TRANS	Z TRANS	XX ROT	YY ROT	ZZ ROT
1	.156	1	1.680	.190	1.680			
2	.100	1	.189	.190	.189			
3	.075	1	.168	.190	.168			
4	.069	1	.163	.190	.163			
5	.065	1	.159	.190	.159			
6	.057	1	.152	.190	.152			
7	.052	1	.148	.190	.148			
8	.051	1	.147	.190	.147			
9	.047	1	.144	.190	.144			
10	.035	1	.134	.190	.134			
11	.033	1	.132	.190	.132			
12	.032	1	.131	.190	.131			
13	.031	1	.131	.190	.131			
14	.027	1	.127	.190	.127			
15	.024	1	.125	.190	.125			
16	.024	1	.125	.190	.125			
17	.021	1	.122	.190	.122			
18	.020	1	.121	.190	.121			
19	.020	1	.121	.190	.121			
20	.019	1	.120	.190	.120			
21	.018	1	.119	.190	.119			

APPLIED SPECTRAL ACCELERATION SUMMARY(CONTINUED)

FREQUENCY NUMBER	PERIOD (SEC)	ZONE NUMBER	SPECTRAL ACCELERATIONS (G) X TRANS	Y TRANS	Z TRANS	XX ROT	YY ROT	ZZ ROT
22	.017	1	.119	.190	.119			
23	.015	1	.117	.190	.117			
24	.014	1	.116	.190	.116			
25	.013	1	.115	.190	.115			
26	.013	1	.115	.190	.115			
27	.012	1	.115	.190	.115			
28	.012	1	.114	.190	.114			
29	.011	1	.114	.190	.114			
30	.011	1	.113	.190	.113			
31	.010	1	.113	.190	.113			

N O D A L A C C E L E R A T I O N S

NODE NAME	****** ACCELERATIONS ******* X-GLOBAL (G)	Y-GLOBAL (G)	Z-GLOBAL (G)	******* THRESHOLD ACCELERATIONS ******* VERTICAL (G)	EXCEED	HORIZONTAL (G)	EXCEED	
1 *	.000	.000	.000	.000	YES	.000	YES	GLOBAL
2 *	.000	.001	.000	.001	YES	.000	YES	GLOBAL
3 *	.080	.097	.086	.097	YES	.118	YES	GLOBAL
4 *	.119	.100	.117	.100	YES	.167	YES	GLOBAL
5 *	.187	.105	.171	.105	YES	.254	YES	GLOBAL
6 *	.212	.109	.199	.109	YES	.291	YES	GLOBAL
7 *	.189	.112	.202	.112	YES	.277	YES	GLOBAL
8 *	.142	.113	.174	.113	YES	.225	YES	GLOBAL
9 *	.109	.115	.146	.115	YES	.162	YES	GLOBAL
10 *	.099	.116	.117	.116	YES	.153	YES	GLOBAL
11 *	.100	.116	.117	.116	YES	.154	YES	GLOBAL
12 *	.153	.139	.162	.139	YES	.222	YES	GLOBAL
13 *	.153	.142	.161	.142	YES	.223	YES	GLOBAL
14 *	.164	.194	.180	.194	YES	.244	YES	GLOBAL
15 *	.181	.241	.222	.241	YES	.286	YES	GLOBAL
16 *	.190	.249	.235	.249	YES	.302	YES	GLOBAL
17 *	.189	.235	.221	.235	YES	.291	YES	GLOBAL
18 *	.176	.193	.188	.193	YES	.258	YES	GLOBAL
19 *	.164	.129	.158	.129	YES	.228	YES	GLOBAL
20 *	.157	.073	.135	.073	YES	.207	YES	GLOBAL
21 *	.167	.172	.128	.172	YES	.210	YES	GLOBAL
22 *	.172	.268	.121	.268	YES	.210	YES	GLOBAL
23 *	.178	.312	.118	.312	YES	.214	YES	GLOBAL
24 *	.169	.269	.114	.269	YES	.204	YES	GLOBAL
25 *	.147	.175	.109	.175	YES	.183	YES	GLOBAL
26 *	.126	.096	.104	.096	YES	.163	YES	GLOBAL
27 *	.160	.167	.102	.167	YES	.189	YES	GLOBAL
28 *	.197	.199	.102	.199	YES	.222	YES	GLOBAL
29 *	.231	.174	.103	.174	YES	.253	YES	GLOBAL
30 *	.246	.106	.103	.106	YES	.267	YES	GLOBAL
31 *	.252	.136	.101	.136	YES	.272	YES	GLOBAL
32 *	.240	.175	.095	.175	YES	.258	YES	GLOBAL
33 *	.216	.214	.088	.214	YES	.233	YES	GLOBAL
34 *	.076	.263	.160					NON-GLOBAL
35 *	.152	.336	.107	.336	YES	.186	YES	GLOBAL
36 *	.182	.300	.186	.300	YES	.212	YES	GLOBAL
37 *	.102	.249	.167	.249	YES	.195	YES	GLOBAL
38 *	.101	.140	.123	.140	YES	.160	YES	GLOBAL
39 *	.095	.082	.093	.082	YES	.133	YES	GLOBAL
40 *	.000	.000	.000	.000	YES	.000	YES	GLOBAL
41 *	.000	.000	.000					NON-GLOBAL

NODAL DISPLACEMENTS

NODE NAME	NODAL TRANSLATIONS X	Y	Z	NODAL ROTATIONS XX	YY	ZZ	COORDINATE SYSTEM
1 *	.0000	.0000	.0000	.000000	.000000	.000000	GLOBAL
2 *	.0000	.0000	.0000	.000000	.000000	.000000	GLOBAL
3 *	.0028	.0019	.0024	.000052	.000051	.000047	GLOBAL
4 *	.0047	.0019	.0043	.000049	.000051	.000045	GLOBAL
5 *	.0079	.0019	.0076	.000030	.000050	.000027	GLOBAL
6 *	.0090	.0020	.0088	.000009	.000051	.000005	GLOBAL
7 *	.0080	.0020	.0079	.000025	.000052	.000026	GLOBAL
8 *	.0057	.0020	.0056	.000042	.000053	.000042	GLOBAL
9 *	.0037	.0020	.0033	.000049	.000055	.000047	GLOBAL
10 *	.0025	.0021	.0013	.000051	.000056	.000048	GLOBAL
11 *	.0025	.0021	.0012	.000051	.000057	.000048	GLOBAL
12 *	.0046	.0034	.0044	.000045	.000050	.000054	GLOBAL
13 *	.0046	.0035	.0045	.000044	.000050	.000054	GLOBAL
14 *	.0052	.0059	.0069	.000042	.000041	.000049	GLOBAL
15 *	.0059	.0076	.0086	.000042	.000025	.000037	GLOBAL
16 *	.0062	.0082	.0092	.000044	.000011	.000024	GLOBAL
17 *	.0061	.0075	.0088	.000047	.000021	.000016	GLOBAL
18 *	.0053	.0056	.0076	.000050	.000036	.000021	GLOBAL
19 *	.0044	.0031	.0060	.000048	.000043	.000026	GLOBAL
20 *	.0039	.0008	.0046	.000041	.000041	.000027	GLOBAL
21 *	.0044	.0023	.0039	.000031	.000031	.000025	GLOBAL
22 *	.0050	.0037	.0036	.000019	.000020	.000023	GLOBAL
23 *	.0052	.0043	.0034	.000012	.000015	.000023	GLOBAL
24 *	.0046	.0036	.0033	.000019	.000028	.000028	GLOBAL
25 *	.0037	.0021	.0032	.000027	.000047	.000035	GLOBAL
26 *	.0048	.0013	.0033	.000032	.000069	.000043	GLOBAL
27 *	.0089	.0034	.0035	.000029	.000084	.000051	GLOBAL
28 *	.0139	.0048	.0036	.000002	.000083	.000056	GLOBAL
29 *	.0183	.0036	.0036	.000052	.000066	.000060	GLOBAL
30 *	.0214	.0020	.0033	.000132	.000041	.000065	GLOBAL
31 *	.0227	.0130	.0031	.000212	.000018	.000067	GLOBAL
32 *	.0220	.0278	.0029	.000268	.000035	.000060	GLOBAL
33 *	.0196	.0448	.0031	.000302	.000062	.000045	GLOBAL
34 *	.0015	.0620	.0166	.000101	.000082	.000303	NON-GLOBAL
35 *	.0122	.0779	.0073	.000320	.000092	.000022	GLOBAL
36 *	.0079	.0689	.0145	.000240	.000052	.000278	GLOBAL
37 *	.0074	.0580	.0129	.000232	.000063	.000293	GLOBAL
38 *	.0060	.0262	.0076	.000205	.000078	.000311	GLOBAL
39 *	.0056	.0109	.0052	.000187	.000076	.000305	GLOBAL
40 *	.0000	.0000	.0000	.000001	.000001	.000002	GLOBAL
41 *	.0000	.0000	.0000	.000001	.000001	.000002	NON-GLOBAL

P I P E M E M B E R S T R E S S E S

PIPE NAME	PIPE TYPE	NODAL PT NAME-END	SECTION DESCRIP	LOCAL X FORCE	LOCAL Y FORCE	LOCAL Z FORCE	LOCAL X MOMENT	LOCAL Y MOMENT	LOCAL Z MOMENT	BENDING STRESS	INTEN FACTR
1 *		1 -I		837.27	2014.25	984.13	51315.54	39755.14	71991.34	175.72	1.00
1 *		2 -J		837.27	2014.25	984.13	51315.54	38649.32	69853.24	172.03	1.00
2 *	CURV	2 -I		837.27	2014.25	984.13	51315.54	38649.32	69853.24	364.17	2.82
2 *	CURV	-C		1520.36	1564.21	984.13	27317.16	30808.35	22399.71	179.87	2.82
2 *	CURV	3 -J		2014.25	837.27	984.13	15999.44	9638.52	31326.90	139.96	2.82
3 *		3 -I		2014.25	984.13	837.27	15999.44	31326.90	9638.52	66.11	1.00
3 *		4 -J		2014.25	984.13	837.27	15999.44	49455.02	32619.81	111.24	1.00
4 *		4 -I		1670.80	563.60	557.55	15999.44	49455.02	32619.81	111.24	1.00
4 *		5 -J		1670.80	563.60	557.55	15999.44	81178.67	78143.17	206.30	1.00
5 *		5 -I		1481.10	213.58	329.03	15999.44	81178.67	78143.17	206.30	1.00
5 *		6 -J		1481.10	213.58	329.03	15999.44	95135.78	92667.00	242.48	1.00
6 *		6 -I		1312.38	272.33	258.53	15999.44	95135.78	92667.00	242.48	1.00
6 *		7 -J		1312.38	272.33	258.53	15999.44	85619.31	79502.09	213.77	1.00
7 *		7 -I		1120.30	673.26	573.69	15999.44	85619.31	79502.09	213.77	1.00
7 *		8 -J		1120.30	673.26	573.69	15999.44	50236.46	46019.23	126.86	1.00
8 *		8 -I		1120.30	673.26	573.69	15999.44	50236.46	46019.23	126.86	1.00
8 *		9 -J		1120.30	673.26	573.69	15999.44	29489.87	39775.58	94.33	1.00
9 *		9 -I		963.92	863.44	776.37	15999.44	29489.87	39775.58	94.33	1.00
9 *		10 -J		963.92	863.44	776.37	15999.44	29920.32	63227.03	130.07	1.00
10 *		10 -I		963.92	1892.18	774.73	15999.44	29920.32	63227.03	130.07	1.00
10 *		11 -J		963.92	1892.18	774.73	15999.44	27917.45	58724.55	121.38	1.00
11 *	CURV	11 -I		871.38	1723.63	769.25	15999.44	34447.11	55148.47	256.95	2.82
11 *	CURV	-C		1485.73	1229.20	769.25	18076.31	11676.57	26864.79	132.08	2.82
11 *	CURV	12 -J		1723.63	871.38	769.25	18252.79	25822.83	30881.40	169.61	2.82
12 *		12 -I		1599.12	783.54	648.02	18252.79	25822.83	30881.40	80.12	1.00
12 *		13 -J		1599.12	783.54	648.02	18252.79	28217.11	30962.51	82.83	1.00
13 *		13 -I		1382.22	661.42	540.58	17973.10	28217.11	31125.70	82.83	1.00
13 *		14 -J		1382.22	661.42	540.58	17973.10	56255.84	48846.27	138.93	1.00
14 *		14 -I		1352.96	661.42	610.12	15769.42	56255.84	49601.58	138.93	1.00
14 *		15 -J		1352.96	661.42	610.12	15769.42	90503.07	83407.50	224.92	1.00

P I P E M E M B E R S T R E S S E S (CONTINUED)

PIPE NAME		PIPE TYPE	NODAL PT NAME-END	SECTION DESCRIP	LOCAL X FORCE	LOCAL Y FORCE	LOCAL Z FORCE	LOCAL X MOMENT	LOCAL Y MOMENT	LOCAL Z MOMENT	BENDING STRESS	INTEN FACTR
15	*		15 -I		1034.94	273.16	169.31	13466.53	90503.07	83810.13	224.92	1.00
15	*		16 -J		1034.94	273.16	169.31	13466.53	86902.46	81537.10	217.39	1.00
15	*		16 -I		1031.86	273.16	187.13	14205.75	86902.46	81411.56	217.39	1.00
16	*		17 -J		1031.86	273.16	187.13	14205.75	87871.36	82322.00	219.78	1.00
17	*		17 -I		946.81	707.56	671.15	17605.17	87871.36	81662.55	219.78	1.00
17	*		18 -J		946.81	707.56	671.15	17605.17	50252.78	48282.62	130.29	1.00
18	*		18 -I		991.90	707.56	602.50	19695.40	50252.78	47468.36	130.29	1.00
18	*		19 -J		991.90	707.56	602.50	19695.40	22852.57	38217.61	88.26	1.00
19	*		19 -I		1174.01	1000.62	950.66	19380.49	22852.57	38378.46	88.26	1.00
19	*		20 -J		1174.01	1000.62	950.66	19380.49	42040.99	75026.04	159.81	1.00
20	*		20 -I		873.54	967.51	679.94	16092.19	42040.99	75799.42	159.81	1.00
20	*		21 -J		873.54	967.51	679.94	16092.19	51455.35	62276.68	149.31	1.00
21	*		21 -I		847.59	531.75	401.88	12145.86	51455.35	63165.03	149.31	1.00
21	*		22 -J		847.59	531.75	401.88	12145.86	64680.40	69620.95	173.66	1.00
22	*		22 -I		838.70	531.75	420.10	9410.37	64680.40	70043.15	173.66	1.00
22	*		23 -J		838.70	531.75	420.10	9410.37	81839.68	87818.49	218.27	1.00
23	*		23 -I		951.28	606.90	479.64	11208.06	81839.68	87607.20	218.27	1.00
23	*		24 -J		951.28	606.90	479.64	11208.06	82585.71	68127.34	195.13	1.00
24	*		24 -I		927.65	606.90	523.89	16135.25	82585.71	67131.28	195.13	1.00
24	*		25 -J		927.65	606.90	523.89	16135.25	92800.93	63286.20	205.70	1.00
25	*		25 -I		1090.70	1061.88	868.16	21178.75	92800.93	51781.47	205.70	1.00
25	*		26 -J		1090.70	1061.88	868.16	21178.75	115649.63	87554.97	265.73	1.00
26	*		26 -I		986.31	2069.53	1499.95	26028.78	115649.63	86237.54	265.73	1.00
26	*		27 -J		986.31	2069.53	1499.95	26028.78	37017.95	62600.22	140.02	1.00
27	*		27 -I		846.73	1976.46	1142.21	21553.36	37017.95	64278.60	140.02	1.00
27	*		28 -J		846.73	1976.46	1142.21	21553.36	46424.62	167101.72	316.80	1.00
28	*		28 -I		901.97	1976.46	1099.11	8353.26	46424.62	168278.80	316.80	1.00
28	*		29 -J		901.97	1976.46	1099.11	8353.26	106913.23	281499.01	546.05	1.00
29	*		29 -I		824.44	2011.55	521.67	18867.77	106913.23	280990.17	546.05	1.00
29	*		30 -J		824.44	2011.55	521.67	18867.77	131132.29	393375.09	752.43	1.00

P I P E M E M B E R S T R E S S E S (CONTINUED)

PIPE NAME	PIPE TYPE	NODAL PT NAME-END	SECTION DESCRIP	LOCAL X FORCE	LOCAL Y FORCE	LOCAL Z FORCE	LOCAL X MOMENT	LOCAL Y MOMENT	LOCAL Z MOMENT	BENDING STRESS	INTEN FACTR
30 *		30 -I		852.60	1987.09	474.24	52336.48	131132.29	390334.27	752.43	1.00
30 *		31 -J		852.60	1987.09	474.24	52336.48	150630.51	276547.93	582.13	1.00
31 *		31 -I		747.85	1783.43	470.92	76120.80	154630.51	270967.69	582.13	1.00
31 *		32 -J		747.85	1783.43	470.92	76120.80	136463.48	167280.23	414.95	1.00
32 *		32 -I		724.94	1783.43	505.48	90320.54	136463.48	160060.15	414.95	1.00
32 *		33 -J		724.94	1783.43	505.48	90320.54	120079.02	59598.93	293.01	1.00
33 *		33 -I		664.61	1251.78	985.81	94786.58	120079.02	52204.75	293.01	1.00
33 *		34 -J		664.61	1251.78	985.81	94786.58	83861.32	30374.30	235.93	1.00
34 *		34 -I		473.20	1251.78	992.87	92269.85	83861.32	37327.87	235.93	1.00
34 *		35 -J		473.20	1251.78	992.87	92269.85	39360.07	107070.24	265.96	1.00
35 *	CURV	35 -I		577.45	1193.96	180.30	92275.32	107065.53	39360.07	265.96	1.26
35 *	CURV	-C		1111.46	723.63	180.30	17844.16	134056.30	75109.61	280.42	1.26
35 *	CURV	36 -J		1261.80	408.48	180.30	76223.19	106261.28	104211.63	303.12	1.26
36 *		36 -I		1317.16	917.98	638.25	76227.76	104211.63	106258.00	303.12	1.00
36 *		37 -J		1317.16	917.98	638.25	76227.76	87127.01	78574.50	253.62	1.00
37 *		37 -I		1364.33	1283.14	840.40	76238.71	87127.01	78563.88	253.62	1.00
37 *		38 -J		1364.33	1283.14	840.40	76238.71	36875.07	42915.72	172.10	1.00
38 *		38 -I		1535.51	1729.36	1185.23	76239.77	36875.07	42913.85	172.10	1.00
38 *		39 -J		1535.51	1729.36	1185.23	76239.77	49112.49	110705.33	259.42	1.00
39 *	CURV	39 -I		1535.44	1729.36	1185.32	76232.74	49112.49	110710.16	473.79	2.95
39 *	CURV	-C		1615.47	1654.85	1185.32	92736.71	57247.23	164162.19	652.33	2.95
39 *	CURV	40 -J		1729.36	1535.44	1185.32	95273.46	78862.87	194917.04	764.25	2.95
40 *		40 -I		1729.36	1771.14	790.95	95273.46	131562.37	164022.40	345.35	1.00
40 *		41 -J		1729.36	1771.14	790.95	95273.46	131565.56	164037.76	345.39	1.00

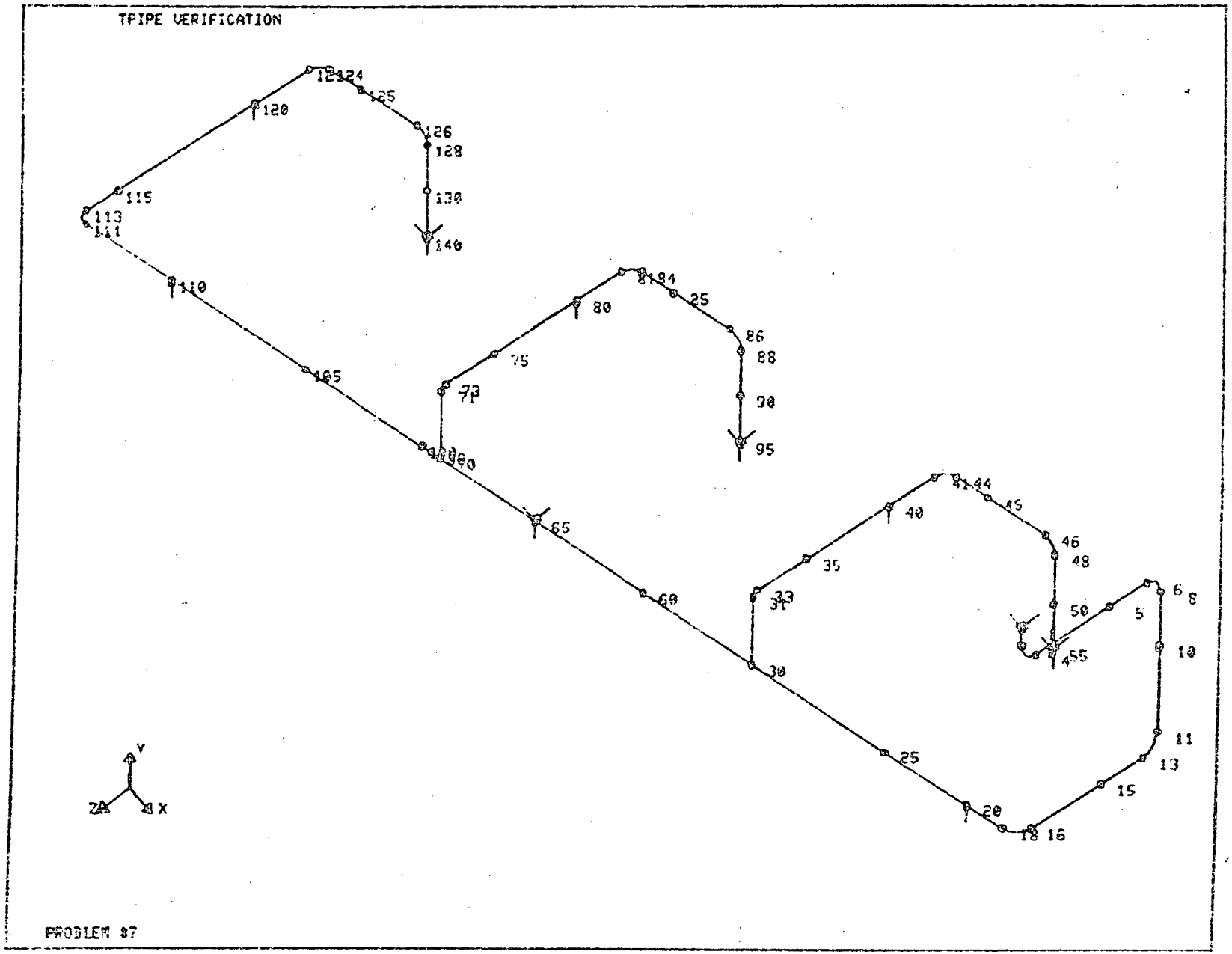
MAXIMUM PIPE MEMBER STRESSES

	PIPE NAME	NODAL PT NAME-END	BENDING STRESS(PSI)
1-	39 *	40-J	764.25
2-	29 *	30-J	752.43
3-	30 *	30-I	752.43
4-	39 *	-C	652.35
5-	39 *	-C	652.35
6-	30 *	31-J	582.13
7-	31 *	31-I	582.13
8-	28 *	29-J	546.05
9-	29 *	29-I	546.05
10-	39 *	39-I	473.79

P I P I N G S Y S T E M R E A C T I O N S

NODE NAME		SUPPORT CODE	X FORCE	Y FORCE	Z FORCE	X MOMENT	Y MOMENT	Z MOMENT	COORDINATE SYSTEM
1	*	222222	984.13	2014.25	837.27	71991.34	39755.14	51315.54	GLOBAL
10	*	202000	2468.49	0.00	1287.98	0.00	0.00	0.00	GLOBAL
20	*	222000	973.03	1526.50	1153.13	0.00	0.00	0.00	GLOBAL
26	*	222000	2160.12	2600.06	1478.86	0.00	0.00	0.00	GLOBAL
30	*	20000	0.00	3966.20	0.00	0.00	0.00	0.00	GLOBAL
34	*	200000	1185.73	0.00	0.00	0.00	0.00	0.00	NON-GLOBAL
41	*	222222	1770.32	1729.36	790.72	131986.68	95273.46	163990.54	NON-GLOBAL

BENCHMARK
PROBLEM 7


TPIPE VERIFICATION
120
124
125
126
128
130
140
115
113
111
110
105
80
84
25
86
88
90
95
75
73
70
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6
5
Y
Z
X
PROBLEM #7

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00000000011111111112222222222333333333344444444445555555555666666666677777777778   CARD
12345678901234567890123456789012345678901234567890123456789012345678901234567890   NUMBER

TPIPE VERIFICATION  N1-TPIPE    PROB. #7    RAGILES   X2159                 1TIT      1
TSI  1 Y            NONE       PLTPIP7   TTTRAG    441        DWHEELER                 2
   13   55    0          2    2         54    0                 1  1  386.4            3
    10100       01100         1    3   22  .01    0       8000                          4
 C01    1    2    4  C02       6.        00.00    -12.        00.00                    5
 C02  C01    6    8  C03       6.        00.      -12.       -60.                      6
 C03  C02   11   13  C04       6.        00.      -71.04     -60.                      7
 C04  C03   16   18   30       6.        00.      -71.04      00.                      8
 C05   30   31   33  C06       4.5     -141.      -71.04     -24.                      9
 C06  C05   41   44  C07       4.5     -141.      -71.04    -106.56                   10
 C07  C06   46   48   55       4.5     -92.94     -71.04    -106.56                   11
 C08   70   71   73  C09       4.5     -279.      -71.04     -24.                     12
 C09  C08   81   84  C10       4.5     -279.      -71.04    -106.56                   13
 C10  C09   86   88   95       4.5     -230.94    -71.04    -106.56                   14
 C11   70  111  113  C12       4.5     -417.      -71.04      00.                     15
 C12  C11  121  124  C13       4.5     -417.      -71.04    -106.68                   16
 C13  C12  126  128  140       4.5     -368.94    -71.04    -106.68                   17
   1      0.000      0.000     0.000                                                  18
   2                                                                                  19
   4                                                                                  20
   5      0.      -12.       -38.04                 182.29966                         21
   6                                                                                  22
   8                                                                                  23
  10      0.      -36.       -60.                   145.30186                         24
  11                                                                                  25
  13                                                                                  26
  15      0.      -71.04     -36.                   156.10174                         27
  16                                                                                  28
  18                                                                                  29
  20    -21.960   -71.04       0.                   135.30182                         30
  25    -57.96    -71.04       0.                   85.699656                         31
  30   -117.      -71.04       0.                   130.59934                         32
  31                                                                                  33
  33                                                                                  34
  35   -141.      -71.04     -46.56                 55.800024                         35
  40   -141.      -71.04     -82.56                 103.8991                          36
  41                                                                                  37
  44                                                                                  38
  45   -122.46    -71.04    -106.56                 112.0985                          39
  46                                                                                  40
  48                                                                                  41
  50    -92.94    -91.08    -106.56                 49.200312                         42
  55    -92.94   -107.04    -106.56                                                   43
  60   -165.      -71.04       0.                   86.499504                         44
  65   -213.      -71.04       0.                   81.10536                          45
  70   -255.      -71.04       0.                   110.58768                         46
  71                                                                                  47
  73                                                                                  48
  75   -279.      -71.04     -46.56                 55.800024                         49
  80   -279.      -71.04     -82.56                 130.59934                         50
  81                                                                                  51
  84                                                                                  52
  85   -260.46    -71.04    -106.56                 112.0985                          53
  86                                                                                  54
  88                                                                                  55
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00000000011111111112222222222333333333344444444455555555556666666667777777778   CARD
12345678901234567890123456789012345678901234567890123456789012345678901234567890  NUMBER

  90   -230.94     -91.08   -106.56                 49.200312                      56
  95   -230.94    -107.04   -106.56                                                57
  98   -259.08     -71.04       0.                                                58
 100   -263.04     -71.04       0.                                                59
 105   -315.       -71.04       0.                 74.799312                      60
 110   -375.       -71.04       0.                 72.399768                      61
 111                                                                              62
 113                                                                              63
 115   -417.       -71.04    -18.12                72.399768                      64
 120   -417.       -71.04    -78.12                121.19822                      65
 121                                                                              66
 124                                                                              67
 125   -398.46     -71.04   -106.68                 114.8999                       68
 126                                                                              69
 128                                                                              70
 130   -368.94     -91.08   -106.68                 49.200312                      71
 140   -368.94    -107.04   -106.68                                                72
   1   1  140                                                                     73
FLEX                                                                              74
  10                RR  .10E01                                                    75
  40                RR  .10E01                                                    76
  80                RR  .10E01                                                    77
 120                RR  .10E01                                                    78
  20                RR  .10E10                                                    79
 110                RR  .10E10                                                    80
  55       RR  .10E10RR  .10E10RR  .10E10RR  .10E12RR  .10E12RR  .10E12           81
  65       RR  .10E10RR  .10E10RR  .10E10RR  .10E12RR  .10E12RR  .10E12           82
  95       RR  .10E10RR  .10E10RR  .10E10RR  .10E12RR  .10E12RR  .10E12           83
END                                                                               84
   1   27.0E06                                                                    85
   2   81.0E06                                                                    86
   1     4.500     .3370       0.0                                               87
   2     3.500     .3000       0.0                                               88
   1         1     2     1     1                                                  89
   2         2     4                                      C01                     90
   3         4     5                                                             91
   4         5     6     2                                                       92
   5         6     8     1                                C02                    93
   6         8    10                                                             94
   7        10    11                                                             95
   8        11    13                                      C03                    96
   9        13    15                                                             97
  10        15    16                                                             98
  11        16    18                                      C04                    99
  12        18    20     2                                                      100
  13        20    25     1                                                      101
  14        25    30                                                           102
  15        30    31           2                                               103
  16        31    33                                      C05                  104
  17        33    35                                                           105
  18        35    40                                                           106
  19        40    41                                                           107
  20        41    44                                      C06                  108
  21        44    45     2                                                     109
  22        45    46     1                                                     110
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00000000011111111112222222222333333333344444444445555555555666666666677777777778   CARD
12345678901234567890123456789012345678901234567890123456789012345678901234567890   NUMBER

  23        46   48                                                  C07            111
  24        48   50                                                                 112
  25        50   55      2                                                          113
  26        30   60      1     1                                                    114
  27        60   65                                                                 115
  28        65   70                                                                 116
  29        70   71            2                                                    117
  30        71   73                                                  C08            118
  31        73   75                                                                 119
  32        75   80                                                                 120
  33        80   81                                                                 121
  34        81   84                                                  C09            122
  35        84   85      2                                                          123
  36        85   86      1                                                          124
  37        86   88                                                  C10            125
  38        88   90                                                                 126
  39        90   95      2                                                          127
  40        70   98      1     1                                                    128
  41        98  100                                                                 129
  42       100  105            2                                                    130
  43       105  110                                                                 131
  44       110  111                                                                 132
  45       111  113                                                  C11            133
  46       113  115                                                                 134
  47       115  120                                                                 135
  48       120  121                                                                 136
  49       121  124                                                  C12            137
  50       124  125      2                                                          138
  51       125  126      1                                                          139
  52       126  128                                                  C13            140
  53       128  130                                                                 141
  54       130  140      2                                                          142
   1             11                                                                143
 .1000E-01 .1300E+00                                                                144
 .1000E+00 .1300E+00                                                                145
 .3100E+00 .1650E+01                                                                146
 .3500E+00 .3500E+00                                                                147
 .5000E+00 .5500E+00                                                                148
 .5800E+00 .1900E+01                                                                149
 .8050E+00 .1700E+01                                                                150
 .9000E+00 .4500E+00                                                                151
 .1000E+01 .1800E+00                                                                152
 .1100E+01 .1000E+00                                                                153
 .1200E+01 .7000E-01                                                                154
   2             11                                                                155
 .1000E-01 .2000E+00                                                                156
 .1000E+00 .2000E+00                                                                157
 .2200E+00 .3000E+00                                                                158
 .3200E+00 .1000E+01                                                                159
 .3700E+00 .2150E+01                                                                160
 .4200E+00 .2150E+01                                                                161
 .5200E+00 .2550E+01                                                                162
 .6000E+00 .6000E+00                                                                163
 .7000E+00 .3000E+00                                                                164
 .8000E+00 .2000E+00                                                                165
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00000000011111111112222222223333333333444444444455555555556666666667777777778   CARD
12345678901234567890123456789012345678901234567890123456789012345678901234567890  NUMBER

 .1100E+01 .1200E+00                                                               166
    3              11                                                             167
 .1000E-01 .1300E+00                                                               168
 .1000E+00 .1300E+00                                                               169
 .3100E+00 .1650E+01                                                               170
 .3500E+00 .3500E+00                                                               171
 .5000E+00 .5500E+00                                                               172
 .5800E+00 .1900E+01                                                               173
 .8050E+00 .1700E+01                                                               174
 .9000E+00 .4500E+00                                                               175
 .1000E+01 .1800E+00                                                               176
 .1100E+01 .1000E+00                                                               177
 .1200E+01 .7000E-01                                                               178
D        1    2    3  1.0  1.0  1.0        GM                                      179
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DEVELOPED JOINTLY BY

PMB SYSTEMS ENGINEERING
SAN FRANCISCO, CALIFORNIA, USA

TENNESSEE VALLEY AUTHORITY
KNOXVILLE, TENNESSEE, USA

******* 1976 ******

VERSION 4.4 MAY 1, 1981

EXECUTED AT 15.16.27. ON 07/21/81

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

PIPING SYSTEM GEOMETRY DEFINITION

NUMBER OF CONTROL POINTS.....	13
NUMBER OF NODAL POINTS.....	55
NUMBER OF NONGLOBAL COORDINATE SYSTEMS.....	0
NUMBER OF ADDITIONAL SUPPORT TYPES.....	0
NUMBER OF MATERIAL PROPERTY TYPES.....	2
NUMBER OF PIPE CROSS SECTION TYPES.....	2
NUMBER OF SPECIAL COMPONENT CROSS SECTIONS..	0
NUMBER OF PIPE MEMBERS.....	54
NUMBER OF SPECIAL CONNECTIONS.....	0
NUMBER OF SPECIAL COMPONENTS.....	0
NUMBER OF DYNAMIC SPRINGS.....	0
NUMBER OF MULTIPLE EXCITATION ZONES.....	0
UNITS OF LENGTH AND WEIGHT.....	CONSISTENT
GRAVITY.....	386.40
NODAL POINT COORDINATE CHECK OPTION.....	NO

PROBLEM DEFINITION

EXECUTION MODE= 101000
1= STRUCTURAL DEFINITION IS FROM DATA CARDS
0= NORMAL DATA CHECKING RUN
1= ANALYSIS REQUESTED
0= NO STRUCTURAL PLOTTING REQUESTED
0= NO POSTPROCESSING REQUESTED
0= NO THERMAL TRANSIENT RESPONSE EXECUTION REQUESTED

ANALYSIS TYPES(01100) REQUESTED

FREQUENCY ANALYSIS

MAXIMUM NUMBER OF MODES REQUESTED.....	22
NUMBER OF SPRING SUPPORTS IN DYNAM MODEL	0
MINIMUM PERIOD OF HIGHEST MODE(SEC).....	.0100
MAXIMUM FREQUENCY FOR MODE PRINTOUT(HZ).	0.0

RESPONSE SPECTRUM ANALYSIS

NUMBER OF SPECTRAL CURVES TO BE INPUT...	3
NUMBER OF RESPONSE SPECTRUM LOAD CASES..	1

PROGRAM STORAGE..... 8000

RESTART TAPE GENERATION OPTION.. NONE REQUESTED

C O N T R O L P O I N T S P E C I F I C A T I O N

CONTROL NAME	I-TAN POINT	*CURVE POINTS* I-END	J-END	J-TAN POINT	CURVE RADIUS	******** COORDINATES ******* X-GLOBAL	Y-GLOBAL	Z-GLOBAL	COMMENT
C01 *	1 *	2 *	4 *	C02 *	6.000	0.00	-12.00	0.00	
C02 *	C01 *	6 *	8 *	C03 *	6.000	0.00	-12.00	-60.00	
C03 *	C02 *	11 *	13 *	C04 *	6.000	0.00	-71.04	-60.00	
C04 *	C03 *	16 *	18 *	30 *	6.000	0.00	-71.04	0.00	
C05 *	30 *	31 *	33 *	C06 *	4.500	-141.00	-71.04	-24.00	
C06 *	C05 *	41 *	44 *	C07 *	4.500	-141.00	-71.04	-106.56	
C07 *	C06 *	46 *	48 *	55 *	4.500	-92.94	-71.04	-106.56	
C08 *	70 *	71 *	73 *	C09 *	4.500	-279.00	-71.04	-24.00	
C09 *	C08 *	81 *	84 *	C10 *	4.500	-279.00	-71.04	-106.56	
C10 *	C09 *	86 *	88 *	95 *	4.500	-230.94	-71.04	-106.56	
C11 *	70 *	111 *	113 *	C12 *	4.500	-417.00	-71.04	0.00	
C12 *	C11 *	121 *	124 *	C13 *	4.500	-417.00	-71.04	-106.68	
C13 *	C12 *	126 *	128 *	140 *	4.500	-368.94	-71.04	-106.68	

N O D A L P O I N T D E F I N I T I O N

NODAL POINT	NODE NAME		******** COORDINATES ******* X-GLOBAL	Y-GLOBAL	Z-GLOBAL	LUMPED WEIGHT	DATA SOURCE	COMMENT
1	1	*	0.00	0.00	0.00	0.0	INPT	
2	2	*	0.00	-6.00	0.00	0.0	CP	
3	4	*	0.00	-12.00	-6.00	0.0	CP	
4	5	*	0.00	-12.00	-38.04	182.3	INPT	
5	6	*	0.00	-12.00	-54.00	0.0	CP	
6	8	*	0.00	-18.00	-60.00	0.0	CP	
7	10	*	0.00	-36.00	-60.00	145.3	INPT	
8	11	*	0.00	-65.04	-60.00	0.0	CP	
9	13	*	0.00	-71.04	-54.00	0.0	CP	
10	15	*	0.00	-71.04	-36.00	156.1	INPT	
11	16	*	0.00	-71.04	-6.00	0.0	CP	
12	18	*	-6.00	-71.04	0.00	0.0	CP	
13	20	*	-21.96	-71.04	0.00	135.3	INPT	
14	25	*	-57.96	-71.04	0.00	85.7	INPT	
15	30	*	-117.00	-71.04	0.00	130.6	INPT	
16	31	*	-139.68	-71.04	-22.68	0.0	CP	
17	33	*	-141.00	-71.04	-25.86	0.0	CP	
18	35	*	-141.00	-71.04	-46.56	55.8	INPT	
19	40	*	-141.00	-71.04	-82.56	103.9	INPT	
20	41	*	-141.00	-71.04	-102.06	0.0	CP	
21	44	*	-136.50	-71.04	-106.56	0.0	CP	
22	45	*	-122.46	-71.04	-106.56	112.1	INPT	
23	46	*	-97.44	-71.04	-106.56	0.0	CP	
24	48	*	-92.94	-75.54	-106.56	0.0	CP	
25	50	*	-92.94	-91.08	-106.56	49.2	INPT	
26	55	*	-92.94	-107.04	-106.56	0.0	INPT	
27	60	*	-165.00	-71.04	0.00	86.5	INPT	
28	65	*	-213.00	-71.04	0.00	81.1	INPT	
29	70	*	-255.00	-71.04	0.00	110.6	INPT	
30	71	*	-277.68	-71.04	-22.68	0.0	CP	
31	73	*	-279.00	-71.04	-25.86	0.0	CP	
32	75	*	-279.00	-71.04	-46.56	55.8	INPT	
33	80	*	-279.00	-71.04	-82.56	130.6	INPT	
34	81	*	-279.00	-71.04	-102.06	0.0	CP	
35	84	*	-274.50	-71.04	-106.56	0.0	CP	
36	85	*	-260.46	-71.04	-106.56	112.1	INPT	
37	86	*	-235.44	-71.04	-106.56	0.0	CP	
38	88	*	-230.94	-75.54	-106.56	0.0	CP	
39	90	*	-230.94	-91.08	-106.56	49.2	INPT	
40	95	*	-230.94	-107.04	-106.56	0.0	INPT	
41	98	*	-259.08	-71.04	0.00	0.0	INPT	
42	100	*	-263.04	-71.04	0.00	0.0	INPT	
43	105	*	-315.00	-71.04	0.00	74.8	INPT	
44	110	*	-375.00	-71.04	0.00	72.4	INPT	
45	111	*	-412.50	-71.04	0.00	0.0	CP	
46	113	*	-417.00	-71.04	-4.50	0.0	CP	
47	115	*	-417.00	-71.04	-18.12	72.4	INPT	

N O D A L P O I N T D E F I N I T I O N (CONTINUED)

NODAL POINT	NODE NAME	******** COORDINATES ******* X-GLOBAL	Y-GLOBAL	Z-GLOBAL	LUMPED WEIGHT	DATA SOURCE	COMMENT
48	120 *	-417.00	-71.04	-78.12	121.2	INPT	
49	121 *	-417.00	-71.04	-102.18	0.0	CP	
50	124 *	-412.50	-71.04	-106.68	0.0	CP	
51	125 *	-398.46	-71.04	-106.68	114.9	INPT	
52	126 *	-373.44	-71.04	-106.68	0.0	CP	
53	128 *	-368.94	-75.54	-106.68	0.0	CP	
54	130 *	-368.94	-91.08	-106.68	49.2	INPT	
55	140 *	-368.94	-107.04	-106.68	0.0	INPT	

S U P P O R T T Y P E L I B R A R Y

SUPPORT TYPE	***** RESTRAINT CODES ***** DYNAMIC	GRAVITY	THERMAL	COMMENT
1	111111	111111	111111	
2	111000	111000	111000	
3	111000	111000	101000	
4	111000	110000	110000	
5	111000	110000	100000	
6	111000	101000	101000	
7	111000	100000	100000	
8	111000	11000	11000	
9	111000	11000	1000	
10	111000	10000	10000	
11	111000	10000	0	
12	111000	1000	1000	
13	111000	0	0	
14	110000	110000	110000	
15	110000	110000	100000	
16	110000	100000	100000	
17	110000	10000	10000	
18	110000	10000	0	
19	110000	0	0	
20	101000	101000	101000	
21	101000	100000	100000	
22	101000	11000	1000	
23	101000	10000	0	
24	101000	1000	1000	
25	101000	0	0	
26	100000	110000	100000	
27	100000	100000	100000	
28	100000	10000	0	
29	100000	0	0	
30	11000	11000	11000	
31	11000	11000	1000	
32	11000	10000	10000	
33	11000	10000	0	
34	11000	1000	1000	
35	11000	0	0	
36	10000	10000	10000	
37	10000	10000	0	
38	10000	0	0	
39	1000	11000	1000	
40	1000	10000	0	
41	1000	1000	1000	
42	1000	0	0	
43	0	10000	0	

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

SUPPORT TYPE	RESTRAINED NODAL POINTS 1	2	3	4	5	6	7	8	9	10	11	12	13	14	*** RESTRAINT CODES *** DYNAMIC	GRAVITY	THERMAL	NO MOD
1	1	140													111111	111111	111111	1

RESTRAINT SPECIFICATION. DEFAULT STIFFNESSES K(X),K(Y),K(Z)= 1.0E13 K(XX),K(YY),K(ZZ)= 1.0E15

NODE NAME	RESTRAINT TYPE	K(X)	RESTRAINT TYPE	K(Y)	RESTRAINT TYPE	K(Z)	RESTRAINT TYPE	K(XX)	RESTRAINT TYPE	K(YY)	RESTRAINT TYPE	K(ZZ)	*** RESTRAINT CODES *** DYNAMIC	GRAVITY	THERMAL	NO MOD
10			RR	.10E01									20000	20000	20000	1
40			RR	.10E01									20000	20000	20000	1
80			RR	.10E01									20000	20000	20000	1
120			RR	.10E01									20000	20000	20000	1
20			RR	.10E10									20000	20000	20000	1
110			RR	.10E10									20000	20000	20000	1
55	RR	.10E10	RR	.10E10	RR	.10E10	RR	.10E12	RR	.10E12	RR	.10E12	222222	222222	222222	1
65	RR	.10E10	RR	.10E10	RR	.10E10	RR	.10E12	RR	.10E12	RR	.10E12	222222	222222	222222	1
95	RR	.10E10	RR	.10E10	RR	.10E10	RR	.10E12	RR	.10E12	RR	.10E12	222222	222222	222222	1

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

MATERIAL NUMBER	COLD ELASTIC MODULUS	POISSONS RATIO	THERMAL EXPANSION COEFFICIENT	INTERNAL PIPE PRESSURE	MEMBER TEMPERATURE	HOT ELASTIC MODULUS	COMMENT
1	27000000.0	.300	0.000000000	0.0	0.00	27000000.0	
2	81000000.0	.300	0.000000000	0.0	0.00	81000000.0	

P I P E M E M B E R C R O S S S E C T I O N T Y P E S

SECTION NUMBER	OUTSIDE DIAMETER	WALL THICKNESS	AXIAL AREA	SHEAR AREA	FLEXURAL INERTIA	INPUT FLEXIBILITY	WEIGHT/ LENGTH	SECTION DESCRIPTION
1	4.500	.3370	4.41	2.21	9.6		0.00	
2	3.500	.3000	3.02	1.52	3.9		0.00	

P I P E M E M B E R D A T A

MEMBER NAME	NODE NAME I-END	NODE NAME J-END	MAT TYPE	SECT TYPE	INTENS FACTOR I-END	INTENS FACTOR J-END	REF TEMP	RELEASE CODE I-END	RELEASE CODE J-END	MEMBER LENGTH	CURVE RADIUS	INTERSECTION X-GLOBAL	INTERSECTION Y-GLOBAL	INTERSECTION Z-GLOBAL	INTER ANGLE	MEMBER NUMBER
1	1	2	1	1	1.000	1.000	70.0	0	0	6.00						1
2	2	4	1	1	1.496	1.496	70.0	0	0	9.42	6.000	0.00	-12.00	0.00	90.000	2
3	4	5	1	1	1.000	1.000	70.0	0	0	32.04						3
4	5	6	2	1	1.000	1.000	70.0	0	0	15.96						4
5	6	8	1	1	1.496	1.496	70.0	0	0	9.42	6.000	0.00	-12.00	-60.00	90.000	5
6	8	10	1	1	1.000	1.000	70.0	0	0	18.00						6
7	10	11	1	1	1.000	1.000	70.0	0	0	29.04						7
8	11	13	1	1	1.496	1.496	70.0	0	0	9.42	6.000	0.00	-71.04	-60.00	90.000	8
9	13	15	1	1	1.000	1.000	70.0	0	0	18.00						9
10	15	16	1	1	1.000	1.000	70.0	0	0	30.00						10
11	16	18	1	1	1.496	1.496	70.0	0	0	9.42	6.000	0.00	-71.04	0.00	90.000	11
12	18	20	2	1	1.000	1.000	70.0	0	0	15.96						12
13	20	25	1	1	1.000	1.000	70.0	0	0	36.00						13
14	25	30	1	1	1.000	1.000	70.0	0	0	59.04						14
15	30	31	1	2	1.000	1.000	70.0	0	0	32.08						15
16	31	33	1	2	1.379	1.379	70.0	0	0	3.53	4.500	-141.00	-71.04	-24.00	45.000	16
17	33	35	1	2	1.000	1.000	70.0	0	0	20.70						17
18	35	40	1	2	1.000	1.000	70.0	0	0	36.00						18
19	40	41	1	2	1.000	1.000	70.0	0	0	19.50						19
20	41	44	1	2	1.379	1.379	70.0	0	0	7.07	4.500	-141.00	-71.04	-106.56	90.000	20
21	44	45	2	2	1.000	1.000	70.0	0	0	14.04						21
22	45	46	1	2	1.000	1.000	70.0	0	0	25.02						22
23	46	48	1	2	1.379	1.379	70.0	0	0	7.07	4.500	-92.94	-71.04	-106.56	90.000	23
24	48	50	1	2	1.000	1.000	70.0	0	0	15.54						24
25	50	55	2	2	1.000	1.000	70.0	0	0	15.96						25
26	30	60	1	1	1.000	1.000	70.0	0	0	48.00						26
27	60	65	1	1	1.000	1.000	70.0	0	0	48.00						27
28	65	70	1	1	1.000	1.000	70.0	0	0	42.00						28
29	70	71	1	2	1.000	1.000	70.0	0	0	32.08						29
30	71	73	1	2	1.379	1.379	70.0	0	0	3.53	4.500	-279.00	-71.04	-24.00	45.000	30
31	73	75	1	2	1.000	1.000	70.0	0	0	20.70						31
32	75	80	1	2	1.000	1.000	70.0	0	0	36.00						32
33	80	81	1	2	1.000	1.000	70.0	0	0	19.50						33
34	81	84	1	2	1.379	1.379	70.0	0	0	7.07	4.500	-279.00	-71.04	-106.56	90.000	34
35	84	85	2	2	1.000	1.000	70.0	0	0	14.04						35
36	85	86	1	2	1.000	1.000	70.0	0	0	25.02						36
37	86	88	1	2	1.379	1.379	70.0	0	0	7.07	4.500	-230.94	-71.04	-106.56	90.000	37
38	88	90	1	2	1.000	1.000	70.0	0	0	15.54						38
39	90	95	2	2	1.000	1.000	70.0	0	0	15.96						39
40	70	98	1	1	1.000	1.000	70.0	0	0	4.08						40
41	98	100	1	1	1.000	1.000	70.0	0	0	3.96						41
42	100	105	1	2	1.000	1.000	70.0	0	0	51.96						42
43	105	110	1	2	1.000	1.000	70.0	0	0	60.00						43
44	110	111	1	2	1.000	1.000	70.0	0	0	37.50						44
45	111	113	1	2	1.379	1.379	70.0	0	0	7.07	4.500	-417.00	-71.04	0.00	90.000	45
46	113	115	1	2	1.000	1.000	70.0	0	0	13.62						46
47	115	120	1	2	1.000	1.000	70.0	0	0	60.00						47

P I P E M E M B E R D A T A (CONTINUED)

MEMBER NAME	* NODE NAME * I-END	J-END	MAT TYPE	SECT TYPE	INTENS FACTOR I-END	J-END	REF TEMP	RELEASE CODE I-END	J-END	MEMBER LENGTH	CURVE RADIUS	******* INTERSECTION ******* X-GLOBAL	Y-GLOBAL	Z-GLOBAL	INTER ANGLE	MEMBER NUMBER
48 *	120 *	121 *	1	2	1.000	1.000	70.0	0	0	24.06						48
49 *	121 *	124 *	1	2	1.379	1.379	70.0	0	0	7.07	4.500	-417.00	-71.04	-106.68	90.000	49
50 *	124 *	125 *	2	2	1.000	1.000	70.0	0	0	14.04						50
51 *	125 *	126 *	1	2	1.000	1.000	70.0	0	0	25.02						51
52 *	126 *	128 *	1	2	1.379	1.379	70.0	0	0	7.07	4.500	-368.94	-71.04	-106.68	90.000	52
53 *	128 *	130 *	1	2	1.000	1.000	70.0	0	0	15.54						53
54 *	130 *	140 *	2	2	1.000	1.000	70.0	0	0	15.96						54

MEMBER LENGTH - DIRECTION INFORMATION

MEMBER NAME	I NODE NAME	J NODE NAME	***DELTA MEMBER LENGTHS*** X	Y	Z	CROSS SECTION DESCRIPTION
1	1	2	0.00	-6.00	0.00	
2	2	4	0.00	-6.00	-6.00	
3	4	5	0.00	0.00	-32.04	
4	5	6	0.00	0.00	-15.96	
5	6	8	0.00	-6.00	-6.00	
6	8	10	0.00	-18.00	0.00	
7	10	11	0.00	-29.04	0.00	
8	11	13	0.00	-6.00	6.00	
9	13	15	0.00	0.00	18.00	
10	15	16	0.00	0.00	30.00	
11	16	18	-6.00	0.00	6.00	
12	18	20	-15.96	0.00	0.00	
13	20	25	-36.00	0.00	0.00	
14	25	30	-59.04	0.00	0.00	
15	30	31	-22.68	0.00	-22.68	
16	31	33	-1.32	0.00	-3.18	
17	33	35	0.00	0.00	-20.70	
18	35	40	0.00	0.00	-36.00	
19	40	41	0.00	0.00	-19.50	
20	41	44	4.50	0.00	-4.50	
21	44	45	14.04	0.00	0.00	
22	45	46	25.02	0.00	0.00	
23	46	48	4.50	-4.50	0.00	
24	48	50	0.00	-15.54	0.00	
25	50	55	0.00	-15.96	0.00	
26	30	60	-48.00	0.00	0.00	
27	60	65	-48.00	0.00	0.00	
28	65	70	-42.00	0.00	0.00	
29	70	71	-22.68	0.00	-22.68	
30	71	73	-1.32	0.00	-3.18	
31	73	75	0.00	0.00	-20.70	
32	75	80	0.00	0.00	-36.00	
33	80	81	0.00	0.00	-19.50	
34	81	84	4.50	0.00	-4.50	
35	84	85	14.04	0.00	0.00	
36	85	86	25.02	0.00	0.00	
37	86	88	4.50	-4.50	0.00	
38	88	90	0.00	-15.54	0.00	
39	90	95	0.00	-15.96	0.00	
40	70	98	-4.08	0.00	0.00	
41	98	100	-3.96	0.00	0.00	
42	100	105	-51.96	0.00	0.00	
43	105	110	-60.00	0.00	0.00	

MEMBER LENGTH - DIRECTION INFORMATION (CONTINUED)

MEMBER NAME	I NODE NAME	J NODE NAME	***DELTA MEMBER LENGTHS*** X	Y	Z	CROSS SECTION DESCRIPTION
44 *	110 *	111 *	-37.50	0.00	0.00	
45 *	111 *	113 *	-4.50	0.00	-4.50	
46 *	113 *	115 *	0.00	0.00	-13.62	
47 *	115 *	120 *	0.00	0.00	-60.00	
48 *	120 *	121 *	0.00	0.00	-24.06	
49 *	121 *	124 *	4.50	0.00	-4.50	
50 *	124 *	125 *	14.04	0.00	0.00	
51 *	125 *	126 *	25.02	0.00	0.00	
52 *	126 *	128 *	4.50	-4.50	0.00	
53 *	128 *	130 *	0.00	-15.54	0.00	
54 *	130 *	140 *	0.00	-15.96	0.00	

F R E Q U E N C Y A N A L Y S I S

OVERALL PROBLEM SIZE

TOTAL NUMBER OF EQUATIONS.....	318
HALF BANDWIDTH OF STIFFNESS.....	24
NUMBER OF EQUATION BLOCKS.....	3
NUMBER OF EQUATIONS PER BLOCK.....	153
NUMBER OF MODES REQUIRED.(EST.).....	22
CUT-OFF FREQUENCY.....	100.00
TOTAL MODES TO CUT-OFF FREQUENCY.....	40
NODAL WT./GEN. MASS PRINT CODE (MWPRNT).....	0

PRINT NODAL WT. SUMMARY AND GEN. MASS = 0
SUPPRESS GEN. MASS PRINT = 1
SUPPRESS NODAL WT. SUMMARY PRINT = 2
SUPPRESS BOTH OF ABOVE PRINTS = 3

THE OUT OF CORE SUBSPACE ITERATION ALGORITHM WITH A MAXIMUM ALLOWABLE NUMBER OF ITERATIONS PER GROUP OF 16 IS CHOSEN.
SUBSPACE ITERATION WAS USER REQUESTED.
AN IN CORE SOLUTION WOULD REQUIRE A VALUE OF ABOUT 16540 FOR *MTOT*.

STORAGE ESTIMATES

THE FOLLOWING CONTROL PARAMETERS ARE EITHER USER SUPPLIED OR INTERNALLY ESTIMATED ARE USED TO CALCULATE ESTIMATES OF THE MINIMUM VALUE OF *MTOT*, THE PROGRAM STORAGE PARAMETER, AND THE CORRESPONDING CORE FIELD LENGTH SPECIFICATION REQUIRED FOR THE USERS JOB CARD...

NUMBER OF NODAL POINTS (NUMNP).....	55
NUMBER OF DYNAMIC NODAL RESTRAINTS (NODREA)....	12
NUMBER OF NON-GLOBAL NODES (NNG).....	0
NUMBER OF MODES (NM).....	22
NUMBER OF EQUATIONS PER BLOCK (NEQB).....	153
NUMBER OF SPECTRAL CURVES INPUT (NSC).....	3
NUMBER OF MODAL TIME STEPS (NT).....	100
NUMBER OF FORCING FUNCTIONS (NFN).....	3

EMPLOYING THE ABOVE PARAMETERS,THE FOLLOWING VALUES FOR MTOT AND CORE ARE ESTIMATED...

	MTOT (DECIMAL)	CORE (OCTAL)
RESPONSE SPECTRUM ANALYSIS.....	3180	006154
TIME HISTORY MODAL.....	4784	011260
STRUCTURAL PLOTTING.....	4356	010404
CREATE OR READ RESTART TAPE.....	1540	003004

N O D A L W E I G H T S U M M A R Y

NODE NAME		RESTRAINT CODE	X TRANSLATION	Y TRANSLATION	Z TRANSLATION
1	*	111111	0.000	0.000	0.000
2	*	000000	0.000	0.000	0.000
4	*	000000	0.000	0.000	0.000
5	*	000000	182.300	182.300	182.300
6	*	000000	0.000	0.000	0.000
8	*	000000	0.000	0.000	0.000
10	*	000000	145.302	145.302	145.302
11	*	000000	0.000	0.000	0.000
13	*	000000	0.000	0.000	0.000
15	*	000000	156.102	156.102	156.102
16	*	000000	0.000	0.000	0.000
18	*	000000	0.000	0.000	0.000
20	*	000000	135.302	135.302	135.302
25	*	000000	85.700	85.700	85.700
30	*	000000	130.599	130.599	130.599
31	*	000000	0.000	0.000	0.000
33	*	000000	0.000	0.000	0.000
35	*	000000	55.800	55.800	55.800
40	*	000000	103.899	103.899	103.899
41	*	000000	0.000	0.000	0.000
44	*	000000	0.000	0.000	0.000
45	*	000000	112.099	112.099	112.099
46	*	000000	0.000	0.000	0.000
48	*	000000	0.000	0.000	0.000
50	*	000000	49.200	49.200	49.200
55	*	000000	0.000	0.000	0.000
60	*	000000	86.500	86.500	86.500
65	*	000000	81.105	81.105	81.105
70	*	000000	110.588	110.588	110.588
71	*	000000	0.000	0.000	0.000
73	*	000000	0.000	0.000	0.000
75	*	000000	55.800	55.800	55.800
80	*	000000	130.599	130.599	130.599
81	*	000000	0.000	0.000	0.000
84	*	000000	0.000	0.000	0.000
85	*	000000	112.099	112.099	112.099
86	*	000000	0.000	0.000	0.000
88	*	000000	0.000	0.000	0.000
90	*	000000	49.200	49.200	49.200
95	*	000000	0.000	0.000	0.000
98	*	000000	0.000	0.000	0.000
100	*	000000	0.000	0.000	0.000
105	*	000000	74.799	74.799	74.799
110	*	000000	72.400	72.400	72.400
111	*	000000	0.000	0.000	0.000
113	*	000000	0.000	0.000	0.000
115	*	000000	72.400	72.400	72.400

N O D A L W E I G H T S U M M A R Y (CONTINUED)

NODE NAME	RESTRAINT CODE	X TRANSLATION	Y TRANSLATION	Z TRANSLATION
120 *	000000	121.198	121.198	121.198
121 *	000000	0.000	0.000	0.000
124 *	000000	0.000	0.000	0.000
125 *	000000	114.900	114.900	114.900
126 *	000000	0.000	0.000	0.000
128 *	000000	0.000	0.000	0.000
130 *	000000	49.200	49.200	49.200
140 *	111111	0.000	0.000	0.000

F R E Q U E N C Y D I S T R I B U T I O N B Y G R O U P

SUBSPACE GROUP	NO. MODES IN GROUP	LOWER BOUND HERTZ	LOWER BOUND EIGENVALUE	UPPER BOUND HERTZ	UPPER BOUND EIGENVALUE
1	3	4.419	.7711E+03	8.839	.3084E+04
2	3	8.839	.3084E+04	12.500	.6169E+04
3	3	12.500	.6169E+04	17.678	.1234E+05
4	3	17.678	.1234E+05	25.000	.2467E+05
5	3	25.000	.2467E+05	27.951	.3084E+05
6	3	27.951	.3084E+05	35.355	.4935E+05
7	4	35.355	.4935E+05	50.000	.9870E+05

F R E Q U E N C Y A N D C O N V E R G E N C E D A T A - S U B S P A C E I T E R A T I O N

GROUP	NO. MODES	ITERATIONS	SHIFT EIGENVALUE	MODE	CIRCULAR FREQUENCY (RAD/SEC)	FREQUENCY (HZ)	PERIOD (SEC)	FREQUENCY TOLERANCE	MODE TOLERANCE	//K*Ø// 2	//K*Ø-EIG *M*Ø// MAX	K*Ø OF MAX NORM
1	3	7	.192766E+04	1	31.6283	5.0338	.1987	.7160E-08	.3421E-04	.6078E+03	.9347E-02	-.9715E+02
				2	49.0887	7.8127	.1280	.6039E-14	.1584E-08	.1217E+04	.1003E-05	.1784E+03
				3	51.4786	8.1931	.1221	.2196E-13	.1794E-07	.1399E+04	.1362E-04	.4446E+03
2	3	1	.462638E+04	4	56.4073	8.9775	.1114	.3262E-09	.9113E-05	.1935E+04	.6713E-02	.6677E+02
				5	58.5114	9.3124	.1074	.3957E-11	.3572E-06	.1874E+04	.3606E-03	-.2662E+03
				6	62.1763	9.8957	.1011	.2055E-07	.4215E-04	.1957E+04	.3158E-01	.1170E+02
3	3	4	.925275E+04	7	83.0740	13.2216	.0756	.4480E-07	.4099E-04	.3997E+04	.8675E-01	-.6237E+03
				8	93.9774	14.9570	.0669	.6591E-14	.2951E-08	.4404E+04	.7196E-05	.4931E+00
				9	94.6681	15.0669	.0664	.4352E-12	.1338E-07	.5128E+04	.3653E-04	-.4153E+03
4	3	4	.185055E+05	10	111.5567	17.7548	.0563	.1099E-10	.1042E-05	.5894E+04	.3731E-02	-.1117E+04
				11	114.4102	18.2090	.0549	.1368E-09	.2607E-05	.7723E+04	.1081E-01	-.3717E+00
				12	143.8879	22.9005	.0437	.5498E-08	.5521E-05	.1046E+05	.3484E-01	.5689E+03
5	3	3	.277583E+05	13	157.2295	25.0238	.0400	.2984E-08	.4467E-05	.1348E+05	.2187E-01	.1060E+00
				14	162.4529	25.8552	.0387	.2516E-10	.2017E-06	.1264E+05	.9055E-03	.2364E+04
				15	169.2943	26.9440	.0371	.4416E-10	.1479E-06	.1539E+05	.8100E-03	.6195E+03
6	3	5	.400953E+05	16	176.7658	28.1331	.0355	.3558E-11	.1207E-07	.1844E+05	.9375E-04	-.2975E+04
				17	190.3831	30.3004	.0330	.6424E-14	.5688E-09	.1890E+05	.6403E-05	.1757E+00
				18	221.2887	35.2192	.0284	.4633E-08	.1045E-04	.2403E+05	.1520E+00	.4967E+04
7	4	4	.740220E+05	19	233.0911	37.0976	.0270	.4285E-13	.1377E-06	.2560E+05	.2106E-02	-.3112E+04
				20	267.7573	42.6149	.0235	.1260E-11	.3497E-07	.3748E+05	.7320E-03	-.3310E+00
				21	279.0928	44.4190	.0225	.1196E-13	.6888E-08	.3923E+05	.1487E-03	-.1969E+05
				22	302.1591	48.0901	.0208	.6647E-08	.1246E-04	.4531E+05	.3018E+00	-.7472E+04

G E N E R A L I Z E D M A S S M A T R I X

	1	2	3	4	5	6	7	8	9	10
1	1.00000	.00000	-.00000	.00000	.00000	.00000	-.00000	-.00000	.00000	-.00000
2	.00000	1.00000	-.00000	-.00000	-.00000	-.00000	.00000	.00000	-.00000	-.00000
3	-.00000	-.00000	1.00000	.00000	-.00000	.00000	-.00000	-.00000	.00000	.00000
4	.00000	-.00000	.00000	1.00000	-.00000	.00000	-.00000	-.00000	.00000	.00000
5	.00000	-.00000	-.00000	-.00000	1.00000	-.00000	-.00000	-.00000	.00000	-.00000
6	.00000	-.00000	.00000	.00000	-.00000	1.00000	-.00001	-.00000	.00001	.00000
7	-.00000	.00000	-.00000	-.00000	-.00000	-.00001	1.00000	.00000	.00000	.00000
8	-.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	1.00000	-.00000	.00000
9	.00000	-.00000	.00000	.00000	.00000	.00001	.00000	-.00000	1.00000	-.00000
10	-.00000	-.00000	.00000	.00000	-.00000	.00000	.00000	.00000	-.00000	1.00000
11	.00000	-.00000	.00000	-.00000	-.00000	-.00001	-.00000	-.00000	.00000	-.00000
12	-.00000	.00000	.00000	.00000	.00000	.00000	-.00000	-.00000	.00000	.00000
13	.00000	.00000	-.00000	-.00000	.00000	-.00000	.00000	.00000	-.00000	.00000
14	-.00000	-.00000	.00000	.00000	.00000	.00000	-.00000	-.00000	.00000	-.00000
15	-.00000	.00000	.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000	-.00000
16	-.00000	-.00000	.00000	.00000	.00000	.00000	-.00001	-.00000	.00000	.00000
17	-.00000	-.00000	.00000	-.00000	.00000	-.00000	-.00000	-.00000	.00000	.00000
18	-.00000	.00000	.00000	-.00000	-.00000	-.00000	.00000	.00000	-.00000	-.00000
19	-.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000	.00000
20	.00000	.00000	-.00000	-.00000	-.00000	-.00000	.00000	.00000	-.00000	-.00000
21	.00000	-.00000	-.00000	-.00000	.00000	-.00000	-.00000	-.00000	.00000	-.00000
22	.00000	-.00000	.00000	.00000	.00000	.00000	-.00000	-.00000	.00000	.00000

G E N E R A L I Z E D M A S S M A T R I X (CONTINUED)

	11	12	13	14	15	16	17	18	19	20
1	.00000	-.00000	.00000	-.00000	-.00000	-.00000	-.00000	-.00000	-.00000	.00000
2	-.00000	.00000	.00000	-.00000	.00000	-.00000	-.00000	.00000	.00000	.00000
3	.00000	.00000	-.00000	.00000	.00000	.00000	.00000	.00000	.00000	-.00000
4	-.00000	.00000	-.00000	.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000
5	-.00000	.00000	.00000	.00000	.00000	.00000	.00000	-.00000	.00000	-.00000
6	-.00001	.00000	-.00000	.00000	-.00000	.00000	-.00000	-.00000	.00000	-.00000
7	-.00000	-.00000	.00000	-.00000	-.00000	-.00001	-.00000	.00000	.00000	.00000
8	-.00000	-.00000	.00000	-.00000	.00000	-.00000	-.00000	.00000	.00000	.00000
9	.00000	.00000	-.00000	.00000	-.00000	.00000	.00000	-.00000	.00000	-.00000
10	-.00000	.00000	.00000	-.00000	-.00000	.00000	.00000	-.00000	.00000	-.00000
11	1.00000	.00000	.00000	-.00000	-.00000	.00000	.00000	-.00000	.00000	-.00000
12	.00000	1.00000	-.00000	.00000	.00000	-.00000	-.00000	.00000	-.00000	.00000
13	.00000	-.00000	1.00000	-.00000	.00000	-.00000	.00000	-.00000	.00000	.00000
14	-.00000	.00000	-.00000	1.00000	.00000	.00000	-.00000	.00000	-.00000	-.00000
15	-.00000	.00000	.00000	.00000	1.00000	-.00000	.00000	-.00000	.00000	.00000
16	.00000	-.00000	-.00000	.00000	-.00000	1.00000	.00000	-.00000	.00000	-.00000
17	.00000	-.00000	.00000	-.00000	.00000	.00000	1.00000	.00000	.00000	.00000
18	-.00000	.00000	-.00000	.00000	-.00000	-.00000	.00000	1.00000	-.00000	.00000
19	.00000	-.00000	.00000	-.00000	.00000	.00000	.00000	-.00000	1.00000	-.00000
20	-.00000	.00000	.00000	-.00000	.00000	-.00000	.00000	.00000	-.00000	1.00000
21	-.00000	.00000	.00000	-.00000	.00000	.00000	.00000	-.00000	.00000	.00000
22	.00000	-.00000	-.00000	.00000	-.00000	-.00000	.00000	.00000	-.00000	-.00000

G E N E R A L I Z E D M A S S M A T R I X (CONTINUED)

	21	22
1	.00000	.00000
2	-.00000	-.00000
3	-.00000	.00000
4	-.00000	.00000
5	.00000	.00000
6	-.00000	.00000
7	-.00000	-.00000
8	-.00000	-.00000
9	.00000	.00000
10	-.00000	.00000
11	-.00000	.00000
12	.00000	-.00000
13	.00000	-.00000
14	-.00000	.00000
15	.00000	-.00000
16	.00000	-.00000
17	.00000	.00000
18	-.00000	.00000
19	.00000	-.00000
20	.00000	-.00000
21	1.00000	-.00000
22	-.00000	1.00000

MAXIMUM VALUE OF OFF DIAGONAL TERMS = .117E-04
MODE SHAPE NUMBER.. 16
ROW NUMBER..... 7

MAXIMUM ABSOLUTE DIFFERANCE BETWEEN DIAGONAL AND 1 = .63949E-13
MODE SHAPE NUMBER.. 20

F R E Q U E N C Y E R R O R E S T I M A T E S U M M A R Y - S U B S P A C E I T E R A T I O N

CONDITIONING NUMBER = .1067E+08

WARNING CONDITIONING NUMBER GREATER THAN .1E+08

SUMMARY OF WARNINGS

CONDITIONING NUMBER GREATER THAN

S P E C T R A L C U R V E D A T A

IDENT NUMBER 1
CURVE TITLE .....
CURVE TYPE ..... PERIOD VS. ACCELERATION
CURVE SCALE ..... LINEAR
NUMBER OF POINTS .. 11

POINT	PERIOD (SECS)	ACCELERATION (G)	***** COMMENT ******
1	.0100	.1300	
2	.1000	.1300	
3	.3100	1.6500	
4	.3500	.3500	
5	.5000	.5500	
6	.5800	1.9000	
7	.8050	1.7000	
8	.9000	.4500	
9	1.0000	.1800	
10	1.1000	.1000	
11	1.2000	.0700	

S P E C T R A L C U R V E D A T A (CONTINUED)

IDENT NUMBER 2
CURVE TITLE .....
CURVE TYPE ..... PERIOD VS. ACCELERATION
CURVE SCALE ..... LINEAR
NUMBER OF POINTS .. 11

POINT	PERIOD (SECS)	ACCELERATION (G)	***** COMMENT ******
1	.0100	.2000	
2	.1000	.2000	
3	.2200	.3000	
4	.3200	1.0000	
5	.3700	2.1500	
6	.4200	2.1500	
7	.5200	2.5500	
8	.6000	.6000	
9	.7000	.3000	
10	.8000	.2000	
11	1.1000	.1200	

S P E C T R A L C U R V E D A T A (CONTINUED)

IDENT NUMBER 3
CURVE TITLE .....
CURVE TYPE ..... PERIOD VS. ACCELERATION
CURVE SCALE ..... LINEAR
NUMBER OF POINTS .. 11

POINT	PERIOD (SECS)	ACCELERATION (G)	***** COMMENT ******
1	.0100	.1300	
2	.1000	.1300	
3	.3100	1.6500	
4	.3500	.3500	
5	.5000	.5500	
6	.5800	1.9000	
7	.8050	1.7000	
8	.9000	.4500	
9	1.0000	.1800	
10	1.1000	.1000	
11	1.2000	.0700	

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

MODE NUMBER	PARTICIPATION FACTORS X DIR	Y DIR	Z DIR
1	-.177	.586	-1.158
2	-.026	.251	-1.087
3	.107	.433	.447
4	-.875	.163	.539
5	-.201	-1.108	-.037
6	-.231	-.930	.007
7	-.516	-.433	-.798
8	-.024	.041	.664
9	.102	.068	.075
10	.103	.310	-.080
11	-.083	1.011	.159
12	.749	-.227	-.448
13	.578	-.137	-.277
14	-.300	.393	-.169
15	.012	.003	-.214
16	-.526	-.039	.030
17	.831	.123	.222
18	.057	.297	.145
19	-.175	.218	-.101
20	-.272	.133	-.161
21	-.001	-.203	-.023
22	-.115	-.151	-.026

R E S P O N S E S P E C T R U M A N A L Y S I S

```
TITLE.....
FILE LABEL.....
SPECTRAL CURVES
  X-DIRECTION.....    1
  Y-DIRECTION.....    2
  Z-DIRECTION.....    3
CURVE SCALE FACTORS
  X-SCALE.....    1.000
  Y-SCALE.....    1.000
  Z-SCALE.....    1.000

SPECTRA COMBINATION CODE... VECTORIAL SUM
MODE COMBINATION CODE..... MODIFIED NRC GROUPING METHOD WITH FR= .1
NODAL PRINT THRESHOLD (G)
  VERTICAL ACCELERATION....    0
  HORIZONTAL ACCELERATION..    0
SAVE RESULTS PARAMETER.....    0
```

APPLIED SPECTRAL ACCELERATION SUMMARY

FREQUENCY NUMBER	PERIOD (SEC)	ZONE NUMBER	SPECTRAL ACCELERATIONS (G) X TRANS	Y TRANS	Z TRANS	XX ROT	YY ROT	ZZ ROT
1	.199	1	.844	.282	.844			
2	.128	1	.333	.223	.333			
3	.122	1	.290	.218	.290			
4	.111	1	.212	.209	.212			
5	.107	1	.183	.206	.183			
6	.101	1	.138	.201	.138			
7	.076	1	.130	.200	.130			
8	.067	1	.130	.200	.130			
9	.066	1	.130	.200	.130			
10	.056	1	.130	.200	.130			
11	.055	1	.130	.200	.130			
12	.044	1	.130	.200	.130			
13	.040	1	.130	.200	.130			
14	.039	1	.130	.200	.130			
15	.037	1	.130	.200	.130			
16	.036	1	.130	.200	.130			
17	.033	1	.130	.200	.130			
18	.028	1	.130	.200	.130			
19	.027	1	.130	.200	.130			
20	.023	1	.130	.200	.130			
21	.023	1	.130	.200	.130			

APPLIED SPECTRAL ACCELERATION SUMMARY(CONTINUED)

FREQUENCY NUMBER	PERIOD (SEC)	ZONE NUMBER	SPECTRAL ACCELERATIONS (G) X TRANS	Y TRANS	Z TRANS	XX ROT	YY ROT	ZZ ROT
22	.021	1	.130	.200	.130			

N O D A L A C C E L E R A T I O N S

NODE NAME	****** ACCELERATIONS ******* X-GLOBAL (G)	Y-GLOBAL (G)	Z-GLOBAL (G)	******* THRESHOLD ACCELERATIONS ******* VERTICAL (G)	EXCEED	HORIZONTAL (G)	EXCEED	
1 *	0.000	0.000	0.000	0.000	YES	0.000	YES	GLOBAL
2 *	.001	.000	.004	.000	YES	.004	YES	GLOBAL
4 *	.017	.035	.028	.035	YES	.032	YES	GLOBAL
5 *	.160	.372	.028	.372	YES	.162	YES	GLOBAL
6 *	.241	.571	.028	.571	YES	.243	YES	GLOBAL
8 *	.275	.650	.111	.650	YES	.297	YES	GLOBAL
10 *	.295	.650	.380	.650	YES	.481	YES	GLOBAL
11 *	.353	.650	.813	.650	YES	.887	YES	GLOBAL
13 *	.333	.575	.894	.575	YES	.954	YES	GLOBAL
15 *	.224	.366	.894	.366	YES	.922	YES	GLOBAL
16 *	.036	.057	.894	.057	YES	.895	YES	GLOBAL
18 *	.002	.037	.868	.037	YES	.868	YES	GLOBAL
20 *	.002	.000	.796	.000	YES	.796	YES	GLOBAL
25 *	.001	.102	.626	.102	YES	.626	YES	GLOBAL
30 *	.001	.189	.329	.189	YES	.329	YES	GLOBAL
31 *	.110	.220	.254	.220	YES	.277	YES	GLOBAL
33 *	.121	.227	.252	.227	YES	.279	YES	GLOBAL
35 *	.161	.253	.252	.253	YES	.299	YES	GLOBAL
40 *	.133	.280	.252	.280	YES	.285	YES	GLOBAL
41 *	.090	.313	.252	.313	YES	.267	YES	GLOBAL
44 *	.086	.293	.234	.293	YES	.249	YES	GLOBAL
45 *	.086	.196	.170	.196	YES	.190	YES	GLOBAL
46 *	.086	.024	.059	.024	YES	.104	YES	GLOBAL
48 *	.066	.000	.035	.000	YES	.075	YES	GLOBAL
50 *	.017	.000	.008	.000	YES	.018	YES	GLOBAL
55 *	.000	.000	.000	.000	YES	.000	YES	GLOBAL
60 *	.000	.094	.115	.094	YES	.115	YES	GLOBAL
65 *	.000	.000	.000	.000	YES	.000	YES	GLOBAL
70 *	.000	.086	.077	.086	YES	.077	YES	GLOBAL
71 *	.062	.198	.127	.198	YES	.141	YES	GLOBAL
73 *	.070	.211	.128	.211	YES	.146	YES	GLOBAL
75 *	.111	.255	.129	.255	YES	.170	YES	GLOBAL
80 *	.127	.309	.129	.309	YES	.181	YES	GLOBAL
81 *	.100	.338	.129	.338	YES	.163	YES	GLOBAL
84 *	.096	.313	.124	.313	YES	.157	YES	GLOBAL
85 *	.096	.207	.100	.207	YES	.139	YES	GLOBAL
86 *	.096	.026	.044	.026	YES	.106	YES	GLOBAL
88 *	.075	.000	.028	.000	YES	.080	YES	GLOBAL
90 *	.019	.000	.007	.000	YES	.020	YES	GLOBAL
95 *	.000	.000	.000	.000	YES	.000	YES	GLOBAL
98 *	.000	.098	.086	.098	YES	.086	YES	GLOBAL
100 *	.000	.110	.095	.110	YES	.095	YES	GLOBAL
105 *	.001	.192	.290	.192	YES	.290	YES	GLOBAL
110 *	.001	.000	.445	.000	YES	.445	YES	GLOBAL
111 *	.002	.262	.426	.262	YES	.426	YES	GLOBAL
113 *	.020	.307	.422	.307	YES	.423	YES	GLOBAL
115 *	.074	.335	.422	.335	YES	.429	YES	GLOBAL

N O D A L A C C E L E R A T I O N S (CONTINUED)

NODE NAME	****** ACCELERATIONS ******* X-GLOBAL (G)	Y-GLOBAL (G)	Z-GLOBAL (G)	******* THRESHOLD ACCELERATIONS ******* VERTICAL (G)	EXCEED	HORIZONTAL (G)	EXCEED	
120 *	.166	.402	.422	.402	YES	.454	YES	GLOBAL
121 *	.092	.396	.422	.396	YES	.432	YES	GLOBAL
124 *	.099	.357	.392	.357	YES	.404	YES	GLOBAL
125 *	.099	.234	.280	.234	YES	.297	YES	GLOBAL
126 *	.098	.028	.082	.028	YES	.128	YES	GLOBAL
128 *	.075	.000	.044	.000	YES	.087	YES	GLOBAL
130 *	.018	.000	.011	.000	YES	.021	YES	GLOBAL
140 *	0.000	0.000	0.000	0.000	YES	0.000	YES	GLOBAL

N O D A L D I S P L A C E M E N T S

NODE NAME	NODAL TRANSLATIONS X	Y	Z	NODAL ROTATIONS XX	YY	ZZ	COORDINATE SYSTEM
1 *	0.0000	0.0000	0.0000	0.000000	0.000000	0.000000	GLOBAL
2 *	.0002	.0000	.0016	.000494	.000149	.000043	GLOBAL
4 *	.0034	.0126	.0102	.002943	.000597	.000288	GLOBAL
5 *	.0298	.1371	.0102	.004652	.000991	.000482	GLOBAL
6 *	.0459	.2129	.0103	.004830	.001021	.000514	GLOBAL
8 *	.0557	.2438	.0425	.005623	.001120	.000629	GLOBAL
10 *	.0669	.2439	.1460	.005795	.001180	.000656	GLOBAL
11 *	.0848	.2439	.3115	.005478	.001279	.000603	GLOBAL
13 *	.0801	.2141	.3427	.004652	.001368	.000500	GLOBAL
15 *	.0550	.1343	.3427	.004246	.001439	.000409	GLOBAL
16 *	.0098	.0156	.3428	.003689	.001575	.000264	GLOBAL
18 *	.0001	.0044	.3330	.003330	.001757	.000284	GLOBAL
20 *	.0001	.0000	.3051	.003215	.001805	.000260	GLOBAL
25 *	.0001	.0066	.2350	.002434	.002111	.000128	GLOBAL
30 *	.0000	.0091	.1121	.001160	.001863	.000065	GLOBAL
31 *	.0330	.0268	.0792	.000574	.001000	.000224	GLOBAL
33 *	.0356	.0286	.0781	.000459	.000650	.000242	GLOBAL
35 *	.0424	.0351	.0781	.000276	.000077	.000354	GLOBAL
40 *	.0263	.0363	.0780	.000310	.000887	.000559	GLOBAL
41 *	.0069	.0337	.0780	.000373	.001256	.000671	GLOBAL
44 *	.0051	.0298	.0714	.000404	.001571	.000737	GLOBAL
45 *	.0051	.0193	.0491	.000410	.001596	.000743	GLOBAL
46 *	.0051	.0022	.0118	.000448	.001265	.000578	GLOBAL
48 *	.0034	.0000	.0053	.000317	.000822	.000284	GLOBAL
50 *	.0006	.0000	.0013	.000144	.000210	.000075	GLOBAL
55 *	.0000	.0000	.0000	.000000	.000000	.000000	GLOBAL
60 *	.0000	.0044	.0340	.000580	.001283	.000134	GLOBAL
65 *	.0000	.0000	.0000	.000000	.000000	.000000	GLOBAL
70 *	.0000	.0059	.0066	.000172	.000271	.000235	GLOBAL
71 *	.0037	.0180	.0103	.000330	.000099	.000415	GLOBAL
73 *	.0039	.0195	.0104	.000360	.000083	.000440	GLOBAL
75 *	.0044	.0263	.0104	.000350	.000101	.000532	GLOBAL
80 *	.0054	.0354	.0104	.000178	.000077	.000700	GLOBAL
81 *	.0062	.0375	.0104	.000098	.000071	.000792	GLOBAL
84 *	.0064	.0341	.0098	.000070	.000175	.000845	GLOBAL
85 *	.0064	.0222	.0072	.000068	.000193	.000848	GLOBAL
86 *	.0064	.0025	.0022	.000076	.000185	.000667	GLOBAL
88 *	.0043	.0000	.0012	.000065	.000124	.000346	GLOBAL
90 *	.0008	.0000	.0003	.000032	.000032	.000098	GLOBAL
95 *	.0000	.0000	.0000	.000000	.000000	.000000	GLOBAL
98 *	.0000	.0069	.0078	.000171	.000298	.000235	GLOBAL
100 *	.0000	.0078	.0090	.000171	.000322	.000234	GLOBAL
105 *	.0000	.0162	.0379	.000230	.000647	.000092	GLOBAL
110 *	.0001	.0000	.0664	.000361	.000238	.000643	GLOBAL
111 *	.0001	.0320	.0671	.000454	.000181	.000987	GLOBAL
113 *	.0012	.0386	.0662	.000484	.000296	.001029	GLOBAL
115 *	.0056	.0448	.0662	.000462	.000331	.001059	GLOBAL

N O D A L D I S P L A C E M E N T S (CONTINUED)

NODE NAME	NODAL TRANSLATIONS X	Y	Z	NODAL ROTATIONS XX	YY	ZZ	COORDINATE SYSTEM
120 *	.0148	.0602	.0661	.000112	.000228	.001194	GLOBAL
121 *	.0069	.0574	.0661	.000206	.000727	.001251	GLOBAL
124 *	.0098	.0508	.0613	.000247	.001230	.001280	GLOBAL
125 *	.0098	.0328	.0435	.000259	.001296	.001271	GLOBAL
126 *	.0098	.0038	.0115	.000390	.001121	.000985	GLOBAL
128 *	.0067	.0000	.0056	.000316	.000742	.000529	GLOBAL
130 *	.0013	.0000	.0014	.000155	.000189	.000152	GLOBAL
140 *	0.0000	0.0000	0.0000	0.000000	0.000000	0.000000	GLOBAL

F R E Q U E N C Y S P A C I N G N R C G R O U P I N G M E T H O D

FREQUENCY NUMBER	SPACING NUMBER	FREQUENCY (CPS)
1	1	5.0338
2	2	7.8127
3	2	8.1931
4	3	8.9775
5	3	9.3124
6	4	9.8957
7	5	13.2216
8	6	14.9570
9	6	15.0669
10	7	17.7548
11	7	18.2090
12	8	22.9005
13	8	25.0238
14	9	25.8552
15	9	26.9440
16	9	28.1331
17	10	30.3004
18	11	35.2192
19	11	37.0976
20	12	42.6149
21	12	44.4190
22	13	48.0901

P I P E M E M B E R S T R E S S E S

PIPE NAME		PIPE TYPE	NODAL PT NAME-END	SECTION DESCRIP	LOCAL X FORCE	LOCAL Y FORCE	LOCAL Z FORCE	LOCAL X MOMENT	LOCAL Y MOMENT	LOCAL Z MOMENT	BENDING STRESS	INTEN FACTR
1	*		1 -I		236.87	80.72	266.53	4946.94	22172.66	2106.24	5341.49	1.00
1	*		2 -J		236.87	80.72	266.53	4946.94	20589.19	1656.46	4972.66	1.00
2	*	CURV	2 -I		236.87	266.53	80.72	4946.94	1656.46	20589.19	5578.79	1.50
2	*	CURV	-C		52.66	352.66	80.72	2546.03	4295.27	19057.80	5174.62	1.50
2	*	CURV	4 -J		266.53	236.87	80.72	1233.11	4467.41	17597.33	4779.67	1.50
3	*		4 -I		266.53	236.87	80.72	1233.11	4467.41	17597.33	4260.36	1.00
3	*		5 -J		266.53	236.87	80.72	1233.11	1946.96	10110.93	2427.88	1.00
4	*		5 -I		261.89	170.09	57.51	1233.11	1946.96	10110.93	2427.88	1.00
4	*		6 -J		261.89	170.09	57.51	1233.11	1038.39	7444.10	1783.20	1.00
5	*	CURV	6 -I		261.89	170.09	57.51	1233.11	1038.39	7444.10	2000.57	1.50
5	*	CURV	-C		72.91	303.65	57.51	263.70	1367.00	6281.52	1689.92	1.50
5	*	CURV	8 -J		170.09	261.89	57.51	703.09	918.28	4881.75	1317.72	1.50
6	*		8 -I		170.09	57.51	261.89	703.09	4881.75	918.28	1174.55	1.00
6	*		10 -J		170.09	57.51	261.89	703.09	275.27	489.93	210.73	1.00
7	*		10 -I		77.98	31.53	206.97	703.09	275.27	489.93	210.73	1.00
7	*		11 -J		77.98	31.53	206.97	703.09	5847.14	893.99	1394.58	1.00
8	*	CURV	11 -I		77.98	206.97	31.53	703.09	893.99	5847.14	1564.58	1.50
8	*	CURV	-C		201.36	91.51	31.53	246.49	1233.97	6587.89	1761.64	1.50
8	*	CURV	13 -J		206.97	77.98	31.53	1060.10	866.64	6621.18	1775.90	1.50
9	*		13 -I		206.97	77.98	31.53	1060.10	866.64	6621.18	1582.95	1.00
9	*		15 -J		206.97	77.98	31.53	1060.10	1396.71	5220.85	1289.40	1.00
10	*		15 -I		69.35	33.31	37.43	1060.10	1396.71	5220.85	1289.40	1.00
10	*		16 -J		69.35	33.31	37.43	1060.10	2007.99	4479.07	1175.69	1.00
11	*	CURV	16 -I		69.35	37.43	33.31	1060.10	4479.07	2007.99	1319.00	1.50
11	*	CURV	-C		51.33	59.80	33.31	3855.82	2354.78	2215.48	1321.68	1.50
11	*	CURV	18 -J		37.43	69.35	33.31	4343.12	1197.79	2485.03	1351.41	1.50
12	*		18 -I		37.43	33.31	69.35	4343.12	2485.03	1197.79	1204.58	1.00
12	*		20 -J		37.43	33.31	69.35	4343.12	3413.24	1628.03	1348.24	1.00
13	*		20 -I		37.55	23.86	43.34	4343.12	3413.24	1628.03	1348.24	1.00
13	*		25 -J		37.55	23.86	43.34	4343.12	2143.38	1037.98	1159.64	1.00
14	*		25 -I		37.61	19.23	93.75	4343.12	2143.38	1037.98	1159.64	1.00
14	*		30 -J		37.61	19.23	93.75	4343.12	3974.72	806.38	1391.21	1.00

P I P E M E M B E R S T R E S S E S (CONTINUED)

PIPE NAME	PIPE TYPE	NODAL PT NAME-END	SECTION DESCRIP	LOCAL X FORCE	LOCAL Y FORCE	LOCAL Z FORCE	LOCAL X MOMENT	LOCAL Y MOMENT	LOCAL Z MOMENT	BENDING STRESS	INTEN FACTR
15 *		30 -I		53.77	22.67	31.60	1377.73	2377.25	1686.89	1448.84	1.00
15 *		31 -J		53.77	22.67	31.60	1377.73	3316.95	1038.16	1680.08	1.00
16 *	CURV	31 -I		53.77	31.60	22.67	1377.73	1038.16	3316.95	1737.42	1.38
16 *	CURV	-C		61.31	11.45	22.67	945.99	1416.30	3350.85	1746.78	1.38
16 *	CURV	33 -J		59.70	18.06	22.67	474.85	1610.69	3344.14	1738.98	1.38
17 *		33 -I		59.70	22.67	18.06	474.85	3344.14	1610.69	1681.59	1.00
17 *		35 -J		59.70	22.67	18.06	474.85	3032.01	1371.16	1510.50	1.00
18 *		35 -I		69.28	19.49	22.52	474.85	3032.01	1371.16	1510.50	1.00
18 *		40 -J		69.28	19.49	22.52	474.85	2281.21	885.75	1120.19	1.00
19 *		40 -I		90.29	32.28	30.69	474.85	2281.21	885.75	1120.19	1.00
19 *		41 -J		90.29	32.28	30.69	474.85	1741.77	285.23	821.33	1.00
20 *	CURV	41 -I		90.29	30.69	32.28	474.85	285.23	1741.77	849.36	1.38
20 *	CURV	-C		45.08	84.04	32.28	228.26	421.76	1539.86	749.49	1.38
20 *	CURV	44 -J		30.69	90.29	32.28	177.81	336.16	1223.14	595.24	1.38
21 *		44 -I		30.69	32.28	90.29	177.81	1223.14	336.16	575.60	1.00
21 *		45 -J		30.69	32.28	90.29	177.81	256.68	182.52	162.53	1.00
22 *		45 -I		33.88	48.78	106.12	177.81	256.68	182.52	162.53	1.00
22 *		46 -J		33.88	48.78	106.12	177.81	2710.92	1318.94	1357.10	1.00
23 *	CURV	46 -I		33.88	48.78	106.12	177.81	2710.92	1318.94	1403.42	1.38
23 *	CURV	-C		47.44	35.73	106.12	2153.89	2158.63	1457.14	1570.57	1.38
23 *	CURV	48 -J		48.78	33.88	106.12	3186.70	359.28	1487.67	1642.82	1.38
24 *		48 -I		48.78	33.88	106.12	3186.70	359.28	1487.67	1588.60	1.00
24 *		50 -J		48.78	33.88	106.12	3186.70	1993.22	1433.38	1807.72	1.00
25 *		50 -I		48.78	34.31	106.34	3186.70	1993.22	1433.38	1807.72	1.00
25 *		55 -J		48.78	34.31	106.34	3186.70	3688.88	1579.37	2302.67	1.00
26 *		30 -I		43.10	25.87	78.40	2412.79	1918.60	1322.87	785.35	1.00
26 *		60 -J		43.10	25.87	78.40	2412.79	4942.36	188.78	1288.38	1.00
27 *		60 -I		43.13	32.47	87.71	2412.79	4942.36	188.78	1288.38	1.00
27 *		65 -J		43.13	32.47	87.71	2412.79	8981.20	1495.09	2205.18	1.00
28 *		65 -I		49.72	38.09	39.50	815.19	2453.14	2243.76	801.39	1.00
28 *		70 -J		49.72	38.09	39.50	815.19	984.12	678.68	338.76	1.00

P I P E M E M B E R S T R E S S E S (CONTINUED)

PIPE NAME		PIPE TYPE	NODAL PT NAME-END	SECTION DESCRIP	LOCAL X FORCE	LOCAL Y FORCE	LOCAL Z FORCE	LOCAL X MOMENT	LOCAL Y MOMENT	LOCAL Z MOMENT	BENDING STRESS	INTEN FACTR
29	*		70 -I		17.76	24.58	19.05	115.29	971.03	1275.94	722.39	1.00
29	*		71 -J		17.76	24.58	19.05	115.29	517.21	501.06	327.72	1.00
30	*	CURV	71 -I		17.76	19.05	24.58	115.29	501.06	517.21	338.91	1.38
30	*	CURV	-C		20.22	16.41	24.58	287.91	380.74	498.94	320.88	1.38
30	*	CURV	73 -J		21.43	14.54	24.58	402.42	206.45	477.22	305.55	1.38
31	*		73 -I		21.43	24.58	14.54	402.42	477.22	206.45	295.46	1.00
31	*		75 -J		21.43	24.58	14.54	402.42	259.31	338.39	263.45	1.00
32	*		75 -I		17.81	12.64	14.48	402.42	259.31	338.39	263.45	1.00
32	*		80 -J		17.81	12.64	14.48	402.42	357.82	747.48	413.99	1.00
33	*		80 -I		19.70	28.81	20.63	402.42	357.82	747.48	413.99	1.00
33	*		81 -J		19.70	28.81	20.63	402.42	592.92	239.46	339.52	1.00
34	*	CURV	81 -I		19.70	20.63	28.81	402.42	239.46	592.92	351.11	1.38
34	*	CURV	-C		26.85	9.68	28.81	194.05	362.51	622.43	346.66	1.38
34	*	CURV	84 -J		20.63	19.70	28.81	155.11	283.96	585.99	311.07	1.38
35	*		84 -I		20.63	28.81	19.70	155.11	585.99	283.96	300.80	1.00
35	*		85 -J		20.63	28.81	19.70	155.11	335.95	202.56	189.57	1.00
36	*		85 -I		28.53	50.36	27.02	155.11	335.95	202.56	189.57	1.00
36	*		86 -J		28.53	50.36	27.02	155.11	363.16	1396.94	652.35	1.00
37	*	CURV	86 -I		28.53	50.36	27.02	155.11	363.16	1396.94	674.61	1.38
37	*	CURV	-C		36.19	45.46	27.02	387.41	257.32	1562.23	757.47	1.38
37	*	CURV	88 -J		50.36	28.53	27.02	481.94	96.70	1645.11	797.90	1.38
38	*		88 -I		50.36	28.53	27.02	481.94	96.70	1645.11	771.56	1.00
38	*		90 -J		50.36	28.53	27.02	481.94	427.99	1795.55	857.28	1.00
39	*		90 -I		50.36	29.32	27.21	481.94	427.99	1795.55	857.28	1.00
39	*		95 -J		50.36	29.32	27.21	481.94	857.70	2097.44	1041.07	1.00
40	*		70 -I		36.78	22.09	36.61	220.02	1906.29	721.94	480.00	1.00
40	*		98 -J		36.78	22.09	36.61	220.02	1758.16	654.46	442.22	1.00
41	*		98 -I		36.78	22.09	36.61	220.02	1758.16	654.46	442.22	1.00
41	*		100 -J		36.78	22.09	36.61	220.02	1614.61	594.68	406.12	1.00
42	*		100 -I		36.78	22.09	36.61	220.02	1614.61	594.68	779.51	1.00
42	*		105 -J		36.78	22.09	36.61	220.02	384.97	888.05	446.05	1.00

P I P E M E M B E R S T R E S S E S (CONTINUED)

PIPE NAME		PIPE TYPE	NODAL PT NAME-END	SECTION DESCRIP	LOCAL X FORCE	LOCAL Y FORCE	LOCAL Z FORCE	LOCAL X MOMENT	LOCAL Y MOMENT	LOCAL Z MOMENT	BENDING STRESS	INTEN FACTR
43	*		105 -I		36.75	17.59	17.53	220.02	384.97	888.05	446.05	1.00
43	*		110 -J		36.75	17.59	17.53	220.02	1287.34	1662.79	950.13	1.00
44	*		110 -I		36.70	35.50	16.96	220.02	1287.34	1662.79	950.13	1.00
44	*		111 -J		36.70	35.50	16.96	220.02	792.27	364.73	404.22	1.00
45	*	CURV	111 -I		36.70	16.96	35.50	220.02	364.73	792.27	418.01	1.38
45	*	CURV	-C		18.86	35.82	35.50	122.56	299.48	713.49	364.07	1.38
45	*	CURV	113 -J		16.96	36.70	35.50	235.43	85.21	590.66	298.13	1.38
46	*		113 -I		16.96	35.50	36.70	235.43	590.66	85.21	288.29	1.00
46	*		115 -J		16.96	35.50	36.70	235.43	215.89	440.34	244.46	1.00
47	*		115 -I		44.04	13.76	33.83	235.43	215.89	440.34	244.46	1.00
47	*		120 -J		44.04	13.76	33.83	235.43	1967.92	1211.76	1043.91	1.00
48	*		120 -I		94.27	35.29	26.06	235.43	1967.92	1211.76	1043.91	1.00
48	*		121 -J		94.27	35.29	26.06	235.43	2490.54	446.59	1141.94	1.00
49	*	CURV	121 -I		94.27	26.06	35.29	235.43	446.59	2490.54	1180.92	1.38
49	*	CURV	-C		83.04	51.67	35.29	369.63	320.87	2439.09	1156.07	1.38
49	*	CURV	124 -J		26.06	94.27	35.29	469.13	138.98	2170.01	1033.74	1.38
50	*		124 -I		26.06	35.29	94.27	469.13	2170.01	138.98	999.62	1.00
50	*		125 -J		26.06	35.29	94.27	469.13	853.86	475.96	487.25	1.00
51	*		125 -I		33.99	60.67	126.07	469.13	853.86	475.96	487.25	1.00
51	*		126 -J		33.99	60.67	126.07	469.13	2310.14	1961.16	1377.97	1.00
52	*	CURV	126 -I		33.99	60.67	126.07	469.13	2310.14	1961.16	1425.00	1.38
52	*	CURV	-C		29.55	62.85	126.07	2127.74	1707.39	2186.59	1624.73	1.38
52	*	CURV	128 -J		60.67	33.99	126.07	2876.93	202.69	2348.23	1728.32	1.38
53	*		128 -I		60.67	33.99	126.07	2876.93	202.69	2348.23	1671.28	1.00
53	*		130 -J		60.67	33.99	126.07	2876.93	2063.93	2773.32	2021.07	1.00
54	*		130 -I		60.67	34.76	126.52	2876.93	2063.93	2773.32	2021.07	1.00
54	*		140 -J		60.67	34.76	126.52	2876.93	4082.69	3250.65	2677.89	1.00

M A X I M U M P I P E M E M B E R S T R E S S E S

	PIPE NAME		NODAL PT NAME-END	BENDING STRESS(PSI)
1-	2	*	2-I	5578.79
2-	2	*	2-I	5578.79
3-	1	*	1-I	5341.49
4-	2	*	-C	5174.62
5-	2	*	-C	5174.62
6-	2	*	4-J	4972.66
7-	1	*	2-J	4972.66
8-	2	*	4-J	4779.67
9-	3	*	4-I	4260.36
10-	54	*	140-J	2677.89

P I P I N G S Y S T E M R E A C T I O N S

NODE NAME		SUPPORT CODE	X FORCE	Y FORCE	Z FORCE	X MOMENT	Y MOMENT	Z MOMENT	COORDINATE SYSTEM
1	*	111111	80.72	236.87	266.53	22172.66	4946.94	2106.24	GLOBAL
10	*	20000	0.00	.24	0.00	0.00	0.00	0.00	GLOBAL
20	*	20000	0.00	54.54	0.00	0.00	0.00	0.00	GLOBAL
40	*	20000	0.00	.04	0.00	0.00	0.00	0.00	GLOBAL
55	*	222222	34.31	48.78	106.34	3688.88	3186.70	1579.37	GLOBAL
65	*	222222	69.09	53.98	96.92	2564.47	9333.81	2867.56	GLOBAL
80	*	20000	0.00	.04	0.00	0.00	0.00	0.00	GLOBAL
95	*	222222	29.32	50.36	27.21	857.70	481.94	2097.44	GLOBAL
110	*	20000	0.00	51.42	0.00	0.00	0.00	0.00	GLOBAL
120	*	20000	0.00	.06	0.00	0.00	0.00	0.00	GLOBAL
140	*	111111	34.76	60.67	126.52	4082.69	2876.93	3250.65	GLOBAL