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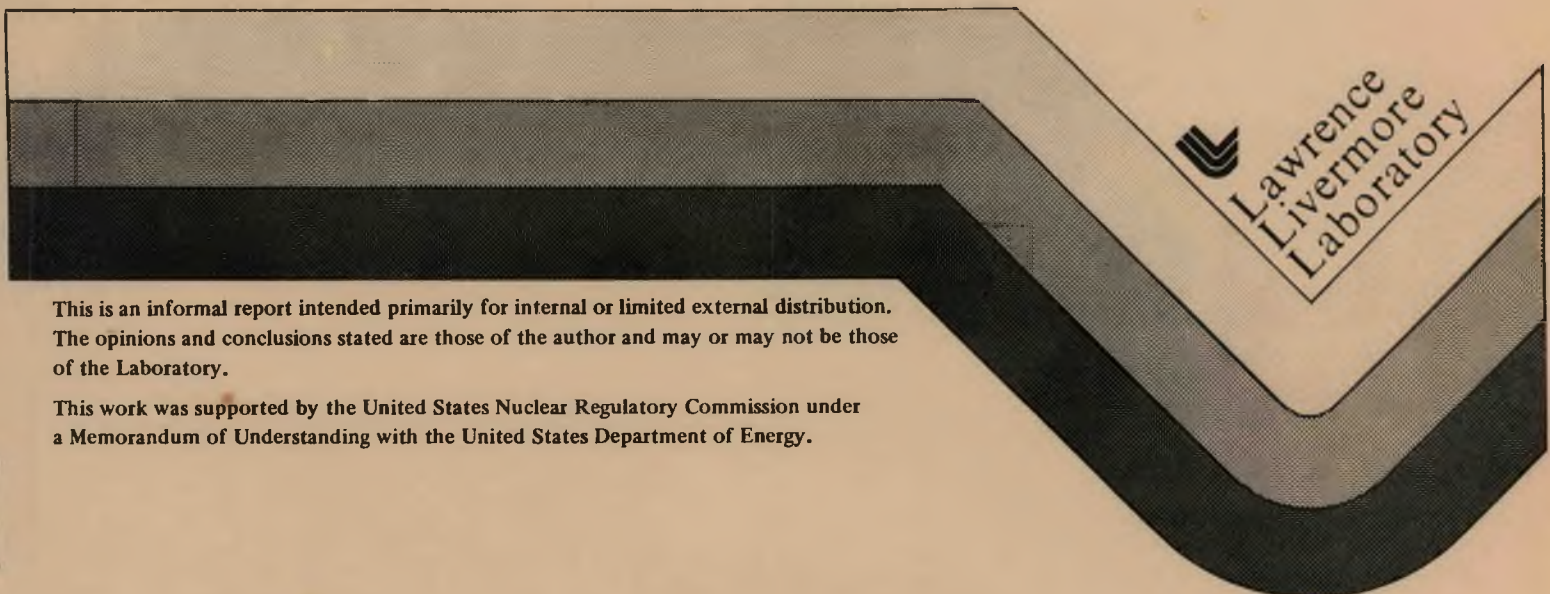
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USER'S MANUAL FOR SMACS:  
A Family of Codes for Probabilistic  
Structural Analysis

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**MASTER**

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## FOREWORD

SMACS is a code which links the seismic input, soil-structure interaction and structural response calculations to obtain response vectors, which in turn are used as input for risk analysis. Inherently, there are uncertainties involved in various links of the seismic methodology chain. SMACS incorporates the uncertainty in the seismic input by using a suite of possible earthquakes. Uncertainties in the soil-structure interaction (SSI) are incorporated by using a range of values of soil shear modulus and soil material damping at a given site. Similarly a range of probable values of modal frequency and damping of the structure are used to account for uncertainties in structural modelling.

The following pre-processor codes are available, as a package, to create necessary input files for the SMACS program:

- o SIMQ (for generating seismic input).
- o GLAY & CLAF (for soil-structure interaction analysis).
- o SAP4 (for modal analysis of the structures).

The post-processor codes available are:

- o PRESTO (to plot probability distributions for the response vectors or basic events); and
- o CHANGC (to plot comparisons of basic events from different analyses).

Chapter 1 of this document briefly discusses the code, SMACS, and the nature of the problem it solves. Chapter 2 then discusses the way that SMACS is executed. Chapter 3 contains manuals explaining how to create the necessary input files for different subprograms of the SMACS family. In Chapter 4 there is an example problem illustrating an SSI analysis for a containment structure.

## CHAPTER 1

### INTRODUCTION

A nuclear power plant is designed to withstand a safe shutdown earthquake. Conventionally, structures and substructures are modelled and analyzed deterministically for a given earthquake at a specific site. However, there are several uncertainties involved in the process; namely, uncertainties in modelling, in selecting soil and structural material properties and in choosing the characteristics of the earthquake accelerogram. To quantify these uncertainties a trend towards a probabilistic analysis of nuclear power plants followed by a risk analysis has developed. Total risk of failure as computed in the SSMRP\* is obtained by considering the entire spectrum of possible earthquakes, the entire range of uncertainties in shear modulus and material damping values of soil, and the entire range of variations in modal frequencies and damping values in the structures.

The approach to risk analysis is embodied in the "seismic methodology chain" (SMC) comprising the following steps:

- (a) Determination of seismic input characteristics for a given site;
- (b) Calculation of soil-structure interaction effects;
- (c) Calculation of major structure (building) response;
- (d) Calculation of subsystem (piping) response; and
- (e) Calculation of probability of failure.

The seismic input consists of the earthquake hazard at the site as defined by the seismic hazard function; that is, the relationship between the probability of occurrence and the size of an earthquake as well as a description of the free-field motion. The soil-structure interaction step in the SMC transforms the free-field ground motion into basemat or foundation response, usually assuming that the basemat is rigid. After the basemat response is obtained, detailed in-structure response is computed in a straightforward manner. The time history accelerations at the support points are then used to calculate responses in the pipelines.

---

\*Seismic Safety Margins Research Program at LLNL.

The computer program, SMACS, (Seismic Methodology Analysis Chain with Statistics) uses the seismic input and structural data to calculate soil-structure interaction, major structure response, and subsystem response. It also performs statistical analysis of the resulting responses.

As mentioned earlier, uncertainty is involved in every link of the SMC. For example, the frequency and damping values of a structure or a substructure vary with material properties, modelling technique, and method of analysis. The uncertainties in these parameters may be represented by probabilistic distributions of values for structural frequency and damping. It has been reported elsewhere<sup>1</sup> that the frequency and damping values have lognormal distributions. Therefore, SMACS uses the calculated frequency and damping as the median value of these distributions and accounts for uncertainty through multiplicative factors that are distributed lognormally. The same approach is used for variations in the shear modulus and material damping of soil.

Before executing SMACS, one must first perform a modal analysis of the given structure with a fixed base. This modal extraction is done by using the computer code, SAP4<sup>2</sup>. The resulting modal frequencies are used as the median values in SMACS. For seismic input a desired number of synthetic earthquakes can be generated by the computer program, SIMQ<sup>3</sup>, which generates earthquake acceleration time-histories to match a given design spectra for a specific site. The soil-structure interaction part of SMACS solves the problem through the use of substructuring. It uses the CLASSI<sup>4</sup> family of programs to divide the soil-structure interaction problem into simpler ones; namely, determination of Green's functions; determination of foundation impedances; and analysis of the coupled soil-structure system. These three problems are solved independently, and then the results are superimposed to give the response of structures. Once the time history of responses at support points is obtained, responses of subsystems or piping can be calculated. One important set of SMACS output is the response vectors. These response vectors can be used along with fragility curves of the structural components and subsystems to complete a risk analysis that will determine probability of failure and the risk of radioactive release.

For the mathematical theory and methodology involved at various links of SMACS, the reader should refer to the SSMRP report on SMACS<sup>5</sup>.

SMACS has two post-processors which construct plots of calculated statistics about the responses. These post-processors are described in more detail in the next chapter.

## CHAPTER 2

### EXECUTION OF SMACS

SMACS links the pertinent parts of the programs, CLASSI and SAP4, in order to solve a sequence of soil-structure interaction problems along with a number of associated subsystem problems. Resulting outputs are time histories of acceleration, or force, at points of interest on the foundation, structures and subsystems. However, the principal output quantities are the response vectors which are input to the program, SEISIM<sup>6</sup>, to compute probability of failure. These response vector quantities from the output time histories are response peaks or spectral maximum values for selected frequencies and critical damping values at specified points in the structure. For an insight into the methodology that is involved, the reader should refer to the SSMRP Phase I Final Report on SMACS<sup>5</sup>.

In order to execute SMACS, the user must prepare four input files, namely, IMPEDFN, SSINTH, SSINST and SMACSI. The schematic flow chart\* in Figure 1 shows the paths and programs needed to generate these files. A brief description on how to obtain each of these files is given below.

#### o IMPEDFN

This file is obtained by first executing the GLAY<sup>4</sup> code which computes Green's function for a given set of soil properties, followed by the CLAF<sup>4</sup> code which gives IMPEDFN and CLAFLOG as output files. The IMPEDFN file contains values of the impedance function for the soil-structure interaction. CLAFLOG is a log of the execution of the program. Only the former is used as an input file for SMACS.

#### o SSINTH

This file contains sets of acceleration time histories of a given number of earthquakes. SSINTH is obtained as a combined output file by repeatedly executing SIMQ, which generates synthetic earthquake acceleration time histories to match given design spectra for a specific site.

---

\*Note in Figure 1 that each program code is shown in a rectangle.

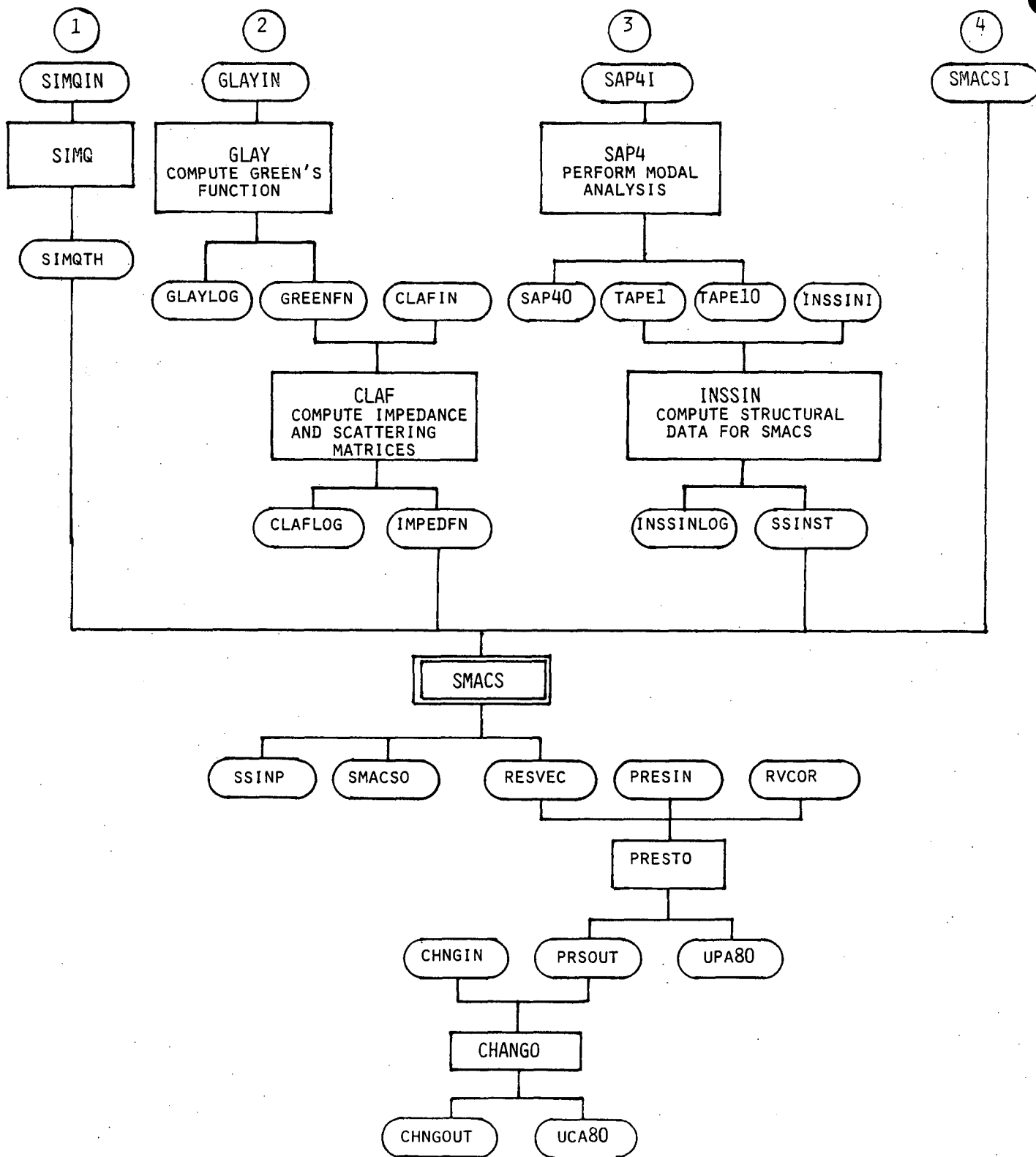


FIGURE I: SCHEMATIC FLOW DIAGRAM FOR EXECUTION OF SMACS

o SSINST

First of all, a modal analysis is performed for the subject structures using SAP4. The resulting output tapes, TAPE1 and TAPE10, along with another prepared file, INSSINI, are used as input files for the code, INSSIN. The input file, INSSINI, contains additional information about the structure. To prepare this file, the user should refer to the INSSIN Manual write-up given in chapter 3 of this manual. INSSIN produces the following output files: (1) INSSINLOG, a log showing what the code was asked to calculate and (2) SSINST which contains modal information about the structure in the SMACS format. The SSINST files for all the subject structures are arranged back-to-back and the resulting file is also named SSINST. This SSINST file is then used as one of the input files to SMACS.

o SMACSI

This file is created as specified in the SMACS Manual given in chapter 3. Included in the file is information on the type of foundations (fixed base or soil-structure interaction), dimensions of foundations, number of structures, and coefficients of variation of the soil properties.

The step-by-step procedure to create input files necessary to execute SMACS is summarized below:

IMPEDFN

- 1) Create input file GLAYIN (Manual: GLAY)
- 2) Execute GLAY (Output: GREENFN, GLAYLOG)
- 3) Create CLAFIN (Manual: CLAF)
- 4) Execute CLAF with input files GREENFN and CLAFIN (Output: CLAFLOG, IMPEDFN)

SSINTH

- 1) Obtain SIMQIN and modify as appropriate (Manual: SIMQ)
- 2) Execute SIMQ (Output: SIMQTH)
- 3) Combine outputs from SIMQ to create a master SSINTH file.

SSINST

- 1) Create input file SAP4I (Manual: SAP4)
- 2) Execute SAP4 I=SAP4I (Output: SAP40, TAPE1, TAPE10)
- 3) Create INSSINI (Manual: INSSIN)
- 4) Execute INSSIN3.2 I=INSSINI (Output: INSSINLOG, SSINST)
- 5) Text edit the SSINST files to put all the pertinent structures back to back to create a new master file also named SSINST

SMACSI

- 1) Create input file SMACSI (Manual: SMACS).

EXECUTION OF SMACS

SMACS will look for the above four files during execution. For a full soil-structure-interaction problem, SMACS will abort with an error if any of these files is missing. For a fixed base analysis, SMACS does not need (and will execute perfectly without) the IMPEDFN file, but the other files must be present. Executing SMACS produces output files SMACSO, SSINP and RESVEC. SMACSO is merely a log of what options were requested. SSINP is a binary file containing peak values and/or time histories of responses at desired points in the structure. The third output file, RESVEC, which is also in binary form, contains the response vectors which are used in subsequent post-processors.

POST-PROCESSORSPRESTO

This code post-processes the binary file, RESVEC, as obtained as an output from SMACS. To run PRESTO we also need the file, PRESIN, and possibly the file, RVCOR. The RVCOR file will not be needed if we are doing a straight raw data analysis. PRESIN is an input driver file which has such data as numbers of earthquakes, structures, substructures, etc. The RVCOR file tells how to combine the response vectors to get basic events. The resulting output files are:

PRSOOT - a printed listing of response vectors; and

UPA80 - the resulting response vectors or basic events plotted with the fitted lognormal probability distribution.

CHANGC

This post-processor plots comparisons of the medians, the logarithmic standard deviation, etc., of response vectors at various points of interest. The input files used are PRSGOUT and CHNGIN. The former actually represents one or more PRESTO outputs. The latter is a file containing information somewhat similar to PRESIN. The output files are:

- CHNGOUT - a printout of information about the comparison of statistical data relating to the response vectors as basic events; and
- UCA80 - the computed information from CHNGOUT in plotted form.

## CHAPTER 3

### Manuals for Input Files

The following manuals are included to instruct the user in how to prepare the necessary input files for the SMACS Program:

- o SIMQ
- o GLAY
- o CLAF
- o INSSIN
- o SMACS
- o PRESTO
- o CHANGO

SIMQ MANUAL

SIMQ INPUT

The program, SIMQKE, can generally be used in three modes or options. In all options the primary output is an acceleration time-history, but in OPTION 1 the primary input is a target response spectrum; in OPTION 2 the spectral density function is directly specified; and OPTION 3 allows the user to re-input a previously generated power spectral density function and to specify desired changes in that function.

## OPTION 1 - INPUT DATA

CARD 1 - Format (20A4) TITLE CARD

CARD 2 - FORMAT (6F10.0)

TS : smallest period (seconds) of desired response spectrum.

TL : largest period (seconds) of desired response spectrum.

TMIN1 : smallest period used to determine the range of frequencies to be represented in the simulation. Generally it is equal to TS.

TMAX1 : largest period used to determine the range of frequencies to be represented in the simulation. Generally it is equal to TL.

YMIN : an estimated smallest velocity response spectral value (in/sec). It is mainly used to determine the minimum ordinate on a plot of the spectrum.

YMAX : an estimated largest velocity response spectral value (in/sec). It is used mainly to determine the maximum ordinate on a plot of the response.

CARD 3 - FORMAT (5F10.0)

DELTA : discretization interval (sec) (Standard input is 0.01).

TRISE : earthquake rise time (sec) of intensity envelope.

TLVL : earthquake level time (sec) of intensity envelope.

AGMX : desired maximum ground acceleration in "g's".

DUR : desired duration of accelerogram.

CARD 4 - FORMAT (I10,8I5)

- IIX : an arbitrary odd integer which acts as a seed for the random phase angle generator.
- NDAMP : number of damping values for which  $s_v(\omega)$  is desired.
- NCYCLE : number of cycles to smoothen a response spectrum. If NCYCLE = 1, no cycling is done.
- ICASE : if ICASE = 1, no intensity envelope is used. If ICASE = 2, an intensity envelope is used (standard input is ICASE =2).
- NPA : number of artificial earthquakes desired from one target response spectrum (and one spectral density function).
- NRES : total number of points which describe the target response spectrum.
- NGWK : set NGWK = 0 for Option 1
- NKK : total number of periods at equal intervals on a logarithmic scale.  $0 < NKK < 3000$  (generally NKK is on the order of 200 or 300 points).
- NTHP : number of zeros to add to the time history output.

CARD 5 FORMAT (8F10.0)

- AMOR (I) : damping coefficients in decimal parts of critical damping. The first damping entered will be the one for which cycling, if desired, will be done.

CARD 6 to CARD (5+NRES): FORMAT (2F10.) - target response spectrum

TSV(1)    SVO(1)  
 .        .  
 .        .  
 .        .  
 TSV(NRES) SVO(NRES)

- where: TSV(1) = smallest period (sec)  
 TSV(NRES) = largest period (sec)  
 SVO(1) = target pseudo-velocity value in in/sec  
 SVO(NRES) = target pseudo-velocity value in in/sec

GLAY MANUAL

Preparation of Input Data for Executing GLAY\*

A) Logical Channel Numbers for I/O Operations: GLAY operates on only three I/O channels. The logical channel numbers are specified by three Fortran statements in each program. The applications of these three I/O channels are as follows:

IGR1 = The logical channel number assigned to the input data; it is the master device from which all input data is read (Default IGR=5).

IGR2 = The logical channel number for output data; it is used to list the input data, write error messages, and provide general procedural information (Default IGR2=6).

ICLA3 = The logical channel number for storing the Green's function tables for CLAF. This channel should be assigned to a tape or a permanent disk device because the data will be written in binary (unformatted write) form (Default ICLA3=1).

B) Modular input for GLAY: The input data for GLAY can be conveniently divided into six input modules as shown in Figure 2.4. By using data modules, the user can more readily identify the location of the read statements and the block of data which has to be repeated in a loop. The parameters in each module will be described in the following outline:

MODULE #1 -- Global Control Parameters

Logical Channel Number=IGR1

Program=MAIN

---

\*This is taken from Reference 4.

```

*****
*      READ(IGR1,10)NRFQ,NLY,IFITER,LLLL,IPRNT *
* 10   FORMAT(16I5)                               *
*      READ(IGR1,20)RI,RE                           *
* 20   FORMAT(2E10.3)                               *
*****

```

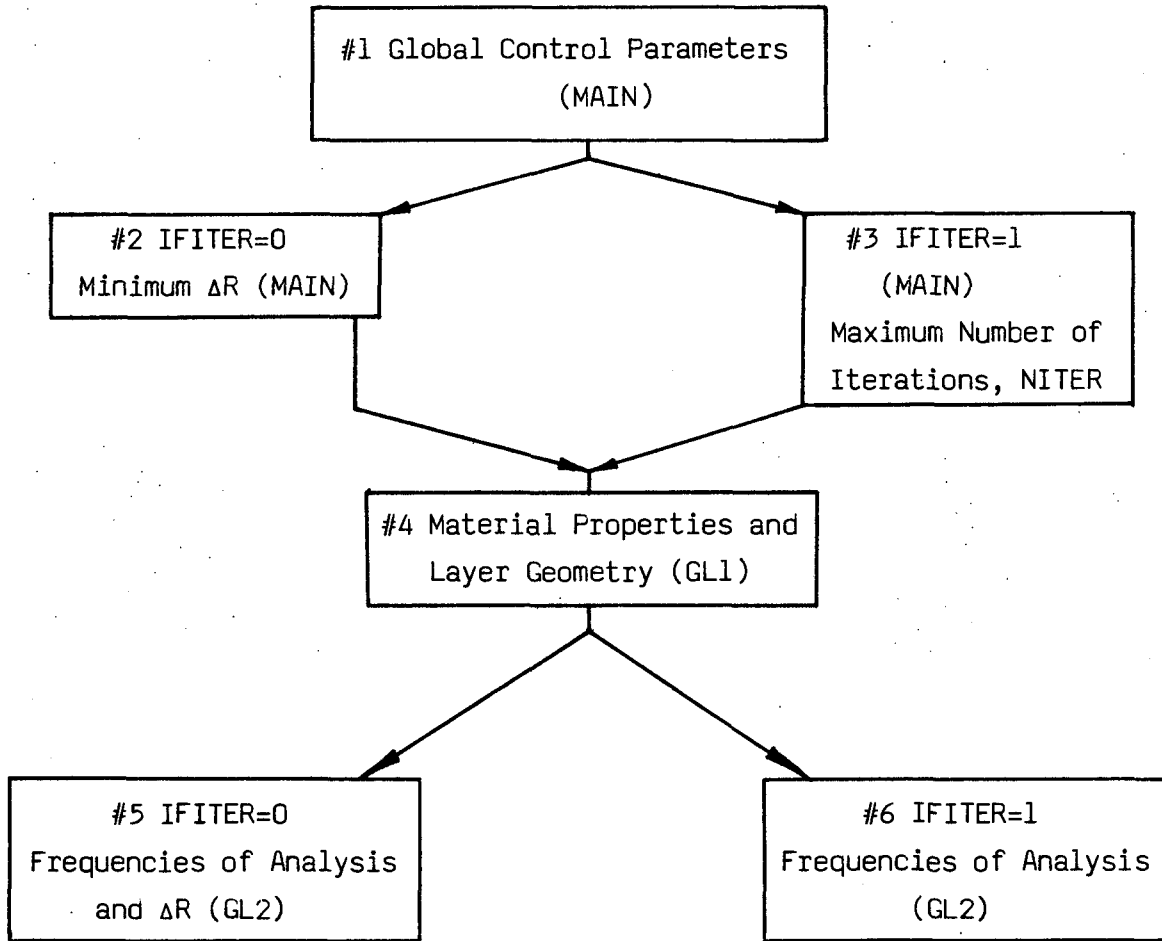
NRFQ = The total number of frequencies at which the Green's function tables are to be calculated.

NLY = The number of layers (including the underlying half space) in the soil medium.

IFITER = 0. Do not calculate the Green's function table by iteration; use the prescribed increment "DR" instead. For users who are experienced in choosing the optimum increment; DR, this option is much faster than the iterative procedure.

IFITER = 1. Calculate the Green's function table by iteration; let the program choose the optimum increment.

MODULES OF INPUT DATA FOR GLAYER



LLLL = The initial number of points in the Green's function table before the iterations begin. To avoid a large number of iterations (the most time-consuming part), it is wise to choose a larger value of LLLL for high frequencies and a lower one for low frequencies. Recommended values are LLLL=8 for low frequencies, and LLLL=16 or higher for high frequencies.

IPRNT = 0. Do not print the Green's function tables.

IPRNT = 1. Print the Green's function tables.

RI,RE = The initial and final radii, respectively, for all the Green's function tables. RI is usually set to zero while RE is set to the maximum length of the foundation, thus allowing all intermediate radii to be interpolated within this range.

MODULE #2 -- IFITER=0, Minimum Increment DR

Logical Channel Number=IGR1

Program=MAIN

```
*****
*      READ(IGR1,100)DRMIN  *
* 100  FORMAT (E10.3)      *
*****
```

DRMIN = The minimum increment of DR to be used among all the frequencies. This parameter is used to determine what size core memory is required to store the largest Green's function table while using IFITER=0.

MODULE #3 -- IFITER=1, Maximum Number of Iterations, NITER.

Logical Channel Number=IGR1

Program=MAIN

```
*****
*      READ (IGR1,210)NITER *
* 210 FORMAT (I5)          *
*****
```

NITER = The maximum number of iterations allowed when IFITER=1 is used. NITER is used to prevent possible nonconvergent iterations and to determine what size core memory is required if the maximum number of iterations is performed.

MODULE #4 -- Material Properties and Layer Geometry

Logical Channel Number=IGR1

Program=SUBROUTINE GL1

```
*****
*      READ(IGR1,10)(BETA(II),II=1,NLY)      *
*      READ(IGR1,10)(RHO(II),II=1,NLY)      *
*      READ(IGR1,10)(POISON(II),II=1,NLY)    *
*      READ(IGR1,10)(DAMP(II),II=1,NLY)      *
*      READ(IGR1,10)(TH(II),II=1,NLY)        *
* 10  FORMAT(8E10.3)                          *
*****
```

BETA = The shear wave velocity for each layer in the soil medium.

RHO = The mass density of each layer in the soil medium.

POISON = The Poisson's ratio of each layer in the soil medium.

DAMP = The damping coefficient (in decimal) of each layer in the soil medium.

TH = The thickness of each layer in the soil medium; its physical units must be consistent with BETA and RHO. Since the last layer is assumed to be a semi-infinite half space, it is not necessary to specify TH(NLY).

MODULE #5 -- IFITER=0, Frequencies of Analysis and DR

Logical Channel Number=IGR1

Program=SUBROUTINE GL2

```
*****
*      DO 600 IFRQ=1,NFRQ          *
*      READ (IGR1,400)FRQ,DR      *
* 400  FORMAT(2E10.3)            *
* 600  CONTINUE                  *
*****
```

FRQ = One of the frequencies (cycle/sec) to be analyzed in the program CLAF. For each "NFRQ" frequency, a Green's function table is created. It should be emphasized that the frequency cannot be set to zero for this program. A substitute value of FRQ=0.01 cycle/sec will be used if FRQ=0.

DR = The increment of radius to be used in the Green's function table when IFITER=0. The value of DR must be chosen for each frequency so that the interpolated values will have adequate accuracy. At higher frequencies, i.e., shorter wavelengths, DR must be smaller.

MODULE #6 -- IFITER=1, Frequencies of Analysis

Logical Channel Number = IGR1

Program=SUBROUTINE GL2

```
*****  
*      DO 600 IFRQ=1,NFRQ          *  
*      READ(IGR1,400)FRQ          *  
* 400  FORMAT(E10.3)              *  
* 600  CONTINUE                   *  
*****
```

FRQ = One of the frequencies (cycle/sec) to be analyzed in the program CLAF. For each "NFRQ" frequency, a Green's function table is created with an increment DR determined by GLAY through iteration. It should be emphasized that the frequency cannot be set to zero for this program. A suitable value of  $FRQ=0.01$  cycle/sec will be used if  $FRQ=0$ .

CLAF MANUAL

Preparation of Input Data for Executing CLAF\*

A) Logical Channel Numbers for I/O Operations: CLAF operates on four I/O channels. All four logical channel numbers are assigned by Fortran statements in the main program. The applications of these four I/O channels are as follows:

ICLA1 = The logical channel number assigned to the input data (Default ICLA1=5).

ICLA2 = The logical channel number for output data. It is used to list the input data, write error messages, and provide general procedural information (Default ICLA2=6).

ICLA3 = The logical channel number for reading the Green's function tables generated by GLAY (Default ICLA3=7).

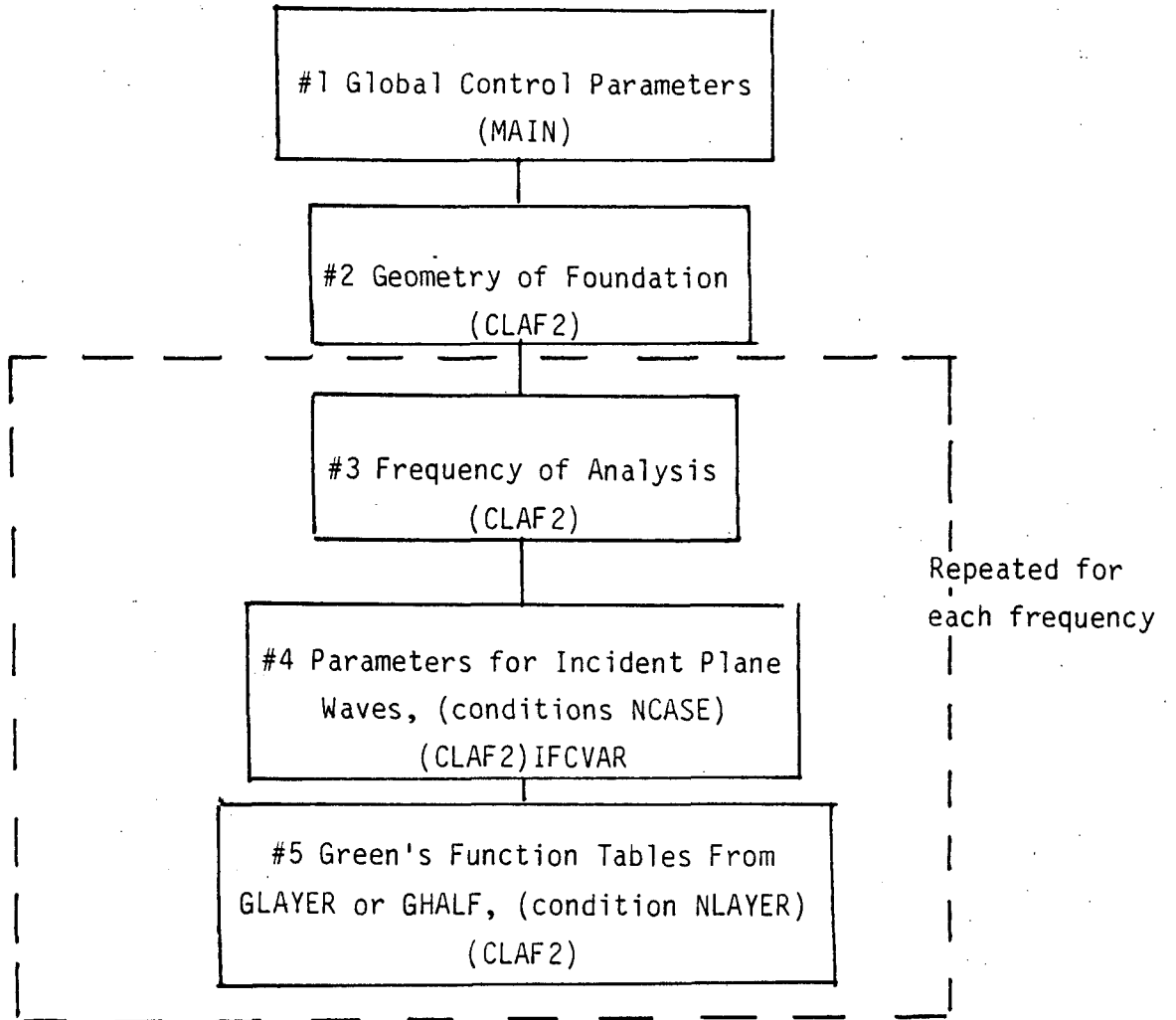
ICLA4 = The logical channel number assigned to store the impedance and wave scattering matrices for SSIN. The write statements using channel ICLA4 are formatted (Default ICLA4=8).

B) Modular Input for CLAF: The input data for CLAF may be divided into five input modules as shown in Figure 2.6. Module numbers, 3, 4, and 5 must be repeated for each frequency of the analysis; however, the latter two modules may be exempted for some frequencies by one of three conditional parameters.

---

\*Taken from Reference 4.

MODULES OF INPUT DATA FOR CLAF



MODULE #1 -- Global Control Parameters

Logical Channel Number = ICLAI

Program=MAIN

```
      READ(ICLAI,10)G,VS,CL,DAMP
10   FORMAT(4E10.3)
      READ(ICLAI,20)NUMFRQ,NGRN,IFCVAR,IPRNT,IPLGT,IDIM
20   FORMAT(16I5)
      READ(ICLAI,20)(IFDOF(JG),JG=1,6)
      READ(ICLAI,20)NP,NTYPE,ISFX,IFSY,NCASE,IMP,NLAYER
```

- G = The reference shear modulus of the soil medium (first layer). It is used to normalize the dimensionless impedance and scattering matrices.
- VS = The reference shear wave velocity of the soil medium (first layer). It is used to normalize the dimensionless frequency  $a_0 = \omega l / v_s$ .
- CL = The characteristic length of the foundation. It is used to render dimensionless both the frequency and the impedances. If CL is chosen to represent reasonably the overall dimension of the foundation, e.g., the radius of a circle or the width of a rectangle, the impedance functions will usually have the order of  $10^0$  or  $10^1$ .
- DAMP = The damping ratio of the soil medium in decimal, e.g., DAMP=0.01 implies 1% damping. DAMP is used to determine the attenuation of plane wave amplitudes.
- NUMFRQ = The number of frequencies at which the impedance and scattering matrices are to be calculated.
- NGRN = The maximum number of points among all the Green's function tables calculated by GLAY.
- IFCVAR = 0. The parameters, BOC, UL, UT, and UV, are not functions of frequency. This option is useful for some body waves.
- IFCVAR = 1. The parameters, BOC, UL, UT, and UV, are functions of frequency; they must be read in for each frequency if NLAYER.GT.1 (there is no dispersion for a half space).
- IPRNT = 0. Do not print the calculated results.
- IPRNT = 1. Print the calculated results.

- I PLOT = 0. Do not create a printer-plot of the results.
- I PLOT = 1. Plot the results on the printed output.
- I DIM = 0. Print the impedance and scattering matrices in dimensionless form.
- I DIM = 1. Print the impedance and scattering matrices in physical units that are consistent with G, VS, and CL.  
Note: the results stored in device, ICLA4, for SSIN will always be dimensionless.
- I FDOF = An array of up to six integers indicating which degrees of freedom of the foundation are to be considered. Values: (1-X,2-Y,3-Z,4-XX,5-YY,6-ZZ).
- N P = The number of rectangular subregions required to approximate the foundation surface.
- N TYPE = The number of different types of rectangular subregions used. In order to use the same type, the X and Y dimension of the subregions must be identical.
- I FSX = 0. The foundation is not symmetrical about the x-axis.
- I FSX = 1. The foundation is symmetrical about the x-axis. Only one half of the subregions must be read in.
- I FSY = 0. The foundation is not symmetrical about the y-axis.
- I FSY = 1. The foundation is symmetrical about the y-axis. Only one half of the subregions must be read in. If both IFSX and IFSY = 1, input only one quadrant of the foundation.

NCASE = The number of incident wave forms to be considered. If NCASE is set to zero, the scattering matrix will not be calculated.

IMP = 0. Do not calculate the impedance matrix.

IMP = 1. Calculate the impedance matrix.

NLAYER = The number of layers in the soil profiles. If NLAYER=1 (half space), only one Green's function table will be read in from unit ICLA3; otherwise, a table will be read in for each of the "NUMFRQ" frequencies.

MODULE #2 -- Geometry of Foundation

Logical Channel Number = ICLA1

Program=SUBROUTINE CLAF2

```

                READ(ICLA1,100)SCALE
                READ(ICLA1,100)(XB(IX),YB(IX),LET(IX),IX=1,NP)
100             FORMAT(2F6.3,I5)
                READ(ICLA1,200)(XH(IX),YH(IX),IX=1,NTYPE)
200             FORMAT(2F6.3)

```

SCALE = A scale factor for the convenience of input. The values of XB, YB, XH, and YH will be divided by this factor.

XB(I),YB(I)= The x- and y-coordinates of the centroid of the I<sup>th</sup> sub-region; both values are normalized by the characteristic length CL. For example, if CL=100ft, and the x-coordinate is 30 ft from the origin, then XB=0.300, if SCALE=1. Clearly, XB and YB may be expressed in regular physical units if SCALE is equal to CL.

LET(I) = An integer specifying the type of subregional dimensions for the I<sup>th</sup> subregion; i.e., the I<sup>th</sup> subregion will have the dimensions of XH(LET(I)) and YH(LET(I)).

XH(J),YH(J)= The x and y dimensions of the J<sup>th</sup> type of subregion; both dimensions are normalized by CL.

MODULE #3 -- Frequency of Analysis

Logical Channel Number = ICLA1

Program=SUBROUTINE CLAF2

\*Note: This module is repeated for each of "NUMFRQ" frequencies (see Figure 2.5); the index for each loop is NF.

```

                READ(ICLA1,300)FRQ(NF)
            300  FORMAT (E10.3)

```

FRQ(NF) = The frequencies at which the impedance and scattering matrices are to be calculated. If the soil medium is layered (NLAYER.GT.1), the frequencies must be identical to those used by GLAY. If the soil medium is a half space (NLAYER.EQ.1), the frequencies must be lower than the maximum frequency used in GLAY.

\*MODULE #4 -- Parameters for Incident Plane Waves

Logical Channel Number = ICLA1

Program=SUBROUTINE CLAF2

\*Note: This module is repeated for each of "NUMFRQ" frequencies (see Figure 2.6) except for the following conditions:

- (i) NLAYER=1. Since all plane waves in a half space are nondispersive, the parameters are frequency independent. Hence, module #4 is used only for the first frequency loop.
- (ii) IFCVAR=0. The parameters for the incident waves are frequency independent; therefore, module #4 is used only for the first frequency loop.
- (iii) NCASE=0. Module #4 will be omitted for every frequency.

```

READ(ICLA1,310)(BOC(J),TH(J),UL(J),UT(J),UV(J),J=1,NCASE)
310  FORMAT(F10.4,F10.2,6F8.3)

```

BOC(J) = The ratio of shear wave velocity,  $V_S$ , to the apparent wave velocity for the  $J^{\text{th}}$  incident wave. BOC is frequency dependent for surface waves in a layered medium.

TH(J) = The horizontal angle which specifies the propagation direction of the  $J^{\text{th}}$  wave. TH is measured in degrees counterclockwise to the x-axis (see Figure 2.3).

UL(J),UT(J),

UV(J) = The complex amplitude of the longitudinal, transverse and vertical component, respectively, of the  $J^{\text{th}}$  incident wave evaluated at the origin of the foundation coordinate system.

\*MODULE #5 -- Green's Function Tables from GLAY

Logical Channel Number = ICLA3

Program=SUBROUTINE CLAF2

\*Note: Module #5 is repeated for each of "NUMFRQ" frequencies (see Figure 2.6) if N\_LAYER.GT.1. For N\_LAYER=1, however, module #5 is used only for the first frequency loop.

```
READ(ICLA3)DIV,NGRN1,FFFR
READ(ICLA3)((GF(IX,J),IX=1,4),J=1,NGRN1)
```

The following parameters were calculated by GLAY and were stored in binary form in logical channel, ICLA3:

- DIV = The normalized increment,  $\omega\Delta R/V_s$ , of the Green's function table.
- NGRN1 = The number of points in the Green's function table; NGRN1 must be smaller than or equal to NGRN.
- FFFR = A frequency compatibility check for CLAF. If N\_LAYER 1, FFFR must be equal to FRQ(NF) for each loop. If N\_LAYER=1, FFFR (one table) represents the maximum frequency of the analysis and must be larger than FRQ(NF) for each loop.
- GF = A set of four complex numbers for each "NGRN1" increment. These complex numbers will be used for calculating the Green's function matrix by interpolation.

INSSIN MANUAL

PROGRAM INSSIN, VERSION 3.2

INPUT DATA FROM FILE INSSINI

THIS VERSION OF INSSIN IS NOT COMPATIBLE  
WITH SSIN VERSIONS PRIOR TO SSIN 5.3

RECORD 1 (215,4X,A1): BASIC CONTROL DATA

---

JOPT = OPTION NUMBER FOR CALCULATION OF SSIN INPUT  
= 1: CALCULATE INPUT DATA FOR SSIN OPTION IFCAL=0  
= 2: CALCULATE INPUT DATA FOR SSIN OPTION IFCAL=1  
DEFAULT VALUE IS JOPT = 1

NNREQ = UPPER BOUND ON NUMBER OF RESPONSE REQUESTS TO  
BE PROCESSED. THIS PARAMETER IS USED TO DETERMINE  
STORAGE REQUIREMENTS.

IVIN = NAME (X, Y OR Z) OF THE VERTICAL AXIS IN THE SAP4  
MODEL (DEFAULT = Z). IF THE VERTICAL AXIS IS NOT  
THE Z-AXIS, THE COORDINATE SYSTEM WILL BE TRANSPOSED  
TO FORM A RIGHT-HANDED SYSTEM WITH THE Z-AXIS VERTICAL.

RECORD 2 (2413): INSSIN OUTPUT LOG OPTIONS (LIST IN ANY ORDER)  
-----

- 1 = PRINT NODE POINT COORDINATES IN INSSINLOG.
- 2 = PRINT SAP4 ID-ARRAY IN INSSINLOG. THIS ARRAY IS USED TO FIND EQUATION NUMBERS OF GIVEN DEGREES OF FREEDOM AS DESCRIBED BY NODE POINT NUMBER AND COMPONENT.
- 3 = PRINT CONDENSED ID-ARRAY IN INSSINLOG. THIS ARRAY PERFORMS THE INVERSE FUNCTION OF OBTAINING NODES AND COMPONENTS FROM EQUATION NUMBERS.
- 4 = PRINT MASS MATRIX (XM) IN INSSINLOG.
- 5 = PRINT MODAL FREQUENCIES (RAD/SEC) AND DAMPING RATIOS IN INSSINLOG.
- 6 = PRINT MODAL PARTICIPATION FACTORS (BETA MATRIX) IN INSSINLOG. THIS OPTION ALSO PRINTS PERCENTAGES OF TOTAL MASS PARTICIPATING IN EACH MODE FOR EACH BASEMAT DEGREE OF FREEDOM. OPTION 1 ONLY.
- 7 = PRINT RIGID BODY MASS MATRIX (BMASS) IN INSSINLOG. OPTION 1 ONLY.
- 8 = PRINT STRESS-DISPLACEMENT MATRIX (SA) AND MODAL COORDINATES FOR ELEMENT DEGREES OF FREEDOM (ELPHI MATRIX) TO INSSINLOG. OPTION 1 ONLY.
- 9 = PRINT THE SMODE MATRIX, WHICH CONSISTS OF THE MODAL COORDINATES OF THE REQUESTED ACCELERATION AND STRESS COMPONENTS, TO INSSINLOG. OPTION 1 ONLY.
- 10 = PRINT THE ALKP MATRIX, WHICH CONSISTS OF THE ALFA MATRIX FOR THE MODAL COORDINATES OF SMODE. OPTION 1 ONLY.
- 11 = PRINT THE COMPLETE ALFA MATRIX, WHICH DEFINES THE RIGID BODY MOTIONS OF ALL DEGREES OF FREEDOM INDUCED BY UNIT MOTIONS OF THE RIGID BASEMAT. OPTION 1 ONLY.
- 12 = PRINT DETAILED TIMING INFORMATION BY SUBROUTINE ON THE USERS TERMINAL AND IN INSSINLOG. INFORMATION INCLUDES CPU TIME, I/O TIME, SYSTEM TIME AND TOTAL CHARGED TIME IN SECONDS.
- 13 = PRINT FIXED BASE EIGENVECTORS IN INSSINLOG. OPTION 2 ONLY.

RECORD 3 (715.2X,A3): BASEMAT DEGREES OF FREEDOM

---

NDFD = NUMBER OF FOUNDATION DEGREES OF FREEDOM (UP TO 6)  
 DEFAULT VALUE = 6 UNLESS SYMMETRY CONDITIONS  
 ARE SPECIFIED (SEE IFSYMM BELOW).

ITDOF = NDFD NUMBERS INDICATING WHICH FOUNDATION DEGREES OF  
 FREEDOM ARE TO BE INCLUDED. THE CONVENTION IS AS FOLLOWS:

1 = X-TRANSLATION	4 = XX-ROTATION
2 = Y-TRANSLATION	5 = YY-ROTATION
3 = Z-TRANSLATION	6 = ZZ-ROTATION

DEFAULT VALUES ARE 1 THRU 6 SEQUENTIALLY  
 DEFAULT OCCURS ONLY IF NDFD IS DEFAULTED

IFSYMM = THIS FLAG IS USED TO PROCESS HALF-MODELS THAT ARE SYMMETRIC  
 ABOUT A PLANE. SYMMETRIC OR ANTISYMMETRIC BOUNDARY CONDITIONS  
 CAN BE SPECIFIED. ONLY ONE VERTICAL PLANE MAY BE SPECIFIED.  
 THE Z-AXIS MUST BE VERTICAL. THE CONVENTION IS AS FOLLOWS:

XZ = SYMMETRIC MODEL ABOUT THE XZ-PLANE
-XZ = ANTISYMMETRIC MODEL ABOUT THE XZ-PLANE
YZ = SYMMETRIC MODEL ABOUT THE YZ-PLANE
-YZ = ANTISYMMETRIC MODEL ABOUT THE YZ-PLANE

IF THIS OPTION IS USED, NDFD MAY BE DEFAULTED TO 3 AND  
 THE APPROPRIATE DEGREES OF FREEDOM WILL BE DETERMINED FROM  
 THE FLAG IFSYMM. IF THE DEFAULT IS NOT USED, THE DEGREES  
 OF FREEDOM THAT ARE INPUT WILL BE CHECKED.

RECORD 4 (3E10.3): LOCATION OF BASEMAT REFERENCE POINT

---

XREF = X-COORDINATE  
 YREF = Y-COORDINATE  
 ZREF = Z-COORDINATE

RECORD 5 (8F10.5): MODAL DAMPING RATIOS  
-----

DAMP(J) = THE DAMPING RATIO TO BE USED FOR EACH MODE IN THE SUBSEQUENT  
SSIN RUN. A ZERO VALUE WILL CAUSE THE DAMPING RATIO OF THE  
PREVIOUS MODE TO BE ASSIGNED. MODE 1 MUST BE ASSIGNED A VALUE.

RECORD 6 (315,1X,3A8,15,2F10.0): KINEMATIC RESPONSE REQUESTS

---

PROVIDE ONE LINE FOR EACH RESPONSE COMPONENT DESIRED. TERMINATE WITH A BLANK LINE.

NP = NODE POINT

IC = RESPONSE COMPONENT. THE CONVENTION IS THE SAME AS FOR THE BASEMAT COMPONENTS:

1 = X-TRANSLATION	4 = XX-ROTATION
2 = Y-TRANSLATION	5 = YY-ROTATION
3 = Z-TRANSLATION	6 = ZZ-ROTATION

ITYPE = THE TYPE OF RESPONSE DESIRED. THE CONVENTION IS AS FOLLOWS:

0 = ABSOLUTE ACCELERATION
+1 = ABSOLUTE VELOCITY
-1 = RELATIVE VELOCITY
+2 = ABSOLUTE DISPLACEMENT
-2 = RELATIVE DISPLACEMENT

LBL = ANY IDENTIFYING LABEL UP TO 24 CHARACTERS

IUSE = THE USE TO WHICH THIS RESPONSE IS TO BE PUT (DEFAULT = 0):

0 = ONLY THE PEAK RESPONSE WILL BE OUTPUT BY SSIN.
1 = THE COMPLETE TIME HISTORY WILL BE OUTPUT BY SSIN.
>1 = THE COMPLETE TIME HISTORY WILL BE OUTPUT BY SSIN, WITH THE SUBSEQUENT USE OF IT TO BE DEFINED BY THE USER EXTERNALLY TO SSIN.

FRQ = THIS IS A SPECIAL CONTROL PARAMETER FOR USE WITH SMACS. IT DEFINES A SPECIFIC FREQUENCY AT WHICH A SPECTRAL RESPONSE IS TO BE COMPUTED SUBSEQUENT TO SSIN. THE VALUE OF IUSE MUST BE AT LEAST 1; THE PRECISE VALUE IS DETERMINED BY THE SMACS CODE CONVENTION.

DMP = THIS SPECIAL SMACS CONTROL PARAMETER DEFINES THE DAMPING RATIO FOR WHICH THE ABOVE SPECTRAL RESPONSE IS TO BE COMPUTED.

RECORD 7 (215,6X,3A8,15): ELEMENT FORCE OR STRESS RESPONSE REQUESTS  
-----

PROVIDE ONE LINE FOR EACH ELEMENT FORCE OR STRESS COMPONENT FOR WHICH OUTPUT FROM PROGRAM SSIN IS DESIRED. REQUESTS ARE GROUPED BY ELEMENT TYPE; ALL ELEMENT GROUPS MUST BE INCLUDED. A GROUP CONSISTS OF A SERIES OF ELEMENT STRESS COMPONENT REQUEST LINES TERMINATED BY A BLANK LINE. ELEMENT NUMBER REFERENCES WITHIN AN ELEMENT TYPE (TRUSS, SAY) GROUPING MUST BE IN ASCENDING ORDER. THE PROGRAM PROCESSES ELEMENT GROUPS IN THE SAME ORDER AS ORIGINALLY INPUT IN THE SAP4 ELEMENT DATA. IF NO OUTPUT IS TO BE PRODUCED FOR AN ELEMENT TYPE, THEN INPUT ONE BLANK LINE FOR ITS GROUP.

NEL = ELEMENT NUMBER

II = COMPONENT NUMBER. THE CONVENTION IS THE SAME AS THAT USED BY SAP4.

LBL = ANY IDENTIFYING LABEL UP TO 24 CHARACTERS.

IUSE = THE USE TO WHICH THIS RESPONSE IS TO BE PUT (DEFAULT = 0):

0 = ONLY THE PEAK RESPONSE WILL BE OUTPUT BY SSIN.  
1 = THE COMPLETE TIME HISTORY WILL BE OUTPUT BY SSIN.  
>1 = THE COMPLETE TIME HISTORY WILL BE OUTPUT BY SSIN,  
WITH THE SUBSEQUENT USE OF IT TO BE DEFINED BY  
THE USER EXTERNALLY TO SSIN.

SMACS MANUAL

USER'S GUIDE FOR PROGRAM

SMACS / SSIN ON THE BERKELEY LBL SYSTEM

BY

STAN BUMPUS

WITH

MUCH HELP FROM

OLEG MASLENIKOV

LAWRENCE LIVERMORE NATIONAL LABORATORY

4 MARCH 1982

DATA SET 1: GLOBAL CONTROL PARAMETERS

-----

RECORD 1 (10A8)

-----

IDENT1 = UP TO 64 CHARACTERS IDENTIFYING THE SMACS/SSIN RUN

RECORD 2 (4E10.3,2110)

-----

G = THE REFERENCE SHEAR MODULUS.  
 VS = THE REFERENCE SHEAR WAVE VELOCITY.  
 CL = THE CHARACTERISTIC LENGTH OF THE FOUNDATION.  
 DRAT = THE REFERENCE DAMPING RATIO. NEEDED ONLY IF NVIMP > 0  
 LLCM = THE REQUIRED SIZE OF LCM STORAGE.  
 NPROBS = NUMBER OF EARTHQUAKE PROBLEMS TO BE SOLVED. DEFAULT = 1  
 REPEAT DATA SETS 6 THROUGH 8 NPROBS TIMES

RECORD 3 (415)

-----

NFDN = THE NUMBER OF FOUNDATIONS IN THE PROBLEM.  
 NTSTR = THE TOTAL NUMBER OF STRUCTURES IN THE PROBLEM.  
 ISMXI = THE INDICATOR FOR A SMACS/SSIN RUN  
 .EQ. 0 MEANS AN SSIN RUN  
 .EQ. 1 MEANS A SMACS RUN  
 (A SMACS RUN WILL REQUIRE ADDITIONAL  
 INPUT FOR THE EXPERIMENTAL DESIGN  
 AND IT WILL WRITE THE RESVEC FILE  
 NEEDED FOR STATISTICAL ANALYSIS.)  
 IFXBI = THE INDICATOR FOR A FIXED BASE ANALYSIS  
 .EQ. 0 MEANS AN SSI ANALYSIS  
 .EQ. 1 MEANS A FIXED BASE ANALYSIS

RECORD 4 (110) THIS RECORD IS INCLUDED ONLY IF ISMXI .EQ. 1  
 -----

ISEED = THE SEED FOR THE RANDOM NUMBER GENERATOR  
 THIS INTEGER MUST BE ODD.

RECORD 5 (8F10.0) THIS RECORD IS INCLUDED ONLY IF ISMXI .EQ. 1  
 -----

COV = THE COEFFICIENTS OF VARIATION USED IN THE CONSTRUCTION OF THE EXPERIMENTAL DESIGN.

IF IFXBI .EQ. 0 , THE COV HAVE THE FOLLOWING MEANING:

COV(1) IS THE COEFF. OF VARIATION FOR THE FREQUENCY OF THE FIRST STRUCTURE  
 COV(2) IS THE COEFF. OF VARIATION FOR THE DAMPING IN THE FIRST STRUCTURE  
 COV(3) IS THE COEFF. OF VARIATION FOR THE FREQUENCY OF THE SECOND STRUCTURE  
 COV(4) IS THE COEFF. OF VARIATION FOR THE DAMPING IN THE SECOND STRUCTURE  
 COV(5) IS THE COEFF. OF VARIATION FOR THE FREQUENCY OF THE THIRD STRUCTURE  
 COV(6) IS THE COEFF. OF VARIATION FOR THE DAMPING IN THE THIRD STRUCTURE  
 COV(7) IS THE COEFF. OF VARIATION FOR THE FREQUENCY OF THE FOURTH STRUCTURE  
 COV(8) IS THE COEFF. OF VARIATION FOR THE DAMPING IN THE FOURTH STRUCTURE  
 NOTE: ONLY 4 STRUCTURES ARE ALLOWED IN A SMACS' FIXED BASE ANALYSIS

IF IFXBI .EQ. 1 , THE COV HAVE THE FOLLOWING MEANING:

COV(1) IS THE COEFF. OF VARIATION FOR THE SOIL SHEAR MODULUS  
 COV(2) IS THE COEFF. OF VARIATION FOR THE SOIL DAMPING VALUE  
 COV(3) IS THE COEFF. OF VARIATION FOR THE FREQUENCY OF THE FIRST STRUCTURE  
 COV(4) IS THE COEFF. OF VARIATION FOR THE DAMPING IN THE FIRST STRUCTURE  
 COV(5) IS THE COEFF. OF VARIATION FOR THE FREQUENCY OF THE SECOND STRUCTURE  
 COV(6) IS THE COEFF. OF VARIATION FOR THE DAMPING IN THE SECOND STRUCTURE  
 COV(7) IS THE COEFF. OF VARIATION FOR THE FREQUENCY OF THE THIRD STRUCTURE  
 COV(8) IS THE COEFF. OF VARIATION FOR THE DAMPING IN THE THIRD STRUCTURE  
 NOTE: ONLY 3 STRUCTURES ARE ALLOWED IN A SMACS' SSI ANALYSIS

DATA SET 2: TRANSFORMATION OF IMPEDANCE AND SCATTERING MATRICES  
 -----

THIS DATA SET IS REPEATED NFDN TIMES, ONCE FOR EACH FOUNDATION.  
 WARNING -- TRANSFORMATION ALGORITHMS HAVE NOT BEEN VERIFIED.

RECORD 1 (315.4E10.3)  
 -----

NSTR = THE NUMBER OF STRUCTURES SUPPORTED ON THE FOUNDATION.  
 NDFD = THE NUMBER OF DEGREES OF FREEDOM OF THE FOUNDATION (UP TO 6).  
 IFTIMP = IMPEDANCE AND SCATTERING MATRIX TRANSFORMATION CONTROL  
           IFTIMP = 0: DO NOT TRANSFORM MATRICES  
           IFTIMP = 1: TRANSFORM MATRICES ACCORDING TO XF, YF, ZF AND QF  
                       DEFINED BELOW.  
 XF,YF,ZF= THE COORDINATES OF THE ORIGIN OF THE LOCAL SYSTEM (IN FILE  
           IMPEDFN) WITH RESPECT TO THE REFERENCE SYSTEM.  
 QF      = THE HORIZONTAL ANGLE OF THE LOCAL SYSTEM MEASURED  
           COUNTER-CLOCKWISE FROM THE REFERENCE SYSTEM.

RECORD 2 (615)  
 -----

ITDOF = AN INTEGER ARRAY OF LENGTH NDFD DEFINING THE UNCONSTRAINED  
 DEGREES OF FREEDOM OF THE FOUNDATION. THE CONVENTION IS:  
           1 = X-TRANSLATION      4 = XX-ROTATION  
           2 = Y-TRANSLATION      5 = YY-ROTATION  
           3 = Z-TRANSLATION      6 = ZZ-ROTATION

DATA SET 3: FOUNDATION MASS MATRIX  
-----

THIS DATA SET, FOLLOWED BY DATA SETS 4 AND 4A/B, IS REPEATED NFDN TIMES,  
ONCE FOR EACH FOUNDATION.

RECORDS 1 TO NDFD (6E10.3)  
-----

FM1 = THE MASS MATRIX OF THE FOUNDATION MAT. IT IS READ IN NDFD  
LINES (ROW-BY-ROW) WITH NDFD VALUES ON EACH LINE.  
THIS MATRIX IS USUALLY DERIVED BY HAND TAKING INTO  
ACCOUNT THE CENTER OF GRAVITY AND THE REFERENCE  
POINT OF THE SYSTEM.

RECORD NDFD+1 (15,4E10.3)  
-----

IFTR = FOUNDATION MASS MATRIX TRANSFORMATION CONTROL.  
IFTR = 0: DO NOT TRANSFORM MATRIX.  
IFTR = 1: TRANSFORM MATRIX ACCORDING TO XF, YF, ZF AND QF BELOW.  
X,Y,Z,Q = TRANSFORMATION PARAMETERS SIMILAR TO THOSE IN DATA SET 2.  
WARNING -- TRANSFORMATION ALGORITHMS HAVE NOT BEEN VERIFIED

## DATA SET 4 CONTROL PARAMETERS FOR STRUCTURAL DATA

DATA SETS 4 AND 4A/B ARE READ NSTR TIMES, ONCE FOR EACH STRUCTURE SUPPORTED ON THE FOUNDATION SPECIFIED IN DATA SET 3.

## RECORD 1 (815)

NMODE = THE NUMBER OF MODES REPRESENTING THE STRUCTURE.  
 NDOF = THE NUMBER OF FOUNDATION DEGREES OF FREEDOM THAT THE STRUCTURE AFFECTS (UP TO NDFD, THE NUMBER OF FOUNDATION DEGREES OF FREEDOM).  
 IDOF = AN ARRAY OF NDOF NUMBERS INDICATING WHICH FOUNDATION DEGREES OF FREEDOM ARE AFFECTED BY THE STRUCTURE. THIS MUST BE A SUBSET OF THE ITOF ARRAY SPECIFIED IN DATA SET 2 FOR THE FOUNDATION.

## RECORD 2 (15,4E10.3)

IFTRAN = STRUCTURAL DATA TRANSFORMATION CONTROL  
 IFTRAN = 0: DO NOT TRANSFORM STRUCTURAL DATA  
 IFTRAN = 1: TRANSFORM STRUCTURAL DATA ACCORDING TO PARAMETERS X, Y, Z AND Q.  
 X,Y,Z,Q = TRANSFORMATION PARAMETERS. SEE DATA SET 2 FOR DETAILS.  
 WARNING -- TRANSFORMATION ALGORITHMS HAVE NOT BEEN VERIFIED

## RECORD 3 (15,3(A8,2X),315)

IFCAL = STRUCTURAL DATA INPUT OPTION CONTROL  
 IFCAL = 0: STRUCTURAL DATA HAS BEEN PRECALCULATED TO A COMPACT FORM FOR SSIN. INPUT FORMAT IS IN DATA SET 4A.  
 IFCAL = 1: STRUCTURAL DATA HAS NOT BEEN PRECALCULATED. INPUT FORMAT IS IN DATA SET 4B.  
 ISS15 = NAME OF THE FILE IN WHICH THE STRUCTURAL DATA IS LOCATED. THE DEFAULT NAME IS SSINST NOT NEEDED IF ISMXI .EQ. 1 (A SMACS RUN) BECAUSE THE DEFAULT NAME IS SSINST AND CAN BE SUBSTITUTED AT EXECUTION TIME.  
 ISS16 = NAME OF THE FILE IN WHICH THE STRUCTURAL MASS MATRIX IS LOCATED THIS IS USED ONLY WITH THE OPTION IFCAL = 1.  
 ISS17 = NAME OF THE FILE IN WHICH THE FIXED-BASE MODAL FREQUENCIES, DAMPING RATIOS AND EIGENVECTORS ARE LOCATED THIS IS USED ONLY WITH THE OPTION IFCAL = 1.  
 ND = THE NUMBER OF UNCONSTRAINED DEGREES OF FREEDOM IN THE STRUCTURE. THIS IS USED ONLY WITH THE OPTION IFCAL = 1.  
 NNODES = THE NUMBER OF NODES IN THE STRUCTURAL MODEL. (IFCAL = 1 ONLY)  
 NBAND = THE HALF-BANDWIDTH OF THE STRUCTURAL MASS MATRIX. (IFCAL = 1 ONLY)

## RECORD 4 (15)

-----  
NKEEP = THE NUMBER OF IN-STRUCTURE DEGREES OF FREEDOM AT WHICH SSI RESPONSE  
IS DESIRED. FOUNDATION RESPONSE IS NOT INCLUDED IN THIS COUNT.

DATA SET 4A: PRECALCULATED STRUCTURAL DATA OPTION (IFCAL = 0)  
 -----

FOR THIS OPTION, THE MODAL PARTICIPATION FACTORS, RIGID-BODY MASS MATRIX AND RESPONSE MODAL COMPONENT MATRIX MUST HAVE BEEN COMPUTED EXTERNALLY USING SOME PREPROCESSOR SUCH AS PROGRAM INSSIN. THIS DATA SET IS CONTAINED IN THE SSINST FILE RATHER THAN IN THE SMACSI FILE.

RECORD 1 (10A8)  
 -----

IDENT = IDENTIFIER OF 64 CHARACTERS FOLLOWED BY 16 CHARACTERS@  
 GIVING TIME & DATE OF DATA GENERATION

RECORDS 2 AND 3 ARE READ NMODE TIMES

RECORD 2 (2E10.3)  
 -----

WN = THE MODAL FREQUENCY IN RAD/SEC. FREQUENCIES MUST BE READ IN  
 ASCENDING ORDER.  
 DAMP = THE MODAL DAMPING RATIO IN DECIMAL.

RECORD 3 (6E10.3)  
 -----

BETA = THE MODAL PARTICIPATION FACTORS FOR EACH OF THE NDOF DEGREES  
 OF FREEDOM SPECIFIED IN DATA SET 4.

RECORD 3A IS REPEATED NDOF TIMES

RECORD 3A (6E10.3)  
 -----

BMASS = THE RIGID-BODY MASS MATRIX. NDOF LINES, EACH CONSISTING OF  
 NDOF VALUES.

RECORDS 4, 5 AND 6 ARE READ NKEEP TIMES, ONCE FOR EACH RESPONSE COMPONENT

RECORD 4 (3A8,1X,215,2F10.3)

-----

LABEL = AN ARRAY OF 24 CHARACTERS IDENTIFYING THE RESPONSE PARAMETER.  
 IF ISMX1 .EQ. 1, THEN THE FOLLOWING CONVENTIONS MUST BE OBSERVED:  
 FOR A NODAL ACCELERATION OUTPUT --  
 THE FIRST LETTER MUST BE AN 'N',  
 THE NODE NUMBER AND COMPONENT DESCRIPTION RESPECTIVELY  
 MUST FOLLOW IN THE NEXT 23 LETTERS  
 ALLOWABLE COMPONENT DESCRIPTIONS ARE:  
 X FOR LINEAR ACCELERATION IN THE 1-DIRECTION  
 Y FOR LINEAR ACCELERATION IN THE 2-DIRECTION  
 Z FOR LINEAR ACCELERATION IN THE 3-DIRECTION  
 XX FOR ROTATIONAL ACCELERATION IN THE 1-DIRECTION  
 YY FOR ROTATIONAL ACCELERATION IN THE 2-DIRECTION  
 ZZ FOR ROTATIONAL ACCELERATION IN THE 3-DIRECTION  
 FOR ELEMENT FORCE OR STRESS OUTPUT --  
 THE FIRST LETTER MUST BE AN 'E',  
 THE ELEMENT NUMBER AND COMPONENT NUMBER RESPECTIVELY  
 MUST FOLLOW IN THE NEXT 23 LETTERS

ITYPE = THE RESPONSE TYPE IDENTIFIER  
 ITYPE .EQ. -2 CALCULATES A RELATIVE DISPLACEMENT  
 ITYPE .EQ. -1 CALCULATES A RELATIVE VELOCITY  
 ITYPE .EQ. 0 CALCULATES AN ABSOLUTE ACCELERATION  
 ITYPE .EQ. 1 CALCULATES AN ABSOLUTE VELOCITY  
 ITYPE .EQ. 2 CALCULATES AN ABSOLUTE DISPLACEMENT  
 ITYPE .EQ. 3 CALCULATES A FORCE OR STRESS

IUSE = THE RESPONSE USE IDENTIFIER.  
 IUSE .EQ. 0 CALCULATES ONLY THE PEAK RESPONSE (GOES INTO THE RESPONSE VECTOR)  
 IUSE .GT. 0 CALCULATES THE PEAK RESPONSE AND THE RESPONSE TIME HISTORY  
 IUSE .EQ. 1 CALCULATES TIME HISTORY BUT PEAK IS NOT PUT IN RESPONSE VECTOR  
 IUSE .EQ. 2 PEAK AND SPECTRAL ACCEL. AT FREQ AND DAMP ARE PUT INTO RESPONSE VECTOR  
 IF AN ACCEL.  
 PEAK ONLY IS PUT INTO RESPONSE VECTOR  
 IF A FORCE OR STRESS  
 IUSE .EQ. 3 PEAK AND SPECTRAL ACCEL. AT FREQ AND DAMP ARE PUT INTO RESPONSE VECTOR  
 IUSE .EQ. 4 PEAK AND THREE SPECTRAL ACCELERATIONS ARE PUT INTO RESPONSE VECTOR  
 FREQ(1) .EQ. 4.0 HERTZ AND DAMP(1) .EQ. 0.05  
 FREQ(2) .EQ. 8.0 HERTZ AND DAMP(2) .EQ. 0.05  
 FREQ(3) .EQ. 16.0 HERTZ AND DAMP(3) .EQ. 0.05

FREQ = A FREQUENCY AT WHICH A SPECTRAL ACCELERATION IS TO BE CALCULATED  
 SUBSEQUENT TO THE SMACS/SSIN EXECUTION. THIS PARAMETER IS FOR USE WITH  
 THE SMACS DRIVING SOFTWARE.

DAMP = THE DAMPING RATIO FOR WHICH THE SPECTRAL ACCELERATION IS TO BE  
 COMPUTED.

RECORD 5 (8E10.3)

-----

SMODE = THE MODAL COMPONENT VECTOR FOR THE SPECIFIED RESPONSE PARAMETER.  
 THIS CONSISTS OF THE MODAL VALUES FOR THE DESIRED DEGREE OF FREEDOM  
 FOR ALL MODES THAT ARE INCLUDED IN THE ANALYSIS.

RECORD 6 (8E10.3)  
-----

ALKP = THE DIRECTION VECTOR OF THE DESIRED RESPONSE CONSISTING OF RIGID-BODY MOTION FOR THAT DEGREE OF FREEDOM CAUSED BY UNIT DISPLACEMENTS OF EACH OF THE FOUNDATION DEGREES OF FREEDOM THAT AFFECT THE STRUCTURE.

DATA SET 4B: SMACS/SSIN CALCULATION OF STRUCTURAL DATA OPTION (IFCAL = 1)

---

THIS OPTION HAS NOT YET BEEN FULLY CHECKED AND IS NOT CONSIDERED  
READY FOR USE AT THIS TIME.

DATA SET 5: CONTROL DATA FOR GROUND MOTION AND STRUCTURAL AND SOIL VARIATIONS

---

RECORD 1 (815,A1,A7,4A8)

---

LFT = INPUT AND OUTPUT MOTION TYPE CONTROL PARAMETER  
 LFT = 1: MOTIONS ARE ACCELERATION TIME HISTORIES

NCOM = NUMBER OF GROUND MOTION COMPONENTS PER EARTHQUAKE  
 MAXIMUM NUMBER OF COMPONENTS FOR SSI ANALYSIS IS 3.  
 MAXIMUM NUMBER OF COMPONENTS FOR FIXED-BASE ANALYSIS IS 6.

NCASE = NUMBER OF INCIDENT WAVE CASES IN THE IMPEDANCE FUNCTION FILE IMPEDFN  
 IF NCASE = 0, A FIXED-BASE ANALYSIS WILL BE PERFORMED WITH  
 INPUT MOTIONS ASSUMED TO BE IN THE ORDER X, Y, Z, XX, YY, ZZ

NSTART = FIRST INCIDENT WAVE CASE TO BE READ FROM IMPEDFN.

IEXTRP = FOURIER ANALYSIS EXTRAPOLATION CONTROL  
 IEXTRP = 0: DO NOT EXTRAPOLATE IMPEDANCE AND SCATTERING MATRICES  
 OUTSIDE FREQUENCY RANGE FMIN-FMAX.  
 IEXTRP = 1: EXTRAPOLATE MATRICES. USE WITH CARE.

NQKS = NUMBER OF EARTHQUAKE PROBLEMS TO BE SOLVED SIMULTANEOUSLY.  
 IF NQKS < 0, THE SAME EARTHQUAKES WILL BE USED FOR ALL  
 NVSTR X NVIMP PROBLEMS.

NVSTR = NUMBER OF STRUCTURAL VARIATIONS FOR EACH SOIL VARIATION.

NVIMP = NUMBER OF SOIL VARIATIONS.

IFMT = FORMAT IN WHICH INPUT MOTIONS ARE TO BE READ.  
 THE FORMAT SPECIFICATION MUST BE LEFT-JUSTIFIED IN COLUMNS 41-80@  
 IF COLUMN 41 IS BLANK, A DEFAULT FORMAT (10A8,/, (8F10.0)) WILL BE READ

THE FOURIER SOLUTION IS CARRIED OUT NVIMP X NVSTR TIMES FOR NPROBS PROBLEMS (DATA SET 1).  
 EACH TIME, NQKS GROUND MOTION PROBLEMS ARE SOLVED SIMULTANEOUSLY.

DATA SET 5A: GROUND MOTION CONTROL PARAMETERS FOR TIME DOMAIN INPUT/OUTPUT

-----

THIS DATA SET IS READ ONLY IF OPTION LFT = 1 IS SPECIFIED IN DATA SET 5.

FOR THIS OPTION, INPUT MOTIONS AND COMPUTED SSI RESPONSE MOTIONS ARE IN THE TIME DOMAIN. THE FAST FOURIER TRANSFORM (FFT) IS USED TO TRANSFORM INPUT ACCELEROGRAMS INTO FOURIER SPECTRA, THE PROBLEM SOLUTION IS PERFORMED IN THE FREQUENCY DOMAIN, AND FINALLY THE COMPUTED RESPONSES ARE TRANSFORMED TO THE TIME DOMAIN USING THE INVERSE FFT.

THE PARAMETERS IN THIS DATA SET APPLY TO ALL INPUT MOTIONS, WHETHER THEY ARE MULTIPLE COMPONENTS OF ONE EARTHQUAKE PROBLEM, OR MULTIPLE EARTHQUAKE PROBLEMS. ALL COMPUTED SSI RESPONSE MOTIONS WILL HAVE THE SAME TIME INCREMENT AND NUMBER OF DATA POINTS (DURATION) AS THE INPUT MOTIONS.

IF THIS RUN IS AN SSIN RUN ( ISMXI .EQ. 0 ), INPUT THE FOLLOWING TWO RECORDS:

RECORD 1 (2E10.3.215)

-----

DT = THE TIME INCREMENT OF EACH INPUT AND OUTPUT ACCELEROGRAM.

SCALE = A SCALE FACTOR APPLIED TO EACH INPUT ACCELEROGRAM. NO DEFAULT.

NPOINT = NUMBER OF DATA POINTS IN EACH INPUT ACCELEROGRAM.

NFFT = THE NUMBER OF POINTS USED IN THE FAST FOURIER TRANSFORM. NFFT IS TWICE THE NUMBER OF FREQUENCY INCREMENTS THAT ARE USED IN THE FOURIER SSI RESPONSE ANALYSIS. NFFT MUST BE AN INTEGER POWER OF TWO. IF NFFT < NPOINT, THE INPUT MOTIONS WILL BE TRUNCATED TO NFFT POINTS. IF NFFT > NPOINT, TRAILING ZEROES WILL BE ADDED TO THE INPUT MOTIONS.

RECORD 2 (2F6.2)

-----

FMIN = THE MINIMUM FREQUENCY (IN HZ) IN THE IMPEDANCE AND SCATTERING MATRIX TABLES PRODUCED BY PROGRAM CLAF (SEE DATA SET 9)

FMAX = THE MAXIMUM FREQUENCY (IN HZ) IN THE IMPEDANCE AND SCATTERING MATRIX TABLES PRODUCED BY PROGRAM CLAF (SEE DATA SET 9)

IF THIS RUN IS A SMACS RUN ( ISMXI .NE. 0 ), INPUT THE FOLLOWING TWO RECORDS:

RECORD 1 (2F10.0)

-----

FMIN = THE MINIMUM FREQUENCY (IN HZ) IN THE IMPEDANCE AND SCATTERING MATRIX TABLES PRODUCED BY PROGRAM CLAF (SEE DATA SET 9)

FMAX = THE MAXIMUM FREQUENCY (IN HZ) IN THE IMPEDANCE AND SCATTERING MATRIX TABLES PRODUCED BY PROGRAM CLAF (SEE DATA SET 9)

RECORD 2 (2E10.3,215) REPEATED NPROB TIMES, ONCE FOR EACH SET OF TIME HISTORIES  
-----

DT = THE TIME INCREMENT OF EACH INPUT AND OUTPUT ACCELEROGRAM.

SCALE = A SCALE FACTOR APPLIED TO EACH INPUT ACCELEROGRAM. NO DEFAULT.

NPOINT = NUMBER OF DATA POINTS IN EACH INPUT ACCELEROGRAM.

NFFT = THE NUMBER OF POINTS USED IN THE FAST FOURIER TRANSFORM. NFFT IS TWICE THE NUMBER OF FREQUENCY INCREMENTS THAT ARE USED IN THE FOURIER SSI RESPONSE ANALYSIS. NFFT MUST BE AN INTEGER POWER OF TWO. IF NFFT < NPOINT, THE INPUT MOTIONS WILL BE TRUNCATED TO NFFT POINTS. IF NFFT > NPOINT, TRAILING ZEROES WILL BE ADDED TO THE INPUT MOTIONS.

DATA SET 6: VARIATION OF SOIL PROPERTIES  
-----

REPEAT DATA SETS 6 THROUGH 8 NPROBS TIMES

THIS DATA SET WILL BE READ ONLY IF ISMXI .EQ. 0 (SEE DATA SET 1)  
THIS DATA SET WILL BE READ ONLY IF NVIMP (DATA SET 5) IS GREATER THAN ZERO.

THE SOIL SHEAR MODULUS AND DAMPING RATIO SCALE FACTORS THAT ARE SPECIFIED  
IN THIS DATA SET ARE USED TO MODIFY THE SOIL IMPEDANCE MATRIX TABLES, WHICH  
ARE GENERATED BY PROGRAM CLAF AND ARE READ IN DATA SET 9.

RECORD 1 (2F10.0)  
-----

GFAC = THE SCALE FACTOR FOR THE VARIATION IN SOIL SHEAR MODULUS.

DFAC = THE SCALE FACTOR FOR THE VARIATION IN SOIL DAMPING RATIOS

DATA SET 7: VARIATION OF STRUCTURAL PROPERTIES

---

THIS DATA SET WILL BE READ ONLY IF NVSTR (DATA SET 5) IS GREATER THAN ZERO.

THIS DATA SET IS READ NVSTR TIMES FOR EACH VARIATION OF SOIL PROPERTIES SPECIFIED IN DATA SET 6 (NVIMP). IF NVIMP = 0, THIS DATA SET IS READ NVSTR TIMES.

EACH TIME THIS DATA SET IS READ, RECORDS 1 AND 2 WILL BE READ NTSTR (DATA SET 1) TIMES, ONCE FOR EACH STRUCTURE IN THE SSI SYSTEM. THE ORDER OF THE STRUCTURAL MODELS IS THAT IN WHICH THEY WERE READ IN DATA SET 4.

RECORD 1 (10F8.5)

---

VW(N) = THE SCALE FACTORS TO BE APPLIED TO EACH MODAL FREQUENCY OF THE STRUCTURAL MODEL. THERE MUST BE NMODE (DATA SET 4) VALUES. A VALUE OF ZERO WILL DEFAULT TO 1.0. IF VW(N) < 0, THAT IS THE ONLY VALUE READ AND ITS MAGNITUDE IS APPLIED TO ALL MODES.

RECORD 2 (10F8.5)

---

VD(N) = THE SCALE FACTORS TO BE APPLIED TO EACH MODAL DAMPING RATIO OF THE STRUCTURAL MODEL. THERE MUST BE NMODE (DATA SET 4) VALUES. A VALUE OF ZERO WILL DEFAULT TO 1.0. IF VD(N) < 0, THAT IS THE ONLY VALUE READ AND ITS MAGNITUDE IS APPLIED TO ALL MODES.

DATA SET 8A: GROUND MOTION DATA IN THE TIME DOMAIN

-----

THIS DATA SET IS READ ONLY IF OPTION LFT = 1 (DATA SET 5).

THE NAME OF THE DATA FILE FROM WHICH THIS DATA IS READ IS SPECIFIED BY THE PARAMETER ISS18 , READ IN DATA SET 5. THE DEFAULT NAME IS SSINTH .

THE TOTAL NUMBER OF ACCELEROGRAMS THAT ARE EXPECTED IS EQUAL TO  $NCOM * NQKS * NVSTR * NVIMP$  (SEE DATA SET 5). IF NQKS IS NEGATIVE, THE DATA FILE FOR THE ACCELEROGRAMS WILL BE REWOUND AFTER EACH SOLUTION OF NQKS PROBLEMS AND REREAD  $NVSTR * NVIMP$  TIMES, SO THAT THE TOTAL NUMBER OF ACCELEROGRAMS EXPECTED IS  $NCOM * NQKS$ .

THE FOLLOWING RECORDS MUST BE REPEATED FOR EACH ACCELEROGRAM. ALL ACCELEROGRAMS MUST BE IN IDENTICAL FORMAT WITH TIME STEP OF DT AND NPOINT DATA POINTS. ALL WILL BE SCALED BY SCALE . SEE DATA SET 5A.

THE FORMATS LISTED BELOW ARE THE DEFAULT FORMATS

RECORD 1 (10A8)

-----

IDENT = 64 CHARACTERS IDENTIFYING THE ACCELEROGRAM, FOLLOWED BY 16 CHARACTERS IDENTIFYING THE DATE AND TIME IT WAS GENERATED.

SUBSEQUENT RECORDS (8F10.3)

-----

PLCM = NPOINT ACCELERATION VALUES.

DATA SET 9: SOIL IMPEDANCE AND SCATTERING MATRICES  
-----

THIS DATA SET IS DESIGNED TO READ THE FILE GENERATED BY PROGRAM CLAF. THE DEFAULT NAME OF THE FILE IS IMPEDFN. THIS NAME CAN ONLY BE CHANGED ON THE SMACS/SSIN EXECUTION LINE.

RECORD 1 (10A8)  
-----

ICARD = IMPEDANCE FUNCTION IDENTIFIER CONSISTING OF 64 CHARACTERS OF LABELLING DATA FOLLOWED BY 16 CHARACTERS IDENTIFYING GENERATION OF DATA

RECORD 2 (6E10.3)  
-----

GIMP = REFERENCE SHEAR MODULUS WITH WHICH DATA WAS GENERATED  
 VSIMP = REFERENCE SHEAR WAVE VELOCITY WITH WHICH DATA WAS GENERATED  
 CLIMP = CHARACTERISTIC LENGTH USED TO GENERATE DATA  
 DRIMP = DAMPING RATIO USED TO GENERATE DATA  
 AOMIN = MINIMUM NORMALIZED FREQUENCY FOR WHICH DATA WAS GENERATED  
 AOMAX = MAXIMUM NORMALIZED FREQUENCY FOR WHICH DATA WAS GENERATED

IF THESE PARAMETERS DO NOT MATCH THOSE PROVIDED IN THE SSININ FILE, A WARNING WILL BE WRITTEN IN THE SSINLOG FILE. EXCEPT FOR AOMIN AND AOMAX, ALL DATA FROM THE SSININ FILE WILL TAKE PRECEDENCE. AOMIN AND AOMAX FROM THIS FILE WILL BE USED ONLY IF FMIN OR FMAX FROM THE SSININ FILE LIE OUTSIDE THE FREQUENCY RANGE DEFINED BY AOMIN AND AOMAX.

THE FOLLOWING RECORDS ARE READ FOR EACH FREQUENCY AT WHICH IMPEDANCE AND SCATTERING MATRIX TABLES WERE COMPUTED BY CLAF:

RECORD 1 (F7.2)  
-----

A0 = THE DIMENSIONLESS FREQUENCY AT WHICH THE DATA IS COMPUTED.  
 THIS VALUE IS EQUAL TO  $\omega \cdot CL / VS$ .

RECORDS 2 (3(2X,2E10.3))  
-----

K(I,J) = THE IMPEDANCE MATRIX, CONSISTING OF NDFD\*NDFD VALUES.  
 NDFD COMPLEX VALUES ARE READ SIMULTANEOUSLY NDFD TIMES.

RECORD 3 (F7.2)  
-----

A0 = THE DIMENSIONLESS FREQUENCY AT WHICH THE DATA IS COMPUTED.  
THIS VALUE IS EQUAL TO  $w \cdot CL / VS$ .

RECORDS 4 (3(2X,2E10.3))  
-----

S(I,J) = THE SCATTERING MATRIX, CONSISTING OF NCASE\*NDFD VALUES.  
NCASE COMPLEX VALUES ARE READSIMULTANEOUSLY NDFD TIMES.

PRESTO MANUAL

Special Note: This manual was written to describe PRESTO as it was implemented on the LLNL computer system. The LBL user should ignore any reference to initial startup of PRESTO.

## Input to PRESTO

PRESTO is executed by typing:

```
PRESTO I= prsin, O= prsout, RV= resvec, RC= rvcor / t v
```

where the default names are given in small print. Any file or file substitution can be defaulted, in which case we do not have to type in that part of the substitution at execution time. Here we have

I = the input file,  
 O = the output file,  
 RV= the response vector as generated in SMACS,  
 RC= the response correlation file.

The input to PRESTO as contained in the file, PRESIN, is summarized below.

Card.	Format	Content
1.	(10A8)	Title of up to 80 characters
2.	(3A10)	Box and identifier for the plotted output files
3.	(6I5,F10.0,4I5)	<p>NBE = the number of basic events            NEQ = the number of earthquakes            NSTR = the number of structures            IRAW = flag for doing raw data</p> <p>.EQ. 0 No raw data calculation, compute basic event responses by combining raw data response.</p> <p>.EQ. 1 Do raw data calculations with no combination to get basic events.</p> <p>.EQ. 2 Same as 1 except use the RVCOR file for extra printout.</p>

I PLOT = plotting flag

- .EQ. 0 no plots produced
- .EQ. 1 abscissa and ordinate are linear with ordinate being cumulative probability in the range 0 to 1.0.
- .EQ. 2 Abscissa is logarithmic and ordinate is cumulative probability between 0 and 1.0.
- .EQ. 3 Abscissa is logarithmic and ordinate is normalized standard deviation values; i.e., a lognormal distribution will plot as a straight line.

I PRNT = flag to print data

- .EQ. -1 suppress printing
- .EQ. 0 print all earthquakes
- .GE. 1 print up to IPRNT earthquakes

XMULT = multiplier for all data values (default is 1.0)

NBEVENT= sizing limit for the number of basic events. This number must be greater than or equal to the number of basic events (raw data values) that are being analyzed. The default and maximum size is set at 1200.

NRV = the sizing limit for the number of raw data responses. This number must be greater than or equal to number of raw events actually used. The default and maximum size is set at 1200.

NNUM = the number of upper points on the probability plots to have their corresponding earthquake number labeled.

NCHSIZ = the plot character size for the NNUM labeled numbers  
 .EQ. 0 small  
 .EQ. -1 even smaller

In a separate file we must construct the RVCOR data. This data has the following content:

Format

(2A5, 8I5)

IDBE = Ten character identifier for the response.

NODEL = node, element, or foundation number.

NEI = node or element indicator  
 .EQ. 0 an element force  
 .EQ. 1 a nodal acceleration  
 .EQ. 2 free-field acceleration  
 .EQ. 3 foundation acceleration  
 .EQ. 4 structure base force  
 .EQ. 5 fixed base acceleration or input motion.

IROW = Ith row number (not used in the LBL version)

ICOL = Jth column number (not used in the LBL version)

IPOS = Ith position in the basic event vector that is being constructed from this and other responses.

## CHANGO MANUAL

Special Note: This manual was written to describe CHANGO as it was implemented on the LLNL computer system. The LBL user should ignore not only the parts about initial startup of CHANGO, but also about the interactive nature with the attached television monitor. On the LBL system, CHANGO can be run only in the batch mode.

# CHANGO

THE OTHER HALF  
OF  
PRESTO

*March 04, 1982*

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## INTRODUCTION

CHANGO is an interactive code that may also be run in a batch mode. The interactive driver to CHANGO was derived from the interactive mesh generator SLIC. The command processor in CHANGO is a sophisticated new parser which prompts for all required data (unless it has already been provided). The error recovery system has been expanded to prompt the user for required corrections.

CHANGO was developed to post-process data from its companion code, PRESTO. CHANGO allows you to read in the PRESTO summary table and manipulate the data columns. The main manipulations that CHANGO can perform are:

1. Write the columns out in the print file.
2. Sort the complete set of columns.
3. Place a gap between the free-field, foundation and fixed-base accelerations and the rest of the data.
4. Plot the columns (with upto 4 columns overplotted) versus the response number.
5. Cross-plot the columns (with upto 4 columns plotted versus a single column).
6. Plot and print the decoded identifier associated with each response.
8. Create new columns as combinations of existing columns.

## RUNNING CHANGO

CHANGO is executed by typing

```
CHANGO c=cmf l=lgf p=prf s=svf b=batch / t v
```

where the execution parameters are defined as

```
cmf = command file           (default is C$CMD)
lgf = log file               (default is CHGLOG)
prf = print file            (default is CPRNT)
svf = command save file     (default is CSAVE)
batch = flag for batch execution
```

These parameters cause several different actions to occur. The parameters "c=", "l=", "p=", and "s=" all serve to rename files that CHANGO uses. The parameter "c=" has the additional function in that by renaming the command file, CHANGO will immediately try to obtain commands from the named file. The parameter "b=" places CHANGO into *batch mode*. When CHANGO is in *batch mode*, no messages will be sent to the terminal. Also, a command file must be supplied on the execute line when going into *batch mode*. If the value of "b=" is not batch, CHANGO will not go into *batch mode*. These parameters may be entered in any order and may be omitted as well. When parameters are omitted, the defaults are assumed. For example, the execute line

```
CHANGO c=job1 b=batch / t v
```

would result in the following actions: CHANGO would enter into *batch mode* and would then immediately try to obtain commands from the file job1. The log of the execution would be found in file chglog; all printed data would be found in file cprnt; and CHANGO would not save any commands into file csave.

## GENERAL INFORMATION ABOUT CHANGO

There are several features in CHANGO that make it easy to use: command continuation on another line; command stacking; command duplication without re-typing the complete command word; free-format input; use of keyword= for command options; and the ability to obtain and execute commands from a command file.

### Command Continuation

The special character "&" allows continuation of a command. When this character is preceded and followed by a blank, CHANGO will prompt for more input if input is from the terminal. If input is from a command file, CHANGO will interpret the next record in the command file as a continuation of the current command. Since CHANGO accepts input in the form of a mock 80 column "card," the continuation character "&" must occur at or before column 80 because no data past 80 characters of input is read. A given command may have any number of continuations. An example of the use of the continuation character is shown below (following the CHANGO prompts which appear underlined).

```
start of command => command ? device mon= 1231 uxon box= &
continuation => box= ? "box r09 gerhard"
```

### Command Stacking

Commands may be stacked for sequential execution. This procedure is handy when entering short command lines on the terminal (i.e. DEVICE and OPTIONS commands). Commands are separated by means of the special character "\". On older model terminals (Teletypes or ttys), the character "\" may occur as a shift of the L key, while on most 7-bit terminals it is a separate key. In the event of an error CHANGO will purge the stack and leave a clean slate. An example of how stacking might be used is shown below.

```
setup lowercas\plot 17 18 vs 5 xlab="column 5"\make 4 from 3 + 5
```

### Command Duplication

Whenever the same command is to be executed several times in succession with different data, it is not convenient to type out the complete command word each time (apart from the first time). CHANGO allows the user to signal re-use of the most previous command word by preceding the data for the command with the special character ";". When the character ";" is used, it must occur as the first non-blank

character and must be followed by a blank. When the command is placed into the CSAVE file, the total command word is substituted for the duplication character ";". For example, the following command is issued.

```
command ? rdset prsout1 v3=5 v4= 9 clear.
```

If the next command is

```
command ? ; prsout2 v1=3 v5=1 v3=8
```

This command will be interpreted as the RDSET command and the following image will be saved in the CSAVE file.

```
rdset prsout2 v1= 3 v5= 1 v3= 8
```

## Free-Format Input

CHANGO has free-format input. Thus, all inputs may be delimited by either a comma "," or a blank " ". These delimiters may appear as many times as one likes. While several blanks look ok, a string of commas seems silly. All numeric inputs may be input with or without the decimal point for both integer and real numbers. Some of the legal forms for numeric input are:

```
nn      .nnn   nn.   nn.nnn   +nnnn  -nn.nnnn
nnn.nnE+nn  nnn.nEnn   .nnnnE-nn   +.nnE-n
```

Other combinations can be produced and one should get the idea. The main restrictions are that numeric (and alphabetic) input may not have any imbedded blanks and that the values which "n" may take are limited to the digits 0 through 9. The character "E" indicates the use of the exponent form, in which digits following "E" signify powers of 10. These powers of 10 then multiply the number preceding the E).

## Keyword Equals

In following with free-format input for CHANGO, options for commands may be entered in any order. This convenience is accomplished by the use of "keyword" and "keyword equals" designators (key and key=). Any option not named by either of the two designators is assigned its default value.

## Command File

CHANGO allows the user to either enter commands interactively from the terminal or obtain commands from a disk file called the "command" file. CHANGO saves all successfully executed commands during each session in the file CSAVE, overwriting an existing CSAVE file. Generally the command file comes from a past CSAVE file. If the user wishes to save or reuse the resulting file CSAVE, he must switch its name. For example, after a CHANGO session, file CSAVE is created. At a future time, it is desired to run the same session with a few modifications; thus, the file CSAVE may be renamed JOBIN and modified with a text editor until it is in the desired form. When CHANGO is then initialized, the execute line could include c=jobin as one of the parameters. For further discussion of this feature see the READ command (page 7).

## Interrupts

Execution of CHANGO may be interrupted at almost any time by typing (CTRL-E)I. CHANGO cannot be interrupted when it is performing an RDSET command (read a set of data). Upon interruption, CHANGO will abandon its current operation, end any graphics frames that are in progress, and prompt for the next command. If CHANGO is in *batch mode*, CHANGO will terminate rather than prompt for the next command. If CHANGO is obtaining commands from a command file, CHANGO will return to interactive input.

## HANDLING ERRORS

CHANGO has an exceptional error recovery system. Two main types of errors can occur: errors that are recoverable within the command and errors that are non-recoverable. In either case, CHANGO prompts for terminal input for correction if appropriate and will not return to the command file, if in use, until the user so instructs.

The user can treat recoverable errors in either of two ways: by correcting the error, thus recovering, or by aborting the command. For recoverable errors CHANGO will print the offending input line and the appropriate error message. CHANGO will then prompt for data to continue the command. CHANGO will discretely identify the input field that initiated the error (i.e. "value of mon= must be positive"). All data after and including that field is lost. In this example the input line is cleared starting with the value for "mon=" and CHANGO prompts with mon= ?. Correction would start with a valid value for "mon=". To abort the command without recovering, do a carriage return (return key). This action results in the message **"\*ABORTED\*"** being printed on the terminal. If CHANGO is prompting for options ? after an error, it is possible to execute the command "as is" by supplying a blank input line (1 or 2 blanks followed by a carriage return) after the prompt. This action results in the execution of the command with all of the previously accepted options. Any time CHANGO prompts for options ?, a blank input line will cause CHANGO to process all of the command that has been accepted whereas a null line (carriage return with no blanks) will cause CHANGO to abort the command.

Non-recoverable errors result in CHANGO printing the offending input line, the appropriate error message and the word **"\*ABORTED\*"**. CHANGO will abort all commands that cannot be corrected "mid-stream". Thus, the user should determine why such an error was encountered before attempting the command again. Typically, all errors having to do with file names result in an abort.

In the event of either type of error, if several commands have been stacked (see page 3), they are purged and CHANGO will print **"\*\*STACK CLEARED\*\* THESE COMMANDS PURGED"**, followed by one line displaying the purged commands. Thus, those commands are lost and the user must re-enter them upon recovery. The offending command is printed with its appropriate error message after the stack cleared message is printed.

## BASIC COMMANDS

There are several basic commands that allow the user to exercise control over the mode of execution, the source of command input, and termination. Two commands have been included for documenting the execution and for reporting the current stage of execution.

READ (filenam)

This command causes subsequent commands to be obtained from a command file, rather than from the terminal. If filenam is omitted, CHANGO will continue to use the command file that is currently open (if any). If the filenam that is included on the READ command is the same as the name of the currently opened command file, commands are obtained from filenam starting with the next available command (filenam is not rewound). If filenam is not currently open, the current command file is closed, filenam is opened and commands are obtained starting with the first record. NOTE: If an end-of-file has been encountered while reading filenam, another READ for that file will cause CHANGO to crash.

example: read job1

RETURN (comment to be printed upon return)

This command is applicable only to command files and is used to return control to interactive input from command file input. When RETURN is executed, the complete command line including the optional comment is printed on the terminal. NOTE: If CHANGO is in *batch mode*, CHANGO will terminate upon encountering a RETURN

example: return this is the end of the rdsets

C (printable comment)

This command allows the user to print comments from the command file to the terminal during the execution of the command file. The complete C line is printed. If C is executed interactively, the only effect is to save the comment in the CSAVE file. NOTE: If CHANGO is operating in *batch mode* no comments will be printed.

example: c now reading columns from prsout12

N (non-printable comment)

N is designed to be used in the command file for documentation and is not printed to the terminal during execution of the command file. N can be used to place spaces between comments in the command file by using a blank comment. All N commands are saved in the CSAVE file.

example: n  
n input file for chango date 18-feb-82  
n

END

All good interactive codes must have some way to terminate. END will obtain a log of the time used by CHANGO and then terminate CHANGO. The only other way that CHANGO can terminate is for CHANGO to encounter an error, a prompt, or an interrupt while in *batch mode*.

example: end

## GRAPHICS COMMANDS

CHANGO is a graphics post-processor, thus it is necessary to exercise control over the various graphics devices, namely the TMDS and the generation of a UX80 plot file.

```
DEVICE < mon= box= tvon tvoff uxon uxoff rjet= >
```

This command is the basic graphics command. It attaches and/or releases the TMDS ("tvon" and "tvoff") and the UX80 file ("uxon" and "uxoff"); it sets or changes the TMDS monitor ("mon="); and it specifies the box number and id for the UX80 file ("box="). The default mode is "tvon" and "uxoff". This default means that upon execution of DEVICE, the only required data is the "mon=" option which will hook up the TMDS of your choice but will not save the frames in a UX80 plot file. The UX80 plot files may be output to an RJET automatically using the option "rjet=". The various options are discussed in greater depth below. NOTE: Frames are plotted only if the DEVICE command initializes either the TMDS or the UX80 file.

"mon=" -- The monitor to be attached. Monitors can be changed at will by executing DEVICE with a new monitor number. If DEVICE is executed and the status is "tvon" (default) but "mon=" is not specified, CHANGO will prompt for the monitor number.

"box=" -- The UX80 file box number and id. This information is required for attaching a UX80 file. The value associated with "box=" is a character string of up to 30 characters enclosed within quotes ". ". The first 3 characters must be box. The first time a UX80 file is requested (either by "uxon" on the DEVICE command or by TAKE, page 10), a box and id is required. When "uxon" is requested, if "box=" is not specified on the DEVICE command, CHANGO will prompt for the box number and id. Once the box number and id have been input, it is not necessary to input them again. The initial box and id cannot be overridden.

"tvon" -- Activate the TMDS. "tvon" implies that a "tvoff" has already been done. The normal mode is "tvon". Thus one needs to input only the monitor number ("mon=") to hook up the TMDS.

"tvoff" -- Turn the TMDS off. This command is useful if all one wants is the UX80 plot files. Since DEVICE defaults to "tvon" and will thus prompt for a monitor number, "tvoff" is used to inhibit this default. The general use would be in *batch mode* operation where no interactive processing is done.

"uxon" -- Activate the UX80 file. This option will cause all

subsequent frames to be saved in the UX80 plot file until "uxoff" is specified.

"uxoff" -- Deactivate the UX80 plot file. This option turns off the automatic saving of all frames into the UX80 plot file. Thus, to save any subsequent frames, one must either reselect "uxon" or execute TAKE (see page 10).

"rjet=" -- The RJET number for plot output at termination. A value of zero or less will turn off the RJET request (default).

example: device mon = 1231 uxon box="box r09 test1"

TAKE < "box and id" >

This command will save the current frame into the UX80 plot file if the UX80 plot file has been previously initialized. If the current frame is still in-progress, it will be completed and then saved. If the UX80 plot file has never been requested by TAKE or by DEVICE (see page 9), then a box number and id must be input. The box and id may be included on the TAKE command by enclosing it within quotes " ", or if not included, CHANGO will prompt for it. In either case, the box number and id must be enclosed within quotes and must begin with the characters box. The TAKE command is useful when operating in an interactive mode, especially when doing overplotting, allowing one to save only those frames that are really desired. If "uxon" has been selected by the DEVICE command, TAKE need not be executed. NOTE: If the UX80 plot file has not been previously initialized, the current frame is not saved. It must be reconstructed to save it.

example: take "box r09 test2"

## MANIPULATION COMMANDS

---

CHANGO has a variety of manipulation commands. The primitive commands set global parameters, define the maximum array size and read in sets of data from PRESTO summary tables. The remaining commands can create new columns as combinations of old ones, sort the columns according to structure and component, and place gaps between free-field data and structure data.

```
SETUP      < ncol= pc1= pc2= pc3= pc4= full short uppercas lowercas
            minic smallc mediumc largec >
```

SETUP sets various plotting options and determines the maximum array size to be used.

"ncol=" -- Set the maximum array size to be used. This number is actually the maximum number of columns to allow. The column length is determined from the PRESTO file. The maximum "ncol=" allowed is 100. The default for "ncol=" is 20.

"pc1= ... pc4=" -- Set the character to be used for point plotting. Since one can plot upto four columns on the same plot, these options allow one to assign different characters to be plotted for each of the different columns. The default characters are "+", "#", "0" and "\*". NOTE: Care should be taken to pick characters that fill the complete character block as all characters are positioned based on the center of the character block. Periods (.) and quotes (") are poor choices while pound signs (#), plus signs (+) and zeros (0) are good choices.

"full" -- Make all subsequent plots full size, square plots.

"short" -- Make all subsequent plots short, rectangular plots with the vertical dimension 70% of the horizontal dimension (used to output to the RJET without shrinking the plots).

"uppercas" -- Make all plotting characters uppercase (default).

"lowercas" -- Make all plotting characters lowercase.

"minic" -- Make all plot labels and text (except for plotting characters) miniature size.

"smallc" -- Make all plot labels and text small size (default).

"mediumc" -- Make all plot labels and text medium size.

"largec" -- Make all plot labels (not text) large size.

example: setup mediumc pc1= # ncol= 35

RDSET *filenam* < v1= v2= v3= v4= v5= v6= clear. >

This command reads selected data vectors from the PRESTO file *filenam* and stores them in the specified columns of the large data matrix. There are six vectors available from each PRESTO file. Thus, one can store zero to six of them in any of the available columns. Care should be taken, in that it only makes sense to read sets of data into the data matrix before gapping or sorting the matrix. To start a completely new set of data reads and manipulations, the first RDSET command should include the "clear." option. This option clears the work space and hopefully nothing wierd should happen. NOTE: The seventh vector in the PRESTO summary table is the IDENTITY of the responses. This vector must match all previous IDENTITY vectors from other PRESTO summary tables, or CHANGO will not accept the RDSET command. There is one exception. If the "clear." option is used, it is a fresh start, and the IDENTITY vector encountered on this RDSET command becomes the vector other PRESTO summary tables must match.

"v1= ... v6=" -- Read selected vector and place it into designated data column. "v1=" through "v6=" designate the vector to read in the PRESTO summary table, and the number following it indicates which data column to store it into. For example, "v4= 14" means to read vector 4 from the PRESTO table and put it into data column 14. Thus, vector 4 from this PRESTO file would subsequently be refered to as column 14 for all plotting and manipulations.

"clear." -- Clear the workspace prior to reading in new vectors. This option is necessary when starting a new batch of vector reads after having already done GAP or SORT. If neither of these commands have been executed, "clear." is not needed.

example: rdset prsout1 v3=5 v4=11 v6=12 clear.

GAP ( ngap )

The GAP command places gaps between certain types of data, for plot clarity. The default gap size is 5 spaces. A different gap size can be ordered by including a numeric value (ngap) on the command, where  $1 \leq \text{ngap} \leq 50$ . The gaps will occur after free-field accelerations, foundation accelerations and fixed-base accelerations. If both free-field and foundation acclerations are present, two gaps will be constructed.

example: gap 15

## SORT

The SORT command will sort the responses occurring after the free-field and foundation accelerations. The responses are already sorted by structure number. SORT will sort first by response component, and then by response type. Response components are sorted in ascending order; response types are sorted such that nodal responses are first, base forces are second and element forces are third.

example: sort

MAKE col1 from col2 ( op col3 ) < scaleby >

The MAKE command constructs new columns as combinations of other columns. The parameters col1, col2 and col3 are *column numbers*. These numbers correspond to the *column numbers* utilized with the RDSET command (see page 12). The word *from* must separate the parameters col1 and col2. The most trivial construction is to copy one column into another (i.e., MAKE 5 from 12). New columns can be constructed as a combination of two columns, when the parameter pair "op col3" are included. Here *op* is one of the four basic mathematical operators "+", "-", "\*", or "/". Thus col1 can be the sum, difference, product, or quotient of col2 and col3. The option "scaleby" can be used to scale col3 prior to the actual mathematical operation. "scaleby" is followed by a numeric scale factor. The default for "scaleby" is 1. NOTE: The terms col1, col2 and col3 refer to a complete column of data. Thus, the indicated MAKE operation is performed on each element of the appropriate columns.

example: make 17 from 5 + 3 scaleby 32.174



in identifying the characteristics of a particular response number. If the parameter pair "vs col2" is included in the command, the columns col1...coln are plotted versus col2.

- "t1=","t2=" -- Set the plot title. There are two title lines (referred to as "t1=" and "t2=") that can be specified for each plot. The default for "t1=" is a blank line; the default for "t2=" is blank for response number plots and "CROSS PLOT" for cross-plots. Titles must be enclosed within quotes (" ") and are limited to 60 characters; excess characters are ignored.
- "xlab=" -- Set the abscissa label. Default is "RESPONSE NUMBER" for response number plots and "ABSCISSA VALUE" for cross-plots. The abscissa value must be enclosed within quotes and is limited to 30 characters; excess characters are ignored.
- "ylab=" -- Set the ordinate label. Default is "VALUE OF RESPONSE" for response number plots and "ORDINATE VALUE(S)" for cross-plots. The ordinate label must be enclosed within quotes and is limited to 30 characters; excess characters are ignored.
- "xmin=","xmax=" -- Set the minimum and maximum abscissa limits for cross-plots.
- "ymin=","ymax=" -- Set the minimum and maximum ordinate limits for all plots.

example: plot 4 8 ymin= -5 ymax= 7 t2="plot 1" ylab="accel"  
(response number plot)

plot 18 26 31 vs 42 xlab="column 42" ylab= &  
"columns 18 26 31" t1="test problem 1" xmax= 100  
(cross-plot)

## COMMAND ABBREVIATIONS

CHANGO will read only the first five characters of a command name. Thus longer command names can be shortened (i.e. RETURN and be input as RETUR). This manual indicates the required letters in the command names by placing them in all caps. The lower case letters are optional. Some feel it is advantageous to have even shorter commands. I have incorporated a set of unambiguous abbreviations. These abbreviations must be typed exactly. There is no option for typing something in between the abbreviation and the full command word. Following is an alphabetic list of the commands and their abbreviations. As noted previously, the required letters are in caps.

C	.....	C
DEVICe	.....	D
END	.....	E
GAP	.....	G
IDLIST	.....	I
MAKE	.....	M
N	.....	N
PLOT	.....	P
RDSET	.....	RDS
READ	.....	RD
RETURN	.....	RT
SETUP	.....	ST
SORT	.....	S
TAKE	.....	T
WRITE	.....	W

## Chapter 4

### SOLVED EXAMPLE

In this section a solved example is presented to familiarize the user with the type of analysis that the SMACS series of codes can perform. In the example the structure being analyzed is the containment shell of the Zion Nuclear Generating Plant in Illinois. This shell structure is modeled as a three-dimensional beam with lumped masses. The shell is 188 feet tall above the ground level and has an outside diameter of 147 feet. The shell wall is 3.5 feet thick (See Figs. 2 and 3). The structure is embedded 36 feet below the ground surface.

In this example the containment structure is analyzed with the base not fixed but resting on the soil as shown in Fig. 4. The soil is considered to have three horizontally layered strata consisting of 36 feet of lake deposit, 30 feet of deep cohesive glacial till, and 45 feet of thick cohesionless glacial deposits as shown in Figure 2. The coefficients of variation, not only for the soil shear moduli and soil damping, but also for the structural frequencies and damping values, are given in Table 1. The median values of modal frequencies used are those obtained by the fixed base analysis for the structure. The median structural damping value is 0.025.

Only a part of the outputs is presented here to save space. The user is encouraged to run this problem to get acquainted with most of the features of the SMACS programs.

For simplicity, only a beam model of the structure is solved as an example. Any model that the SAP4 code can handle can also be solved by the SMACS program.

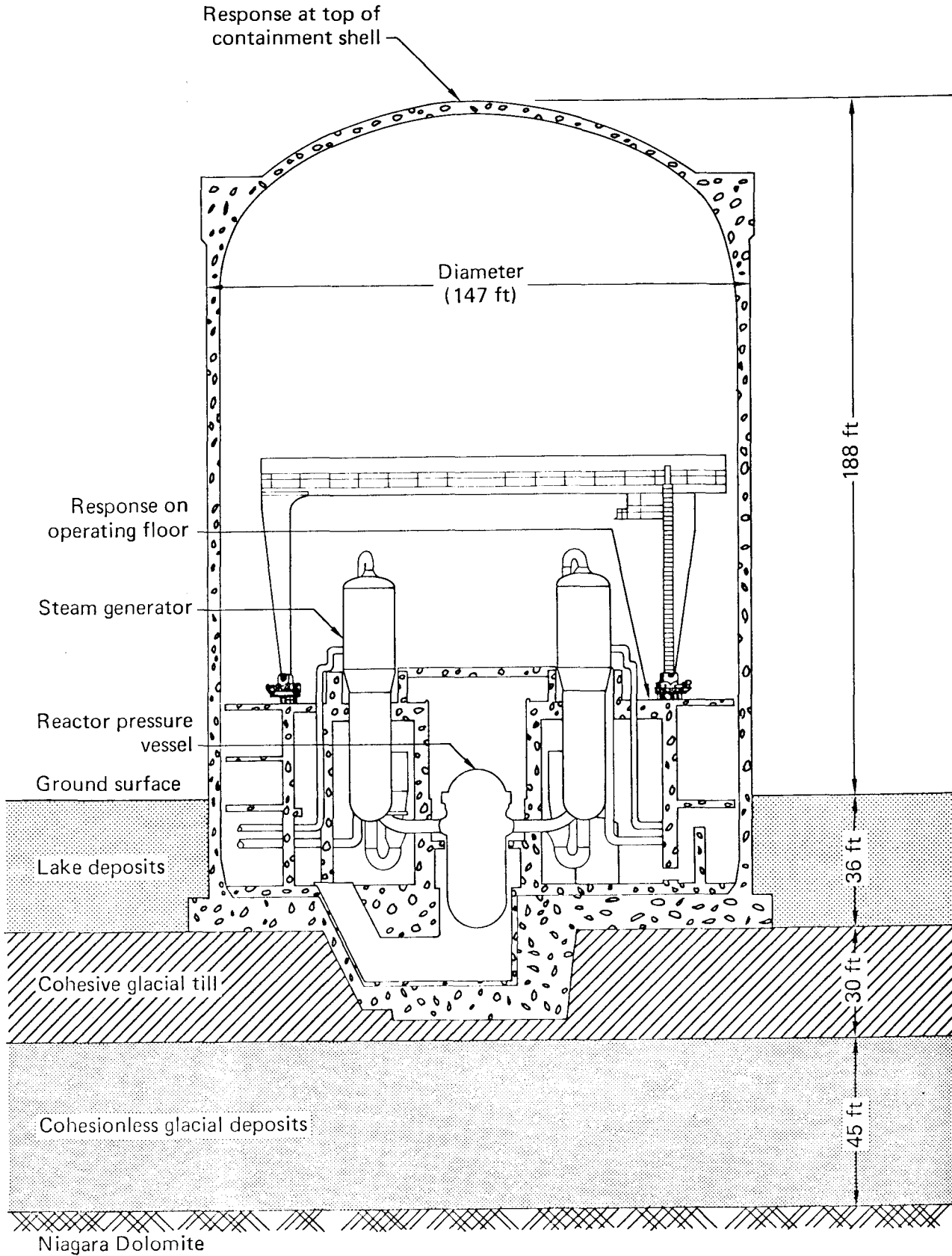


Fig. 2

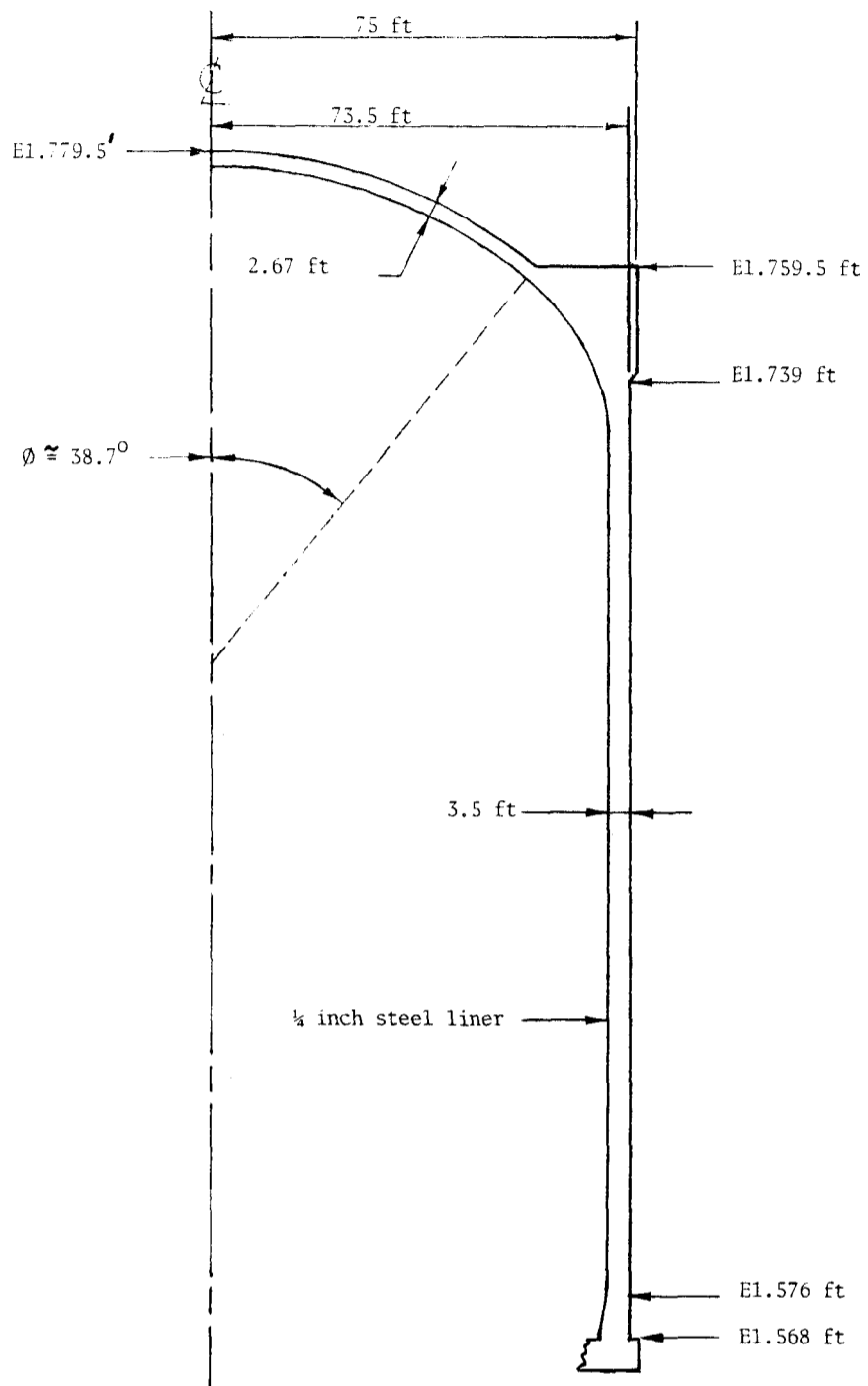
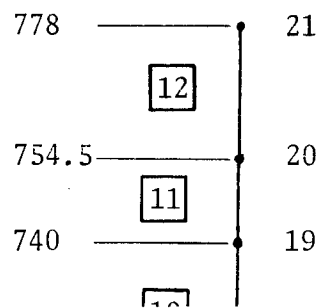


Fig. 3 Dimensions of the containment shell structure.

Elevation (feet)	Beam element	Node number
---------------------	-----------------	----------------



4-6

## EXAMPLE

## SSI ANALYSIS USING A BEAM MODEL

All files needed to execute, as well as all output files, are stored on GSS tape 12955 on the LBL system. The following line is typical of the fetch line used to access these files.

```
FETCHGS, CONTROL = GLAY/CONTROL, 12955.
```

This line would fetch the control cards needed to execute the GLAY. To fetch the GLAY executable file, the user would substitute the word GLAY for the word CONTROL on the line above to have

```
FETCHGS, GLAY = GLAY/GLAY, 12955.
```

All other file associated with the program GLAY can be obtained just by substituting its name (as shown in Fig. 1, Chapter 2) for the word CONTROL on the first given line. As a final example, if the user wanted to fetch the SMACSO output file that SMACS generated in this example, the input line would be:

```
FETCHGS, SMACSO = SMACS/SMACSO, 12955.
```

Here we see that the ordering of the files is controlled by the program name, as it is given just before the "/" in all cases.

All printed and plotted examples that follow are shown as they were obtained on the LLNL system. Very slight changes in the plotted output can be expected on the LBL system.

SIMQ INPUT AND OUTPUT

This example shows the generation of a typical time history that can be used as one of the suite of time histories needed in the analysis.

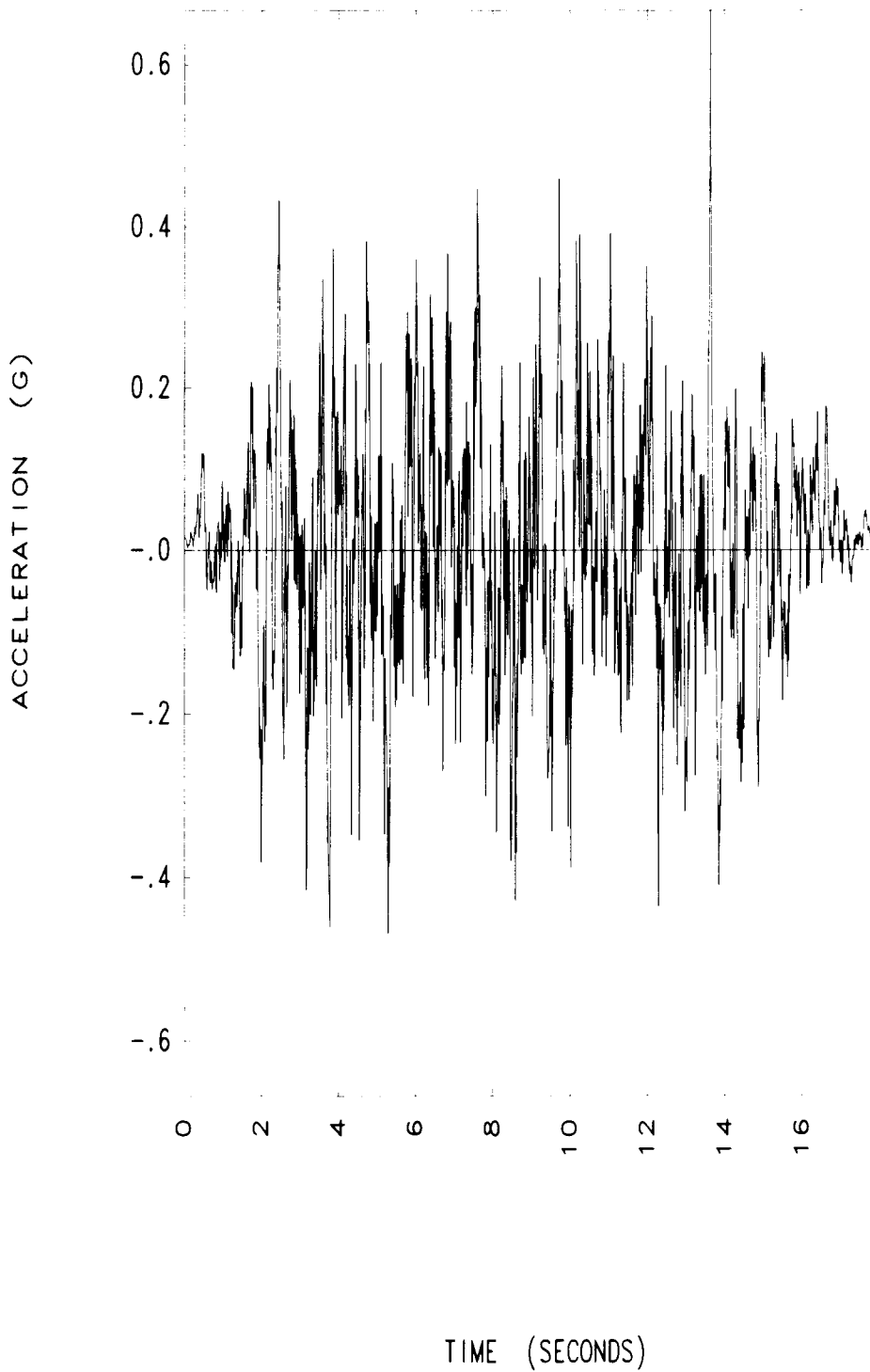
1	SONGS HOUSNER SPECTRA 10% DAMPING DT = 0.01						1
2	.029	5.	.029	5.	1.0	50.	
3	.01	3.	10.	.667	18.		
4	140847	2	2	2	1	75 0 56 2000	
5	0.12	0.10					
6	0.029	1.190					
7	0.032	1.313					
8	0.036	1.477					
9	0.040	1.641					
10	0.045	1.846					
11	0.050	2.076					
12	0.056	2.325					
13	0.059	2.453					
14	0.063	2.619					
15	0.067	2.785					
16	0.069	2.873					
17	0.071	2.956					
18	0.074	3.081					
19	0.077	3.206					
20	0.080	3.385					
21	0.083	3.512					
22	0.087	3.670					
23	0.091	3.845					
24	0.095	4.019					
25	0.100	4.243					
26	0.105	4.468					
27	0.111	4.737					
28	0.118	5.065					
29	0.125	5.389					
30	0.129	5.585					
31	0.133	5.791					
32	0.138	6.026					
33	0.143	6.297					
34	0.148	6.544					
35	0.154	6.838					
36	0.160	7.153					
37	0.167	7.528					
38	0.174	7.972					
39	0.181	8.315					
40	0.190	8.798					
41	0.200	9.397					
42	0.208	9.913					
43	0.217	10.410					
44	0.227	11.110					
45	0.238	11.770					
46	0.250	12.550					
47	0.263	13.410					
48	0.278	14.310					
49	0.290	15.050					
50	0.303	15.730					
51	0.317	16.400					
52	0.333	17.140					
53	0.345	17.550					
54	0.357	17.980					
55	0.370	18.430					
56	0.385	18.960					
57	0.400	19.480					
58	0.417	20.050					
59	0.435	20.380					
60	0.455	20.900					
61	0.476	21.400					
62	0.500	21.990					
63	0.526	22.380					
64	0.556	22.870					

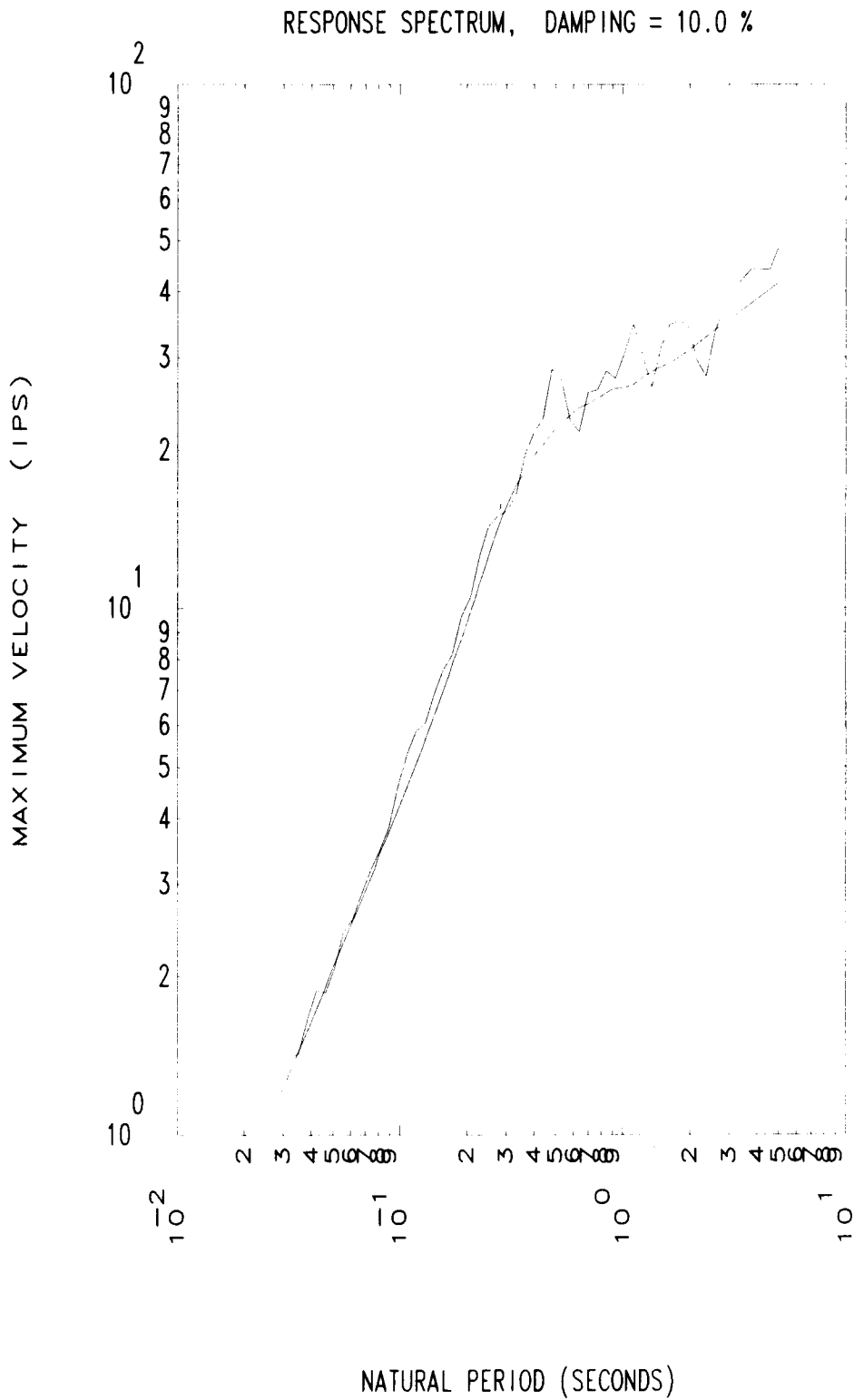


129	0.290	15.050
130	0.303	15.730
131	0.317	16.400
132	0.333	17.140
133	0.345	17.550
134	0.357	17.980
135	0.370	18.430
136	0.385	18.960
137	0.400	19.480
138	0.417	20.050
139	0.435	20.380
140	0.455	20.900
141	0.476	21.400
142	0.500	21.990
143	0.526	22.380
144	0.556	22.870
145	0.588	23.360
146	0.625	23.950
147	0.667	24.280
148	0.714	24.590
149	0.769	25.060
150	0.833	25.610
151	0.909	26.220
152	1.000	26.260
153	1.110	26.620
154	1.250	27.670
155	1.430	28.580
156	1.670	29.480
157	2.000	30.990
158	2.500	33.360
159	3.330	36.450
160	5.000	41.510

SONGS HOUSNER SPECTRA 10% DAMPING DT = 0.01 # 1

18:05:0111/16/81





SAP4 INPUT  
of containment model

4-14

```

1  RESPONSE SPECTRUM ANALYSIS OF ZION CONTAINMENT STRUCTURE
2  28  1  0  15  1  0  0  0  2
3  1  1  1  1  1  1  10.  0.  568.  1
4  08  1  1  1  1  1  10.  0.  568.
5  09  0  0  0  0  0  00.  0.  568.5
6  10  0.  0.  576.
7  11  0.  0.  590.
8  12  0.  0.  603.
9  13  0.  0.  617.
10 14  0.  0.  640.  1
11 19  0.  0.  740.
12 20  0.  0.  754.5
13 21  0.  0.  778.
14 22  1  1  1  1  1  1 00.  70.  568.
15 23  0  0  0  0  0  0 -67.2900 +39.2260 584.5833
16 24  0  0  0  0  0  0 -25.4270 -72.4700 577.500
17 25  0  0  0  0  0  0 -13.5000 -72.5000 590.0000
18 26  0  0  0  0  0  0 -12.8000 -74.9770 598.084
19 27  0  0  0  0  0  0 -62.1771 -75.7052 557.1406
20 28  0  0  0  0  0  0 -9.684 -74.776 577.479
21 2  19  4  0  1
22 1  6.624E8  0.17
23 1 2010.  1005.  1005.  1.022E 07  5.11E 06  5.11E 06
24 2 1577.  788.  788.  8.12E 06  4.06E 06  4.06E 06
25 3 3286.  1643.  1643.  16.04E 06  8.02E 06  8.02E 06
26 4 36.4  804.  804.  2.74E 06  1.37E 06  1.37E 06
27
28
29
30 1  09  10  22  1  1
31 2  10  11  22  1  2  1
32 10 18  19  22  1  2
33 11 19  20  22  1  3
34 12 20  21  22  1  4
35 13 11  23  22  1  1
36 14 10  24  22  1  1
37 15 11  25  22  1  1
38 16 12  26  22  1  1
39 17  9  27  22  1  1
40 18  8  9  22  1  1
41 19 10  28  22  1  1
42  9  37500.  37500.  37500.  0.966E8  0.966E8  1.931E8
43 10  88900.  88900.  88900.  2.306E8  2.306E8  4.162E8
44 11  99200.  99200.  99200.  2.584E8  2.584E8  5.108E8
45 12  99200.  99200.  99200.  2.584E8  2.584E8  5.108E8
46 13 135900. 135900. 135900.  3.576E8  3.576E8  7.000E8
47 14 157900. 157900. 157900.  4.186E8  4.186E8  8.134E8
48 15 146900. 146900. 146900.  3.880E8  3.880E8  7.567E8
49 16 146900. 146900. 146900.  3.880E8  3.880E8  7.567E8
50 17 146900. 146900. 146900.  3.880E8  3.880E8  7.567E8
51 18 146900. 146900. 146900.  3.880E8  3.880E8  7.567E8
52 19 183200. 183200. 183200.  4.688E8  4.688E8  9.378E8
53 20 380800. 380800. 380800.  7.853E8  7.853E8  1.565E9
54 21  78800.  78800.  78800.  7.653E7  7.653E7  1.472E8
55
56
57 0  0  0  .000000  33.  0
58
59

```

INSSIN INPUT AND OUTPUT

This example shows the generation of a typical structural file, SSINST, that must be used in the analysis.

WELCOME TO THE WONDERFUL WORLD OF . . . . .

```
*** * * * ***** ***** *** * *
* ** * * * * * * * * * * * *
* * * * * * * * * * * * * *
* * * * * ***** ***** * * * *
* * * * * * * * * * * * * *
* * * * * * * * * * * * * *
*** * * * ***** ***** *** * *
```

PROGRAM INSSIN, VERSION 3.2 COMPILED 80/12/15. 11.22.51.  
GENERATION OF STRUCTURAL INPUT FOR PROGRAM SSIN  
EXECUTED ON THE R-MACHINE ON 01/20/82 14:32:13

STRUCTURAL DATA FROM SAP4 ANALYSIS RUN ON R 01/20/82 14:27:50  
RESPONSE SPECTRUM ANALYSIS OF ZION CONTAINMENT STRUCTURE



OPTION 1 WILL BE EXECUTED

LCM REQD = 4338, LCM ALLOWED = 340000

SCM REQD = 2004, SCM ALLOWED = 20000

NUMBER OF NODAL POINTS (NUMNP)	=	28
NUMBER OF ELEMENT TYPES (NELTYP)	=	1
SAP4 DYNAMIC OPTION (NDYN)	=	1
TOTAL NUMBER OF EQUATIONS (NEQ)	=	114
NUMBER OF BLOCKS (NBLOCK)	=	1
NUMBER OF EQUATIONS PER BLOCK (NEQB)	=	114
NEQB X NBLOCK (NEQBB)	=	114
NUMBER OF MODES (NF)	=	13

THE FOLLOWING DATA SETS WILL BE PRINTED IN THIS RUNLOG:

6 0 0 0 0 0 0 0 0 0 0 0 0 0 0

THE FOLLOWING DATA IS RELATIVE THE SAP4 MODEL COORDINATE SYSTEM

LOCATION OF BASE OF STRUCTURE    XREF = 0.  
  YREF = 0.  
  ZREF = .56800E+03

NUMBER OF BASEMAT DEGREES OF FREEDOM (NDFD) = 6  
DEGREE OF FREEDOM INDICES (ITDOF):            1            2            3            4            5            6  
CORRESPONDING DEGREES OF FREEDOM    X-COMP    Y-COMP    Z-COMP    XX-COMP    YY-COMP    ZZ-COMP

VERTICAL AXIS OF SAP4 MODEL IS Z-AXIS

EQUATIONS ARE NOT ORDERED SEQUENTIALLY BY NODES

## BETA MATRIX: MODAL PARTICIPATION FACTORS

MODE	RAD/SEC	HZ	DAMPING	X-COMP	Y-COMP	Z-COMP	XX-COMP	YY-COMP	ZZ-COMP
1	26.074	4.150	.0200	-.807E+03	.807E+03	.275E-13	-.134E+06	-.134E+06	.846E-14
2	26.074	4.150	.0200	.807E+03	.807E+03	.425E-13	-.134E+06	.134E+06	-.483E-10
3	53.665	8.541	.0200	-.599E-09	.599E-09	-.221E-13	-.994E-07	-.992E-07	.844E+05
4	74.894	11.920	.0200	.531E-10	.641E-10	.119E+04	-.102E-07	.918E-08	-.111E-08
5	83.685	13.319	.0200	.394E+03	.394E+03	-.427E-12	.471E+04	-.471E+04	.126E-07
6	83.685	13.319	.0200	.394E+03	-.394E+03	.498E-10	-.471E+04	-.471E+04	.116E-08
7	121.221	19.293	.0200	-.144E-07	.149E-07	-.305E+03	-.217E-06	-.222E-06	.571E-06
8	141.858	22.577	.0200	-.138E+03	-.138E+03	-.510E-11	.137E+05	-.137E+05	.290E-10
9	141.858	22.577	.0200	-.138E+03	.138E+03	.361E-09	-.137E+05	-.137E+05	.149E-10
10	169.321	26.948	.0200	.748E-10	.702E-10	.452E-14	.657E-09	-.599E-09	.282E+05
11	193.239	30.755	.0200	.180E+03	.180E+03	.749E-10	.385E+04	-.385E+04	.583E-08
12	193.239	30.755	.0200	.180E+03	-.180E+03	.725E-10	-.385E+04	-.385E+04	-.927E-08
13	273.047	43.457	.0200	.761E+02	-.761E+02	-.176E-09	.964E+04	.963E+04	-.554E-09

## PERCENT OF TOTAL MASS PARTICIPATING IN EACH MODE

MODE	RAD/SEC	HZ	DAMPING	X-COMP	Y-COMP	Z-COMP	XX-COMP	YY-COMP	ZZ-COMP
1	26.074	4.150	.0200	35.2	35.2	.0	48.4	48.4	.0
2	26.074	4.150	.0200	35.2	35.2	.0	48.4	48.4	.0
3	53.665	8.541	.0200	0	0	.0	.0	.0	80.7
4	74.894	11.920	.0200	.0	.0	76.6	.0	.0	.0
5	83.685	13.319	.0200	8.4	8.4	.0	.1	.1	.0
6	83.685	13.319	.0200	8.4	8.4	.0	.1	.1	.0
7	121.221	19.293	.0200	.0	.0	5.0	.0	.0	.0
8	141.858	22.577	.0200	1.0	1.0	.0	.5	.5	.0
9	141.858	22.577	.0200	1.0	1.0	.0	.5	.5	.0
10	169.321	26.948	.0200	0	0	.0	.0	.0	9.0
11	193.239	30.755	.0200	1.7	1.7	.0	.0	.0	.0
12	193.239	30.755	.0200	1.7	1.7	.0	.0	.0	.0
13	273.047	43.457	.0200	.3	.3	.0	.3	.3	.0
TOTAL MASS PARTICIPATION OF INCLUDED MODES				93.1	93.1	81.6	98.2	98.2	89.6

TOTAL NUMBER OF RESPONSE COMPONENTS REQUESTED (NNREQ) = 198

KINEMATIC RESPONSE COMPONENTS ARE LISTED BELOW

REQUEST 1 IN SAP4 COORDINATES: NODE 8, COMPONENT 1 ABSOLUTE ACCELERATION NODE 8 ( X ), FIXED BASE  
 \*\*\* WARNING -- NODAL COMPONENT IS CONSTRAINED: RIGID-BODY MOTIONS WILL BE COMPUTED \*\*\*

REQUEST 2 IN SAP4 COORDINATES: NODE 8, COMPONENT 2 ABSOLUTE ACCELERATION NODE 8 ( Y ), FIXED BASE  
 \*\*\* WARNING -- NODAL COMPONENT IS CONSTRAINED: RIGID-BODY MOTIONS WILL BE COMPUTED \*\*\*

REQUEST 3 IN SAP4 COORDINATES: NODE 8, COMPONENT 3 ABSOLUTE ACCELERATION NODE 8 ( Z ), FIXED BASE  
 \*\*\* WARNING -- NODAL COMPONENT IS CONSTRAINED: RIGID-BODY MOTIONS WILL BE COMPUTED \*\*\*

REQUEST 4 IN SAP4 COORDINATES: NODE 8, COMPONENT 4 ABSOLUTE ACCELERATION NODE 8 (XX), FIXED BASE  
 \*\*\* WARNING -- NODAL COMPONENT IS CONSTRAINED: RIGID-BODY MOTIONS WILL BE COMPUTED \*\*\*

REQUEST 5 IN SAP4 COORDINATES: NODE 8, COMPONENT 5 ABSOLUTE ACCELERATION NODE 8 (YY), FIXED BASE  
 \*\*\* WARNING -- NODAL COMPONENT IS CONSTRAINED: RIGID-BODY MOTIONS WILL BE COMPUTED \*\*\*

REQUEST 6 IN SAP4 COORDINATES: NODE 8, COMPONENT 6 ABSOLUTE ACCELERATION NODE 8 (ZZ), FIXED BASE  
 \*\*\* WARNING -- NODAL COMPONENT IS CONSTRAINED: RIGID-BODY MOTIONS WILL BE COMPUTED \*\*\*

REQUEST 7 IN SAP4 COORDINATES: NODE 9, COMPONENT 1 ABSOLUTE ACCELERATION NODE 9 ( X )  
 IN SSIN COORDINATES: NODE 9, COMPONENT 1

REQUEST 8 IN SAP4 COORDINATES: NODE 9, COMPONENT 2 ABSOLUTE ACCELERATION NODE 9 ( Y )  
 IN SSIN COORDINATES: NODE 9, COMPONENT 2

REQUEST 9 IN SAP4 COORDINATES: NODE 9, COMPONENT 3 ABSOLUTE ACCELERATION NODE 9 ( Z )  
 IN SSIN COORDINATES: NODE 9, COMPONENT 3

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REQUEST 79 IN SAP4 COORDINATES: NODE 21, COMPONENT 1 ABSOLUTE ACCELERATION NODE 21 ( X ), TOP  
 IN SSIN COORDINATES: NODE 21, COMPONENT 1

REQUEST 80 IN SAP4 COORDINATES: NODE 21, COMPONENT 2 ABSOLUTE ACCELERATION NODE 21 ( Y ), TOP  
 IN SSIN COORDINATES: NODE 21, COMPONENT 2

REQUEST 81 IN SAP4 COORDINATES: NODE 21, COMPONENT 3 ABSOLUTE ACCELERATION NODE 21 ( Z ), TOP  
 IN SSIN COORDINATES: NODE 21, COMPONENT 3

REQUEST 82 IN SAP4 COORDINATES: NODE 21, COMPONENT 4 ABSOLUTE ACCELERATION NODE 21 (XX), TOP  
 IN SSIN COORDINATES: NODE 21, COMPONENT 4

REQUEST 83 IN SAP4 COORDINATES: NODE 21, COMPONENT 5 ABSOLUTE ACCELERATION NODE 21 (YY), TOP  
 IN SSIN COORDINATES: NODE 21, COMPONENT 5

REQUEST 84 IN SAP4 COORDINATES: NODE 21, COMPONENT 6 ABSOLUTE ACCELERATION NODE 21 (ZZ), TOP  
 IN SSIN COORDINATES: NODE 21, COMPONENT 6

FORCE RESPONSE COMPONENTS ARE LISTED BELOW

REQUEST 85:	ELEMENT SET	1,	ELEMENT	1,	COMPONENT	1	ELMT.	1 (1)
REQUEST 86:	ELEMENT SET	1,	ELEMENT	1,	COMPONENT	2	ELMT.	1 (2)
REQUEST 87:	ELEMENT SET	1,	ELEMENT	1,	COMPONENT	3	ELMT.	1 (3)
REQUEST 88:	ELEMENT SET	1,	ELEMENT	1,	COMPONENT	4	ELMT.	1 (4)
REQUEST 89:	ELEMENT SET	1,	ELEMENT	1,	COMPONENT	5	ELMT.	1 (5)
REQUEST 90:	ELEMENT SET	1,	ELEMENT	1,	COMPONENT	6	ELMT.	1 (6)
REQUEST 91:	ELEMENT SET	1,	ELEMENT	2,	COMPONENT	1	ELMT.	2 (1)
REQUEST 92:	ELEMENT SET	1,	ELEMENT	2,	COMPONENT	2	ELMT.	2 (2)
REQUEST 93:	ELEMENT SET	1,	ELEMENT	2,	COMPONENT	3	ELMT.	2 (3)

...  
...  
...

REQUEST 193:	ELEMENT SET	1,	ELEMENT	19,	COMPONENT	1	ELMT.	19 (1)
REQUEST 194:	ELEMENT SET	1,	ELEMENT	19,	COMPONENT	2	ELMT.	19 (2)
REQUEST 195:	ELEMENT SET	1,	ELEMENT	19,	COMPONENT	3	ELMT.	19 (3)
REQUEST 196:	ELEMENT SET	1,	ELEMENT	19,	COMPONENT	4	ELMT.	19 (4)
REQUEST 197:	ELEMENT SET	1,	ELEMENT	19,	COMPONENT	5	ELMT.	19 (5)
REQUEST 198:	ELEMENT SET	1,	ELEMENT	19,	COMPONENT	6	ELMT.	19 (6)

THE NUMBER OF RESPONSE COMPONENTS SPECIFIED ABOVE  
HAS BEEN EXCEEDED: FURTHER REQUESTS WILL BE IGNORED

## RESPONSE SPECTRUM ANALYSIS OF ZION CONTAINMENT STRUCTURE

01/20/8214.27:50

261E+02	.200E-01							
.807E+03	.807E+03	.275E-13	-.134E+06	-.134E+06	.846E-14			
.261E+02	.200E-01							
.807E+03	.807E+03	.425E-13	-.134E+06	.134E+06	-.483E-10			
.537E+02	.200E-01							
-.599E-09	.599E-09	-.221E-13	-.994E-07	-.992E-07	.844E+05			
.749E+02	.200E-01							
.531E-10	.641E-10	.119E+04	-.102E-07	.918E-08	-.111E-08			
.837E+02	.200E-01							
.394E+03	.394E+03	-.427E-12	.471E+04	-.471E+04	.126E-07			
.837E+02	.200E-01							
.394E+03	-.394E+03	.498E-10	-.471E+04	-.471E+04	.116E-08			
.121E+03	.200E-01							
-.144E-07	.149E-07	-.305E+03	-.217E-06	-.222E-06	.571E-06			
.142E+03	.200E-01							
-.138E+03	-.138E+03	-.510E-11	.137E+05	-.137E+05	.290E-10			
.142E+03	.200E-01							
-.138E+03	.138E+03	.361E-09	-.137E+05	-.137E+05	.149E-10			
.169E+03	.200E-01							
.748E-10	.702E-10	.452E-14	.657E-09	-.599E-09	.282E+05			
.193E+03	.200E-01							
.180E+03	.180E+03	.749E-10	.385E+04	-.385E+04	.583E-08			
.193E+03	.200E-01							
.180E+03	-.180E+03	.725E-10	-.385E+04	-.385E+04	-.927E-08			
.273E+03	.200E-01							
.761E+02	-.761E+02	-.176E-09	.964E+04	.963E+04	-.554E-09			
.185E+07	0.	0.	0.	.215E+09	0.			
0.	.185E+07	0.	-.215E+09	0.	0.			
0.	0.	.185E+07	0.	0.	0.			
0.	-.215E+09	0.	.370E+11	0.	0.			
.215E+09	0.	0.	0.	.370E+11	0.			
0.	0.	0.	0.	0.	.882E+10			
NODE 8 ( X ), FIXED BASE	0	2	4.000	.020				
0.	0.	0.	0.	0.	0.	0.	0.	
0.	0.	0.	0.	0.	0.			
.100E+01	0.	0.	0.	0.	0.			
NODE 8 ( Y ), FIXED BASE	0	2	4.000	.020				
0.	0.	0.	0.	0.	0.	0.	0.	
0.	0.	0.	0.	0.	0.			
0.	.100E+01	0.	0.	0.	0.			
NODE 8 ( Z ), FIXED BASE	0	2	4.000	.020				
0.	0.	0.	0.	0.	0.	0.	0.	
0.	0.	0.	0.	0.	0.			
0.	0.	.100E+01	0.	0.	0.			
NODE 8 ( XX ), FIXED BASE	0	2	4.000	.020				
0.	0.	0.	0.	0.	0.	0.	0.	
0.	0.	0.	0.	0.	0.			
0.	0.	0.	.100E+01	0.	0.			
NODE 8 ( YY ), FIXED BASE	0	2	4.000	.020				
0.	0.	0.	0.	0.	0.	0.	0.	
0.	0.	0.	0.	0.	0.			
0.	0.	0.	0.	.100E+01	0.			
NODE 8 ( ZZ ), FIXED BASE	0	2	4.000	.020				
0.	0.	0.	0.	0.	0.	0.	0.	
0.	0.	0.	0.	0.	0.			
0.	0.	0.	0.	0.	.100E+01			
NODE 9 ( X )	0	2	4.000	.020				
-.968E-06	.968E-06	-.722E-18	.328E-18	.485E-05	.485E-05	-.584E-14	-.489E-05	
-.489E-05	.971E-18	.118E-04	.118E-04	.999E-05				
.100E+01	0.	0.	0.	.500E+00	0.			
NODE 9 ( Y )	0	2	4.000	.020				
.968E-06	.968E-06	.714E-18	-.181E-18	.485E-05	-.485E-05	.585E-14	-.489E-05	
.489E-05	.759E-18	.118E-04	-.118E-04	-.999E-05				

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0. .100E+01 0. -.500E+00 0. 0.
NODE 9 ( Z) 0 2 4.000 .020
-.308E-22 .196E-21 -.137E-21 .251E-05 .734E-21 .104E-18 -.168E-05 -.286E-19
.916E-18 -.367E-21 .416E-18 .233E-18 -.201E-17
0. 0. .100E+01 0. 0. 0.
NODE 9 (XX) 0 2 4.000 .020
-.134E-07 -.134E-07 -.992E-20 -.521E-21 .497E-08 -.497E-08 -.644E-17 .406E-07
-.406E-07 .411E-21 .215E-07 -.215E-07 .106E-06
0. 0. 0. .100E+01 0. 0.
NODE 9 (YY) 0 2 4.000 .020
-.134E-07 .134E-07 -.100E-19 .141E-20 -.497E-08 -.497E-08 -.643E-17 -.406E-07
-.406E-07 -.298E-21 -.215E-07 -.215E-07 .106E-06
0. 0. 0. 0. .100E+01 0.
NODE 9 (ZZ) 0 2 4.000 .020
-.503E-24 -.758E-22 .420E-07 -.132E-20 .625E-20 .554E-21 .157E-16 .368E-21
.208E-22 .140E-06 .288E-19 -.157E-19 -.283E-20
0. 0. 0. 0. 0. .100E+01
...
...
...
NODE 20 ( X) 0 2 4.000 .020
-.725E-03 .725E-03 -.537E-15 .534E-16 -.204E-03 -.204E-03 -.573E-13 .319E-03
.319E-03 -.435E-16 .305E-03 .305E-03 -.366E-04
.100E+01 0. 0. 0. .187E+03 0.
NODE 20 ( Y) 0 2 4.000 .020
.725E-03 .725E-03 .538E-15 .512E-16 -.204E-03 .204E-03 .570E-13 .319E-03
-.319E-03 -.438E-16 .305E-03 -.305E-03 .367E-04
0. .100E+01 0. -.187E+03 0. 0.
NODE 20 ( Z) 0 2 4.000 .020
.171E-19 .265E-19 -.129E-19 .911E-03 -.289E-18 .381E-16 -.408E-03 -.677E-17
.303E-15 .308E-19 .100E-15 .695E-16 -.303E-16
0. 0. .100E+01 0. 0. 0.
NODE 20 (XX) 0 2 4.000 .020
-.287E-05 -.287E-05 -.214E-17 -.147E-18 .963E-05 -.964E-05 -.697E-16 .109E-04
-.109E-04 .166E-17 -.370E-06 .371E-06 -.678E-05
0. 0. 0. .100E+01 0. 0.
NODE 20 (YY) 0 2 4.000 .020
-.287E-05 .287E-05 -.213E-17 .260E-18 -.964E-05 -.963E-05 -.818E-16 -.109E-04
-.109E-04 -.154E-17 .371E-06 .370E-06 -.678E-05
0. 0. 0. 0. .100E+01 0.
NODE 20 (ZZ) 0 2 4.000 .020
.117E-22 -.648E-20 .144E-04 -.174E-18 .216E-17 .197E-18 -.228E-15 -.205E-19
.145E-20 -.106E-04 -.219E-17 -.233E-18 .208E-18
0. 0. 0. 0. 0. .100E+01
NODE 21 ( X) , TOP 0 2 4.000 .020
-.797E-03 .797E-03 -.591E-15 .597E-16 -.459E-03 -.459E-03 .253E-13 .696E-04
.696E-04 -.850E-16 .461E-03 .461E-03 -.580E-03
.100E+01 0. 0. 0. .210E+03 0.
NODE 21 ( Y) , TOP 0 2 4.000 .020
.797E-03 .797E-03 .592E-15 .551E-16 -.459E-03 .459E-03 -.259E-13 .696E-04
-.696E-04 -.901E-16 .461E-03 -.461E-03 .580E-03
0. .100E+01 0. -.210E+03 0. 0.
NODE 21 ( Z) , TOP 0 2 4.000 .020
.181E-19 .281E-19 -.941E-20 .160E-02 -.224E-17 .681E-16 .318E-02 .531E-16
-.468E-16 -.248E-19 -.781E-15 -.187E-15 .837E-15
0. 0. .100E+01 0. 0. 0.
NODE 21 (XX) , TOP 0 2 4.000 .020
-.289E-05 -.289E-05 -.215E-17 -.156E-18 .985E-05 -.985E-05 .365E-15 .113E-04
-.113E-04 .170E-17 -.846E-06 .846E-06 -.917E-05
0. 0. 0. .100E+01 0. 0.
NODE 21 (YY) , TOP 0 2 4.000 .020
.289E-05 .289E-05 .214E-17 .155E-18 .985E-05 .985E-05 .365E-15 .113E-04

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-.113E-04 -.157E-17 .846E-06 .846E-06 -.917E-05
0. 0. 0. 0. .100E+01 0.
NODE 21 (ZZ) , TOP 0 2 4.000 .020
.720E-23 -.651E-20 .146E-04 -.748E-19 .219E-17 .199E-18 -.227E-14 -.224E-19
.136E-20 -.122E-04 -.252E-17 -.112E-18 .240E-18
0. 0. 0. 0. 0. .100E+01
ELMT. 1 (1) 3 2
.944E-10 -.464E-09 .380E-09 -.667E+07 -.159E-08 -.276E-06 .448E+07 .766E-07
-.244E-05 .100E-08 -.111E-05 -.621E-06 .535E-05
0. 0. 0. 0. 0. 0.
ELMT. 1 (2) 3 2
-.549E+06 -.549E+06 -.405E-06 .100E-06 -.276E+07 .276E+07 -.328E-02 .277E+07
-.277E+07 -.432E-06 -.669E+07 .669E+07 .564E+07
0. 0. 0. 0. 0. 0.
ELMT. 1 (3) 3 2
-.549E+06 .549E+06 -.409E-06 .184E-06 .276E+07 .276E+07 -.327E-02 -.277E+07
-.277E+07 .551E-06 .669E+07 .669E+07 .564E+07
0. 0. 0. 0. 0. 0.
ELMT. 1 (4) 3 2
-.515E-08 .460E-06 -.243E+09 .763E-05 -.362E-04 -.331E-05 -.901E-01 -.217E-05
-.193E-06 -.807E+09 -.166E-03 .910E-04 .164E-04
0. 0. 0. 0. 0. 0.
ELMT. 1 (5) 3 2
.907E+08 -.907E+08 .675E-04 -.951E-05 .343E+08 .343E+08 .426E-01 .274E+09
.274E+09 .213E-05 .147E+09 .147E+09 -.715E+09
0. 0. 0. 0. 0. 0.
ELMT. 1 (6) 3 2
-.907E+08 -.907E+08 -.670E-04 -.352E-05 .343E+08 -.343E+08 -.426E-01 .274E+09
-.274E+09 .289E-05 .147E+09 -.147E+09 .715E+09
0. 0. 0. 0. 0. 0.
...
...
...
ELMT. 19 (1) 3 2
-.320E-09 .195E-08 .225E-09 .116E-09 .217E-07 -.319E-08 -.116E-09 -.815E-09
.336E-07 -.160E-08 .658E-08 .257E-07 -.638E-07
0. 0. 0. 0. 0. 0.
ELMT. 19 (2) 3 2
.571E-10 -.437E-10 .931E-09 -.103E-08 -.173E-08 .556E-09 .222E-09 .692E-08
-.192E-09 .931E-09 -.667E-08 -.977E-08 .131E-07
0. 0. 0. 0. 0. 0.
ELMT. 19 (3) 3 2
-.261E-09 .220E-09 -.233E-09 -.155E-08 .786E-09 .728E-10 .475E-09 -.766E-08
.659E-09 .931E-09 .647E-08 .743E-08 -.782E-08
0. 0. 0. 0. 0. 0.
ELMT. 19 (4) 3 2
.298E-07 .795E-09 -.745E-08 .245E-08 .300E-07 .227E-07 -.100E-08 .113E-06
.238E-06 -.298E-07 .258E-06 -.539E-07 -.681E-06
0. 0. 0. 0. 0. 0.
ELMT. 19 (5) 3 2
-.134E-06 -.361E-07 -.596E-07 .383E-07 .412E-07 .135E-07 -.515E-07 .102E-05
-.156E-06 -.477E-06 -.299E-06 -.302E-06 .115E-05
0. 0. 0. 0. 0. 0.
ELMT. 19 (6) 3 2
.301E-07 .184E-07 .119E-06 -.204E-07 -.159E-06 .128E-07 .239E-07 -.540E-07
.135E-06 .477E-06 -.784E-06 .756E-07 .256E-06
0. 0. 0. 0. 0. 0.

```

GLAY INPUT AND OUTPUT  
for an SSI analysis

This program and its resulting output files are  
not needed for a fixed base analysis.

WELCOME TO THE WONDERFUL WORLD OF . . .

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***** *      ***  *****  *****  ***
*      * *      * * *      *      *
*      *      * * *      *      *
*      *      * * *      *      *
*      *      * * *      *      *
*      *      * * *      *      *
***** ***** *      * ***** *****  ***
```

YOU ARE NOW EXECUTING . . .

PROGRAM GLAY, CDC 7600 VERSION 2.2

COMPILED 80/06/23 08:01:36

EXECUTED 01/28/82 15:13:02

EXECUTION ON THE R-MACHINE

GENERATION OF GREENS FUNCTION TABLES FOR LAYERED MEDIA



GREENS FUNCTION IDENTIFIER TEST RUN 5: RUN 1 W/ GREATER HI FREQ REFINEMENT & FMAX = 35 HZ

NUMBER OF FREQUENCIES AT WHICH GREEN'S  
FUNCTION TABLES WILL BE CALCULATED = 31

NUMBER OF SOIL LAYERS, INCLUDING HALFSpace = 2

FLAG IFITER FOR SPATIAL INCREMENT ITERATION = 1

INITIAL NUMBER OF POINTS IN TABLES = 16

FLAG IPRNT FOR PRINTING TABLES IN THIS LOG = 1

INITIAL RADIUS OF TABLE = 0.

FINAL RADIUS OF TABLE = .180E+03

GREENS FUNCTION TABLE WILL BE CALCULATED BY ITERATION

MAXIMUM ALLOWED ITERATIONS = 5

SOIL PROPERTIES

LAYER	BETA	RHO	POISSON	DAMPING	THICKNESS
1	.139E+04	.444E+01	.460E+00	.250E-01	.750E+02
2	.920E+04	.497E+01	.270E+00	.100E-01	.400E+03

GREEN'S FUNCTION TABLE NUMBER 1

INCREMENT OF  $\theta_0$  FOR TABLE = .264E-03

THE NUMBER OF POINTS IN THE TABLE = 33

THE FREQUENCY OF THE ANALYSIS = .100E-01

## GREENS FUNCTION TABLE

	GRR	GTR	GRZ	GZZ				
1	.159E+00	-.794E-02	-.857E-01	.429E-02	-.635E-02	.318E-03	.857E-01	-.429E-02
2	.152E+00	-.761E-02	-.793E-01	.396E-02	-.610E-02	.305E-03	.750E-01	-.374E-02
3	.146E+00	-.729E-02	-.730E-01	.364E-02	-.536E-02	.267E-03	.645E-01	-.321E-02
4	.140E+00	-.698E-02	-.668E-01	.332E-02	-.417E-02	.206E-03	.544E-01	-.270E-02
5	.134E+00	-.667E-02	-.608E-01	.301E-02	-.258E-02	.125E-03	.449E-01	-.221E-02
6	.128E+00	-.638E-02	-.549E-01	.272E-02	-.678E-03	.283E-04	.360E-01	-.176E-02
7	.123E+00	-.611E-02	-.494E-01	.243E-02	.145E-02	-.804E-04	.280E-01	-.135E-02
8	.118E+00	-.585E-02	-.441E-01	.216E-02	.372E-02	-.196E-03	.208E-01	-.988E-03
9	.113E+00	-.561E-02	-.391E-01	.191E-02	.604E-02	-.314E-03	.145E-01	-.670E-03
10	.109E+00	-.539E-02	-.345E-01	.167E-02	.832E-02	-.431E-03	.916E-02	-.399E-03
11	.105E+00	-.518E-02	-.302E-01	.145E-02	.105E-01	-.541E-03	.469E-02	-.173E-03
12	.101E+00	-.498E-02	-.262E-01	.125E-02	.125E-01	-.643E-03	.106E-02	.112E-04
13	.971E-01	-.479E-02	-.226E-01	.107E-02	.143E-01	-.734E-03	-.181E-02	.156E-03
14	.937E-01	-.462E-02	-.193E-01	.903E-03	.158E-01	-.812E-03	-.399E-02	.266E-03
15	.904E-01	-.445E-02	-.164E-01	.753E-03	.171E-01	-.876E-03	-.557E-02	.345E-03
16	.873E-01	-.430E-02	-.138E-01	.619E-03	.181E-01	-.927E-03	-.665E-02	.400E-03
17	.843E-01	-.414E-02	-.114E-01	.499E-03	.188E-01	-.964E-03	-.730E-02	.432E-03
18	.814E-01	-.400E-02	-.932E-02	.393E-03	.193E-01	-.989E-03	-.760E-02	.447E-03
19	.785E-01	-.385E-02	-.749E-02	.301E-03	.195E-01	-.100E-02	-.764E-02	.448E-03
20	.757E-01	-.371E-02	-.589E-02	.219E-03	.196E-01	-.100E-02	-.749E-02	.440E-03
21	.730E-01	-.357E-02	-.451E-02	.149E-03	.195E-01	-.997E-03	-.717E-02	.424E-03
22	.703E-01	-.343E-02	-.331E-02	.884E-04	.192E-01	-.983E-03	-.675E-02	.403E-03
23	.677E-01	-.330E-02	-.228E-02	.364E-04	.188E-01	-.962E-03	-.627E-02	.378E-03
24	.651E-01	-.317E-02	-.141E-02	-.772E-05	.183E-01	-.937E-03	-.576E-02	.352E-03
25	.625E-01	-.304E-02	-.668E-03	-.449E-04	.177E-01	-.907E-03	-.523E-02	.325E-03
26	.600E-01	-.291E-02	-.480E-04	-.761E-04	.170E-01	-.874E-03	-.474E-02	.300E-03
27	.575E-01	-.278E-02	.460E-03	-.102E-03	.163E-01	-.840E-03	-.424E-02	.275E-03
28	.551E-01	-.266E-02	.874E-03	-.122E-03	.156E-01	-.804E-03	-.377E-02	.252E-03
29	.528E-01	-.254E-02	.121E-02	-.139E-03	.149E-01	-.769E-03	-.333E-02	.230E-03
30	.505E-01	-.243E-02	.146E-02	-.152E-03	.142E-01	-.733E-03	-.293E-02	.210E-03
31	.483E-01	-.232E-02	.166E-02	-.161E-03	.135E-01	-.697E-03	-.256E-02	.191E-03
32	.461E-01	-.221E-02	.180E-02	-.168E-03	.128E-01	-.663E-03	-.223E-02	.174E-03
33	.441E-01	-.210E-02	.190E-02	-.173E-03	.122E-01	-.629E-03	-.194E-02	.160E-03

## GREEN'S FUNCTION TABLE NUMBER 31

INCREMENT OF B0 FOR TABLE = .238E+00

THE NUMBER OF POINTS IN THE TABLE = 129

THE FREQUENCY OF THE ANALYSIS = .360E+02

## GREENS FUNCTION TABLE

	GRR	GTR	GRZ	GZZ				
1	.159E+00	-.794E-02	-.857E-01	.429E-02	-.635E-02	.318E-03	.857E-01	-.429E-02
2	.153E+00	-.335E-01	-.793E-01	.296E-01	-.745E-02	.143E-02	.803E-01	-.292E-01
3	.143E+00	-.576E-01	-.665E-01	.525E-01	-.881E-02	.447E-02	.684E-01	-.517E-01
4	.130E+00	-.793E-01	-.481E-01	.715E-01	-.924E-02	.900E-02	.508E-01	-.700E-01
5	.112E+00	-.981E-01	-.254E-01	.854E-01	-.805E-02	.145E-01	.289E-01	-.828E-01
6	.921E-01	-.113E+00	.336E-03	.932E-01	-.486E-02	.202E-01	.434E-02	-.893E-01
7	.702E-01	-.124E+00	.274E-01	.943E-01	.452E-03	.254E-01	-.212E-01	-.889E-01
8	.474E-01	-.131E+00	.541E-01	.887E-01	.780E-02	.295E-01	-.458E-01	-.817E-01
9	.246E-01	-.134E+00	.787E-01	.765E-01	.169E-01	.318E-01	-.678E-01	-.682E-01
10	.255E-02	-.132E+00	.998E-01	.585E-01	.271E-01	.316E-01	-.855E-01	-.493E-01
11	-.179E-01	-.127E+00	.116E+00	.356E-01	.379E-01	.287E-01	-.977E-01	-.264E-01
12	-.362E-01	-.119E+00	.126E+00	.927E-02	.484E-01	.229E-01	-.104E+00	-.856E-03
13	-.519E-01	-.108E+00	.130E+00	-.190E-01	.579E-01	.141E-01	-.103E+00	.254E-01
14	-.646E-01	-.962E-01	.126E+00	-.475E-01	.655E-01	.257E-02	-.952E-01	.507E-01
15	-.743E-01	-.829E-01	.116E+00	-.747E-01	.706E-01	-.111E-01	-.813E-01	.732E-01
16	-.810E-01	-.692E-01	.992E-01	-.988E-01	.725E-01	-.264E-01	-.622E-01	.915E-01
17	-.850E-01	-.559E-01	.771E-01	-.118E+00	.708E-01	-.424E-01	-.389E-01	.104E+00
18	-.865E-01	-.435E-01	.509E-01	-.132E+00	.654E-01	-.583E-01	-.133E-01	.111E+00
19	-.861E-01	-.323E-01	.218E-01	-.140E+00	.562E-01	-.732E-01	.132E-01	.111E+00
20	-.843E-01	-.226E-01	-.826E-02	-.140E+00	.436E-01	-.860E-01	.386E-01	.104E+00
21	-.816E-01	-.145E-01	-.378E-01	-.133E+00	.280E-01	-.960E-01	.614E-01	.906E-01
22	-.784E-01	-.798E-02	-.650E-01	-.120E+00	.102E-01	-.103E+00	.800E-01	.722E-01
23	-.754E-01	-.290E-02	-.883E-01	-.999E-01	-.890E-02	-.105E+00	.932E-01	.498E-01
24	-.728E-01	.106E-02	-.106E+00	-.753E-01	-.284E-01	-.103E+00	.100E+00	.249E-01
25	-.709E-01	.424E-02	-.118E+00	-.470E-01	-.473E-01	-.971E-01	.101E+00	-.740E-03
26	-.698E-01	.705E-02	-.123E+00	-.166E-01	-.645E-01	-.870E-01	.943E-01	-.254E-01
27	-.696E-01	.991E-02	-.120E+00	.140E-01	-.791E-01	-.733E-01	.820E-01	-.475E-01
28	-.701E-01	.132E-01	-.111E+00	.433E-01	-.904E-01	-.567E-01	.645E-01	-.655E-01
29	-.711E-01	.173E-01	-.941E-01	.695E-01	-.976E-01	-.381E-01	.431E-01	-.782E-01
30	-.723E-01	.224E-01	-.717E-01	.911E-01	-.101E+00	-.185E-01	.193E-01	-.847E-01
31	-.732E-01	.286E-01	-.447E-01	.107E+00	-.991E-01	.104E-02	-.520E-02	-.848E-01
32	-.735E-01	.359E-01	-.146E-01	.116E+00	-.933E-01	.195E-01	-.287E-01	-.784E-01
33	-.728E-01	.443E-01	.171E-01	.117E+00	-.837E-01	.358E-01	-.495E-01	-.660E-01
34	-.706E-01	.535E-01	.484E-01	.111E+00	-.709E-01	.492E-01	-.663E-01	-.485E-01
35	-.667E-01	.632E-01	.778E-01	.981E-01	-.557E-01	.590E-01	-.777E-01	-.273E-01
36	-.608E-01	.729E-01	.103E+00	.780E-01	-.391E-01	.648E-01	-.830E-01	-.371E-02
37	-.529E-01	.821E-01	.124E+00	.523E-01	-.221E-01	.663E-01	-.817E-01	.205E-01
38	-.430E-01	.904E-01	.138E+00	.222E-01	-.584E-02	.637E-01	-.740E-01	.435E-01
39	-.313E-01	.972E-01	.145E+00	-.108E-01	.873E-02	.573E-01	-.604E-01	.638E-01
40	-.181E-01	.102E+00	.145E+00	-.449E-01	.207E-01	.477E-01	-.417E-01	.799E-01
41	-.375E-02	.105E+00	.136E+00	-.784E-01	.295E-01	.358E-01	-.192E-01	.905E-01
42	.112E-01	.105E+00	.120E+00	-.110E+00	.345E-01	.223E-01	.549E-02	.948E-01
43	.263E-01	.103E+00	.978E-01	-.137E+00	.356E-01	.846E-02	.307E-01	.925E-01
44	.409E-01	.974E-01	.696E-01	-.159E+00	.328E-01	-.483E-02	.548E-01	.836E-01
45	.544E-01	.897E-01	.371E-01	-.174E+00	.264E-01	-.165E-01	.759E-01	.685E-01
46	.663E-01	.797E-01	.180E-02	-.182E+00	.170E-01	-.258E-01	.926E-01	.482E-01
47	.763E-01	.678E-01	-.346E-01	-.182E+00	.531E-02	-.319E-01	.104E+00	.241E-01
48	.838E-01	.546E-01	-.703E-01	-.175E+00	-.770E-02	-.343E-01	.108E+00	-.244E-02

49	.888E-01	.404E-01	-.104E+00	-.160E+00	-.210E-01	-.328E-01	.106E+00	-.296E-01
50	.910E-01	.260E-01	-.133E+00	-.139E+00	-.336E-01	-.275E-01	.965E-01	-.555E-01
51	.907E-01	.119E-01	-.158E+00	-.112E+00	-.445E-01	-.186E-01	.808E-01	-.785E-01
52	.879E-01	-.146E-02	-.176E+00	-.812E-01	-.528E-01	-.664E-02	.596E-01	-.970E-01
53	.830E-01	-.135E-01	-.187E+00	-.474E-01	-.577E-01	.756E-02	.342E-01	-.110E+00
54	.764E-01	-.238E-01	-.191E+00	-.125E-01	-.587E-01	.231E-01	.612E-02	-.116E+00
55	.685E-01	-.323E-01	-.188E+00	.219E-01	-.556E-01	.390E-01	-.228E-01	-.114E+00
56	.599E-01	-.386E-01	-.178E+00	.543E-01	-.484E-01	.540E-01	-.506E-01	-.106E+00
57	.511E-01	-.429E-01	-.162E+00	.833E-01	-.373E-01	.673E-01	-.757E-01	-.904E-01
58	.425E-01	-.452E-01	-.141E+00	.108E+00	-.228E-01	.779E-01	-.962E-01	-.691E-01
59	.347E-01	-.458E-01	-.117E+00	.127E+00	-.574E-02	.849E-01	-.111E+00	-.431E-01
60	.279E-01	-.450E-01	-.894E-01	.140E+00	.130E-01	.877E-01	-.119E+00	-.140E-01
61	.224E-01	-.433E-01	-.612E-01	.147E+00	.323E-01	.861E-01	-.119E+00	.163E-01
62	.183E-01	-.411E-01	-.335E-01	.148E+00	.512E-01	.800E-01	-.111E+00	.459E-01
63	.156E-01	-.388E-01	-.750E-02	.143E+00	.685E-01	.695E-01	-.966E-01	.729E-01
64	.141E-01	-.369E-01	.155E-01	.133E+00	.831E-01	.552E-01	-.754E-01	.957E-01
65	.137E-01	-.357E-01	.346E-01	.119E+00	.944E-01	.378E-01	-.490E-01	.113E+00
66	.139E-01	-.356E-01	.492E-01	.103E+00	.101E+00	.180E-01	-.190E-01	.122E+00
67	.144E-01	-.366E-01	.589E-01	.851E-01	.104E+00	-.288E-02	.128E-01	.125E+00
68	.147E-01	-.389E-01	.637E-01	.670E-01	.102E+00	-.239E-01	.444E-01	.119E+00
69	.144E-01	-.423E-01	.638E-01	.498E-01	.950E-01	-.439E-01	.739E-01	.105E+00
70	.131E-01	-.467E-01	.598E-01	.347E-01	.840E-01	-.618E-01	.993E-01	.848E-01
71	.105E-01	-.518E-01	.525E-01	.225E-01	.693E-01	-.768E-01	.119E+00	.584E-01
72	.621E-02	-.571E-01	.430E-01	.140E-01	.520E-01	-.880E-01	.132E+00	.276E-01
73	.203E-03	-.623E-01	.322E-01	.946E-02	.328E-01	-.949E-01	.137E+00	-.569E-02
74	-.756E-02	-.667E-01	.215E-01	.903E-02	.129E-01	-.973E-01	.134E+00	-.395E-01
75	-.170E-01	-.700E-01	.118E-01	.125E-01	-.655E-02	-.952E-01	.123E+00	-.719E-01
76	-.277E-01	-.717E-01	.430E-02	.193E-01	-.246E-01	-.888E-01	.104E+00	-.101E+00
77	-.395E-01	-.713E-01	-.196E-03	.288E-01	-.402E-01	-.788E-01	.783E-01	-.125E+00
78	-.519E-01	-.685E-01	-.100E-02	.400E-01	-.527E-01	-.658E-01	.477E-01	-.142E+00
79	-.642E-01	-.633E-01	.227E-02	.517E-01	-.614E-01	-.507E-01	.137E-01	-.152E+00
80	-.760E-01	-.555E-01	.971E-02	.630E-01	-.660E-01	-.346E-01	-.218E-01	-.153E+00
81	-.866E-01	-.452E-01	.211E-01	.725E-01	-.666E-01	-.185E-01	-.567E-01	-.146E+00
82	-.956E-01	-.327E-01	.360E-01	.793E-01	-.632E-01	-.338E-02	-.890E-01	-.131E+00
83	-.102E+00	-.184E-01	.537E-01	.824E-01	-.564E-01	.978E-02	-.117E+00	-.109E+00
84	-.106E+00	-.265E-02	.731E-01	.810E-01	-.468E-01	.202E-01	-.139E+00	-.804E-01
85	-.108E+00	.139E-01	.932E-01	.748E-01	-.352E-01	.274E-01	-.154E+00	-.481E-01
86	-.106E+00	.307E-01	.113E+00	.634E-01	-.227E-01	.309E-01	-.161E+00	-.133E-01
87	-.101E+00	.470E-01	.130E+00	.471E-01	-.101E-01	.306E-01	-.160E+00	.221E-01
88	-.933E-01	.623E-01	.145E+00	.263E-01	.145E-02	.268E-01	-.151E+00	.559E-01
89	-.830E-01	.760E-01	.155E+00	.160E-02	.111E-01	.199E-01	-.134E+00	.865E-01
90	-.705E-01	.875E-01	.160E+00	-.259E-01	.182E-01	.105E-01	-.111E+00	.112E+00
91	-.563E-01	.965E-01	.160E+00	-.551E-01	.220E-01	-.662E-03	-.831E-01	.132E+00
92	-.411E-01	.103E+00	.153E+00	-.847E-01	.223E-01	-.126E-01	-.520E-01	.144E+00
93	-.253E-01	.106E+00	.140E+00	-.113E+00	.190E-01	-.243E-01	-.195E-01	.149E+00
94	-.962E-02	.107E+00	.121E+00	-.139E+00	.121E-01	-.349E-01	.125E-01	.146E+00
95	.535E-02	.105E+00	.970E-01	-.161E+00	.220E-02	-.434E-01	.422E-01	.136E+00
96	.191E-01	.100E+00	.680E-01	-.179E+00	-.102E-01	-.491E-01	.682E-01	.119E+00
97	.313E-01	.935E-01	.356E-01	-.190E+00	-.242E-01	-.514E-01	.889E-01	.980E-01
98	.415E-01	.855E-01	.114E-02	-.195E+00	-.390E-01	-.498E-01	.104E+00	.731E-01
99	.496E-01	.765E-01	-.340E-01	-.193E+00	-.534E-01	-.444E-01	.112E+00	.462E-01
100	.556E-01	.670E-01	-.683E-01	-.183E+00	-.666E-01	-.352E-01	.113E+00	.191E-01
101	.596E-01	.576E-01	-.100E+00	-.167E+00	-.776E-01	-.226E-01	.107E+00	-.648E-02
102	.618E-01	.486E-01	-.128E+00	-.145E+00	-.856E-01	-.722E-02	.965E-01	-.291E-01
103	.624E-01	.406E-01	-.152E+00	-.117E+00	-.899E-01	.101E-01	.808E-01	-.474E-01
104	.619E-01	.336E-01	-.169E+00	-.856E-01	-.901E-01	.285E-01	.618E-01	-.606E-01
105	.607E-01	.280E-01	-.179E+00	-.513E-01	-.860E-01	.469E-01	.409E-01	-.680E-01
106	.593E-01	.236E-01	-.182E+00	-.158E-01	-.778E-01	.643E-01	.198E-01	-.694E-01
107	.581E-01	.205E-01	-.177E+00	.192E-01	-.657E-01	.797E-01	-.328E-04	-.653E-01
108	.574E-01	.183E-01	-.166E+00	.524E-01	-.504E-01	.923E-01	-.172E-01	-.562E-01
109	.576E-01	.169E-01	-.148E+00	.821E-01	-.325E-01	.101E+00	-.304E-01	-.430E-01
110	.588E-01	.158E-01	-.125E+00	.107E+00	-.130E-01	.106E+00	-.390E-01	-.271E-01
111	.610E-01	.145E-01	-.973E-01	.127E+00	.708E-02	.107E+00	-.423E-01	-.985E-02
112	.644E-01	.128E-01	-.666E-01	.139E+00	.267E-01	.103E+00	-.403E-01	.728E-02

113	.687E-01	.101E-01	-.343E-01	.145E+00	.448E-01	.946E-01	-.333E-01	.228E-01
114	.735E-01	.613E-02	-.206E-02	.144E+00	.606E-01	.830E-01	-.219E-01	.355E-01
115	.786E-01	.674E-03	.286E-01	.136E+00	.732E-01	.684E-01	-.705E-02	.441E-01
116	.835E-01	-.647E-02	.563E-01	.122E+00	.820E-01	.516E-01	.994E-02	.479E-01
117	.877E-01	-.153E-01	.797E-01	.102E+00	.868E-01	.338E-01	.276E-01	.466E-01
118	.907E-01	-.257E-01	.978E-01	.777E-01	.874E-01	.158E-01	.446E-01	.399E-01
119	.921E-01	-.376E-01	.110E+00	.506E-01	.840E-01	-.126E-02	.593E-01	.282E-01
120	.914E-01	-.504E-01	.115E+00	.218E-01	.770E-01	-.166E-01	.706E-01	.124E-01
121	.884E-01	-.639E-01	.114E+00	-.699E-02	.670E-01	-.293E-01	.774E-01	-.667E-02
122	.829E-01	-.774E-01	.107E+00	-.345E-01	.547E-01	-.388E-01	.788E-01	-.276E-01
123	.748E-01	-.904E-01	.932E-01	-.592E-01	.412E-01	-.447E-01	.744E-01	-.490E-01
124	.641E-01	-.102E+00	.745E-01	-.800E-01	.272E-01	-.468E-01	.643E-01	-.693E-01
125	.511E-01	-.113E+00	.517E-01	-.958E-01	.139E-01	-.453E-01	.488E-01	-.870E-01
126	.362E-01	-.121E+00	.260E-01	-.106E+00	.207E-02	-.405E-01	.287E-01	-.101E+00
127	.197E-01	-.126E+00	-.112E-02	-.110E+00	-.747E-02	-.330E-01	.514E-02	-.109E+00
128	.230E-02	-.129E+00	-.284E-01	-.107E+00	-.141E-01	-.234E-01	-.206E-01	-.112E+00
129	-.155E-01	-.129E+00	-.543E-01	-.989E-01	-.175E-01	-.126E-01	-.468E-01	-.108E+00

CLAF INPUT AND OUTPUT  
for an SSI analysis

This program and its resulting output files are  
not needed for a fixed base analysis.

PROGRAM CLAF, CDC-7600 LCM VERSION 3.0  
COMPILATION DATE AND TIME: 80/04/04. 21.48.18.

GENERATION OF SSIN IMPEDANCE AND SCATTERING MATRICES  
EXECUTED ON THE R-MACHINE ON 01/28/82 15:33:33





IMPEDANCE FUNCTION IDENTIFIER: CLAF RUN 6; RERUN PROB 2 W/ CL = 78.5 & REFINED GRN FNS TO 36 HZ

GREENS FUNCTION IDENTIFIER: TEST RUN 5: RUN 1 W/ GREATER HI FREQ REFINEMENT & FMAX = 35 HZ  
GENERATED ON 01/28/82 15:13:02

THE REFERENCE SHEAR MODULUS= .857E+07

THE REFERENCE SHEAR WAVE VELOCITY= .139E+04

THE CHARACTERISTIC LENGTH OF THE FOUNDATION= .785E+02

THE NUMBER OF FREQUENCIES AT WHICH THE IMPEDANCE  
AND SCATTERING MATRICES WILL BE CALCULATED = 31

THE MAXIMUM NUMBER OF POINTS IN ANY GREEN'S  
FUNCTION TABLE TO BE READ IN = 129

THE NUMBER OF RECTANGULAR SUBREGIONS REQUIRED TO  
APPROXIMATE THE FOUNDATION GEOMETRY = 28

THE NUMBER OF DIFFERENT SUBREGION SHAPE TYPES = 3

THE NUMBER OF INCIDENT WAVE FORMS TO BE CONSIDERED = 9

THE NUMBER OF LAYERS IN THE SOIL PROFILE = 2

THE FOUNDATION IS SYMMETRICAL ABOUT X-AXIS

THE FOUNDATION IS SYMMETRICAL ABOUT Y-AXIS

THE WAVE VELOCITIES ARE NOT FUNCTIONS OF FREQUENCY

IMPEDANCE MATRICES WILL BE CALCULATED

THE FOUNDATION DEGREES OF FREEDOM ARE AS FOLLOWS: 1 2 3 4 5 6

SCM REQUIRED FOR THIS PROBLEM IS 3503 WORDS  
SCM AVAILABLE IS 35000 WORDS

LCM REQUIRED FOR THIS PROBLEM IS 62833 WORDS  
LCM AVAILABLE IS 345000 WORDS

THE FOUNDATION GEOMETRY FOLLOWS:

THE SCALE FACTOR FOR THE DIMENSIONS = .100E+01

SUBREGION	1:	CENTROID,	.925	.255,	TYPE 1
SUBREGION	2:	CENTROID,	.925	.085,	TYPE 1
SUBREGION	3:	CENTROID,	.765	.595,	TYPE 2
SUBREGION	4:	CENTROID,	.765	.425,	TYPE 2
SUBREGION	5:	CENTROID,	.765	.255,	TYPE 2
SUBREGION	6:	CENTROID,	.765	.085,	TYPE 2
SUBREGION	7:	CENTROID,	.595	.765,	TYPE 2
SUBREGION	8:	CENTROID,	.595	.595,	TYPE 2
SUBREGION	9:	CENTROID,	.595	.425,	TYPE 2
SUBREGION	10:	CENTROID,	.595	.255,	TYPE 2
SUBREGION	11:	CENTROID,	.595	.085,	TYPE 2
SUBREGION	12:	CENTROID,	.425	.765,	TYPE 2
SUBREGION	13:	CENTROID,	.425	.595,	TYPE 2
SUBREGION	14:	CENTROID,	.425	.425,	TYPE 2
SUBREGION	15:	CENTROID,	.425	.255,	TYPE 2
SUBREGION	16:	CENTROID,	.425	.085,	TYPE 2
SUBREGION	17:	CENTROID,	.255	.925,	TYPE 3
SUBREGION	18:	CENTROID,	.255	.765,	TYPE 2
SUBREGION	19:	CENTROID,	.255	.595,	TYPE 2
SUBREGION	20:	CENTROID,	.255	.425,	TYPE 2
SUBREGION	21:	CENTROID,	.255	.255,	TYPE 2
SUBREGION	22:	CENTROID,	.255	.085,	TYPE 2
SUBREGION	23:	CENTROID,	.085	.925,	TYPE 3
SUBREGION	24:	CENTROID,	.085	.765,	TYPE 2
SUBREGION	25:	CENTROID,	.085	.595,	TYPE 2
SUBREGION	26:	CENTROID,	.085	.425,	TYPE 2
SUBREGION	27:	CENTROID,	.085	.255,	TYPE 2
SUBREGION	28:	CENTROID,	.085	.085,	TYPE 2

DIMENSIONS OF SUBREGION TYPE	1 ARE	.150	.170
DIMENSIONS OF SUBREGION TYPE	2 ARE	.170	.170
DIMENSIONS OF SUBREGION TYPE	3 ARE	.170	.150

## INCIDENT WAVE INPUT DATA FOR FREQUENCY NUMBER 1

BETA/C	THETA	LONGITUDINAL	TRANSVERSE	VERTICAL
0.0000	0.00	1.000	0.000	0.000
0.0000	0.00	0.000	0.000	1.000
0.0000	0.00	0.000	0.000	0.000
.1410	0.00	1.000	0.000	0.000
.2120	0.00	0.000	0.000	1.000
.1410	0.00	0.000	0.000	0.000
.0710	0.00	1.000	0.000	0.000
.1060	0.00	0.000	0.000	1.000
.0710	0.00	0.000	0.000	0.000

## IMPEDANCE AND SCATTERING MATRICES ARE IN PHYSICAL UNITS

.01 6 IMPEDANCE MATRIX FOLLOWS IN 3(2X,2E10.3) FORMAT.

.537E+10	.266E+09	0.	0.	0.	0.
0.	0.	.286E+11	.136E+10	0.	.117E-04
0.	0.	.537E+10	.266E+09	0.	0.
-.286E+11	-.136E+10	0.	0.	0.	0.
0.	0.	.598E-06	0.	.160E+11	.771E+09
-.750E-03	-.469E-04	0.	0.	0.	0.
0.	0.	-.286E+11	-.136E+10	-.750E-03	-.469E-04
.283E+14	.140E+13	0.	0.	0.	0.
.286E+11	.136E+10	0.	0.	0.	0.
0.	0.	.283E+14	.140E+13	0.	0.
-.410E-04	.139E-04	-.750E-03	0.	0.	0.
0.	0.	0.	-.863E-04	.237E+14	.118E+13

.01 9 INPUT MOTIONS FOLLOW IN 3(2X,2E10.3) FORMAT

.100E+01	0.	.179E-46	.493E-45	-.183E-47	-.968E-47
.100E+01	.200E-08	-.860E-32	-.863E-31	-.957E-48	.143E-48
.100E+01	.507E-09	.237E-39	.157E-38	.216E-47	.210E-46
0.	0.	.100E+01	-.222E-15	.142E-15	-.124E-16
0.	0.	.100E+01	.458E-08	-.690E-18	-.139E-16
0.	0.	.100E+01	.115E-08	-.305E-15	.840E-18
0.	0.	.264E-30	-.352E-31	.100E+01	-.804E-15
0.	0.	-.372E-16	.413E-17	.100E+01	.187E-08
0.	0.	.851E-24	-.839E-25	.100E+01	.473E-09
0.	0.	-.413E-19	-.832E-18	.267E-16	.328E-18
0.	0.	-.182E-12	.905E-14	-.727E-21	-.141E-19
0.	0.	-.454E-13	.226E-14	.262E-16	-.131E-17
.207E-19	.416E-18	-.191E-49	-.499E-48	.187E-50	.979E-50
.277E-10	-.145E-11	.887E-35	.873E-34	.968E-51	-.147E-51
.701E-11	-.367E-12	-.243E-42	-.159E-41	-.222E-50	-.213E-49
.308E-16	-.207E-17	-.225E-30	-.296E-32	.445E-32	-.615E-33
.568E-17	-.191E-18	.395E-16	-.197E-17	-.438E-34	-.440E-33
.170E-16	-.111E-17	-.723E-24	.724E-25	-.964E-32	.508E-33

IMPEDANCE AND SCATTERING MATRICES ARE IN PHYSICAL UNITS

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36.00  6  IMPEDANCE MATRIX FOLLOWS IN 3(2X,2E10.3) FORMAT.
-.131E+11 .399E+11  0.      0.      0.      0.
 0.      0.      .369E+12 .891E+12 -.750E-03 .150E-02
 0.      0.      -.131E+11 .399E+11  0.      -.956E-05
-.369E+12 -.891E+12  0.      0.      0.      0.
 0.      0.      .956E-05 .382E-04 .360E+11 .131E+12
 0.      -.600E-02  0.      0.      0.      0.
 0.      0.      -.369E+12 -.891E+12  0.      0.
 .194E+14 .249E+15  0.      0.      0.      0.
 .369E+12 .891E+12  0.      0.      0.      0.
 0.      0.      .194E+14 .249E+15  0.      .115E-03
-.188E-03 .101E-02  0.      0.      0.      0.
 .147E-01  0.      .589E-01 .589E-01 -.383E+14 .915E+14

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36.00  9  INPUT MOTIONS FOLLOW IN 3(2X,2E10.3) FORMAT
.100E+01 -.187E-14 .124E-45 .122E-45 .299E-46 -.259E-46
.646E+00 .675E-01 .141E-16 .403E-15 .293E-02 -.961E-02
.901E+00 .207E-01 .277E-16 .352E-15 .414E-03 -.139E-02
 0.      0.      .100E+01  0.      .413E-15 .932E-15
-.591E-16 -.644E-16 .372E+00 .930E-01 .168E-15 .608E-15
.764E-16 -.791E-16 .805E+00 .360E-01 .349E-15 .883E-15
 0.      0.      -.290E-15 -.660E-17 .100E+01  0.
-.125E+00 -.957E-01 -.106E-15 -.290E-16 .724E+00 -.291E-01
-.756E-01 -.581E-01 -.233E-15 -.156E-16 .924E+00 -.800E-02
 0.      0.      -.251E-16 .126E-16 .240E-17 .591E-17
-.293E-18 -.166E-18 .174E-04 .587E-05 -.109E-16 .409E-17
.185E-18 -.381E-18 .640E-05 .129E-05 .233E-17 .282E-17
.281E-19 .188E-16 -.598E-48 -.297E-48 -.784E-49 .130E-48
.188E-02 -.142E-02 -.907E-18 -.148E-17 -.557E-05 .182E-01
.549E-03 -.424E-03 -.522E-18 -.125E-17 .205E-03 .109E-01
.218E-17 -.913E-18 -.316E-32 -.271E-32 -.672E-33 .667E-33
.625E-17 -.563E-17 .107E-02 -.912E-02 -.800E-18 -.312E-17
-.969E-17 .461E-19 .349E-04 -.742E-02 -.102E-18 -.273E-17

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## SUMMARY OF IMPORTANT TERMS

STIFFNESS TERMS FOR D.O.F.S							
	1	2	3	4	5	6	
A0= .004	.799E+01	.799E+01	.238E+02	.682E+01	.682E+01	.571E+01	
A0= .035	.798E+01	.798E+01	.238E+02	.682E+01	.682E+01	.571E+01	
A0= .089	.798E+01	.798E+01	.237E+02	.681E+01	.681E+01	.571E+01	
A0= .177	.795E+01	.795E+01	.237E+02	.680E+01	.680E+01	.570E+01	
A0= .266	.790E+01	.790E+01	.236E+02	.679E+01	.679E+01	.568E+01	
A0= .355	.783E+01	.783E+01	.235E+02	.677E+01	.677E+01	.565E+01	
A0= .532	.762E+01	.762E+01	.232E+02	.670E+01	.670E+01	.557E+01	
A0= .710	.731E+01	.731E+01	.228E+02	.661E+01	.661E+01	.546E+01	
A0= .887	.689E+01	.689E+01	.223E+02	.649E+01	.649E+01	.531E+01	
A0= 1.065	.632E+01	.632E+01	.216E+02	.635E+01	.635E+01	.510E+01	
A0= 1.242	.553E+01	.553E+01	.207E+02	.617E+01	.617E+01	.483E+01	
A0= 1.419	.443E+01	.443E+01	.196E+02	.595E+01	.595E+01	.446E+01	
A0= 1.597	.305E+01	.305E+01	.181E+02	.570E+01	.570E+01	.391E+01	
A0= 1.774	.218E+01	.218E+01	.166E+02	.541E+01	.541E+01	.341E+01	
A0= 1.952	.163E+01	.163E+01	.152E+02	.509E+01	.509E+01	.310E+01	
A0= 2.129	.113E+01	.113E+01	.138E+02	.473E+01	.473E+01	.287E+01	
A0= 2.484	.253E+00	.253E+00	.108E+02	.388E+01	.388E+01	.250E+01	
A0= 2.839	.512E+00	.512E+00	.702E+01	.276E+01	.276E+01	.219E+01	
A0= 3.194	.888E+01	.888E+01	.164E+01	.122E+01	.122E+01	.202E+01	
A0= 3.548	.176E+02	.176E+02	-.475E+01	.222E+00	.222E+00	.226E+01	
A0= 4.258	.476E+01	.476E+01	-.709E+01	-.940E+00	-.940E+00	.673E+01	
A0= 4.968	.848E+00	.848E+00	-.246E+02	-.267E+01	-.267E+01	.433E+01	
A0= 5.677	-.952E+01	-.952E+01	-.195E+02	-.396E+01	-.396E+01	.342E+00	
A0= 6.387	-.824E+01	-.824E+01	.207E+01	-.176E+01	-.176E+01	-.266E+01	
A0= 7.097	.292E+02	.292E+02	-.104E+02	-.267E+01	-.267E+01	.454E+01	
A0= 7.807	.110E+02	.110E+02	-.210E+02	-.576E+01	-.576E+01	.107E+02	
A0= 8.516	-.329E+01	-.329E+01	-.256E+02	-.621E+01	-.621E+01	.112E+01	
A0= 9.581	-.183E+02	-.183E+02	-.560E+02	-.484E+01	-.484E+01	-.697E+01	
A0= 10.645	.259E+02	.259E+02	-.985E+02	-.167E+02	-.167E+02	.182E+02	
A0= 11.710	-.162E+01	-.162E+01	-.654E+02	-.271E+02	-.271E+02	.113E+01	
A0= 12.774	-.194E+02	-.194E+02	.534E+02	.468E+01	.467E+01	-.925E+01	

DAMPING TERMS FOR D.O.F.S							
	1	2	3	4	5	6	
A0= .004	.111E+03	.111E+03	.323E+03	.954E+02	.954E+02	.804E+02	
A0= .035	.112E+02	.112E+02	.325E+02	.954E+01	.954E+01	.804E+01	
A0= .089	.448E+01	.448E+01	.132E+02	.381E+01	.381E+01	.322E+01	
A0= .177	.225E+01	.225E+01	.670E+01	.191E+01	.191E+01	.161E+01	
A0= .266	.151E+01	.151E+01	.454E+01	.127E+01	.127E+01	.107E+01	
A0= .355	.114E+01	.114E+01	.347E+01	.954E+00	.954E+00	.804E+00	
A0= .532	.775E+00	.775E+00	.240E+01	.636E+00	.636E+00	.536E+00	
A0= .710	.599E+00	.599E+00	.185E+01	.477E+00	.477E+00	.403E+00	
A0= .887	.504E+00	.504E+00	.151E+01	.382E+00	.382E+00	.323E+00	
A0= 1.065	.461E+00	.461E+00	.129E+01	.319E+00	.319E+00	.272E+00	
A0= 1.242	.470E+00	.470E+00	.112E+01	.275E+00	.275E+00	.239E+00	
A0= 1.419	.601E+00	.601E+00	.989E+00	.243E+00	.243E+00	.225E+00	
A0= 1.597	.108E+01	.108E+01	.973E+00	.223E+00	.223E+00	.292E+00	
A0= 1.774	.178E+01	.178E+01	.122E+01	.216E+00	.216E+00	.523E+00	
A0= 1.952	.231E+01	.231E+01	.149E+01	.217E+00	.217E+00	.737E+00	
A0= 2.129	.277E+01	.277E+01	.171E+01	.224E+00	.224E+00	.905E+00	
A0= 2.484	.375E+01	.375E+01	.201E+01	.250E+00	.250E+00	.117E+01	
A0= 2.839	.523E+01	.523E+01	.222E+01	.298E+00	.298E+00	.140E+01	
A0= 3.194	.689E+01	.689E+01	.256E+01	.490E+00	.490E+00	.165E+01	
A0= 3.548	.304E+01	.304E+01	.374E+01	.825E+00	.825E+00	.194E+01	
A0= 4.258	.143E+01	.143E+01	.476E+01	.122E+01	.122E+01	.205E+01	
A0= 4.968	.154E+01	.154E+01	.732E+01	.152E+01	.152E+01	.687E+00	
A0= 5.677	.264E+01	.264E+01	.111E+02	.190E+01	.190E+01	.104E+01	
A0= 6.387	.846E+01	.846E+01	.101E+02	.247E+01	.247E+01	.171E+01	
A0= 7.097	.287E+01	.287E+01	.809E+01	.172E+01	.172E+01	.327E+01	
A0= 7.807	.124E+01	.124E+01	.827E+01	.195E+01	.195E+01	.820E+00	
A0= 8.516	.155E+01	.155E+01	.827E+01	.225E+01	.225E+01	.778E+00	

A0= 9.581	.480E+01	.480E+01	.806E+01	.189E+01	.189E+01	.178E+01
A0= 10.645	.267E+01	.267E+01	.123E+02	.195E+01	.195E+01	.172E+01
A0= 11.710	.167E+01	.167E+01	.211E+02	.320E+01	.320E+01	.888E+00
A0= 12.774	.465E+01	.465E+01	.152E+02	.471E+01	.471E+01	.173E+01

INCIDENT WAVE NUMBER: 1

AMPLITUDES OF INPUT MOTION FOR D.O.F.S 1 2 3 4 5 6

A0= .004	.100E+01	0.	0.	0.	.327E-16	.245E-14
A0= .035	.100E+01	0.	0.	0.	.157E-14	.194E-16
A0= .089	.100E+01	0.	0.	0.	.524E-15	.124E-14
A0= .177	.100E+01	0.	0.	0.	.525E-15	.892E-16
A0= .266	.100E+01	0.	0.	0.	.526E-15	.469E-15
A0= .355	.100E+01	0.	0.	0.	.530E-15	.794E-16
A0= .532	.100E+01	0.	0.	0.	.533E-15	.597E-15
A0= .710	.100E+01	0.	0.	0.	.541E-15	.752E-15
A0= .887	.100E+01	0.	0.	0.	.184E-31	.230E-15
A0= 1.065	.100E+01	0.	0.	0.	.290E-15	.673E-15
A0= 1.242	.100E+01	0.	0.	0.	.174E-14	.785E-15
A0= 1.419	.100E+01	0.	0.	0.	.604E-15	.824E-15
A0= 1.597	.100E+01	0.	0.	0.	.645E-15	.818E-15
A0= 1.774	.100E+01	0.	0.	0.	.738E-15	.569E-15
A0= 1.952	.100E+01	0.	0.	0.	.106E-14	.128E-14
A0= 2.129	.100E+01	0.	0.	0.	.152E-14	.160E-15
A0= 2.484	.100E+01	0.	0.	0.	.263E-14	.188E-14
A0= 2.839	.100E+01	0.	0.	0.	.744E-14	.276E-14
A0= 3.194	.100E+01	0.	0.	0.	.104E-13	.324E-14
A0= 3.548	.100E+01	0.	0.	0.	.151E-13	.374E-14
A0= 4.258	.100E+01	0.	0.	0.	.653E-14	.114E-15
A0= 4.968	.100E+01	0.	0.	0.	.215E-14	.979E-15
A0= 5.677	.100E+01	0.	0.	0.	.611E-14	.544E-15
A0= 6.387	.100E+01	0.	0.	0.	.832E-14	.317E-14
A0= 7.097	.100E+01	0.	0.	0.	.237E-14	.620E-15
A0= 7.807	.100E+01	0.	0.	0.	.126E-14	.956E-15
A0= 8.516	.100E+01	0.	0.	0.	.245E-14	.127E-14
A0= 9.581	.100E+01	0.	0.	0.	.104E-13	.609E-15
A0= 10.645	.100E+01	0.	0.	0.	.273E-14	.551E-15
A0= 11.710	.100E+01	0.	0.	0.	.187E-14	.144E-14
A0= 12.774	.100E+01	0.	0.	0.	.148E-14	.186E-15

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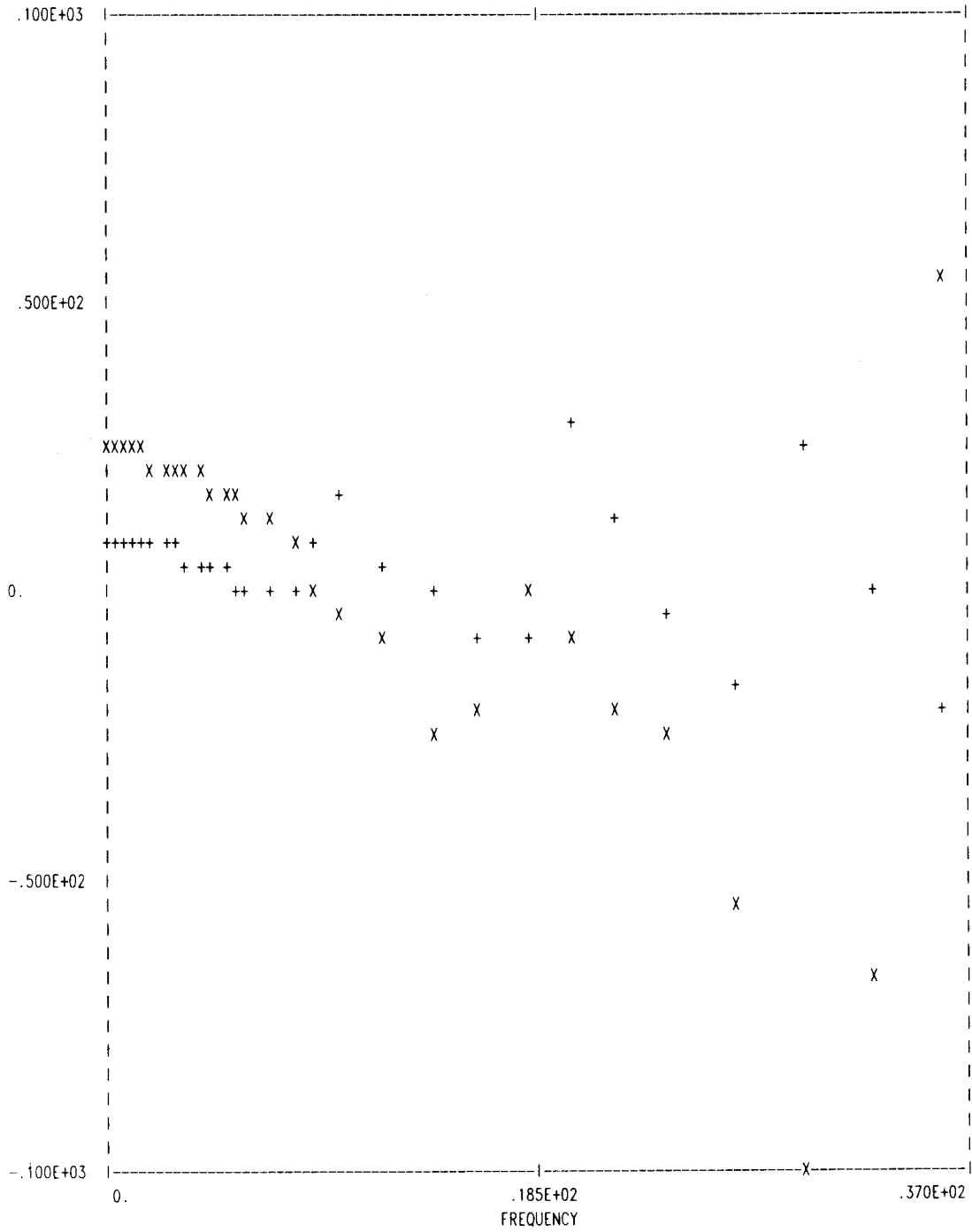
INCIDENT WAVE NUMBER: 9

AMPLITUDES OF INPUT MOTION FOR D.O.F.S 1 2 3 4 5 6

A0= .004	.212E-46	.305E-15	.100E+01	.206E-14	.168E-47	.758E-30
A0= .035	.836E-11	.142E-15	.100E+01	.210E-14	.252E-02	.628E-18
A0= .089	.131E-09	.448E-15	.100E+01	.137E-15	.629E-02	.701E-18
A0= .177	.105E-08	.143E-15	.100E+01	.210E-14	.126E-01	.133E-17
A0= .266	.355E-08	.141E-16	.100E+01	.112E-17	.189E-01	.572E-19
A0= .355	.846E-08	.312E-15	.100E+01	.208E-14	.252E-01	.688E-17
A0= .532	.290E-07	.468E-15	.100E+01	.138E-15	.378E-01	.373E-17
A0= .710	.702E-07	.488E-15	.100E+01	.382E-16	.503E-01	.260E-17
A0= .887	.141E-06	.677E-15	.999E+00	.224E-14	.629E-01	.105E-16
A0= 1.065	.253E-06	.565E-15	.999E+00	.446E-16	.755E-01	.181E-16
A0= 1.242	.420E-06	.190E-15	.999E+00	.231E-14	.881E-01	.808E-17
A0= 1.419	.663E-06	.585E-15	.998E+00	.234E-14	.101E+00	.150E-16
A0= 1.597	.102E-05	.261E-15	.998E+00	.250E-14	.113E+00	.618E-17
A0= 1.774	.152E-05	.360E-16	.998E+00	.330E-15	.126E+00	.121E-16
A0= 1.952	.221E-05	.934E-16	.997E+00	.999E-17	.138E+00	.292E-16
A0= 2.129	.312E-05	.194E-15	.996E+00	.157E-14	.151E+00	.224E-16
A0= 2.484	.566E-05	.456E-15	.995E+00	.873E-15	.176E+00	.974E-17
A0= 2.839	.857E-05	.330E-15	.993E+00	.137E-14	.201E+00	.678E-16

A0= 3.194	.432E-05	.229E-15	.991E+00	.336E-14	.225E+00	.164E-15
A0= 3.548	.203E-04	.171E-15	.991E+00	.274E-15	.250E+00	.721E-16
A0= 4.258	.841E-04	.461E-15	.988E+00	.935E-16	.300E+00	.315E-16
A0= 4.968	.830E-04	.201E-16	.985E+00	.553E-16	.349E+00	.179E-15
A0= 5.677	.946E-04	.117E-14	.982E+00	.229E-14	.397E+00	.104E-14
A0= 6.387	.162E-03	.577E-15	.979E+00	.429E-15	.446E+00	.636E-15
A0= 7.097	.295E-03	.100E-15	.971E+00	.281E-16	.493E+00	.479E-16
A0= 7.807	.271E-03	.555E-15	.967E+00	.455E-15	.540E+00	.312E-15
A0= 8.516	.548E-03	.486E-15	.961E+00	.115E-15	.588E+00	.492E-15
A0= 9.581	.797E-03	.149E-15	.944E+00	.139E-14	.656E+00	.146E-15
A0= 10.645	.766E-03	.345E-15	.941E+00	.304E-14	.722E+00	.612E-16
A0= 11.710	.102E-02	.823E-15	.933E+00	.642E-15	.790E+00	.797E-15
A0= 12.774	.145E-02	.949E-15	.924E+00	.287E-15	.856E+00	.215E-15

STIFFNESS, THE REAL PART OF THE IMPEDANCE  
 THE SYMBOL \* CORRESPONDS TO DEGREE OF FREEDOM NUMBER 1  
 THE SYMBOL + CORRESPONDS TO DEGREE OF FREEDOM NUMBER 2  
 THE SYMBOL X CORRESPONDS TO DEGREE OF FREEDOM NUMBER 3



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SMACS INPUT AND OUTPUT  
for an SSI analysis

THIS PROGRAM IS SUGAR COATED

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SSSSSS M      M      A      CCCCC SSSSSS
S      S MM     MM     A A     C      C S      S
S      M M     M M     A  A     C      S
S      M M M     M  A     A  C      S
SSSSSS M  M     M  A     A  C      SSSSSS
      S M      M AAAAAAAA C      S
      S M      M A     A  C      S
S      S M      M A     A  C      C S      S
SSSSSS M      M  A     A  CCCCC SSSSSS

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CDC 7600 SMACS HIGH LCM VERSION

COMPILED 06JAN82 01.23.45  
 EXECUTED 03/01/82 17:24:15  
 EXECUTION ON THE R-MACHINE

3-D RESPONSE CALCULATION FOR SOIL-STRUCTURE INTERACTION

SUMMARY OF INPUT FILE SMACS.I

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2 4 6 8(1)2 4 6 8(2)2 4 6 8(3)2 4 6 8(4)2 4 6 8(5)2 4 6 8(6)2 4 6 8(7)2 4 6 8(8
1> SMACS TEST1 FOR BERKELEY -- ZION REACTOR CONTAINMENT BUILDING <
2> 8.57E6 1390. 78.5 025 45000 30 <
3> 1 1 1 0 NFDN , NTSTR , ISMXI , IFXBI <
4> 123456789 RANDOM SEED <
5> 0.5 1.0 0.5 0.7 <
6> 1 6 0 0. 0. 0. 0. NSTR,NDFD,IFTIMP,---<
7> 1 2 3 4 5 6 ITDOF <
8> 1.274E6 0. 0. 0. 3.949E6 0. FDN MASS MATRIX<
9> 0. 1.274E6 0. -3.949E6 0. -5.096E5 FDN MASS MATRIX<
10> 0. 0. 1.274E6 0. 5.096E5 0. FDN MASS MATRIX<
11> 0. -3.949E6 0. 1.758E9 0. 1.580E6 FDN MASS MATRIX<
12> 3.949E6 0. 5.096E5 0. 1.749E9 0. FDN MASS MATRIX<
13> 0. -5.096E5 0. 1.580E6 0. 3.483E9 FDN MASS MATRIX<
14> 0 0. 0. 0. 0. 0. IFTR , X , Y , Z , Q <
15> 13 6 1 2 3 4 5 6 NMODE , NDOF , IDOF <
16> 0 0. 0. 0. 0. 0. IFTRAN , X , Y , Z , Q <
17> 0 <
18> 198 NKEEP = THE NUMBER OF RESPONSES TO CALCULATE AND KEEP <
19> 1 3 9 1 0 1 1 1(10A8,/(8F10.5)) <
20> 0.01 33.0 FMIN , FMAX <
21> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 1 <
22> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 2 <
23> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 3 <
24> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 4 <
25> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 5 <
26> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 6 <
27> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 7 <
28> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 8 <
29> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 9 <
30> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 10 <
31> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 11 <
32> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 12 <
33> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 13 <
34> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 14 <
35> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 15 <
36> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 16 <
37> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 17 <
38> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 18 <
39> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 19 <
40> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 20 <
41> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 21 <
42> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 22 <
43> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 23 <
44> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 24 <
45> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 25 <
46> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 26 <
47> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 27 <
48> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 28 <
49> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 29 <
50> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 30 <
2 4 6 8(1)2 4 6 8(2)2 4 6 8(3)2 4 6 8(4)2 4 6 8(5)2 4 6 8(6)2 4 6 8(7)2 4 6 8(8

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END OF INPUT SUMMARY

MAP TITLE FOR BERKELEY -- ZION REACTOR CONTAINMENT BUILDING

REFERENCE SHEAR MODULUS : .857E+07  
REFERENCE SHEAR VELOCITY : .139E+04  
CHARACTERISTIC LENGTH : .785E+02  
REFERENCE DAMPING RATIO : .250E-01

THE AMOUNT OF LCM STORAGE TO BE USED IN THIS PROBLEM IS 45000 WORDS  
THIS CORRESPONDS TO 34.8 PERCENT OF CORE

NUMBER OF FOUNDATIONS : 1  
TOTAL NUMBER OF STRUCTURES : 1  
SMACS INDICATOR : 1  
.EQ. 0 MEANS TREAT AS AN SSIN PROBLEM  
.NE. 0 MEANS TREAT AS A SMACS PROBLEM  
FIXED BASE ANALYSIS INDICATOR : 0  
.EQ. 0 MEANS NOT A FIXED BASE ANALYSIS  
.NE. 0 MEANS A FIXED BASE ANALYSIS

## EXPERIMENTAL DESIGN FOR THE SOIL PLUS 1 STRUCTURE(S) AND 30 EARTHQUAKE PROBLEMS

STARTING SEED FOR RANDOM NUMBER GENERATION = 1717000000726746425B

## INPUT COEFFICIENTS OF VARIATION FOR

SOIL PROPERTIES --STRUCTURE NUMBER 1--STRUCTURE NUMBER 2--STRUCTURE NUMBER 3  
 SHEAR DAMPING FREQ. DAMPING FREQ. DAMPING FREQ. DAMPING  
 .500 1.000 .500 .700

EQ PROB NUMBER	SOIL		STRUCTURE NO 1		STRUCTURE NO 2		STRUCTURE NO 3	
	SHEAR	DAMPING	FREQ.	DAMPING	FREQ.	DAMPING	FREQ.	DAMPING
1	1.7560	1.0025	1.0288	1.0341				
2	.7106	.5891	.7190	.6698				
3	1.2527	1.9712	1.4646	1.6156				
4	1.4164	.3282	.9591	.6203				
5	1.6874	.7553	.8685	1.8298				
6	.5310	2.1858	.6019	.7795				
7	1.0276	.5289	.6939	1.2625				
8	1.5456	1.7719	.5113	1.5096				
9	.9139	.4176	1.9082	1.2243				
10	1.3933	.8884	1.2694	.9267				
11	.8545	3.3929	1.2061	.2210				
12	.7563	1.3711	1.0872	.5269				
13	1.1770	2.3228	1.5309	1.4086				
14	.6911	.6987	.8395	.4935				
15	.6061	1.5437	.9225	1.3708				
16	1.8951	2.8986	1.3663	2.0395				
17	.9315	1.5910	1.8247	.8563				
18	.4103	1.1951	1.1536	2.3482				
19	.8232	.8248	.3197	.8188				
20	1.2992	.3640	.5834	.6962				
21	1.1663	.2728	.7797	2.6075				
22	.5718	1.2617	1.2991	.9609				
23	1.1032	.1537	1.5901	1.9111				
24	.6506	.6068	.4587	1.1502				
25	.4752	.6701	2.1698	.3882				
26	.8048	.9362	.9672	.3568				
27	2.1363	4.0656	.7871	1.0787				
28	.9728	5.8319	1.0529	.7504				
29	2.5334	.4830	3.6964	3.5889				
30	1.0796	1.1071	.6429	.5666				

NUMBER OF FOUNDATIONS = 1  
NUMBER OF SUPERSTRUCTURES ON TOP = 1  
NUMBER OF DEGREES OF FREEDOM = 6  
ITDOF= 1 2 3 4 5 6

IMPEDANCE TRANSFORMATION PARAMETERS: IFTIMP= 0  
XF= 0. , YF= 0. , ZF= 0. , QF= 0.

MASS MATRIX OF FOUNDATION NUMBER 1, 6 D.O.F.

.127E+07	0.	0.	.395E+07	0.	
0.	.127E+07	0.	-.395E+07	0.	-.510E+06
0.	0.	.127E+07	0.	.510E+06	0.
0.	-.395E+07	0.	.176E+10	0.	.158E+07
.395E+07	0.	.510E+06	0.	.175E+10	0.
0.	-.510E+06	0.	.158E+07	0.	.348E+10

DATA FOR STRUCTURE NUMBER 1, FOUNDATION NUMBER 1

NUMBER OF MODES= 13, NUMBER OF D.O.F. = 6

ACTIVE DEGREES OF FREEDOM ARE: 1 2 3 4 5 6

COORDINATE TRANSFORM DATA

IFTRAN=0, X= 0. , Y= 0. , Z= 0. , Q= 0.

STRUCTURAL PARAMETERS FOR STRUCTURE NUMBER 1 WERE PRECALCULATED, IFCAL=0

IDENTIFICATION OF PRECALCULATED STRUCTURAL DATA:

RESPONSE SPECTRUM ANALYSIS OF ZION CONTAINMENT STRUCTURE , GENERATED 01/20/82 14:27:50

MODE	FN(HZ)	WN	DAMPING	X-BETA	Y-BETA	Z-BETA	XX-BETA	YY-BETA	ZZ-BETA
1	4.154	26.100	.0200	-.807E+03	.807E+03	.275E-13	-.134E+06	-.134E+06	.846E-14
2	4.154	26.100	.0200	.807E+03	.807E+03	.425E-13	-.134E+06	.134E+06	-.483E-10
3	8.547	53.700	.0200	-.599E-09	.599E-09	-.221E-13	-.994E-07	-.992E-07	.844E+05
4	11.921	74.900	.0200	.531E-10	.641E-10	.119E+04	-.102E-07	.918E-08	-.111E-08
5	13.321	83.700	.0200	.394E+03	.394E+03	-.427E-12	.471E+04	-.471E+04	.126E-07
6	13.321	83.700	.0200	.394E+03	-.394E+03	.498E-10	-.471E+04	-.471E+04	.116E-08
7	19.258	121.000	.0200	-.144E-07	.149E-07	-.305E+03	-.217E-06	-.222E-06	.571E-06
8	22.600	142.000	.0200	-.138E+03	-.138E+03	-.510E-11	.137E+05	-.137E+05	.290E-10
9	22.600	142.000	.0200	-.138E+03	.138E+03	.361E-09	-.137E+05	-.137E+05	.149E-10
10	26.897	169.000	.0200	.748E-10	.702E-10	.452E-14	.657E-09	-.599E-09	.282E+05
11	30.717	193.000	.0200	.180E+03	.180E+03	.749E-10	.385E+04	-.385E+04	.583E-08
12	30.717	193.000	.0200	.180E+03	-.180E+03	.725E-10	-.385E+04	-.385E+04	-.927E-08
13	43.449	273.000	.0200	.761E+02	-.761E+02	-.176E-09	.964E+04	.963E+04	-.554E-09

EFFECTIVE MODAL MASSES AND HEIGHTS

X,Y,Z-FRACTION OF STATIC MASS

XX,YY-EFFECTIVE HEIGHT OF MODE

ZZ-FRACTION OF TORSIONAL INERTIA

MODE	X-COMP	Y-COMP	Z-COMP	XX-COMP	YY-COMP	ZZ-COMP
1	.352E+00	.352E+00	.409E-33	.985E+02	.985E+02	.811E-38
2	.352E+00	.352E+00	.976E-33	.985E+02	.985E+02	.265E-30
3	.194E-24	.194E-24	.264E-33	.731E-10	.729E-10	.808E+00
4	.152E-26	.222E-26	.765E+00	.750E-11	.675E-11	.140E-27
5	.839E-01	.839E-01	.986E-31	.346E+01	.346E+01	.180E-25
6	.839E-01	.839E-01	.134E-26	.346E+01	.346E+01	.153E-27
7	.112E-21	.120E-21	.503E-01	.160E-09	.163E-09	.370E-22
8	.103E-01	.103E-01	.141E-28	.101E+02	.101E+02	.954E-31
9	.103E-01	.103E-01	.704E-25	.101E+02	.101E+02	.252E-31
10	.302E-26	.266E-26	.110E-34	.483E-12	.440E-12	.902E-01
11	.175E-01	.175E-01	.303E-26	.283E+01	.283E+01	.385E-26
12	.175E-01	.175E-01	.284E-26	.283E+01	.283E+01	.974E-26
13	.313E-02	.313E-02	.167E-25	.709E+01	.708E+01	.348E-28

STATIC BUILDING MASS MATRIX ABOUT THE FOUNDATION

.185E+07	0.	0.	0.	.215E+09	0.
0	.185E+07	0.	-.215E+09	0.	0
0	0.	.185E+07	0	0.	0
0	.215E+09	0	.570E+11	0	0
.215E+09	0	0.	0	.570E+11	0

0. 0. 0. 0. 0. .882E+10

PROCESSING OF STRUCTURAL DATA IS COMPLETE

TOTAL TIME = 6.188, CPU = .582, I/O = .291, SYS = .027

CALCULATION OF FOUNDATION AND STRUCTURAL RESPONSE BEGINS

PARAMETERS FOR RESPONSE CALCULATION:

FORM OF INPUT AND RESPONSE MOTIONS (LFT) = 1  
NUMBER OF FREEFIELD PLANE WAVES TO BE USED (NCOM) = 3  
NUMBER OF WAVE FORMS IN SCATTERING MATRIX (NCASE) = 9  
WAVE NUMBER OF FIRST FREEFIELD MOTION (NSTART) = 1  
IMPEDANCE FUNCTION EXTRAPOLATION (IEXTRP) = 0  
NUMBER OF EARTHQUAKE PROBLEMS TO BE SOLVED (NQKS) = 1  
NUMBER OF STRUCTURAL PROPERTY VARIATIONS (NVSTR) = 1  
NUMBER OF SOIL PROPERTY VARIATIONS (NVIMP) = 1  
FORMAT IN WHICH INPUT MOTIONS WILL BE READ (IFMT) = (10A8,/, (8F10.5))

INPUT EXCITATION CONSISTS OF 3 COMPONENTS OF FREEFIELD MOTION

EARTHQUAKE PROBLEM NUMBER 1

## IMPEDANCE AND SCATTERING MATRIX SET 1

IMPEDANCE FUNCTIONS WILL BE MODIFIED FOR VARIATIONS IN SOIL PROPERTIES LISTED BELOW:

REFERENCE SHEAR MODULUS WILL BE MULTIPLIED BY 1.75601  
 REFERENCE DAMPING RATIO WILL BE MULTIPLIED BY 1.00247

## STRUCTURAL PROPERTY SET 1

THE FREQUENCIES FOR STRUCTURE 1 HAVE BEEN MULTIPLIED BY THE FOLLOWING FACTORS:

1.02882 1.02882 1.02882 1.02882 1.02882 1.02882 1.02882 1.02882 1.02882 1.02882  
 1.02882 1.02882 1.02882

THE DAMPING RATIOS FOR STRUCTURE 1 HAVE BEEN MULTIPLIED BY THE FOLLOWING FACTORS:

1.03407 1.03407 1.03407 1.03407 1.03407 1.03407 1.03407 1.03407 1.03407 1.03407  
 1.03407 1.03407 1.03407

## PARAMETERS FOR REAL TIME ANALYSIS:

TIME STEP SIZE (DT) = .100E-01  
 SCALE FACTOR FOR TIME HISTORIES (SCALE) = .733E+01  
 NUMBER OF DATA POINTS IN EACH TIME HISTORY (NPOINT) = 2048  
 NUMBER OF POINTS IN FAST FOURIER TRANSFORMS (NFFT) = 2048  
 MINIMUM FREQUENCY (HZ) IN FOURIER ANALYSIS (FMIN) = .100E-01  
 MAXIMUM FREQUENCY (HZ) IN FOURIER ANALYSIS (FMAX) = .330E+02

## IDENTIFICATION OF INPUT MOTION FOR EARTHQUAKE PROBLEM 1

CORR=1. NO= 1 COMP= 1 SHAPE= 2 G= .181 R= 20 M= 4.96 GENERATED 09:27:19 12/11/80  
 MAXIMUM VALUE OF SCALED INPUT MOTION = .133E+01 OCCURRING AT 8.86

CORR=1. NO= 1 COMP= 2 SHAPE= 2 G= .323 R= 20 M= 4.96 GENERATED 09:31:03 12/11/80  
 MAXIMUM VALUE OF SCALED INPUT MOTION = .237E+01 OCCURRING AT 9.22

CORR=1. NO= 1 COMP= 3 SHAPE= 2 G= .075 R= 20 M= 4.96 GENERATED 09:33:06 12/11/80  
 MAXIMUM VALUE OF SCALED INPUT MOTION = .546E+00 OCCURRING AT 5.28

INPUT MOTIONS HAVE BEEN WRITTEN TO DATA FILE

PROCESSING OF INPUT MOTIONS IS COMPLETE

TOTAL TIME = 6.784, CPU = .986, I/O = .645, SYS = .032

## IDENTIFICATION OF IMPEDANCE FUNCTION DATA:

CLAF RUN 6; RERUN PROB 2 W/ CL = 78.5 &amp; REFINED GRN FNS TO 36 HZ GENERATED 01/28/82 15:33:33

MINIMUM FREQUENCY OF IMPEDANCE TABLES = 0.0000  
MAXIMUM FREQUENCY OF IMPEDANCE TABLES = 47.6891

PROGRAM WILL READ IMPEDANCES FOR A0= 0.  
PROGRAM WILL READ IMPEDANCES FOR A0= .400E-01  
PROGRAM WILL READ IMPEDANCES FOR A0= .900E-01  
PROGRAM WILL READ IMPEDANCES FOR A0= .180E+00  
PROGRAM WILL READ IMPEDANCES FOR A0= .270E+00  
PROGRAM WILL READ IMPEDANCES FOR A0= .350E+00  
PROGRAM WILL READ IMPEDANCES FOR A0= .530E+00  
PROGRAM WILL READ IMPEDANCES FOR A0= .710E+00  
PROGRAM WILL READ IMPEDANCES FOR A0= .890E+00  
PROGRAM WILL READ IMPEDANCES FOR A0= .106E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .124E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .142E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .160E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .177E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .195E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .213E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .248E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .284E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .319E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .355E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .426E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .497E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .568E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .639E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .710E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .781E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .852E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .958E+01

RESPONSE COMPUTATION FREQUENCY-BY-FREQUENCY IS COMPLETE

TOTAL TIME = 12.835, CPU = 5.919, I/O = 3.041, SYS = .045

RESPONSES WILL BE PROCESSED PROBLEM-BY-PROBLEM IN 10 BLOCKS OF 21 RESPONSE COMPONENTS EACH

## SUMMARY OF PEAK RESPONSES FOR EARTHQUAKE PROBLEM 1

RESPONSE NO 4:	FOUNDATION	1,	X-TRANSLATION	, ABSOLUTE ACCELERATION, MAXIMUM = -.1081E+01 AT 3.150
RESPONSE NO 5:	FOUNDATION	1,	Y-TRANSLATION	, ABSOLUTE ACCELERATION, MAXIMUM = .2268E+01 AT 9.230
RESPONSE NO 6:	FOUNDATION	1,	Z-TRANSLATION	, ABSOLUTE ACCELERATION, MAXIMUM = -.5581E+00 AT 5.290
RESPONSE NO 7:	FOUNDATION	1,	XX-ROTATION	, ABSOLUTE ACCELERATION, MAXIMUM = -.1509E-01 AT 7.820
RESPONSE NO 8:	FOUNDATION	1,	YY-ROTATION	, ABSOLUTE ACCELERATION, MAXIMUM = -.7198E-02 AT 9.710
RESPONSE NO 9:	FOUNDATION	1,	ZZ-ROTATION	, ABSOLUTE ACCELERATION, MAXIMUM = -.8948E-04 AT 9.450
RESPONSE NO 10:	STRUCTURE	1,	BASE SHEAR FORCE X-DIR,	FORCE, MAXIMUM = -.4160E+07 AT 3.460
RESPONSE NO 11:	STRUCTURE	1,	BASE SHEAR FORCE Y-DIR,	FORCE, MAXIMUM = .8153E+07 AT 8.110
RESPONSE NO 12:	STRUCTURE	1,	VERTICAL FORCE Z-DIR,	FORCE, MAXIMUM = -.1439E+07 AT 5.290
RESPONSE NO 13:	STRUCTURE	1,	O. T. MOMENT XX-AXIS,	FORCE, MAXIMUM = -.1267E+10 AT 8.100
RESPONSE NO 14:	STRUCTURE	1,	O. T. MOMENT YY-AXIS,	FORCE, MAXIMUM = -.6163E+09 AT 9.680
RESPONSE NO 15:	STRUCTURE	1,	TORSIONAL MOMENT ZZ-AXIS,	FORCE, MAXIMUM = -.1150E+07 AT 9.290
RESPONSE NO 16:	STRUCTURE	1,	NODE 8 ( X ), FIXED BASE,	ABSOLUTE ACCELERATION, MAXIMUM = -.1081E+01 AT 3.150
RESPONSE NO 17:	STRUCTURE	1,	NODE 8 ( Y ), FIXED BASE,	ABSOLUTE ACCELERATION, MAXIMUM = .2267E+01 AT 9.230
RESPONSE NO 18:	STRUCTURE	1,	NODE 8 ( Z ), FIXED BASE,	ABSOLUTE ACCELERATION, MAXIMUM = -.5579E+00 AT 5.290
RESPONSE NO 19:	STRUCTURE	1,	NODE 8 (XX), FIXED BASE,	ABSOLUTE ACCELERATION, MAXIMUM = -.1509E-01 AT 7.820
RESPONSE NO 20:	STRUCTURE	1,	NODE 8 (YY), FIXED BASE,	ABSOLUTE ACCELERATION, MAXIMUM = -.7198E-02 AT 9.710
RESPONSE NO 21:	STRUCTURE	1,	NODE 8 (ZZ), FIXED BASE,	ABSOLUTE ACCELERATION, MAXIMUM = -.8948E-04 AT 9.450
RESPONSE NO 22:	STRUCTURE	1,	NODE 9 ( X ),	ABSOLUTE ACCELERATION, MAXIMUM = -.1084E+01 AT 3.150
RESPONSE NO 23:	STRUCTURE	1,	NODE 9 ( Y ),	ABSOLUTE ACCELERATION, MAXIMUM = .2270E+01 AT 9.230
RESPONSE NO 24:	STRUCTURE	1,	NODE 9 ( Z ),	ABSOLUTE ACCELERATION, MAXIMUM = -.5588E+00 AT 5.290
RESPONSE NO 25:	STRUCTURE	1,	NODE 9 (XX),	ABSOLUTE ACCELERATION, MAXIMUM = -.1517E-01 AT 7.820
RESPONSE NO 26:	STRUCTURE	1,	NODE 9 (YY),	ABSOLUTE ACCELERATION, MAXIMUM = -.7238E-02 AT 9.710
RESPONSE NO 27:	STRUCTURE	1,	NODE 9 (ZZ),	ABSOLUTE ACCELERATION, MAXIMUM = -.8962E-04 AT 9.450
RESPONSE NO 28:	STRUCTURE	1,	NODE 10 ( X ),	ABSOLUTE ACCELERATION, MAXIMUM = -.1137E+01 AT 3.150
RESPONSE NO 29:	STRUCTURE	1,	NODE 10 ( Y ),	ABSOLUTE ACCELERATION, MAXIMUM = .2326E+01 AT 9.230
RESPONSE NO 30:	STRUCTURE	1,	NODE 10 ( Z ),	ABSOLUTE ACCELERATION, MAXIMUM = -.5722E+00 AT 5.290
RESPONSE NO 31:	STRUCTURE	1,	NODE 10 (XX),	ABSOLUTE ACCELERATION, MAXIMUM = -.1627E-01 AT 7.820
RESPONSE NO 32:	STRUCTURE	1,	NODE 10 (YY),	ABSOLUTE ACCELERATION, MAXIMUM = -.7845E-02 AT 9.710
RESPONSE NO 33:	STRUCTURE	1,	NODE 10 (ZZ),	ABSOLUTE ACCELERATION, MAXIMUM = -.9174E-04 AT 9.450
RESPONSE NO 34:	STRUCTURE	1,	NODE 11 ( X ),	ABSOLUTE ACCELERATION, MAXIMUM = -.1255E+01 AT 3.150
RESPONSE NO 35:	STRUCTURE	1,	NODE 11 ( Y ),	ABSOLUTE ACCELERATION, MAXIMUM = .2461E+01 AT 9.230
RESPONSE NO 36:	STRUCTURE	1,	NODE 11 ( Z ),	ABSOLUTE ACCELERATION, MAXIMUM = -.6037E+00 AT 5.290
RESPONSE NO 37:	STRUCTURE	1,	NODE 11 (XX),	ABSOLUTE ACCELERATION, MAXIMUM = -.1876E-01 AT 7.820
RESPONSE NO 38:	STRUCTURE	1,	NODE 11 (YY),	ABSOLUTE ACCELERATION, MAXIMUM = -.9298E-02 AT 9.710
RESPONSE NO 39:	STRUCTURE	1,	NODE 11 (ZZ),	ABSOLUTE ACCELERATION, MAXIMUM = -.9811E-04 AT 9.440
RESPONSE NO 40:	STRUCTURE	1,	NODE 12 ( X ),	ABSOLUTE ACCELERATION, MAXIMUM = -.1371E+01 AT 3.160
RESPONSE NO 41:	STRUCTURE	1,	NODE 12 ( Y ),	ABSOLUTE ACCELERATION, MAXIMUM = .2572E+01 AT 9.230
RESPONSE NO 42:	STRUCTURE	1,	NODE 12 ( Z ),	ABSOLUTE ACCELERATION, MAXIMUM = -.6328E+00 AT 5.290
RESPONSE NO 43:	STRUCTURE	1,	NODE 12 (XX),	ABSOLUTE ACCELERATION, MAXIMUM = -.2108E-01 AT 7.960
RESPONSE NO 44:	STRUCTURE	1,	NODE 12 (YY),	ABSOLUTE ACCELERATION, MAXIMUM = -.1087E-01 AT 9.700
RESPONSE NO 45:	STRUCTURE	1,	NODE 12 (ZZ),	ABSOLUTE ACCELERATION, MAXIMUM = -.1071E-03 AT 9.440
RESPONSE NO 46:	STRUCTURE	1,	NODE 13 ( X ),	ABSOLUTE ACCELERATION, MAXIMUM = -.1545E+01 AT 3.160
RESPONSE NO 47:	STRUCTURE	1,	NODE 13 ( Y ),	ABSOLUTE ACCELERATION, MAXIMUM = .2669E+01 AT 9.230
RESPONSE NO 48:	STRUCTURE	1,	NODE 13 ( Z ),	ABSOLUTE ACCELERATION, MAXIMUM = -.6636E+00 AT 5.290
RESPONSE NO 49:	STRUCTURE	1,	NODE 13 (XX),	ABSOLUTE ACCELERATION, MAXIMUM = -.2396E-01 AT 7.960
RESPONSE NO 50:	STRUCTURE	1,	NODE 13 (YY),	ABSOLUTE ACCELERATION, MAXIMUM = -.1277E-01 AT 9.700
RESPONSE NO 51:	STRUCTURE	1,	NODE 13 (ZZ),	ABSOLUTE ACCELERATION, MAXIMUM = -.1157E-03 AT 9.290
RESPONSE NO 52:	STRUCTURE	1,	NODE 14 ( X ),	ABSOLUTE ACCELERATION, MAXIMUM = .1838E+01 AT 3.640
RESPONSE NO 53:	STRUCTURE	1,	NODE 14 ( Y ),	ABSOLUTE ACCELERATION, MAXIMUM = .3154E+01 AT 8.110
RESPONSE NO 54:	STRUCTURE	1,	NODE 14 ( Z ),	ABSOLUTE ACCELERATION, MAXIMUM = -.7120E+00 AT 5.290
RESPONSE NO 55:	STRUCTURE	1,	NODE 14 (XX),	ABSOLUTE ACCELERATION, MAXIMUM = -.2814E-01 AT 7.810
RESPONSE NO 56:	STRUCTURE	1,	NODE 14 (YY),	ABSOLUTE ACCELERATION, MAXIMUM = -.1581E-01 AT 9.700
RESPONSE NO 57:	STRUCTURE	1,	NODE 14 (ZZ),	ABSOLUTE ACCELERATION, MAXIMUM = -.1306E-03 AT 9.290
RESPONSE NO 58:	STRUCTURE	1,	NODE 15 ( X ),	ABSOLUTE ACCELERATION, MAXIMUM = -.2132E+01 AT 3.460
RESPONSE NO 59:	STRUCTURE	1,	NODE 15 ( Y ),	ABSOLUTE ACCELERATION, MAXIMUM = .3744E+01 AT 8.110
RESPONSE NO 60:	STRUCTURE	1,	NODE 15 ( Z ),	ABSOLUTE ACCELERATION, MAXIMUM = -.7512E+00 AT 5.290
RESPONSE NO 61:	STRUCTURE	1,	NODE 15 (XX),	ABSOLUTE ACCELERATION, MAXIMUM = -.3132E-01 AT 7.810
RESPONSE NO 62:	STRUCTURE	1,	NODE 15 (YY),	ABSOLUTE ACCELERATION, MAXIMUM = -.1835E-01 AT 9.700
RESPONSE NO 63:	STRUCTURE	1,	NODE 15 (ZZ),	ABSOLUTE ACCELERATION, MAXIMUM = -.1392E-03 AT 9.290
RESPONSE NO 64:	STRUCTURE	1,	NODE 16 ( X ),	ABSOLUTE ACCELERATION, MAXIMUM = -.2384E+01 AT 3.460

RESPONSE NO 65:	STRUCTURE	1,	NODE 16 ( Y )	, ABSOLUTE ACCELERATION, MAXIMUM = .4387E+01 AT 8.110
RESPONSE NO 66:	STRUCTURE	1,	NODE 16 ( Z )	, ABSOLUTE ACCELERATION, MAXIMUM = -.7873E+00 AT 5.290
RESPONSE NO 67:	STRUCTURE	1,	NODE 16 (XX)	, ABSOLUTE ACCELERATION, MAXIMUM = -.3405E-01 AT 7.810
RESPONSE NO 68:	STRUCTURE	1,	NODE 16 (YY)	, ABSOLUTE ACCELERATION, MAXIMUM = -.2069E-01 AT 9.700
RESPONSE NO 69:	STRUCTURE	1,	NODE 16 (ZZ)	, ABSOLUTE ACCELERATION, MAXIMUM = -.1441E-03 AT 9.290
RESPONSE NO 70:	STRUCTURE	1,	NODE 17 ( X )	, ABSOLUTE ACCELERATION, MAXIMUM = -.2593E+01 AT 3.460
RESPONSE NO 71:	STRUCTURE	1,	NODE 17 ( Y )	, ABSOLUTE ACCELERATION, MAXIMUM = .4991E+01 AT 8.100
RESPONSE NO 72:	STRUCTURE	1,	NODE 17 ( Z )	, ABSOLUTE ACCELERATION, MAXIMUM = -.8193E+00 AT 5.290
RESPONSE NO 73:	STRUCTURE	1,	NODE 17 (XX)	, ABSOLUTE ACCELERATION, MAXIMUM = -.3634E-01 AT 7.810
RESPONSE NO 74:	STRUCTURE	1,	NODE 17 (YY)	, ABSOLUTE ACCELERATION, MAXIMUM = -.2273E-01 AT 9.700
RESPONSE NO 75:	STRUCTURE	1,	NODE 17 (ZZ)	, ABSOLUTE ACCELERATION, MAXIMUM = -.1455E-03 AT 9.290
RESPONSE NO 76:	STRUCTURE	1,	NODE 18 ( X )	, ABSOLUTE ACCELERATION, MAXIMUM = -.2759E+01 AT 3.460
RESPONSE NO 77:	STRUCTURE	1,	NODE 18 ( Y )	, ABSOLUTE ACCELERATION, MAXIMUM = .5605E+01 AT 8.100
RESPONSE NO 78:	STRUCTURE	1,	NODE 18 ( Z )	, ABSOLUTE ACCELERATION, MAXIMUM = -.8467E+00 AT 5.290
RESPONSE NO 79:	STRUCTURE	1,	NODE 18 (XX)	, ABSOLUTE ACCELERATION, MAXIMUM = -.3814E-01 AT 7.810
RESPONSE NO 80:	STRUCTURE	1,	NODE 18 (YY)	, ABSOLUTE ACCELERATION, MAXIMUM = -.2437E-01 AT 9.700
RESPONSE NO 81:	STRUCTURE	1,	NODE 18 (ZZ)	, ABSOLUTE ACCELERATION, MAXIMUM = .1509E-03 AT 9.370
RESPONSE NO 82:	STRUCTURE	1,	NODE 19 ( X )	, ABSOLUTE ACCELERATION, MAXIMUM = -.3088E+01 AT 9.680
RESPONSE NO 83:	STRUCTURE	1,	NODE 19 ( Y )	, ABSOLUTE ACCELERATION, MAXIMUM = .6178E+01 AT 8.100
RESPONSE NO 84:	STRUCTURE	1,	NODE 19 ( Z )	, ABSOLUTE ACCELERATION, MAXIMUM = -.8695E+00 AT 5.290
RESPONSE NO 85:	STRUCTURE	1,	NODE 19 (XX)	, ABSOLUTE ACCELERATION, MAXIMUM = -.3948E-01 AT 7.810
RESPONSE NO 86:	STRUCTURE	1,	NODE 19 (YY)	, ABSOLUTE ACCELERATION, MAXIMUM = -.2555E-01 AT 9.700
RESPONSE NO 87:	STRUCTURE	1,	NODE 19 (ZZ)	, ABSOLUTE ACCELERATION, MAXIMUM = .1596E-03 AT 9.370
RESPONSE NO 88:	STRUCTURE	1,	NODE 20 ( X )	, ABSOLUTE ACCELERATION, MAXIMUM = -.3448E+01 AT 9.690
RESPONSE NO 89:	STRUCTURE	1,	NODE 20 ( Y )	, ABSOLUTE ACCELERATION, MAXIMUM = .6546E+01 AT 7.820
RESPONSE NO 90:	STRUCTURE	1,	NODE 20 ( Z )	, ABSOLUTE ACCELERATION, MAXIMUM = -.8748E+00 AT 5.290
RESPONSE NO 91:	STRUCTURE	1,	NODE 20 (XX)	, ABSOLUTE ACCELERATION, MAXIMUM = -.3980E-01 AT 7.810
RESPONSE NO 92:	STRUCTURE	1,	NODE 20 (YY)	, ABSOLUTE ACCELERATION, MAXIMUM = -.2581E-01 AT 9.700
RESPONSE NO 93:	STRUCTURE	1,	NODE 20 (ZZ)	, ABSOLUTE ACCELERATION, MAXIMUM = .1614E-03 AT 9.370
RESPONSE NO 94:	STRUCTURE	1,	NODE 21 ( X ) , TOP	, ABSOLUTE ACCELERATION, MAXIMUM = -.4015E+01 AT 9.690
RESPONSE NO 95:	STRUCTURE	1,	NODE 21 ( Y ) , TOP	, ABSOLUTE ACCELERATION, MAXIMUM = -.7423E+01 AT 7.960
RESPONSE NO 96:	STRUCTURE	1,	NODE 21 ( Z ) , TOP	, ABSOLUTE ACCELERATION, MAXIMUM = -.1099E+01 AT 5.410
RESPONSE NO 97:	STRUCTURE	1,	NODE 21 (XX) , TOP	, ABSOLUTE ACCELERATION, MAXIMUM = -.4015E-01 AT 7.810
RESPONSE NO 98:	STRUCTURE	1,	NODE 21 (YY) , TOP	, ABSOLUTE ACCELERATION, MAXIMUM = -.2612E-01 AT 9.700
RESPONSE NO 99:	STRUCTURE	1,	NODE 21 (ZZ) , TOP	, ABSOLUTE ACCELERATION, MAXIMUM = .1633E-03 AT 9.370
RESPONSE NO100:	STRUCTURE	1,	ELMT. 1 (1)	, FORCE OR STRESS, MAXIMUM = -.1172E+07 AT 5.290
RESPONSE NO101:	STRUCTURE	1,	ELMT. 1 (2)	, FORCE OR STRESS, MAXIMUM = .7606E+07 AT 8.110
RESPONSE NO102:	STRUCTURE	1,	ELMT. 1 (3)	, FORCE OR STRESS, MAXIMUM = .3829E+07 AT 3.460
RESPONSE NO103:	STRUCTURE	1,	ELMT. 1 (4)	, FORCE OR STRESS, MAXIMUM = -.1023E+07 AT 9.290
RESPONSE NO104:	STRUCTURE	1,	ELMT. 1 (5)	, FORCE OR STRESS, MAXIMUM = -.5745E+09 AT 9.680
RESPONSE NO105:	STRUCTURE	1,	ELMT. 1 (6)	, FORCE OR STRESS, MAXIMUM = .1182E+10 AT 8.100
RESPONSE NO106:	STRUCTURE	1,	ELMT. 2 (1)	, FORCE OR STRESS, MAXIMUM = -.1168E+07 AT 5.290
RESPONSE NO107:	STRUCTURE	1,	ELMT. 2 (2)	, FORCE OR STRESS, MAXIMUM = .7576E+07 AT 8.110
RESPONSE NO108:	STRUCTURE	1,	ELMT. 2 (3)	, FORCE OR STRESS, MAXIMUM = .3809E+07 AT 3.460
RESPONSE NO109:	STRUCTURE	1,	ELMT. 2 (4)	, FORCE OR STRESS, MAXIMUM = -.1016E+07 AT 9.290
RESPONSE NO110:	STRUCTURE	1,	ELMT. 2 (5)	, FORCE OR STRESS, MAXIMUM = -.5493E+09 AT 9.680
RESPONSE NO111:	STRUCTURE	1,	ELMT. 2 (6)	, FORCE OR STRESS, MAXIMUM = .1125E+10 AT 8.100
RESPONSE NO112:	STRUCTURE	1,	ELMT. 3 (1)	, FORCE OR STRESS, MAXIMUM = -.1155E+07 AT 5.290
RESPONSE NO113:	STRUCTURE	1,	ELMT. 3 (2)	, FORCE OR STRESS, MAXIMUM = .7464E+07 AT 8.110
RESPONSE NO114:	STRUCTURE	1,	ELMT. 3 (3)	, FORCE OR STRESS, MAXIMUM = .3739E+07 AT 3.460
RESPONSE NO115:	STRUCTURE	1,	ELMT. 3 (4)	, FORCE OR STRESS, MAXIMUM = -.9942E+06 AT 9.290
RESPONSE NO116:	STRUCTURE	1,	ELMT. 3 (5)	, FORCE OR STRESS, MAXIMUM = -.5025E+09 AT 9.690
RESPONSE NO117:	STRUCTURE	1,	ELMT. 3 (6)	, FORCE OR STRESS, MAXIMUM = .1019E+10 AT 8.100
RESPONSE NO118:	STRUCTURE	1,	ELMT. 4 (1)	, FORCE OR STRESS, MAXIMUM = -.1132E+07 AT 5.290
RESPONSE NO119:	STRUCTURE	1,	ELMT. 4 (2)	, FORCE OR STRESS, MAXIMUM = .7286E+07 AT 8.110
RESPONSE NO120:	STRUCTURE	1,	ELMT. 4 (3)	, FORCE OR STRESS, MAXIMUM = .3629E+07 AT 3.460
RESPONSE NO121:	STRUCTURE	1,	ELMT. 4 (4)	, FORCE OR STRESS, MAXIMUM = -.9584E+06 AT 9.290
RESPONSE NO122:	STRUCTURE	1,	ELMT. 4 (5)	, FORCE OR STRESS, MAXIMUM = -.4619E+09 AT 9.690
RESPONSE NO123:	STRUCTURE	1,	ELMT. 4 (6)	, FORCE OR STRESS, MAXIMUM = .9199E+09 AT 8.100
RESPONSE NO124:	STRUCTURE	1,	ELMT. 5 (1)	, FORCE OR STRESS, MAXIMUM = -.1090E+07 AT 5.290
RESPONSE NO125:	STRUCTURE	1,	ELMT. 5 (2)	, FORCE OR STRESS, MAXIMUM = .6968E+07 AT 8.110
RESPONSE NO126:	STRUCTURE	1,	ELMT. 5 (3)	, FORCE OR STRESS, MAXIMUM = .3434E+07 AT 3.460
RESPONSE NO127:	STRUCTURE	1,	ELMT. 5 (4)	, FORCE OR STRESS, MAXIMUM = .8946E+06 AT 9.370
RESPONSE NO128:	STRUCTURE	1,	ELMT. 5 (5)	, FORCE OR STRESS, MAXIMUM = -.4175E+09 AT 9.690

RESPONSE NO129:	STRUCTURE	1,	ELMT.	5 (6)	FORCE OR STRESS, MAXIMUM = .8147E+09 AT 8.100
RESPONSE NO130:	STRUCTURE	1,	ELMT.	6 (1)	FORCE OR STRESS, MAXIMUM = -.1017E+07 AT 5.290
RESPONSE NO131:	STRUCTURE	1,	ELMT.	6 (2)	FORCE OR STRESS, MAXIMUM = .6503E+07 AT 8.100
RESPONSE NO132:	STRUCTURE	1,	ELMT.	6 (3)	FORCE OR STRESS, MAXIMUM = .3172E+07 AT 3.470
RESPONSE NO133:	STRUCTURE	1,	ELMT.	6 (4)	FORCE OR STRESS, MAXIMUM = .8064E+06 AT 9.370
RESPONSE NO134:	STRUCTURE	1,	ELMT.	6 (5)	FORCE OR STRESS, MAXIMUM = -.3435E+09 AT 9.690
RESPONSE NO135:	STRUCTURE	1,	ELMT.	6 (6)	FORCE OR STRESS, MAXIMUM = -.6597E+09 AT 7.960
RESPONSE NO136:	STRUCTURE	1,	ELMT.	7 (1)	FORCE OR STRESS, MAXIMUM = -.9320E+06 AT 5.290
RESPONSE NO137:	STRUCTURE	1,	ELMT.	7 (2)	FORCE OR STRESS, MAXIMUM = .5992E+07 AT 8.100
RESPONSE NO138:	STRUCTURE	1,	ELMT.	7 (3)	FORCE OR STRESS, MAXIMUM = .2947E+07 AT 9.680
RESPONSE NO139:	STRUCTURE	1,	ELMT.	7 (4)	FORCE OR STRESS, MAXIMUM = .7134E+06 AT 9.370
RESPONSE NO140:	STRUCTURE	1,	ELMT.	7 (5)	FORCE OR STRESS, MAXIMUM = -.2793E+09 AT 9.690
RESPONSE NO141:	STRUCTURE	1,	ELMT.	7 (6)	FORCE OR STRESS, MAXIMUM = -.5300E+09 AT 7.960
RESPONSE NO142:	STRUCTURE	1,	ELMT.	8 (1)	FORCE OR STRESS, MAXIMUM = -.8311E+06 AT 5.290
RESPONSE NO143:	STRUCTURE	1,	ELMT.	8 (2)	FORCE OR STRESS, MAXIMUM = .5400E+07 AT 8.100
RESPONSE NO144:	STRUCTURE	1,	ELMT.	8 (3)	FORCE OR STRESS, MAXIMUM = .2688E+07 AT 9.680
RESPONSE NO145:	STRUCTURE	1,	ELMT.	8 (4)	FORCE OR STRESS, MAXIMUM = .6057E+06 AT 9.370
RESPONSE NO146:	STRUCTURE	1,	ELMT.	8 (5)	FORCE OR STRESS, MAXIMUM = -.2156E+09 AT 9.690
RESPONSE NO147:	STRUCTURE	1,	ELMT.	8 (6)	FORCE OR STRESS, MAXIMUM = -.4042E+09 AT 7.960
RESPONSE NO148:	STRUCTURE	1,	ELMT.	9 (1)	FORCE OR STRESS, MAXIMUM = -.7176E+06 AT 5.290
RESPONSE NO149:	STRUCTURE	1,	ELMT.	9 (2)	FORCE OR STRESS, MAXIMUM = .4714E+07 AT 8.100
RESPONSE NO150:	STRUCTURE	1,	ELMT.	9 (3)	FORCE OR STRESS, MAXIMUM = .2408E+07 AT 9.690
RESPONSE NO151:	STRUCTURE	1,	ELMT.	9 (4)	FORCE OR STRESS, MAXIMUM = .4975E+06 AT 9.370
RESPONSE NO152:	STRUCTURE	1,	ELMT.	9 (5)	FORCE OR STRESS, MAXIMUM = -.1549E+09 AT 9.690
RESPONSE NO153:	STRUCTURE	1,	ELMT.	9 (6)	FORCE OR STRESS, MAXIMUM = -.2872E+09 AT 7.960
RESPONSE NO154:	STRUCTURE	1,	ELMT.	10 (1)	FORCE OR STRESS, MAXIMUM = -.5940E+06 AT 5.300
RESPONSE NO155:	STRUCTURE	1,	ELMT.	10 (2)	FORCE OR STRESS, MAXIMUM = .3938E+07 AT 8.100
RESPONSE NO156:	STRUCTURE	1,	ELMT.	10 (3)	FORCE OR STRESS, MAXIMUM = .2067E+07 AT 9.690
RESPONSE NO157:	STRUCTURE	1,	ELMT.	10 (4)	FORCE OR STRESS, MAXIMUM = .3861E+06 AT 9.370
RESPONSE NO158:	STRUCTURE	1,	ELMT.	10 (5)	FORCE OR STRESS, MAXIMUM = -.9935E+08 AT 9.700
RESPONSE NO159:	STRUCTURE	1,	ELMT.	10 (6)	FORCE OR STRESS, MAXIMUM = -.1817E+09 AT 7.960
RESPONSE NO160:	STRUCTURE	1,	ELMT.	11 (1)	FORCE OR STRESS, MAXIMUM = -.4281E+06 AT 5.300
RESPONSE NO161:	STRUCTURE	1,	ELMT.	11 (2)	FORCE OR STRESS, MAXIMUM = .2866E+07 AT 7.820
RESPONSE NO162:	STRUCTURE	1,	ELMT.	11 (3)	FORCE OR STRESS, MAXIMUM = .1532E+07 AT 9.690
RESPONSE NO163:	STRUCTURE	1,	ELMT.	11 (4)	FORCE OR STRESS, MAXIMUM = .2504E+06 AT 9.370
RESPONSE NO164:	STRUCTURE	1,	ELMT.	11 (5)	FORCE OR STRESS, MAXIMUM = -.4947E+08 AT 9.700
RESPONSE NO165:	STRUCTURE	1,	ELMT.	11 (6)	FORCE OR STRESS, MAXIMUM = -.8709E+08 AT 7.960
RESPONSE NO166:	STRUCTURE	1,	ELMT.	12 (1)	FORCE OR STRESS, MAXIMUM = -.7969E+05 AT 5.410
RESPONSE NO167:	STRUCTURE	1,	ELMT.	12 (2)	FORCE OR STRESS, MAXIMUM = -.5444E+06 AT 7.960
RESPONSE NO168:	STRUCTURE	1,	ELMT.	12 (3)	FORCE OR STRESS, MAXIMUM = .2983E+06 AT 9.690
RESPONSE NO169:	STRUCTURE	1,	ELMT.	12 (4)	FORCE OR STRESS, MAXIMUM = .2150E+05 AT 9.370
RESPONSE NO170:	STRUCTURE	1,	ELMT.	12 (5)	FORCE OR STRESS, MAXIMUM = -.8676E+07 AT 9.700
RESPONSE NO171:	STRUCTURE	1,	ELMT.	12 (6)	FORCE OR STRESS, MAXIMUM = -.1568E+08 AT 7.960
RESPONSE NO172:	STRUCTURE	1,	ELMT.	13 (1)	FORCE OR STRESS, MAXIMUM = -.5038E-07 AT 6.030
RESPONSE NO173:	STRUCTURE	1,	ELMT.	13 (2)	FORCE OR STRESS, MAXIMUM = .5609E-08 AT 8.120
RESPONSE NO174:	STRUCTURE	1,	ELMT.	13 (3)	FORCE OR STRESS, MAXIMUM = -.1312E-07 AT 7.960
RESPONSE NO175:	STRUCTURE	1,	ELMT.	13 (4)	FORCE OR STRESS, MAXIMUM = -.4714E-05 AT 8.100
RESPONSE NO176:	STRUCTURE	1,	ELMT.	13 (5)	FORCE OR STRESS, MAXIMUM = .2418E-05 AT 6.130
RESPONSE NO177:	STRUCTURE	1,	ELMT.	13 (6)	FORCE OR STRESS, MAXIMUM = .1112E-05 AT 9.690
RESPONSE NO178:	STRUCTURE	1,	ELMT.	14 (1)	FORCE OR STRESS, MAXIMUM = .5326E-08 AT 8.120
RESPONSE NO179:	STRUCTURE	1,	ELMT.	14 (2)	FORCE OR STRESS, MAXIMUM = .3061E-08 AT 9.700
RESPONSE NO180:	STRUCTURE	1,	ELMT.	14 (3)	FORCE OR STRESS, MAXIMUM = .3141E-08 AT 6.030
RESPONSE NO181:	STRUCTURE	1,	ELMT.	14 (4)	FORCE OR STRESS, MAXIMUM = .3804E-06 AT 8.100
RESPONSE NO182:	STRUCTURE	1,	ELMT.	14 (5)	FORCE OR STRESS, MAXIMUM = .6743E-06 AT 8.100
RESPONSE NO183:	STRUCTURE	1,	ELMT.	14 (6)	FORCE OR STRESS, MAXIMUM = -.4271E-06 AT 8.100
RESPONSE NO184:	STRUCTURE	1,	ELMT.	15 (1)	FORCE OR STRESS, MAXIMUM = -.5029E-07 AT 8.110
RESPONSE NO185:	STRUCTURE	1,	ELMT.	15 (2)	FORCE OR STRESS, MAXIMUM = .1506E-07 AT 6.030
RESPONSE NO186:	STRUCTURE	1,	ELMT.	15 (3)	FORCE OR STRESS, MAXIMUM = -.1902E-07 AT 8.110
RESPONSE NO187:	STRUCTURE	1,	ELMT.	15 (4)	FORCE OR STRESS, MAXIMUM = .1731E-05 AT 7.960
RESPONSE NO188:	STRUCTURE	1,	ELMT.	15 (5)	FORCE OR STRESS, MAXIMUM = .7105E-06 AT 8.110
RESPONSE NO189:	STRUCTURE	1,	ELMT.	15 (6)	FORCE OR STRESS, MAXIMUM = .5136E-05 AT 8.100
RESPONSE NO190:	STRUCTURE	1,	ELMT.	16 (1)	FORCE OR STRESS, MAXIMUM = .6912E-07 AT 7.960
RESPONSE NO191:	STRUCTURE	1,	ELMT.	16 (2)	FORCE OR STRESS, MAXIMUM = .1228E-07 AT 5.110
RESPONSE NO192:	STRUCTURE	1,	ELMT.	16 (3)	FORCE OR STRESS, MAXIMUM = .1419E-07 AT 9.680

RESPONSE NO193:	STRUCTURE	1,	ELMT. 16	(4)	,	FORCE OR STRESS, MAXIMUM =	.1462E-05	AT	9.690
RESPONSE NO194:	STRUCTURE	1,	ELMT. 16	(5)	,	FORCE OR STRESS, MAXIMUM =	.1500E-05	AT	7.960
RESPONSE NO195:	STRUCTURE	1,	ELMT. 16	(6)	,	FORCE OR STRESS, MAXIMUM =	-.1737E-05	AT	6.030
RESPONSE NO196:	STRUCTURE	1,	ELMT. 17	(1)	,	FORCE OR STRESS, MAXIMUM =	-.3142E-09	AT	3.640
RESPONSE NO197:	STRUCTURE	1,	ELMT. 17	(2)	,	FORCE OR STRESS, MAXIMUM =	-.2842E-09	AT	6.030
RESPONSE NO198:	STRUCTURE	1,	ELMT. 17	(3)	,	FORCE OR STRESS, MAXIMUM =	-.1024E-09	AT	6.030
RESPONSE NO199:	STRUCTURE	1,	ELMT. 17	(4)	,	FORCE OR STRESS, MAXIMUM =	.1365E-07	AT	8.110
RESPONSE NO200:	STRUCTURE	1,	ELMT. 17	(5)	,	FORCE OR STRESS, MAXIMUM =	.1167E-06	AT	6.030
RESPONSE NO201:	STRUCTURE	1,	ELMT. 17	(6)	,	FORCE OR STRESS, MAXIMUM =	-.6139E-07	AT	8.100
RESPONSE NO202:	STRUCTURE	1,	ELMT. 18	(1)	,	FORCE OR STRESS, MAXIMUM =	-.1172E+07	AT	5.290
RESPONSE NO203:	STRUCTURE	1,	ELMT. 18	(2)	,	FORCE OR STRESS, MAXIMUM =	.7606E+07	AT	8.110
RESPONSE NO204:	STRUCTURE	1,	ELMT. 18	(3)	,	FORCE OR STRESS, MAXIMUM =	.3829E+07	AT	3.460
RESPONSE NO205:	STRUCTURE	1,	ELMT. 18	(4)	,	FORCE OR STRESS, MAXIMUM =	-.1023E+07	AT	9.290
RESPONSE NO206:	STRUCTURE	1,	ELMT. 18	(5)	,	FORCE OR STRESS, MAXIMUM =	-.5763E+09	AT	9.680
RESPONSE NO207:	STRUCTURE	1,	ELMT. 18	(6)	,	FORCE OR STRESS, MAXIMUM =	.1186E+10	AT	8.100
RESPONSE NO208:	STRUCTURE	1,	ELMT. 19	(1)	,	FORCE OR STRESS, MAXIMUM =	.1330E-07	AT	9.410
RESPONSE NO209:	STRUCTURE	1,	ELMT. 19	(2)	,	FORCE OR STRESS, MAXIMUM =	.8349E-09	AT	3.640
RESPONSE NO210:	STRUCTURE	1,	ELMT. 19	(3)	,	FORCE OR STRESS, MAXIMUM =	.1598E-08	AT	3.470
RESPONSE NO211:	STRUCTURE	1,	ELMT. 19	(4)	,	FORCE OR STRESS, MAXIMUM =	-.2271E-06	AT	8.110
RESPONSE NO212:	STRUCTURE	1,	ELMT. 19	(5)	,	FORCE OR STRESS, MAXIMUM =	.1198E-05	AT	8.110
RESPONSE NO213:	STRUCTURE	1,	ELMT. 19	(6)	,	FORCE OR STRESS, MAXIMUM =	.3373E-06	AT	7.960

TIME HISTORY NUMBER	SPECTRAL FREQUENCY VALUE	SPECTRAL DAMPING VALUE	PEAK/SPC RESPONSE VALUE	TYPE OF RESPONSE
1	0.	0.	.1330E+01	PEAK ACCEL
1	.4000E+01	.5000E-01	.3078E+01	SPEC ACCEL
1	.8000E+01	.5000E-01	.1909E+01	SPEC ACCEL
1	.1600E+02	.5000E-01	.1673E+01	SPEC ACCEL
2	0.	0.	.2369E+01	PEAK ACCEL
2	.4000E+01	.5000E-01	.5091E+01	SPEC ACCEL
2	.8000E+01	.5000E-01	.3485E+01	SPEC ACCEL
2	.1600E+02	.5000E-01	.3133E+01	SPEC ACCEL
3	0.	0.	.5464E+00	PEAK ACCEL
3	.4000E+01	.5000E-01	.1074E+01	SPEC ACCEL
3	.8000E+01	.5000E-01	.9744E+00	SPEC ACCEL
3	.1600E+02	.5000E-01	.6509E+00	SPEC ACCEL
4	0.	0.	.1081E+01	PEAK ACCEL
4	.4000E+01	.5000E-01	.2495E+01	SPEC ACCEL
4	.8000E+01	.5000E-01	.1879E+01	SPEC ACCEL
4	.1600E+02	.5000E-01	.1423E+01	SPEC ACCEL
5	0.	0.	.2268E+01	PEAK ACCEL
5	.4000E+01	.5000E-01	.5117E+01	SPEC ACCEL
5	.8000E+01	.5000E-01	.3839E+01	SPEC ACCEL
5	.1600E+02	.5000E-01	.2864E+01	SPEC ACCEL
6	0.	0.	.5581E+00	PEAK ACCEL
6	.4000E+01	.5000E-01	.1188E+01	SPEC ACCEL
6	.8000E+01	.5000E-01	.1992E+01	SPEC ACCEL
6	.1600E+02	.5000E-01	.7043E+00	SPEC ACCEL
7	0.	0.	.1509E-01	PEAK ACCEL
7	.4000E+01	.5000E-01	.5287E-01	SPEC ACCEL
7	.8000E+01	.5000E-01	.2171E-01	SPEC ACCEL
7	.1600E+02	.5000E-01	.1773E-01	SPEC ACCEL
8	0.	0.	.7198E-02	PEAK ACCEL
8	.4000E+01	.5000E-01	.3404E-01	SPEC ACCEL
8	.8000E+01	.5000E-01	.1191E-01	SPEC ACCEL
8	.1600E+02	.5000E-01	.8802E-02	SPEC ACCEL
9	0.	0.	.8948E-04	PEAK ACCEL
9	.4000E+01	.5000E-01	.9110E-04	SPEC ACCEL
9	.8000E+01	.5000E-01	.1761E-03	SPEC ACCEL
9	.1600E+02	.5000E-01	.1652E-03	SPEC ACCEL
10	0.	0.	.4160E+07	PEAK FORCE
11	0.	0.	.8153E+07	PEAK FORCE
12	0.	0.	.1439E+07	PEAK FORCE
13	0.	0.	.1267E+10	PEAK FORCE
14	0.	0.	.6163E+09	PEAK FORCE
15	0.	0.	.1150E+07	PEAK FORCE
16	0.	0.	.1081E+01	PEAK ACCEL
16	.4000E+01	.2000E-01	.3898E+01	SPEC ACCEL
17	0.	0.	.2267E+01	PEAK ACCEL
17	.4000E+01	.2000E-01	.7868E+01	SPEC ACCEL
18	0.	0.	.5579E+00	PEAK ACCEL
18	.4000E+01	.2000E-01	.1591E+01	SPEC ACCEL
19	0.	0.	.1509E-01	PEAK ACCEL
19	.4000E+01	.2000E-01	.7283E-01	SPEC ACCEL
20	0.	0.	.7198E-02	PEAK ACCEL
20	.4000E+01	.2000E-01	.3936E-01	SPEC ACCEL
21	0.	0.	.8948E-04	PEAK ACCEL
21	.4000E+01	.2000E-01	.1247E-03	SPEC ACCEL
22	0.	0.	.1084E+01	PEAK ACCEL
22	.4000E+01	.2000E-01	.3863E+01	SPEC ACCEL
23	0.	0.	.2270E+01	PEAK ACCEL
23	.4000E+01	.2000E-01	.7821E+01	SPEC ACCEL
24	0.	0.	.5588E+00	PEAK ACCEL
24	.4000E+01	.2000E-01	.1592E+01	SPEC ACCEL

25	0.	0	.1517E-01	PEAK ACCEL
25	.4000E+01	.2000E-01	.7329E-01	SPEC ACCEL
26	0.	0.	.7238E-02	PEAK ACCEL
26	.4000E+01	.2000E-01	.3961E-01	SPEC ACCEL
27	0.	0	.8962E-04	PEAK ACCEL
27	.4000E+01	.2000E-01	.1248E-03	SPEC ACCEL
28	0.	0.	.1137E+01	PEAK ACCEL
28	.4000E+01	.2000E-01	.3403E+01	SPEC ACCEL
29	0.	0.	.2326E+01	PEAK ACCEL
29	.4000E+01	.2000E-01	.7388E+01	SPEC ACCEL
30	0.	0.	.5722E+00	PEAK ACCEL
30	.4000E+01	.2000E-01	.1601E+01	SPEC ACCEL
31	0.	0.	.1627E-01	PEAK ACCEL
31	.4000E+01	.2000E-01	.8013E-01	SPEC ACCEL
32	.4000E+01	.2000E-01	.4331E-01	SPEC ACCEL
33	0.	0.	.9174E-04	PEAK ACCEL
33	.4000E+01	.5000E-01	.9364E-04	SPEC ACCEL
33	.8000E+01	.5000E-01	.1891E-03	SPEC ACCEL
33	.1600E+02	.5000E-01	.1654E-03	SPEC ACCEL
34	0.	0.	.1255E+01	PEAK ACCEL
34	.4000E+01	.2000E-01	.2963E+01	SPEC ACCEL
35	0.	0.	.2461E+01	PEAK ACCEL
35	.4000E+01	.2000E-01	.6658E+01	SPEC ACCEL
36	0.	0.	.6037E+00	PEAK ACCEL
36	.4000E+01	.2000E-01	.1624E+01	SPEC ACCEL
37	0.	0.	.1876E-01	PEAK ACCEL
37	.4000E+01	.2000E-01	.9517E-01	SPEC ACCEL
38	0.	0.	.9298E-02	PEAK ACCEL
38	.4000E+01	.2000E-01	.5147E-01	SPEC ACCEL
39	0.	0.	.9811E-04	PEAK ACCEL
39	.4000E+01	.2000E-01	.1343E-03	SPEC ACCEL
40	0.	0.	.1371E+01	PEAK ACCEL
40	.4000E+01	.2000E-01	.2655E+01	SPEC ACCEL
41	0.	0.	.2572E+01	PEAK ACCEL
41	.4000E+01	.2000E-01	.6174E+01	SPEC ACCEL
42	0.	0.	.6328E+00	PEAK ACCEL
42	.4000E+01	.2000E-01	.1645E+01	SPEC ACCEL
43	0.	0.	.2108E-01	PEAK ACCEL
43	.4000E+01	.2000E-01	.1079E+00	SPEC ACCEL
44	0.	0.	.1087E-01	PEAK ACCEL
44	.4000E+01	.2000E-01	.5837E-01	SPEC ACCEL
45	0.	0.	.1071E-03	PEAK ACCEL
45	.4000E+01	.2000E-01	.1403E-03	SPEC ACCEL
46	0.	0.	.1545E+01	PEAK ACCEL
46	.4000E+01	.2000E-01	.2775E+01	SPEC ACCEL
47	0.	0.	.2669E+01	PEAK ACCEL
47	.4000E+01	.2000E-01	.5988E+01	SPEC ACCEL
48	0.	0.	.6636E+00	PEAK ACCEL
48	.4000E+01	.2000E-01	.1667E+01	SPEC ACCEL
49	0.	0.	.2396E-01	PEAK ACCEL
49	.4000E+01	.2000E-01	.1206E+00	SPEC ACCEL
50	0.	0.	.1277E-01	PEAK ACCEL
50	.4000E+01	.2000E-01	.6533E-01	SPEC ACCEL
51	0.	0.	.1157E-03	PEAK ACCEL
51	.4000E+01	.2000E-01	.1465E-03	SPEC ACCEL
52	0.	0.	.1838E+01	PEAK ACCEL
52	.4000E+01	.2000E-01	.4964E+01	SPEC ACCEL
53	0.	0.	.3154E+01	PEAK ACCEL
53	.4000E+01	.2000E-01	.9806E+01	SPEC ACCEL
54	0.	0.	.7120E+00	PEAK ACCEL
54	.4000E+01	.2000E-01	.1702E+01	SPEC ACCEL
55	0.	0.	.2814E-01	PEAK ACCEL
55	.4000E+01	.2000E-01	.1383E+00	SPEC ACCEL
56	0	0	.1581E-01	PEAK ACCEL

56	.4000E+01	.2000E-01	.7497E-01	SPEC ACCEL
57	0.	0.	.1306E-03	PEAK ACCEL
57	.4000E+01	.2000E-01	.1559E-03	SPEC ACCEL
58	0.	0.	.2132E+01	PEAK ACCEL
58	.4000E+01	.2000E-01	.7141E+01	SPEC ACCEL
59	0.	0.	.3784E+01	PEAK ACCEL
59	.4000E+01	.2000E-01	.1408E+02	SPEC ACCEL
60	0.	0.	.7512E+00	PEAK ACCEL
60	.4000E+01	.2000E-01	.1731E+01	SPEC ACCEL
61	0.	0.	.3132E-01	PEAK ACCEL
61	.4000E+01	.2000E-01	.1506E+00	SPEC ACCEL
62	0.	0.	.1835E-01	PEAK ACCEL
62	.4000E+01	.2000E-01	.8176E-01	SPEC ACCEL
63	0.	0.	.1392E-03	PEAK ACCEL
63	.4000E+01	.2000E-01	.1630E-03	SPEC ACCEL
64	0.	0.	.2384E+01	PEAK ACCEL
64	.4000E+01	.2000E-01	.9352E+01	SPEC ACCEL
65	0.	0.	.4387E+01	PEAK ACCEL
65	.4000E+01	.2000E-01	.1861E+02	SPEC ACCEL
66	0.	0.	.7873E+00	PEAK ACCEL
66	.4000E+01	.2000E-01	.1757E+01	SPEC ACCEL
67	0.	0.	.3405E-01	PEAK ACCEL
67	.4000E+01	.2000E-01	.1605E+00	SPEC ACCEL
68	0.	0.	.2069E-01	PEAK ACCEL
68	.4000E+01	.2000E-01	.8724E-01	SPEC ACCEL
69	0.	0.	.1441E-03	PEAK ACCEL
69	.4000E+01	.2000E-01	.1695E-03	SPEC ACCEL
70	0.	0.	.2593E+01	PEAK ACCEL
70	.4000E+01	.2000E-01	.1175E+02	SPEC ACCEL
71	0.	0.	.4991E+01	PEAK ACCEL
71	.4000E+01	.2000E-01	.2320E+02	SPEC ACCEL
72	0.	0.	.8193E+00	PEAK ACCEL
72	.4000E+01	.2000E-01	.1780E+01	SPEC ACCEL
73	0.	0.	.3634E-01	PEAK ACCEL
73	.4000E+01	.2000E-01	.1679E+00	SPEC ACCEL
74	0.	0.	.2273E-01	PEAK ACCEL
74	.4000E+01	.2000E-01	.9135E-01	SPEC ACCEL
75	0.	0.	.1455E-03	PEAK ACCEL
75	.4000E+01	.2000E-01	.1755E-03	SPEC ACCEL
76	0.	0.	.2759E+01	PEAK ACCEL
76	.4000E+01	.2000E-01	.1420E+02	SPEC ACCEL
77	0.	0.	.5605E+01	PEAK ACCEL
77	.4000E+01	.2000E-01	.2777E+02	SPEC ACCEL
78	0.	0.	.8467E+00	PEAK ACCEL
78	.4000E+01	.2000E-01	.1800E+01	SPEC ACCEL
79	0.	0.	.3814E-01	PEAK ACCEL
79	.4000E+01	.2000E-01	.1729E+00	SPEC ACCEL
80	0.	0.	.2437E-01	PEAK ACCEL
80	.4000E+01	.2000E-01	.9409E-01	SPEC ACCEL
81	0.	0.	.1509E-03	PEAK ACCEL
81	.4000E+01	.2000E-01	.1804E-03	SPEC ACCEL
82	0.	0.	.3088E+01	PEAK ACCEL
82	.4000E+01	.2000E-01	.1660E+02	SPEC ACCEL
83	0.	0.	.6178E+01	PEAK ACCEL
83	.4000E+01	.2000E-01	.3225E+02	SPEC ACCEL
84	0.	0.	.8695E+00	PEAK ACCEL
84	.4000E+01	.2000E-01	.1816E+01	SPEC ACCEL
85	0.	0.	.3948E-01	PEAK ACCEL
85	.4000E+01	.2000E-01	.1756E+00	SPEC ACCEL
86	0.	0.	.2555E-01	PEAK ACCEL
86	.4000E+01	.2000E-01	.9565E-01	SPEC ACCEL
87	0.	0.	.1596E-03	PEAK ACCEL
87	.4000E+01	.2000E-01	.1844E-03	SPEC ACCEL
88	0.	0.	.3448E+01	PEAK ACCEL

88	.4000E+01	.2000E-01	.1813E+02	SPEC ACCEL
89	0.	0.	.6546E+01	PEAK ACCEL
89	.4000E+01	.2000E-01	.3509E+02	SPEC ACCEL
90	0.	0.	.8748E+00	PEAK ACCEL
90	.4000E+01	.2000E-01	.1820E+01	SPEC ACCEL
91	0.	0.	.3980E-01	PEAK ACCEL
91	.4000E+01	.2000E-01	.1760E+00	SPEC ACCEL
92	0.	0.	.2581E-01	PEAK ACCEL
92	.4000E+01	.2000E-01	.9589E-01	SPEC ACCEL
93	0.	0.	.1614E-03	PEAK ACCEL
93	.4000E+01	.2000E-01	.1852E-03	SPEC ACCEL
94	0.	0.	.4015E+01	PEAK ACCEL
94	.4000E+01	.2000E-01	.2042E+02	SPEC ACCEL
95	0.	0.	.7423E+01	PEAK ACCEL
95	.4000E+01	.2000E-01	.3935E+02	SPEC ACCEL
96	0.	0.	.1099E+01	PEAK ACCEL
96	.4000E+01	.2000E-01	.1921E+01	SPEC ACCEL
97	0.	0.	.4015E-01	PEAK ACCEL
97	.4000E+01	.2000E-01	.1768E+00	SPEC ACCEL
98	0.	0.	.2612E-01	PEAK ACCEL
98	.4000E+01	.2000E-01	.9632E-01	SPEC ACCEL
99	0.	0.	.1633E-03	PEAK ACCEL
99	.4000E+01	.2000E-01	.1859E-03	SPEC ACCEL
100	0.	0.	.1172E+07	PEAK FORCE
101	0.	0.	.7606E+07	PEAK FORCE
102	0.	0.	.3829E+07	PEAK FORCE
103	0.	0.	.1023E+07	PEAK FORCE
104	0.	0.	.5745E+09	PEAK FORCE
105	0.	0.	.1182E+10	PEAK FORCE
106	0.	0.	.1168E+07	PEAK FORCE
107	0.	0.	.7576E+07	PEAK FORCE
108	0.	0.	.3809E+07	PEAK FORCE
109	0.	0.	.1016E+07	PEAK FORCE
110	0.	0.	.5493E+09	PEAK FORCE
111	0.	0.	.1125E+10	PEAK FORCE
112	0.	0.	.1155E+07	PEAK FORCE
113	0.	0.	.7464E+07	PEAK FORCE
114	0.	0.	.3739E+07	PEAK FORCE
115	0.	0.	.9942E+06	PEAK FORCE
116	0.	0.	.5025E+09	PEAK FORCE
117	0.	0.	.1019E+10	PEAK FORCE
118	0.	0.	.1132E+07	PEAK FORCE
119	0.	0.	.7286E+07	PEAK FORCE
120	0.	0.	.3629E+07	PEAK FORCE
121	0.	0.	.9584E+06	PEAK FORCE
122	0.	0.	.4619E+09	PEAK FORCE
123	0.	0.	.9199E+09	PEAK FORCE
124	0.	0.	.1090E+07	PEAK FORCE
125	0.	0.	.6968E+07	PEAK FORCE
126	0.	0.	.3434E+07	PEAK FORCE
127	0.	0.	.8946E+06	PEAK FORCE
128	0.	0.	.4175E+09	PEAK FORCE
129	0.	0.	.8147E+09	PEAK FORCE
130	0.	0.	.1017E+07	PEAK FORCE
131	0.	0.	.6503E+07	PEAK FORCE
132	0.	0.	.3172E+07	PEAK FORCE
133	0.	0.	.8064E+06	PEAK FORCE
134	0.	0.	.3435E+09	PEAK FORCE
135	0.	0.	.6597E+09	PEAK FORCE
136	0.	0.	.9320E+06	PEAK FORCE
137	0.	0.	.5992E+07	PEAK FORCE
138	0.	0.	.2947E+07	PEAK FORCE
139	0.	0.	.7134E+06	PEAK FORCE
140	0.	0.	.2793E+09	PEAK FORCE

141	0.	0.	.5300E+09	PEAK FORCE
142	0.	0.	.8311E+06	PEAK FORCE
143	0.	0.	.5400E+07	PEAK FORCE
144	0.	0.	.2688E+07	PEAK FORCE
145	0.	0.	.6057E+06	PEAK FORCE
146	0.	0.	.2156E+09	PEAK FORCE
147	0.	0.	.4042E+09	PEAK FORCE
148	0.	0.	.7176E+06	PEAK FORCE
149	0.	0.	.4714E+07	PEAK FORCE
150	0.	0.	.2408E+07	PEAK FORCE
151	0.	0.	.4975E+06	PEAK FORCE
152	0.	0.	.1549E+09	PEAK FORCE
153	0.	0.	.2872E+09	PEAK FORCE
154	0.	0.	.5940E+06	PEAK FORCE
155	0.	0.	.3938E+07	PEAK FORCE
156	0.	0.	.2067E+07	PEAK FORCE
157	0.	0.	.3861E+06	PEAK FORCE
158	0.	0.	.9935E+08	PEAK FORCE
159	0.	0.	.1817E+09	PEAK FORCE
160	0.	0.	.4281E+06	PEAK FORCE
161	0.	0.	.2866E+07	PEAK FORCE
162	0.	0.	.1532E+07	PEAK FORCE
163	0.	0.	.2504E+06	PEAK FORCE
164	0.	0.	.4947E+08	PEAK FORCE
165	0.	0.	.8709E+08	PEAK FORCE
166	0.	0.	.7969E+05	PEAK FORCE
167	0.	0.	.5444E+06	PEAK FORCE
168	0.	0.	.2983E+06	PEAK FORCE
169	0.	0.	.2150E+05	PEAK FORCE
170	0.	0.	.8676E+07	PEAK FORCE
171	0.	0.	.1568E+08	PEAK FORCE
172	0.	0.	.5038E-07	PEAK FORCE
173	0.	0.	.5609E-08	PEAK FORCE
174	0.	0.	.1312E-07	PEAK FORCE
175	0.	0.	.4714E-05	PEAK FORCE
176	0.	0.	.2418E-05	PEAK FORCE
177	0.	0.	.1112E-05	PEAK FORCE
178	0.	0.	.5326E-08	PEAK FORCE
179	0.	0.	.3061E-08	PEAK FORCE
180	0.	0.	.3141E-08	PEAK FORCE
181	0.	0.	.3804E-06	PEAK FORCE
182	0.	0.	.6743E-06	PEAK FORCE
183	0.	0.	.4271E-06	PEAK FORCE
184	0.	0.	.5029E-07	PEAK FORCE
185	0.	0.	.1506E-07	PEAK FORCE
186	0.	0.	.1902E-07	PEAK FORCE
187	0.	0.	.1731E-05	PEAK FORCE
188	0.	0.	.7105E-06	PEAK FORCE
189	0.	0.	.5136E-05	PEAK FORCE
190	0.	0.	.6912E-07	PEAK FORCE
191	0.	0.	.1228E-07	PEAK FORCE
192	0.	0.	.1419E-07	PEAK FORCE
193	0.	0.	.1462E-05	PEAK FORCE
194	0.	0.	.1500E-05	PEAK FORCE
195	0.	0.	.1737E-05	PEAK FORCE
196	0.	0.	.3142E-09	PEAK FORCE
197	0.	0.	.2842E-09	PEAK FORCE
198	0.	0.	.1024E-09	PEAK FORCE
199	0.	0.	.1365E-07	PEAK FORCE
200	0.	0.	.1167E-06	PEAK FORCE
201	0.	0.	.6139E-07	PEAK FORCE
202	0.	0.	.1172E+07	PEAK FORCE
203	0.	0.	.7606E+07	PEAK FORCE
204	0.	0.	.3829E+07	PEAK FORCE

205	0.	0.	.1023E+07	PEAK FORCE
206	0.	0.	.5763E+09	PEAK FORCE
207	0.	0.	.1186E+10	PEAK FORCE
208	0.	0.	.1330E-07	PEAK FORCE
209	0.	0.	.8349E-09	PEAK FORCE
210	0.	0.	.1598E-08	PEAK FORCE
211	0.	0.	.2271E-06	PEAK FORCE
212	0.	0.	.1198E-05	PEAK FORCE
213	0.	0.	.3373E-06	PEAK FORCE

NUMBER OF ATTRIBUTES = 4  
NUMBER OF RESPONSE VECTOR QUANTITIES = 325

REORDERING BY RESPONSE COMPONENT IS COMPLETE  
AND INVERSE FAST FOURIER TRANSFORMS HAVE BEEN COMPUTED

TOTAL TIME = 43.652, CPU = 20.628, I/O = 32.200, SYS = .081

EARTHQUAKE PROBLEM NUMBER 30

IMPEDANCE AND SCATTERING MATRIX SET 1

IMPEDANCE FUNCTIONS WILL BE MODIFIED FOR VARIATIONS IN SOIL PROPERTIES LISTED BELOW:

REFERENCE SHEAR MODULUS WILL BE MULTIPLIED BY 1.07961  
 REFERENCE DAMPING RATIO WILL BE MULTIPLIED BY 1.10715

STRUCTURAL PROPERTY SET 1

THE FREQUENCIES FOR STRUCTURE 1 HAVE BEEN MULTIPLIED BY THE FOLLOWING FACTORS:

.64288 .64288 .64288 .64288 .64288 .64288 .64288 .64288 .64288 .64288  
 .64288 .64288 .64288

THE DAMPING RATIOS FOR STRUCTURE 1 HAVE BEEN MULTIPLIED BY THE FOLLOWING FACTORS:

.56665 .56665 .56665 .56665 .56665 .56665 .56665 .56665 .56665 .56665  
 .56665 .56665 .56665

PARAMETERS FOR REAL TIME ANALYSIS:

TIME STEP SIZE (DT) = .100E-01  
 SCALE FACTOR FOR TIME HISTORIES (SCALE) = .733E+01  
 NUMBER OF DATA POINTS IN EACH TIME HISTORY (NPOINT) = 2048  
 NUMBER OF POINTS IN FAST FOURIER TRANSFORMS (NFFT) = 2048  
 MINIMUM FREQUENCY (HZ) IN FOURIER ANALYSIS (FMIN) = .628E-01  
 MAXIMUM FREQUENCY (HZ) IN FOURIER ANALYSIS (FMAX) = .207E+03

IDENTIFICATION OF INPUT MOTION FOR EARTHQUAKE PROBLEM 30

CORR=1. NO=30 COMP= 1 SHAPE= 2 G= .344 R= 500 M= 7.63 GENERATED 11:33:28 12/13/80  
 MAXIMUM VALUE OF SCALED INPUT MOTION = .253E+01 OCCURRING AT 11.72

CORR=1. NO=30 COMP= 2 SHAPE= 2 G= .403 R= 500 M= 7.63 GENERATED 11:33:56 12/13/80  
 MAXIMUM VALUE OF SCALED INPUT MOTION = .296E+01 OCCURRING AT 13.43

CORR=1. NO=30 COMP= 3 SHAPE= 2 G= .099 R= 500 M= 7.63 GENERATED 11:34:31 12/13/80  
 MAXIMUM VALUE OF SCALED INPUT MOTION = .730E+00 OCCURRING AT 13.40

INPUT MOTIONS HAVE BEEN WRITTEN TO DATA FILE

PROCESSING OF INPUT MOTIONS IS COMPLETE

TOTAL TIME = 155.776, CPU = 573.775, I/O = 1081.315, SYS = 1.190

## IDENTIFICATION OF IMPEDANCE FUNCTION DATA:

CLAF RUN 6; RERUN PROB 2 W/ CL = 78.5 &amp; REFINED GRN FNS TO 36 HZ GENERATED 01/28/82 15:33:33

MINIMUM FREQUENCY OF IMPEDANCE TABLES = 0.0000  
MAXIMUM FREQUENCY OF IMPEDANCE TABLES = 37.3930

PROGRAM WILL READ IMPEDANCES FOR A0= 0.  
PROGRAM WILL READ IMPEDANCES FOR A0= .400E-01  
PROGRAM WILL READ IMPEDANCES FOR A0= .900E-01  
PROGRAM WILL READ IMPEDANCES FOR A0= .180E+00  
PROGRAM WILL READ IMPEDANCES FOR A0= .270E+00  
PROGRAM WILL READ IMPEDANCES FOR A0= .350E+00  
PROGRAM WILL READ IMPEDANCES FOR A0= .530E+00  
PROGRAM WILL READ IMPEDANCES FOR A0= .710E+00  
PROGRAM WILL READ IMPEDANCES FOR A0= .890E+00  
PROGRAM WILL READ IMPEDANCES FOR A0= .106E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .124E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .142E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .160E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .177E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .195E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .213E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .248E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .284E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .319E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .355E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .426E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .497E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .568E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .639E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .710E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .781E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .852E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .958E+01  
PROGRAM WILL READ IMPEDANCES FOR A0= .107E+02  
PROGRAM WILL READ IMPEDANCES FOR A0= .117E+02

RESPONSE COMPUTATION FREQUENCY-BY-FREQUENCY IS COMPLETE

TOTAL TIME = 161.511, CPU = 578.666, I/O = 1083.993, SYS = 1.195

RESPONSES WILL BE PROCESSED PROBLEM-BY-PROBLEM IN 10 BLOCKS OF 21 RESPONSE COMPONENTS EACH

## SUMMARY OF PEAK RESPONSES FOR EARTHQUAKE PROBLEM 30

RESPONSE NO 4:	FOUNDATION	1,	X-TRANSLATION	,	ABSOLUTE ACCELERATION, MAXIMUM	= -.2850E+01 AT 11.720
RESPONSE NO 5:	FOUNDATION	1,	Y-TRANSLATION	,	ABSOLUTE ACCELERATION, MAXIMUM	= -.3330E+01 AT 7.520
RESPONSE NO 6:	FOUNDATION	1,	Z-TRANSLATION	,	ABSOLUTE ACCELERATION, MAXIMUM	= .6570E+00 AT 13.410
RESPONSE NO 7:	FOUNDATION	1,	XX-ROTATION	,	ABSOLUTE ACCELERATION, MAXIMUM	= -.2080E-01 AT 10.850
RESPONSE NO 8:	FOUNDATION	1,	YY-ROTATION	,	ABSOLUTE ACCELERATION, MAXIMUM	= .1110E-01 AT 10.990
RESPONSE NO 9:	FOUNDATION	1,	ZZ-ROTATION	,	ABSOLUTE ACCELERATION, MAXIMUM	= .7275E-04 AT 13.390
RESPONSE NO 10:	STRUCTURE	1,	BASE SHEAR FORCE X-DIR,	FORCE	, MAXIMUM	= .1208E+08 AT 15.560
RESPONSE NO 11:	STRUCTURE	1,	BASE SHEAR FORCE Y-DIR,	FORCE	, MAXIMUM	= -.2050E+08 AT 11.500
RESPONSE NO 12:	STRUCTURE	1,	VERTICAL FORCE Z-DIR,	FORCE	, MAXIMUM	= -.1519E+07 AT 8.960
RESPONSE NO 13:	STRUCTURE	1,	O. T. MOMENT XX-AXIS,	FORCE	, MAXIMUM	= .3197E+10 AT 11.500
RESPONSE NO 14:	STRUCTURE	1,	O. T. MOMENT YY-AXIS,	FORCE	, MAXIMUM	= .1841E+10 AT 15.560
RESPONSE NO 15:	STRUCTURE	1,	TORSIONAL MOMENT ZZ-AXIS,	FORCE	, MAXIMUM	= -.1439E+07 AT 13.260
RESPONSE NO 16:	STRUCTURE	1,	NODE 8 ( X ), FIXED BASE,	ABSOLUTE ACCELERATION, MAXIMUM	= -.2854E+01 AT 11.720	
RESPONSE NO 17:	STRUCTURE	1,	NODE 8 ( Y ), FIXED BASE,	ABSOLUTE ACCELERATION, MAXIMUM	= -.3327E+01 AT 7.520	
RESPONSE NO 18:	STRUCTURE	1,	NODE 8 ( Z ), FIXED BASE,	ABSOLUTE ACCELERATION, MAXIMUM	= .6568E+00 AT 13.410	
RESPONSE NO 19:	STRUCTURE	1,	NODE 8 (XX), FIXED BASE,	ABSOLUTE ACCELERATION, MAXIMUM	= -.2080E-01 AT 10.850	
RESPONSE NO 20:	STRUCTURE	1,	NODE 8 (YY), FIXED BASE,	ABSOLUTE ACCELERATION, MAXIMUM	= .1110E-01 AT 10.990	
RESPONSE NO 21:	STRUCTURE	1,	NODE 8 (ZZ), FIXED BASE,	ABSOLUTE ACCELERATION, MAXIMUM	= .7275E-04 AT 13.390	
RESPONSE NO 22:	STRUCTURE	1,	NODE 9 ( X )	, ABSOLUTE ACCELERATION, MAXIMUM	= -.2857E+01 AT 11.720	
RESPONSE NO 23:	STRUCTURE	1,	NODE 9 ( Y )	, ABSOLUTE ACCELERATION, MAXIMUM	= -.3335E+01 AT 7.520	
RESPONSE NO 24:	STRUCTURE	1,	NODE 9 ( Z )	, ABSOLUTE ACCELERATION, MAXIMUM	= .6566E+00 AT 13.410	
RESPONSE NO 25:	STRUCTURE	1,	NODE 9 (XX)	, ABSOLUTE ACCELERATION, MAXIMUM	= -.2102E-01 AT 10.850	
RESPONSE NO 26:	STRUCTURE	1,	NODE 9 (YY)	, ABSOLUTE ACCELERATION, MAXIMUM	= .1120E-01 AT 10.990	
RESPONSE NO 27:	STRUCTURE	1,	NODE 9 (ZZ)	, ABSOLUTE ACCELERATION, MAXIMUM	= .7296E-04 AT 13.390	
RESPONSE NO 28:	STRUCTURE	1,	NODE 10 ( X )	, ABSOLUTE ACCELERATION, MAXIMUM	= -.2943E+01 AT 16.230	
RESPONSE NO 29:	STRUCTURE	1,	NODE 10 ( Y )	, ABSOLUTE ACCELERATION, MAXIMUM	= -.3534E+01 AT 7.480	
RESPONSE NO 30:	STRUCTURE	1,	NODE 10 ( Z )	, ABSOLUTE ACCELERATION, MAXIMUM	= .6523E+00 AT 13.410	
RESPONSE NO 31:	STRUCTURE	1,	NODE 10 (XX)	, ABSOLUTE ACCELERATION, MAXIMUM	= -.2420E-01 AT 10.850	
RESPONSE NO 32:	STRUCTURE	1,	NODE 10 (YY)	, ABSOLUTE ACCELERATION, MAXIMUM	= .1275E-01 AT 10.990	
RESPONSE NO 33:	STRUCTURE	1,	NODE 10 (ZZ)	, ABSOLUTE ACCELERATION, MAXIMUM	= .7606E-04 AT 13.390	
RESPONSE NO 34:	STRUCTURE	1,	NODE 11 ( X )	, ABSOLUTE ACCELERATION, MAXIMUM	= -.3280E+01 AT 16.230	
RESPONSE NO 35:	STRUCTURE	1,	NODE 11 ( Y )	, ABSOLUTE ACCELERATION, MAXIMUM	= -.4181E+01 AT 7.490	
RESPONSE NO 36:	STRUCTURE	1,	NODE 11 ( Z )	, ABSOLUTE ACCELERATION, MAXIMUM	= -.6622E+00 AT 8.950	
RESPONSE NO 37:	STRUCTURE	1,	NODE 11 (XX)	, ABSOLUTE ACCELERATION, MAXIMUM	= -.3122E-01 AT 10.850	
RESPONSE NO 38:	STRUCTURE	1,	NODE 11 (YY)	, ABSOLUTE ACCELERATION, MAXIMUM	= .1617E-01 AT 10.990	
RESPONSE NO 39:	STRUCTURE	1,	NODE 11 (ZZ)	, ABSOLUTE ACCELERATION, MAXIMUM	= -.8748E-04 AT 13.030	
RESPONSE NO 40:	STRUCTURE	1,	NODE 12 ( X )	, ABSOLUTE ACCELERATION, MAXIMUM	= -.3672E+01 AT 16.210	
RESPONSE NO 41:	STRUCTURE	1,	NODE 12 ( Y )	, ABSOLUTE ACCELERATION, MAXIMUM	= -.4851E+01 AT 7.490	
RESPONSE NO 42:	STRUCTURE	1,	NODE 12 ( Z )	, ABSOLUTE ACCELERATION, MAXIMUM	= -.6880E+00 AT 8.960	
RESPONSE NO 43:	STRUCTURE	1,	NODE 12 (XX)	, ABSOLUTE ACCELERATION, MAXIMUM	= -.3719E-01 AT 10.850	
RESPONSE NO 44:	STRUCTURE	1,	NODE 12 (YY)	, ABSOLUTE ACCELERATION, MAXIMUM	= .1908E-01 AT 10.990	
RESPONSE NO 45:	STRUCTURE	1,	NODE 12 (ZZ)	, ABSOLUTE ACCELERATION, MAXIMUM	= .9974E-04 AT 13.150	
RESPONSE NO 46:	STRUCTURE	1,	NODE 13 ( X )	, ABSOLUTE ACCELERATION, MAXIMUM	= -.4142E+01 AT 16.210	
RESPONSE NO 47:	STRUCTURE	1,	NODE 13 ( Y )	, ABSOLUTE ACCELERATION, MAXIMUM	= -.5611E+01 AT 11.490	
RESPONSE NO 48:	STRUCTURE	1,	NODE 13 ( Z )	, ABSOLUTE ACCELERATION, MAXIMUM	= -.7198E+00 AT 8.960	
RESPONSE NO 49:	STRUCTURE	1,	NODE 13 (XX)	, ABSOLUTE ACCELERATION, MAXIMUM	= -.4324E-01 AT 10.850	
RESPONSE NO 50:	STRUCTURE	1,	NODE 13 (YY)	, ABSOLUTE ACCELERATION, MAXIMUM	= .2213E-01 AT 10.980	
RESPONSE NO 51:	STRUCTURE	1,	NODE 13 (ZZ)	, ABSOLUTE ACCELERATION, MAXIMUM	= .1149E-03 AT 13.150	
RESPONSE NO 52:	STRUCTURE	1,	NODE 14 ( X )	, ABSOLUTE ACCELERATION, MAXIMUM	= -.4905E+01 AT 16.210	
RESPONSE NO 53:	STRUCTURE	1,	NODE 14 ( Y )	, ABSOLUTE ACCELERATION, MAXIMUM	= -.7463E+01 AT 11.490	
RESPONSE NO 54:	STRUCTURE	1,	NODE 14 ( Z )	, ABSOLUTE ACCELERATION, MAXIMUM	= -.7694E+00 AT 8.960	
RESPONSE NO 55:	STRUCTURE	1,	NODE 14 (XX)	, ABSOLUTE ACCELERATION, MAXIMUM	= -.5169E-01 AT 10.850	
RESPONSE NO 56:	STRUCTURE	1,	NODE 14 (YY)	, ABSOLUTE ACCELERATION, MAXIMUM	= .2669E-01 AT 10.980	
RESPONSE NO 57:	STRUCTURE	1,	NODE 14 (ZZ)	, ABSOLUTE ACCELERATION, MAXIMUM	= .1384E-03 AT 13.150	
RESPONSE NO 58:	STRUCTURE	1,	NODE 15 ( X )	, ABSOLUTE ACCELERATION, MAXIMUM	= -.5518E+01 AT 16.210	
RESPONSE NO 59:	STRUCTURE	1,	NODE 15 ( Y )	, ABSOLUTE ACCELERATION, MAXIMUM	= -.9138E+01 AT 11.490	
RESPONSE NO 60:	STRUCTURE	1,	NODE 15 ( Z )	, ABSOLUTE ACCELERATION, MAXIMUM	= -.8092E+00 AT 8.960	
RESPONSE NO 61:	STRUCTURE	1,	NODE 15 (XX)	, ABSOLUTE ACCELERATION, MAXIMUM	= -.5776E-01 AT 10.850	
RESPONSE NO 62:	STRUCTURE	1,	NODE 15 (YY)	, ABSOLUTE ACCELERATION, MAXIMUM	= .3016E-01 AT 10.980	
RESPONSE NO 63:	STRUCTURE	1,	NODE 15 (ZZ)	, ABSOLUTE ACCELERATION, MAXIMUM	= -.1580E-03 AT 13.260	
RESPONSE NO 64:	STRUCTURE	1,	NODE 16 ( X )	, ABSOLUTE ACCELERATION, MAXIMUM	= .6257E+01 AT 15.570	

RESPONSE NO 65:	STRUCTURE	1,	NODE 16 ( Y )	, ABSOLUTE ACCELERATION, MAXIMUM = -.1080E+02 AT 11.490
RESPONSE NO 66:	STRUCTURE	1,	NODE 16 ( Z )	, ABSOLUTE ACCELERATION, MAXIMUM = -.8451E+00 AT 8.960
RESPONSE NO 67:	STRUCTURE	1,	NODE 16 (XX)	, ABSOLUTE ACCELERATION, MAXIMUM = -.6272E-01 AT 10.850
RESPONSE NO 68:	STRUCTURE	1,	NODE 16 (YY)	, ABSOLUTE ACCELERATION, MAXIMUM = .3316E-01 AT 10.980
RESPONSE NO 69:	STRUCTURE	1,	NODE 16 (ZZ)	, ABSOLUTE ACCELERATION, MAXIMUM = -.1760E-03 AT 13.260
RESPONSE NO 70:	STRUCTURE	1,	NODE 17 ( X )	, ABSOLUTE ACCELERATION, MAXIMUM = .7169E+01 AT 15.570
RESPONSE NO 71:	STRUCTURE	1,	NODE 17 ( Y )	, ABSOLUTE ACCELERATION, MAXIMUM = -.1244E+02 AT 11.500
RESPONSE NO 72:	STRUCTURE	1,	NODE 17 ( Z )	, ABSOLUTE ACCELERATION, MAXIMUM = .8835E+00 AT 11.200
RESPONSE NO 73:	STRUCTURE	1,	NODE 17 (XX)	, ABSOLUTE ACCELERATION, MAXIMUM = -.6653E-01 AT 10.850
RESPONSE NO 74:	STRUCTURE	1,	NODE 17 (YY)	, ABSOLUTE ACCELERATION, MAXIMUM = .3562E-01 AT 10.980
RESPONSE NO 75:	STRUCTURE	1,	NODE 17 (ZZ)	, ABSOLUTE ACCELERATION, MAXIMUM = -.1909E-03 AT 13.260
RESPONSE NO 76:	STRUCTURE	1,	NODE 18 ( X )	, ABSOLUTE ACCELERATION, MAXIMUM = .8077E+01 AT 15.570
RESPONSE NO 77:	STRUCTURE	1,	NODE 18 ( Y )	, ABSOLUTE ACCELERATION, MAXIMUM = -.1408E+02 AT 11.500
RESPONSE NO 78:	STRUCTURE	1,	NODE 18 ( Z )	, ABSOLUTE ACCELERATION, MAXIMUM = .9159E+00 AT 11.200
RESPONSE NO 79:	STRUCTURE	1,	NODE 18 (XX)	, ABSOLUTE ACCELERATION, MAXIMUM = -.6913E-01 AT 10.850
RESPONSE NO 80:	STRUCTURE	1,	NODE 18 (YY)	, ABSOLUTE ACCELERATION, MAXIMUM = .3741E-01 AT 10.980
RESPONSE NO 81:	STRUCTURE	1,	NODE 18 (ZZ)	, ABSOLUTE ACCELERATION, MAXIMUM = -.2035E-03 AT 13.260
RESPONSE NO 82:	STRUCTURE	1,	NODE 19 ( X )	, ABSOLUTE ACCELERATION, MAXIMUM = .8981E+01 AT 15.560
RESPONSE NO 83:	STRUCTURE	1,	NODE 19 ( Y )	, ABSOLUTE ACCELERATION, MAXIMUM = -.1568E+02 AT 11.500
RESPONSE NO 84:	STRUCTURE	1,	NODE 19 ( Z )	, ABSOLUTE ACCELERATION, MAXIMUM = .9417E+00 AT 11.200
RESPONSE NO 85:	STRUCTURE	1,	NODE 19 (XX)	, ABSOLUTE ACCELERATION, MAXIMUM = -.7064E-01 AT 10.850
RESPONSE NO 86:	STRUCTURE	1,	NODE 19 (YY)	, ABSOLUTE ACCELERATION, MAXIMUM = .3855E-01 AT 10.980
RESPONSE NO 87:	STRUCTURE	1,	NODE 19 (ZZ)	, ABSOLUTE ACCELERATION, MAXIMUM = -.2139E-03 AT 13.260
RESPONSE NO 88:	STRUCTURE	1,	NODE 20 ( X )	, ABSOLUTE ACCELERATION, MAXIMUM = .9537E+01 AT 15.560
RESPONSE NO 89:	STRUCTURE	1,	NODE 20 ( Y )	, ABSOLUTE ACCELERATION, MAXIMUM = -.1665E+02 AT 11.500
RESPONSE NO 90:	STRUCTURE	1,	NODE 20 ( Z )	, ABSOLUTE ACCELERATION, MAXIMUM = .9470E+00 AT 11.200
RESPONSE NO 91:	STRUCTURE	1,	NODE 20 (XX)	, ABSOLUTE ACCELERATION, MAXIMUM = -.7088E-01 AT 10.850
RESPONSE NO 92:	STRUCTURE	1,	NODE 20 (YY)	, ABSOLUTE ACCELERATION, MAXIMUM = .3876E-01 AT 10.980
RESPONSE NO 93:	STRUCTURE	1,	NODE 20 (ZZ)	, ABSOLUTE ACCELERATION, MAXIMUM = -.2159E-03 AT 13.260
RESPONSE NO 94:	STRUCTURE	1,	NODE 21 ( X ) , TOP	, ABSOLUTE ACCELERATION, MAXIMUM = .1036E+02 AT 15.560
RESPONSE NO 95:	STRUCTURE	1,	NODE 21 ( Y ) , TOP	, ABSOLUTE ACCELERATION, MAXIMUM = -.1813E+02 AT 11.510
RESPONSE NO 96:	STRUCTURE	1,	NODE 21 ( Z ) , TOP	, ABSOLUTE ACCELERATION, MAXIMUM = .1400E+01 AT 5.230
RESPONSE NO 97:	STRUCTURE	1,	NODE 21 (XX) , TOP	, ABSOLUTE ACCELERATION, MAXIMUM = -.7130E-01 AT 10.850
RESPONSE NO 98:	STRUCTURE	1,	NODE 21 (YY) , TOP	, ABSOLUTE ACCELERATION, MAXIMUM = .3907E-01 AT 10.980
RESPONSE NO 99:	STRUCTURE	1,	NODE 21 (ZZ) , TOP	, ABSOLUTE ACCELERATION, MAXIMUM = -.2179E-03 AT 13.260
RESPONSE NO100:	STRUCTURE	1,	ELMT. 1 (1)	, FORCE OR STRESS, MAXIMUM = .3201E+07 AT 11.200
RESPONSE NO101:	STRUCTURE	1,	ELMT. 1 (2)	, FORCE OR STRESS, MAXIMUM = -.4882E+08 AT 11.500
RESPONSE NO102:	STRUCTURE	1,	ELMT. 1 (3)	, FORCE OR STRESS, MAXIMUM = -.2854E+08 AT 15.560
RESPONSE NO103:	STRUCTURE	1,	ELMT. 1 (4)	, FORCE OR STRESS, MAXIMUM = -.3354E+07 AT 13.260
RESPONSE NO104:	STRUCTURE	1,	ELMT. 1 (5)	, FORCE OR STRESS, MAXIMUM = .4411E+10 AT 15.570
RESPONSE NO105:	STRUCTURE	1,	ELMT. 1 (6)	, FORCE OR STRESS, MAXIMUM = -.7655E+10 AT 11.500
RESPONSE NO106:	STRUCTURE	1,	ELMT. 2 (1)	, FORCE OR STRESS, MAXIMUM = .3190E+07 AT 11.200
RESPONSE NO107:	STRUCTURE	1,	ELMT. 2 (2)	, FORCE OR STRESS, MAXIMUM = -.4865E+08 AT 11.500
RESPONSE NO108:	STRUCTURE	1,	ELMT. 2 (3)	, FORCE OR STRESS, MAXIMUM = -.2842E+08 AT 15.570
RESPONSE NO109:	STRUCTURE	1,	ELMT. 2 (4)	, FORCE OR STRESS, MAXIMUM = -.3337E+07 AT 13.260
RESPONSE NO110:	STRUCTURE	1,	ELMT. 2 (5)	, FORCE OR STRESS, MAXIMUM = .4195E+10 AT 15.570
RESPONSE NO111:	STRUCTURE	1,	ELMT. 2 (6)	, FORCE OR STRESS, MAXIMUM = -.7286E+10 AT 11.500
RESPONSE NO112:	STRUCTURE	1,	ELMT. 3 (1)	, FORCE OR STRESS, MAXIMUM = .3153E+07 AT 11.200
RESPONSE NO113:	STRUCTURE	1,	ELMT. 3 (2)	, FORCE OR STRESS, MAXIMUM = -.4800E+08 AT 11.500
RESPONSE NO114:	STRUCTURE	1,	ELMT. 3 (3)	, FORCE OR STRESS, MAXIMUM = -.2798E+08 AT 15.570
RESPONSE NO115:	STRUCTURE	1,	ELMT. 3 (4)	, FORCE OR STRESS, MAXIMUM = -.3283E+07 AT 13.260
RESPONSE NO116:	STRUCTURE	1,	ELMT. 3 (5)	, FORCE OR STRESS, MAXIMUM = .3793E+10 AT 15.570
RESPONSE NO117:	STRUCTURE	1,	ELMT. 3 (6)	, FORCE OR STRESS, MAXIMUM = -.6597E+10 AT 11.500
RESPONSE NO118:	STRUCTURE	1,	ELMT. 4 (1)	, FORCE OR STRESS, MAXIMUM = .3090E+07 AT 11.200
RESPONSE NO119:	STRUCTURE	1,	ELMT. 4 (2)	, FORCE OR STRESS, MAXIMUM = -.4696E+08 AT 11.500
RESPONSE NO120:	STRUCTURE	1,	ELMT. 4 (3)	, FORCE OR STRESS, MAXIMUM = -.2729E+08 AT 15.570
RESPONSE NO121:	STRUCTURE	1,	ELMT. 4 (4)	, FORCE OR STRESS, MAXIMUM = -.3193E+07 AT 13.260
RESPONSE NO122:	STRUCTURE	1,	ELMT. 4 (5)	, FORCE OR STRESS, MAXIMUM = .3418E+10 AT 15.570
RESPONSE NO123:	STRUCTURE	1,	ELMT. 4 (6)	, FORCE OR STRESS, MAXIMUM = -.5953E+10 AT 11.510
RESPONSE NO124:	STRUCTURE	1,	ELMT. 5 (1)	, FORCE OR STRESS, MAXIMUM = .2973E+07 AT 11.200
RESPONSE NO125:	STRUCTURE	1,	ELMT. 5 (2)	, FORCE OR STRESS, MAXIMUM = -.4508E+08 AT 11.500
RESPONSE NO126:	STRUCTURE	1,	ELMT. 5 (3)	, FORCE OR STRESS, MAXIMUM = -.2605E+08 AT 15.570
RESPONSE NO127:	STRUCTURE	1,	ELMT. 5 (4)	, FORCE OR STRESS, MAXIMUM = -.3020E+07 AT 13.260
RESPONSE NO128:	STRUCTURE	1,	ELMT. 5 (5)	, FORCE OR STRESS, MAXIMUM = .3022E+10 AT 15.570

RESPONSE NO129:	STRUCTURE	1,	ELMT.	5	(6)	FORCE	OR	STRESS,	MAXIMUM	= - .5277E+10	AT	11.510
RESPONSE NO130:	STRUCTURE	1,	ELMT.	6	(1)	FORCE	OR	STRESS,	MAXIMUM	= .2768E+07	AT	11.200
RESPONSE NO131:	STRUCTURE	1,	ELMT.	6	(2)	FORCE	OR	STRESS,	MAXIMUM	= - .4213E+08	AT	11.500
RESPONSE NO132:	STRUCTURE	1,	ELMT.	6	(3)	FORCE	OR	STRESS,	MAXIMUM	= - .2422E+08	AT	15.570
RESPONSE NO133:	STRUCTURE	1,	ELMT.	6	(4)	FORCE	OR	STRESS,	MAXIMUM	= - .2739E+07	AT	13.260
RESPONSE NO134:	STRUCTURE	1,	ELMT.	6	(5)	FORCE	OR	STRESS,	MAXIMUM	= .2399E+10	AT	15.570
RESPONSE NO135:	STRUCTURE	1,	ELMT.	6	(6)	FORCE	OR	STRESS,	MAXIMUM	= - .4201E+10	AT	11.510
RESPONSE NO136:	STRUCTURE	1,	ELMT.	7	(1)	FORCE	OR	STRESS,	MAXIMUM	= .2532E+07	AT	11.200
RESPONSE NO137:	STRUCTURE	1,	ELMT.	7	(2)	FORCE	OR	STRESS,	MAXIMUM	= - .3880E+08	AT	11.500
RESPONSE NO138:	STRUCTURE	1,	ELMT.	7	(3)	FORCE	OR	STRESS,	MAXIMUM	= - .2224E+08	AT	15.570
RESPONSE NO139:	STRUCTURE	1,	ELMT.	7	(4)	FORCE	OR	STRESS,	MAXIMUM	= - .2440E+07	AT	13.260
RESPONSE NO140:	STRUCTURE	1,	ELMT.	7	(5)	FORCE	OR	STRESS,	MAXIMUM	= .1891E+10	AT	15.570
RESPONSE NO141:	STRUCTURE	1,	ELMT.	7	(6)	FORCE	OR	STRESS,	MAXIMUM	= - .3320E+10	AT	11.510
RESPONSE NO142:	STRUCTURE	1,	ELMT.	8	(1)	FORCE	OR	STRESS,	MAXIMUM	= .2251E+07	AT	11.200
RESPONSE NO143:	STRUCTURE	1,	ELMT.	8	(2)	FORCE	OR	STRESS,	MAXIMUM	= - .3503E+08	AT	11.500
RESPONSE NO144:	STRUCTURE	1,	ELMT.	8	(3)	FORCE	OR	STRESS,	MAXIMUM	= - .2006E+08	AT	15.570
RESPONSE NO145:	STRUCTURE	1,	ELMT.	8	(4)	FORCE	OR	STRESS,	MAXIMUM	= - .2086E+07	AT	13.260
RESPONSE NO146:	STRUCTURE	1,	ELMT.	8	(5)	FORCE	OR	STRESS,	MAXIMUM	= .1416E+10	AT	15.570
RESPONSE NO147:	STRUCTURE	1,	ELMT.	8	(6)	FORCE	OR	STRESS,	MAXIMUM	= - .2492E+10	AT	11.510
RESPONSE NO148:	STRUCTURE	1,	ELMT.	9	(1)	FORCE	OR	STRESS,	MAXIMUM	= .1936E+07	AT	11.200
RESPONSE NO149:	STRUCTURE	1,	ELMT.	9	(2)	FORCE	OR	STRESS,	MAXIMUM	= - .3068E+08	AT	11.500
RESPONSE NO150:	STRUCTURE	1,	ELMT.	9	(3)	FORCE	OR	STRESS,	MAXIMUM	= - .1758E+08	AT	15.560
RESPONSE NO151:	STRUCTURE	1,	ELMT.	9	(4)	FORCE	OR	STRESS,	MAXIMUM	= - .1724E+07	AT	13.260
RESPONSE NO152:	STRUCTURE	1,	ELMT.	9	(5)	FORCE	OR	STRESS,	MAXIMUM	= .9848E+09	AT	15.570
RESPONSE NO153:	STRUCTURE	1,	ELMT.	9	(6)	FORCE	OR	STRESS,	MAXIMUM	= - .1736E+10	AT	11.510
RESPONSE NO154:	STRUCTURE	1,	ELMT.	10	(1)	FORCE	OR	STRESS,	MAXIMUM	= .1589E+07	AT	11.200
RESPONSE NO155:	STRUCTURE	1,	ELMT.	10	(2)	FORCE	OR	STRESS,	MAXIMUM	= - .2574E+08	AT	11.510
RESPONSE NO156:	STRUCTURE	1,	ELMT.	10	(3)	FORCE	OR	STRESS,	MAXIMUM	= - .1476E+08	AT	15.560
RESPONSE NO157:	STRUCTURE	1,	ELMT.	10	(4)	FORCE	OR	STRESS,	MAXIMUM	= - .1344E+07	AT	13.260
RESPONSE NO158:	STRUCTURE	1,	ELMT.	10	(5)	FORCE	OR	STRESS,	MAXIMUM	= .6032E+09	AT	15.570
RESPONSE NO159:	STRUCTURE	1,	ELMT.	10	(6)	FORCE	OR	STRESS,	MAXIMUM	= - .1066E+10	AT	11.510
RESPONSE NO160:	STRUCTURE	1,	ELMT.	11	(1)	FORCE	OR	STRESS,	MAXIMUM	= .1124E+07	AT	11.200
RESPONSE NO161:	STRUCTURE	1,	ELMT.	11	(2)	FORCE	OR	STRESS,	MAXIMUM	= - .1876E+08	AT	11.510
RESPONSE NO162:	STRUCTURE	1,	ELMT.	11	(3)	FORCE	OR	STRESS,	MAXIMUM	= - .1074E+08	AT	15.560
RESPONSE NO163:	STRUCTURE	1,	ELMT.	11	(4)	FORCE	OR	STRESS,	MAXIMUM	= - .8731E+06	AT	13.260
RESPONSE NO164:	STRUCTURE	1,	ELMT.	11	(5)	FORCE	OR	STRESS,	MAXIMUM	= .2724E+09	AT	15.570
RESPONSE NO165:	STRUCTURE	1,	ELMT.	11	(6)	FORCE	OR	STRESS,	MAXIMUM	= - .4846E+09	AT	11.510
RESPONSE NO166:	STRUCTURE	1,	ELMT.	12	(1)	FORCE	OR	STRESS,	MAXIMUM	= .2625E+06	AT	5.230
RESPONSE NO167:	STRUCTURE	1,	ELMT.	12	(2)	FORCE	OR	STRESS,	MAXIMUM	= - .3462E+07	AT	11.510
RESPONSE NO168:	STRUCTURE	1,	ELMT.	12	(3)	FORCE	OR	STRESS,	MAXIMUM	= - .1972E+07	AT	15.570
RESPONSE NO169:	STRUCTURE	1,	ELMT.	12	(4)	FORCE	OR	STRESS,	MAXIMUM	= - .7524E+05	AT	13.260
RESPONSE NO170:	STRUCTURE	1,	ELMT.	12	(5)	FORCE	OR	STRESS,	MAXIMUM	= .5240E+08	AT	15.570
RESPONSE NO171:	STRUCTURE	1,	ELMT.	12	(6)	FORCE	OR	STRESS,	MAXIMUM	= - .9269E+08	AT	11.510
RESPONSE NO172:	STRUCTURE	1,	ELMT.	13	(1)	FORCE	OR	STRESS,	MAXIMUM	= .3295E-06	AT	11.520
RESPONSE NO173:	STRUCTURE	1,	ELMT.	13	(2)	FORCE	OR	STRESS,	MAXIMUM	= .4900E-07	AT	5.520
RESPONSE NO174:	STRUCTURE	1,	ELMT.	13	(3)	FORCE	OR	STRESS,	MAXIMUM	= - .8713E-07	AT	11.050
RESPONSE NO175:	STRUCTURE	1,	ELMT.	13	(4)	FORCE	OR	STRESS,	MAXIMUM	= .3090E-04	AT	11.060
RESPONSE NO176:	STRUCTURE	1,	ELMT.	13	(5)	FORCE	OR	STRESS,	MAXIMUM	= - .2462E-04	AT	5.530
RESPONSE NO177:	STRUCTURE	1,	ELMT.	13	(6)	FORCE	OR	STRESS,	MAXIMUM	= - .6823E-05	AT	15.580
RESPONSE NO178:	STRUCTURE	1,	ELMT.	14	(1)	FORCE	OR	STRESS,	MAXIMUM	= - .3251E-07	AT	7.500
RESPONSE NO179:	STRUCTURE	1,	ELMT.	14	(2)	FORCE	OR	STRESS,	MAXIMUM	= - .2152E-07	AT	15.570
RESPONSE NO180:	STRUCTURE	1,	ELMT.	14	(3)	FORCE	OR	STRESS,	MAXIMUM	= - .2005E-07	AT	11.530
RESPONSE NO181:	STRUCTURE	1,	ELMT.	14	(4)	FORCE	OR	STRESS,	MAXIMUM	= - .2463E-05	AT	11.500
RESPONSE NO182:	STRUCTURE	1,	ELMT.	14	(5)	FORCE	OR	STRESS,	MAXIMUM	= - .4422E-05	AT	11.060
RESPONSE NO183:	STRUCTURE	1,	ELMT.	14	(6)	FORCE	OR	STRESS,	MAXIMUM	= .2769E-05	AT	11.510
RESPONSE NO184:	STRUCTURE	1,	ELMT.	15	(1)	FORCE	OR	STRESS,	MAXIMUM	= .3260E-06	AT	11.500
RESPONSE NO185:	STRUCTURE	1,	ELMT.	15	(2)	FORCE	OR	STRESS,	MAXIMUM	= - .9836E-07	AT	11.520
RESPONSE NO186:	STRUCTURE	1,	ELMT.	15	(3)	FORCE	OR	STRESS,	MAXIMUM	= .1289E-06	AT	11.040
RESPONSE NO187:	STRUCTURE	1,	ELMT.	15	(4)	FORCE	OR	STRESS,	MAXIMUM	= - .1289E-04	AT	5.520
RESPONSE NO188:	STRUCTURE	1,	ELMT.	15	(5)	FORCE	OR	STRESS,	MAXIMUM	= - .4579E-05	AT	11.050
RESPONSE NO189:	STRUCTURE	1,	ELMT.	15	(6)	FORCE	OR	STRESS,	MAXIMUM	= - .3324E-04	AT	11.500
RESPONSE NO190:	STRUCTURE	1,	ELMT.	16	(1)	FORCE	OR	STRESS,	MAXIMUM	= .4730E-06	AT	11.030
RESPONSE NO191:	STRUCTURE	1,	ELMT.	16	(2)	FORCE	OR	STRESS,	MAXIMUM	= - .8116E-07	AT	11.050
RESPONSE NO192:	STRUCTURE	1,	ELMT.	16	(3)	FORCE	OR	STRESS,	MAXIMUM	= .7887E-07	AT	15.580

RESPONSE NO193:	STRUCTURE	1,	ELMT. 16	(4)	,	FORCE OR STRESS, MAXIMUM	= -.1117E-04	AT 15.560
RESPONSE NO194:	STRUCTURE	1,	ELMT. 16	(5)	,	FORCE OR STRESS, MAXIMUM	= .9857E-05	AT 11.040
RESPONSE NO195:	STRUCTURE	1,	ELMT. 16	(6)	,	FORCE OR STRESS, MAXIMUM	= .1075E-04	AT 11.530
RESPONSE NO196:	STRUCTURE	1,	ELMT. 17	(1)	,	FORCE OR STRESS, MAXIMUM	= .1811E-08	AT 16.220
RESPONSE NO197:	STRUCTURE	1,	ELMT. 17	(2)	,	FORCE OR STRESS, MAXIMUM	= .1754E-08	AT 11.540
RESPONSE NO198:	STRUCTURE	1,	ELMT. 17	(3)	,	FORCE OR STRESS, MAXIMUM	= .5872E-09	AT 11.530
RESPONSE NO199:	STRUCTURE	1,	ELMT. 17	(4)	,	FORCE OR STRESS, MAXIMUM	= .9944E-07	AT 5.520
RESPONSE NO200:	STRUCTURE	1,	ELMT. 17	(5)	,	FORCE OR STRESS, MAXIMUM	= -.7248E-06	AT 11.530
RESPONSE NO201:	STRUCTURE	1,	ELMT. 17	(6)	,	FORCE OR STRESS, MAXIMUM	= .4003E-06	AT 11.510
RESPONSE NO202:	STRUCTURE	1,	ELMT. 18	(1)	,	FORCE OR STRESS, MAXIMUM	= .3201E+07	AT 11.200
RESPONSE NO203:	STRUCTURE	1,	ELMT. 18	(2)	,	FORCE OR STRESS, MAXIMUM	= -.4882E+08	AT 11.500
RESPONSE NO204:	STRUCTURE	1,	ELMT. 18	(3)	,	FORCE OR STRESS, MAXIMUM	= -.2855E+08	AT 15.560
RESPONSE NO205:	STRUCTURE	1,	ELMT. 18	(4)	,	FORCE OR STRESS, MAXIMUM	= -.3354E+07	AT 13.260
RESPONSE NO206:	STRUCTURE	1,	ELMT. 18	(5)	,	FORCE OR STRESS, MAXIMUM	= .4427E+10	AT 15.570
RESPONSE NO207:	STRUCTURE	1,	ELMT. 18	(6)	,	FORCE OR STRESS, MAXIMUM	= -.7681E+10	AT 11.500
RESPONSE NO208:	STRUCTURE	1,	ELMT. 19	(1)	,	FORCE OR STRESS, MAXIMUM	= .8764E-07	AT 11.550
RESPONSE NO209:	STRUCTURE	1,	ELMT. 19	(2)	,	FORCE OR STRESS, MAXIMUM	= -.4601E-08	AT 16.220
RESPONSE NO210:	STRUCTURE	1,	ELMT. 19	(3)	,	FORCE OR STRESS, MAXIMUM	= -.1301E-07	AT 15.560
RESPONSE NO211:	STRUCTURE	1,	ELMT. 19	(4)	,	FORCE OR STRESS, MAXIMUM	= -.1655E-05	AT 5.520
RESPONSE NO212:	STRUCTURE	1,	ELMT. 19	(5)	,	FORCE OR STRESS, MAXIMUM	= -.8196E-05	AT 11.040
RESPONSE NO213:	STRUCTURE	1,	ELMT. 19	(6)	,	FORCE OR STRESS, MAXIMUM	= .2089E-05	AT 11.050

TIME HISTORY NUMBER	SPECTRAL FREQUENCY VALUE	SPECTRAL DAMPING VALUE	PEAK/SPC RESPONSE VALUE	TYPE OF RESPONSE
1	0.	0.	.2527E+01	PEAK ACCEL
1	.4000E+01	.5000E-01	.4275E+01	SPEC ACCEL
1	.8000E+01	.5000E-01	.3971E+01	SPEC ACCEL
1	.1600E+02	.5000E-01	.3001E+01	SPEC ACCEL
2	0.	0.	.2959E+01	PEAK ACCEL
2	.4000E+01	.5000E-01	.6435E+01	SPEC ACCEL
2	.8000E+01	.5000E-01	.4078E+01	SPEC ACCEL
2	.1600E+02	.5000E-01	.3552E+01	SPEC ACCEL
3	0.	0.	.7297E+00	PEAK ACCEL
3	.4000E+01	.5000E-01	.7903E+00	SPEC ACCEL
3	.8000E+01	.5000E-01	.9229E+00	SPEC ACCEL
3	.1600E+02	.5000E-01	.9477E+00	SPEC ACCEL
4	0.	0.	.2850E+01	PEAK ACCEL
4	.4000E+01	.5000E-01	.5130E+01	SPEC ACCEL
4	.8000E+01	.5000E-01	.3781E+01	SPEC ACCEL
4	.1600E+02	.5000E-01	.2898E+01	SPEC ACCEL
5	0.	0.	.3330E+01	PEAK ACCEL
5	.4000E+01	.5000E-01	.7837E+01	SPEC ACCEL
5	.8000E+01	.5000E-01	.4226E+01	SPEC ACCEL
5	.1600E+02	.5000E-01	.3465E+01	SPEC ACCEL
6	0.	0.	.6570E+00	PEAK ACCEL
6	.4000E+01	.5000E-01	.9003E+00	SPEC ACCEL
6	.8000E+01	.5000E-01	.8059E+00	SPEC ACCEL
6	.1600E+02	.5000E-01	.9377E+00	SPEC ACCEL
7	0.	0.	.2080E-01	PEAK ACCEL
7	.4000E+01	.5000E-01	.3337E-01	SPEC ACCEL
7	.8000E+01	.5000E-01	.2886E-01	SPEC ACCEL
7	.1600E+02	.5000E-01	.2144E-01	SPEC ACCEL
8	0.	0.	.1110E-01	PEAK ACCEL
8	.4000E+01	.5000E-01	.2096E-01	SPEC ACCEL
8	.8000E+01	.5000E-01	.1709E-01	SPEC ACCEL
8	.1600E+02	.5000E-01	.1202E-01	SPEC ACCEL
9	0.	0.	.7275E-04	PEAK ACCEL
9	.4000E+01	.5000E-01	.3827E-03	SPEC ACCEL
9	.8000E+01	.5000E-01	.1271E-03	SPEC ACCEL
9	.1600E+02	.5000E-01	.8685E-04	SPEC ACCEL
10	0.	0.	.1208E+08	PEAK FORCE
11	0.	0.	.2050E+08	PEAK FORCE
12	0.	0.	.1519E+07	PEAK FORCE
13	0.	0.	.3197E+10	PEAK FORCE
14	0.	0.	.1841E+10	PEAK FORCE
15	0.	0.	.1439E+07	PEAK FORCE
16	0.	0.	.2854E+01	PEAK ACCEL
16	.4000E+01	.2000E-01	.6129E+01	SPEC ACCEL
17	0.	0.	.3327E+01	PEAK ACCEL
17	.4000E+01	.2000E-01	.1064E+02	SPEC ACCEL
18	0.	0.	.6568E+00	PEAK ACCEL
18	.4000E+01	.2000E-01	.9844E+00	SPEC ACCEL
19	0.	0.	.2080E-01	PEAK ACCEL
19	.4000E+01	.2000E-01	.3538E-01	SPEC ACCEL
20	0.	0.	.1110E-01	PEAK ACCEL
20	.4000E+01	.2000E-01	.2314E-01	SPEC ACCEL
21	0.	0.	.7275E-04	PEAK ACCEL
21	.4000E+01	.2000E-01	.5366E-03	SPEC ACCEL
22	0.	0.	.2857E+01	PEAK ACCEL
22	.4000E+01	.2000E-01	.6138E+01	SPEC ACCEL
23	0.	0.	.3335E+01	PEAK ACCEL
23	.4000E+01	.2000E-01	.1062E+02	SPEC ACCEL
24	0.	0.	.6566E+00	PEAK ACCEL
24	.4000E+01	.2000E-01	.9852E+00	SPEC ACCEL

25	0.	0.	.2102E-01	PEAK ACCEL
25	.4000E+01	.2000E-01	.3575E-01	SPEC ACCEL
26	0.	0.	.1120E-01	PEAK ACCEL
26	.4000E+01	.2000E-01	.2336E-01	SPEC ACCEL
27	0.	0.	.7296E-04	PEAK ACCEL
27	.4000E+01	.2000E-01	.5394E-03	SPEC ACCEL
28	0.	0.	.2943E+01	PEAK ACCEL
28	.4000E+01	.2000E-01	.6280E+01	SPEC ACCEL
29	0.	0.	.3534E+01	PEAK ACCEL
29	.4000E+01	.2000E-01	.1023E+02	SPEC ACCEL
30	0.	0.	.6523E+00	PEAK ACCEL
30	.4000E+01	.2000E-01	.9965E+00	SPEC ACCEL
31	0.	0.	.2420E-01	PEAK ACCEL
31	.4000E+01	.2000E-01	.4111E-01	SPEC ACCEL
32	.4000E+01	.2000E-01	.2658E-01	SPEC ACCEL
33	0.	0.	.7606E-04	PEAK ACCEL
33	.4000E+01	.5000E-01	.4161E-03	SPEC ACCEL
33	.8000E+01	.5000E-01	.1284E-03	SPEC ACCEL
33	.1600E+02	.5000E-01	.9597E-04	SPEC ACCEL
34	0.	0.	.3280E+01	PEAK ACCEL
34	.4000E+01	.2000E-01	.6617E+01	SPEC ACCEL
35	0.	0.	.4181E+01	PEAK ACCEL
35	.4000E+01	.2000E-01	.9892E+01	SPEC ACCEL
36	0.	0.	.6622E+00	PEAK ACCEL
36	.4000E+01	.2000E-01	.1023E+01	SPEC ACCEL
37	0.	0.	.3122E-01	PEAK ACCEL
37	.4000E+01	.2000E-01	.5290E-01	SPEC ACCEL
38	0.	0.	.1617E-01	PEAK ACCEL
38	.4000E+01	.2000E-01	.3385E-01	SPEC ACCEL
39	0.	0.	.8748E-04	PEAK ACCEL
39	.4000E+01	.2000E-01	.6812E-03	SPEC ACCEL
40	0.	0.	.3672E+01	PEAK ACCEL
40	.4000E+01	.2000E-01	.6914E+01	SPEC ACCEL
41	0.	0.	.4851E+01	PEAK ACCEL
41	.4000E+01	.2000E-01	.9851E+01	SPEC ACCEL
42	0.	0.	.6880E+00	PEAK ACCEL
42	.4000E+01	.2000E-01	.1048E+01	SPEC ACCEL
43	0.	0.	.3719E-01	PEAK ACCEL
43	.4000E+01	.2000E-01	.6286E-01	SPEC ACCEL
44	0.	0.	.1908E-01	PEAK ACCEL
44	.4000E+01	.2000E-01	.4020E-01	SPEC ACCEL
45	0.	0.	.9974E-04	PEAK ACCEL
45	.4000E+01	.2000E-01	.7714E-03	SPEC ACCEL
46	0.	0.	.4142E+01	PEAK ACCEL
46	.4000E+01	.2000E-01	.7201E+01	SPEC ACCEL
47	0.	0.	.5611E+01	PEAK ACCEL
47	.4000E+01	.2000E-01	.9682E+01	SPEC ACCEL
48	0.	0.	.7198E+00	PEAK ACCEL
48	.4000E+01	.2000E-01	.1091E+01	SPEC ACCEL
49	0.	0.	.4324E-01	PEAK ACCEL
49	.4000E+01	.2000E-01	.7289E-01	SPEC ACCEL
50	0.	0.	.2213E-01	PEAK ACCEL
50	.4000E+01	.2000E-01	.4679E-01	SPEC ACCEL
51	0.	0.	.1149E-03	PEAK ACCEL
51	.4000E+01	.2000E-01	.8656E-03	SPEC ACCEL
52	0.	0.	.4905E+01	PEAK ACCEL
52	.4000E+01	.2000E-01	.7572E+01	SPEC ACCEL
53	0.	0.	.7463E+01	PEAK ACCEL
53	.4000E+01	.2000E-01	.1039E+02	SPEC ACCEL
54	0.	0.	.7694E+00	PEAK ACCEL
54	.4000E+01	.2000E-01	.1158E+01	SPEC ACCEL
55	0.	0.	.5169E-01	PEAK ACCEL
55	.4000E+01	.2000E-01	.8670E-01	SPEC ACCEL
56	0.	0.	.2669E-01	PEAK ACCEL

56	.4000E+01	.2000E-01	.5629E-01	SPEC ACCEL
57	0.	0.	.1384E-03	PEAK ACCEL
57	.4000E+01	.2000E-01	.1011E-02	SPEC ACCEL
58	0.	0.	.5518E+01	PEAK ACCEL
58	.4000E+01	.2000E-01	.7821E+01	SPEC ACCEL
59	0.	0.	.9138E+01	PEAK ACCEL
59	.4000E+01	.2000E-01	.1262E+02	SPEC ACCEL
60	0.	0.	.8092E+00	PEAK ACCEL
60	.4000E+01	.2000E-01	.1212E+01	SPEC ACCEL
61	0.	0.	.5776E-01	PEAK ACCEL
61	.4000E+01	.2000E-01	.9638E-01	SPEC ACCEL
62	0.	0.	.3016E-01	PEAK ACCEL
62	.4000E+01	.2000E-01	.6333E-01	SPEC ACCEL
63	0.	0.	.1580E-03	PEAK ACCEL
63	.4000E+01	.2000E-01	.1126E-02	SPEC ACCEL
64	0.	0.	.6257E+01	PEAK ACCEL
64	.4000E+01	.2000E-01	.8427E+01	SPEC ACCEL
65	0.	0.	.1080E+02	PEAK ACCEL
65	.4000E+01	.2000E-01	.1486E+02	SPEC ACCEL
66	0.	0.	.8451E+00	PEAK ACCEL
66	.4000E+01	.2000E-01	.1263E+01	SPEC ACCEL
67	0.	0.	.6272E-01	PEAK ACCEL
67	.4000E+01	.2000E-01	.1041E+00	SPEC ACCEL
68	0.	0.	.3316E-01	PEAK ACCEL
68	.4000E+01	.2000E-01	.6916E-01	SPEC ACCEL
69	0.	0.	.1760E-03	PEAK ACCEL
69	.4000E+01	.2000E-01	.1227E-02	SPEC ACCEL
70	0.	0.	.7169E+01	PEAK ACCEL
70	.4000E+01	.2000E-01	.9881E+01	SPEC ACCEL
71	0.	0.	.1244E+02	PEAK ACCEL
71	.4000E+01	.2000E-01	.1717E+02	SPEC ACCEL
72	0.	0.	.8835E+00	PEAK ACCEL
72	.4000E+01	.2000E-01	.1307E+01	SPEC ACCEL
73	0.	0.	.6653E-01	PEAK ACCEL
73	.4000E+01	.2000E-01	.1099E+00	SPEC ACCEL
74	0.	0.	.3562E-01	PEAK ACCEL
74	.4000E+01	.2000E-01	.7367E-01	SPEC ACCEL
75	0.	0.	.1909E-03	PEAK ACCEL
75	.4000E+01	.2000E-01	.1310E-02	SPEC ACCEL
76	0.	0.	.8077E+01	PEAK ACCEL
76	.4000E+01	.2000E-01	.1145E+02	SPEC ACCEL
77	0.	0.	.1408E+02	PEAK ACCEL
77	.4000E+01	.2000E-01	.1963E+02	SPEC ACCEL
78	0.	0.	.9159E+00	PEAK ACCEL
78	.4000E+01	.2000E-01	.1347E+01	SPEC ACCEL
79	0.	0.	.6913E-01	PEAK ACCEL
79	.4000E+01	.2000E-01	.1137E+00	SPEC ACCEL
80	0.	0.	.3741E-01	PEAK ACCEL
80	.4000E+01	.2000E-01	.7681E-01	SPEC ACCEL
81	0.	0.	.2035E-03	PEAK ACCEL
81	.4000E+01	.2000E-01	.1380E-02	SPEC ACCEL
82	0.	0.	.8981E+01	PEAK ACCEL
82	.4000E+01	.2000E-01	.1308E+02	SPEC ACCEL
83	0.	0.	.1568E+02	PEAK ACCEL
83	.4000E+01	.2000E-01	.2221E+02	SPEC ACCEL
84	0.	0.	.9417E+00	PEAK ACCEL
84	.4000E+01	.2000E-01	.1384E+01	SPEC ACCEL
85	0.	0.	.7064E-01	PEAK ACCEL
85	.4000E+01	.2000E-01	.1158E+00	SPEC ACCEL
86	0.	0.	.3855E-01	PEAK ACCEL
86	.4000E+01	.2000E-01	.7871E-01	SPEC ACCEL
87	0.	0.	.2139E-03	PEAK ACCEL
87	.4000E+01	.2000E-01	.1438E-02	SPEC ACCEL
88	0.	0.	.9537E+01	PEAK ACCEL

88	.4000E+01	.2000E-01	.1410E+02	SPEC ACCEL
89	0.	0.	.1665E+02	PEAK ACCEL
89	.4000E+01	.2000E-01	.2411E+02	SPEC ACCEL
90	0.	0.	.9470E+00	PEAK ACCEL
90	.4000E+01	.2000E-01	.1393E+01	SPEC ACCEL
91	0.	0.	.7088E-01	PEAK ACCEL
91	.4000E+01	.2000E-01	.1162E+00	SPEC ACCEL
92	0.	0.	.3876E-01	PEAK ACCEL
92	.4000E+01	.2000E-01	.7904E-01	SPEC ACCEL
93	0.	0.	.2159E-03	PEAK ACCEL
93	.4000E+01	.2000E-01	.1449E-02	SPEC ACCEL
94	0.	0.	.1036E+02	PEAK ACCEL
94	.4000E+01	.2000E-01	.1562E+02	SPEC ACCEL
95	0.	0.	.1813E+02	PEAK ACCEL
95	.4000E+01	.2000E-01	.2695E+02	SPEC ACCEL
96	0.	0.	.1400E+01	PEAK ACCEL
96	.4000E+01	.2000E-01	.1670E+01	SPEC ACCEL
97	0.	0.	.7130E-01	PEAK ACCEL
97	.4000E+01	.2000E-01	.1167E+00	SPEC ACCEL
98	0.	0.	.3907E-01	PEAK ACCEL
98	.4000E+01	.2000E-01	.7955E-01	SPEC ACCEL
99	0.	0.	.2179E-03	PEAK ACCEL
99	.4000E+01	.2000E-01	.1460E-02	SPEC ACCEL
100	0.	0.	.3201E+07	PEAK FORCE
101	0.	0.	.4882E+08	PEAK FORCE
102	0.	0.	.2854E+08	PEAK FORCE
103	0.	0.	.3354E+07	PEAK FORCE
104	0.	0.	.4411E+10	PEAK FORCE
105	0.	0.	.7655E+10	PEAK FORCE
106	0.	0.	.3190E+07	PEAK FORCE
107	0.	0.	.4865E+08	PEAK FORCE
108	0.	0.	.2842E+08	PEAK FORCE
109	0.	0.	.3337E+07	PEAK FORCE
110	0.	0.	.4195E+10	PEAK FORCE
111	0.	0.	.7286E+10	PEAK FORCE
112	0.	0.	.3153E+07	PEAK FORCE
113	0.	0.	.4800E+08	PEAK FORCE
114	0.	0.	.2798E+08	PEAK FORCE
115	0.	0.	.3283E+07	PEAK FORCE
116	0.	0.	.3793E+10	PEAK FORCE
117	0.	0.	.6597E+10	PEAK FORCE
118	0.	0.	.3090E+07	PEAK FORCE
119	0.	0.	.4696E+08	PEAK FORCE
120	0.	0.	.2729E+08	PEAK FORCE
121	0.	0.	.3193E+07	PEAK FORCE
122	0.	0.	.3418E+10	PEAK FORCE
123	0.	0.	.5953E+10	PEAK FORCE
124	0.	0.	.2973E+07	PEAK FORCE
125	0.	0.	.4508E+08	PEAK FORCE
126	0.	0.	.2605E+08	PEAK FORCE
127	0.	0.	.3020E+07	PEAK FORCE
128	0.	0.	.3022E+10	PEAK FORCE
129	0.	0.	.5277E+10	PEAK FORCE
130	0.	0.	.2768E+07	PEAK FORCE
131	0.	0.	.4213E+08	PEAK FORCE
132	0.	0.	.2422E+08	PEAK FORCE
133	0.	0.	.2739E+07	PEAK FORCE
134	0.	0.	.2399E+10	PEAK FORCE
135	0.	0.	.4201E+10	PEAK FORCE
136	0.	0.	.2532E+07	PEAK FORCE
137	0.	0.	.3880E+08	PEAK FORCE
138	0.	0.	.2224E+08	PEAK FORCE
139	0.	0.	.2440E+07	PEAK FORCE
140	0.	0.	.1891E+10	PEAK FORCE

141	0.	0.	.3320E+10	PEAK FORCE
142	0.	0.	.2251E+07	PEAK FORCE
143	0.	0.	.3503E+08	PEAK FORCE
144	0.	0.	.2006E+08	PEAK FORCE
145	0.	0.	.2086E+07	PEAK FORCE
146	0.	0.	.1416E+10	PEAK FORCE
147	0.	0.	.2492E+10	PEAK FORCE
148	0.	0.	.1936E+07	PEAK FORCE
149	0.	0.	.3068E+08	PEAK FORCE
150	0.	0.	.1758E+08	PEAK FORCE
151	0.	0.	.1724E+07	PEAK FORCE
152	0.	0.	.9848E+09	PEAK FORCE
153	0.	0.	.1736E+10	PEAK FORCE
154	0.	0.	.1589E+07	PEAK FORCE
155	0.	0.	.2574E+08	PEAK FORCE
156	0.	0.	.1476E+08	PEAK FORCE
157	0.	0.	.1344E+07	PEAK FORCE
158	0.	0.	.6032E+09	PEAK FORCE
159	0.	0.	.1066E+10	PEAK FORCE
160	0.	0.	.1124E+07	PEAK FORCE
161	0.	0.	.1876E+08	PEAK FORCE
162	0.	0.	.1074E+08	PEAK FORCE
163	0.	0.	.8731E+06	PEAK FORCE
164	0.	0.	.2724E+09	PEAK FORCE
165	0.	0.	.4846E+09	PEAK FORCE
166	0.	0.	.2625E+06	PEAK FORCE
167	0.	0.	.3462E+07	PEAK FORCE
168	0.	0.	.1972E+07	PEAK FORCE
169	0.	0.	.7524E+05	PEAK FORCE
170	0.	0.	.5240E+08	PEAK FORCE
171	0.	0.	.9269E+08	PEAK FORCE
172	0.	0.	.3295E-06	PEAK FORCE
173	0.	0.	.4900E-07	PEAK FORCE
174	0.	0.	.8713E-07	PEAK FORCE
175	0.	0.	.3090E-04	PEAK FORCE
176	0.	0.	.2462E-04	PEAK FORCE
177	0.	0.	.6823E-05	PEAK FORCE
178	0.	0.	.3251E-07	PEAK FORCE
179	0.	0.	.2152E-07	PEAK FORCE
180	0.	0.	.2005E-07	PEAK FORCE
181	0.	0.	.2463E-05	PEAK FORCE
182	0.	0.	.4422E-05	PEAK FORCE
183	0.	0.	.2769E-05	PEAK FORCE
184	0.	0.	.3260E-06	PEAK FORCE
185	0.	0.	.9836E-07	PEAK FORCE
186	0.	0.	.1289E-06	PEAK FORCE
187	0.	0.	.1289E-04	PEAK FORCE
188	0.	0.	.4579E-05	PEAK FORCE
189	0.	0.	.3324E-04	PEAK FORCE
190	0.	0.	.4730E-06	PEAK FORCE
191	0.	0.	.8116E-07	PEAK FORCE
192	0.	0.	.7887E-07	PEAK FORCE
193	0.	0.	.1117E-04	PEAK FORCE
194	0.	0.	.9857E-05	PEAK FORCE
195	0.	0.	.1075E-04	PEAK FORCE
196	0.	0.	.1811E-08	PEAK FORCE
197	0.	0.	.1754E-08	PEAK FORCE
198	0.	0.	.5872E-09	PEAK FORCE
199	0.	0.	.9944E-07	PEAK FORCE
200	0.	0.	.7248E-06	PEAK FORCE
201	0.	0.	.4003E-06	PEAK FORCE
202	0.	0.	.3201E+07	PEAK FORCE
203	0.	0.	.4882E+08	PEAK FORCE
204	0.	0.	.2855E+08	PEAK FORCE

205	0.	0.	.3354E+07	PEAK FORCE
206	0.	0.	.4427E+10	PEAK FORCE
207	0.	0.	.7681E+10	PEAK FORCE
208	0.	0.	.8764E-07	PEAK FORCE
209	0.	0.	.4601E-08	PEAK FORCE
210	0.	0.	.1301E-07	PEAK FORCE
211	0.	0.	.1655E-05	PEAK FORCE
212	0.	0.	.8196E-05	PEAK FORCE
213	0.	0.	.2089E-05	PEAK FORCE

NUMBER OF ATTRIBUTES = 4  
NUMBER OF RESPONSE VECTOR QUANTITIES = 325

REORDERING BY RESPONSE COMPONENT IS COMPLETE  
AND INVERSE FAST FOURIER TRANSFORMS HAVE BEEN COMPUTED

TOTAL TIME = 190.415, CPU = 593.390, I/O = 1111.412, SYS = 1.225

Example of input file used to run SMACS  
for a fixed base analysis.

Note that only the variables IFXBI, NCASE  
and NVIMP are changed from the  
previous SSI example.

## SUMMARY OF INPUT FILE SMACSI

```

2 4 6 8(1)2 4 6 8(2)2 4 6 8(3)2 4 6 8(4)2 4 6 8(5)2 4 6 8(6)2 4 6 8(7)2 4 6 8(8)
1> SMACS TEST2 FOR BERKELEY -- ZION REACTOR CONTAINMENT BUILDING <
2> 8.57E6 1390. 78.5 .025 45000 30 <
3> 1 1 1 1 NFDN , NTSTR , ISMXI , IFXBI <
4> 123456789 RANDOM SEED <
5> 0.5 0.7 <
6> 1 6 0 0. 0. 0. 0. NSTR,NDFD, IFTIMP,--<
7> 1 2 3 4 5 6 ITDOF <
8> 1.274E6 0. 0. 0. 3.949E6 0. FDN MASS MATRIX<
9> 0. 1.274E6 0. -3.949E6 0. -5.096E5 FDN MASS MATRIX<
10> 0. 0. 1.274E6 0. 5.096E5 0. FDN MASS MATRIX<
11> 0. -3.949E6 0. 1.758E9 0. 1.580E6 FDN MASS MATRIX<
12> 3.949E6 0. 5.096E5 0. 1.749E9 0. FDN MASS MATRIX<
13> 0. -5.096E5 0. 1.580E6 0. 3.483E9 FDN MASS MATRIX<
14> 0 0. 0. 0. 0. 0. IFTR , X , Y , Z , Q <
15> 13 6 1 2 3 4 5 6 NMODE , NDOF , IDOF <
16> 0 0. 0. 0. 0. 0. IFTRAN , X , Y , Z , Q <
17> 0 <
18> 198 NKEEP = THE NUMBER OF RESPONSES TO CALCULATE AND KEEP <
19> 1 3 9 1 0 1 1 0(10A8,/, (8F10.5)) <
20> 0.01 33.0 FMIN , FMAX <
21> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 1 <
22> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 2 <
23> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 3 <
24> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 4 <
25> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 5 <
26> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 6 <
27> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 7 <
28> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 8 <
29> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 9 <
30> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 10 <
31> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 11 <
32> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 12 <
33> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 13 <
34> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 14 <
35> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 15 <
36> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 16 <
37> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 17 <
38> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 18 <
39> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 19 <
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44> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 24 <
45> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 25 <
46> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 26 <
47> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 27 <
48> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 28 <
49> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 29 <
50> 0.01 7.334 2048 2048 DT , SCALE , NPOINT , NFFT -- EQ. PROB 30 <
2 4 6 8(1)2 4 6 8(2)2 4 6 8(3)2 4 6 8(4)2 4 6 8(5)2 4 6 8(6)2 4 6 8(7)2 4 6 8(8)

```

PRESTO INPUT AND OUTPUT  
for an SSI analysis.

1 PRESTO TEST FOR FIRST BERKELEY PROBLEM  
2 BOX R38 STAN BUMPUS  
3 325 30 1 1 1

PRESTO PROCESSOR FOR SMACS -- LOW LCM VERSION  
 COMPILED 27JAN82 12.00.00

PRESTO TEST FOR FIRST BERKELEY PROBLEM

11:16:47 03/18/82

BOX R38 STAN BUMPUS

PLOTS ASKED

325 30 1 1 1 0 1 0 0 0 0

FOR EARTHQUAKE PROBLEM NUMBER 1

ATTRIBUTE ATTRIBUTE  
 NUMBER VALUE

1 .1756009E+01  
 2 .1002474E+01  
 3 .1028815E+01  
 4 .1034068E+01

RESPONSE NUMBER, RV, IDENTY IN TRIPLETS

1	1.33039	20000010	2	3.07797	20000012
3	1.90850	20000013	4	1.67282	20000014
5	2.36888	20000020	6	5.09124	20000022
...					
321	4.601159E-0910000019020		322	1.301393E-0810000019030	
323	1.654922E-0610000019040		324	8.196085E-0610000019050	
325	2.089302E-0610000019060				

FOR BASIC EVENT NUMBER = 1  
 THE UNSORTED RESPONSES ARE

.13303876E+01	.24759584E+01	.17828954E+01	.23278116E+01	.20256508E+01
.24994272E+01	.23410128E+01	.22082674E+01	.19794466E+01	.24752250E+01
.18635694E+01	.24422220E+01	.20923902E+01	.22354032E+01	.21180592E+01
.25580992E+01	.17308240E+01	.22728066E+01	.27524502E+01	.18687032E+01
.27275146E+01	.23769494E+01	.28301906E+01	.20293178E+01	.25984362E+01
.20997242E+01	.30047398E+01	.23791496E+01	.31374852E+01	.25265630E+01

FOR BASIC EVENT NUMBER = 1  
 THE SORTED RESPONSES ARE

.13303876E+01	.17308240E+01	.17828954E+01	.18635694E+01	.18687032E+01
.19794466E+01	.20256508E+01	.20293178E+01	.20923902E+01	.20997242E+01
.21180592E+01	.22082674E+01	.22354032E+01	.22728066E+01	.23278116E+01
.23410128E+01	.23769494E+01	.23791496E+01	.24422220E+01	.24752250E+01



.24759584E+01 .24994272E+01 .25265630E+01 .25580992E+01 .25984362E+01  
 .27275146E+01 .27524502E+01 .28301906E+01 .30047398E+01 .31374852E+01

THE EARTHQUAKES OF THE SORTED RESPONSES ARE

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

FOR BASIC EVENT NUMBER = 1  
 A LOGNORMAL FIT TO THE DATA HAS  
 LN(MEDIAN) = .8191862E+00  
 BETA = .1799775E+00

...  
 ...  
 ...

FOR BASIC EVENT NUMBER = 325  
 THE UNSORTED RESPONSES ARE

.33730451E-06 .75735677E-06 .16119514E-06 .51700225E-06 .51273934E-06  
 .72334640E-06 .10803345E-05 .11276732E-05 .90601229E-07 .16906072E-06  
 .23354050E-06 .27173860E-06 .14456529E-06 .42343416E-06 .46681062E-06  
 .10238373E-06 .11482195E-06 .23049181E-06 .13263005E-05 .16851084E-05  
 .53243868E-06 .24045580E-06 .15398794E-06 .11445199E-05 .42769002E-07  
 .42049446E-06 .75684766E-06 .31779269E-06 .24582296E-07 .20893017E-05

FOR BASIC EVENT NUMBER = 325  
 THE SORTED RESPONSES ARE

.24582296E-07 .42769002E-07 .90601229E-07 .10238373E-06 .11482195E-06  
 .14456529E-06 .15398794E-06 .16119514E-06 .16906072E-06 .23049181E-06  
 .23354050E-06 .24045580E-06 .27173860E-06 .31779269E-06 .33730451E-06  
 .42049446E-06 .42343416E-06 .46681062E-06 .51273934E-06 .51700225E-06  
 .53243868E-06 .72334640E-06 .75684766E-06 .75735677E-06 .10803345E-05  
 .11276732E-05 .11445199E-05 .13263005E-05 .16851084E-05 .20893017E-05

THE EARTHQUAKES OF THE SORTED RESPONSES ARE

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

FOR BASIC EVENT NUMBER = 325  
 A LOGNORMAL FIT TO THE DATA HAS  
 LN(MEDIAN) = -.1489703E+02  
 BETA = .1066531E+01

## SUMMARY STATISTICS

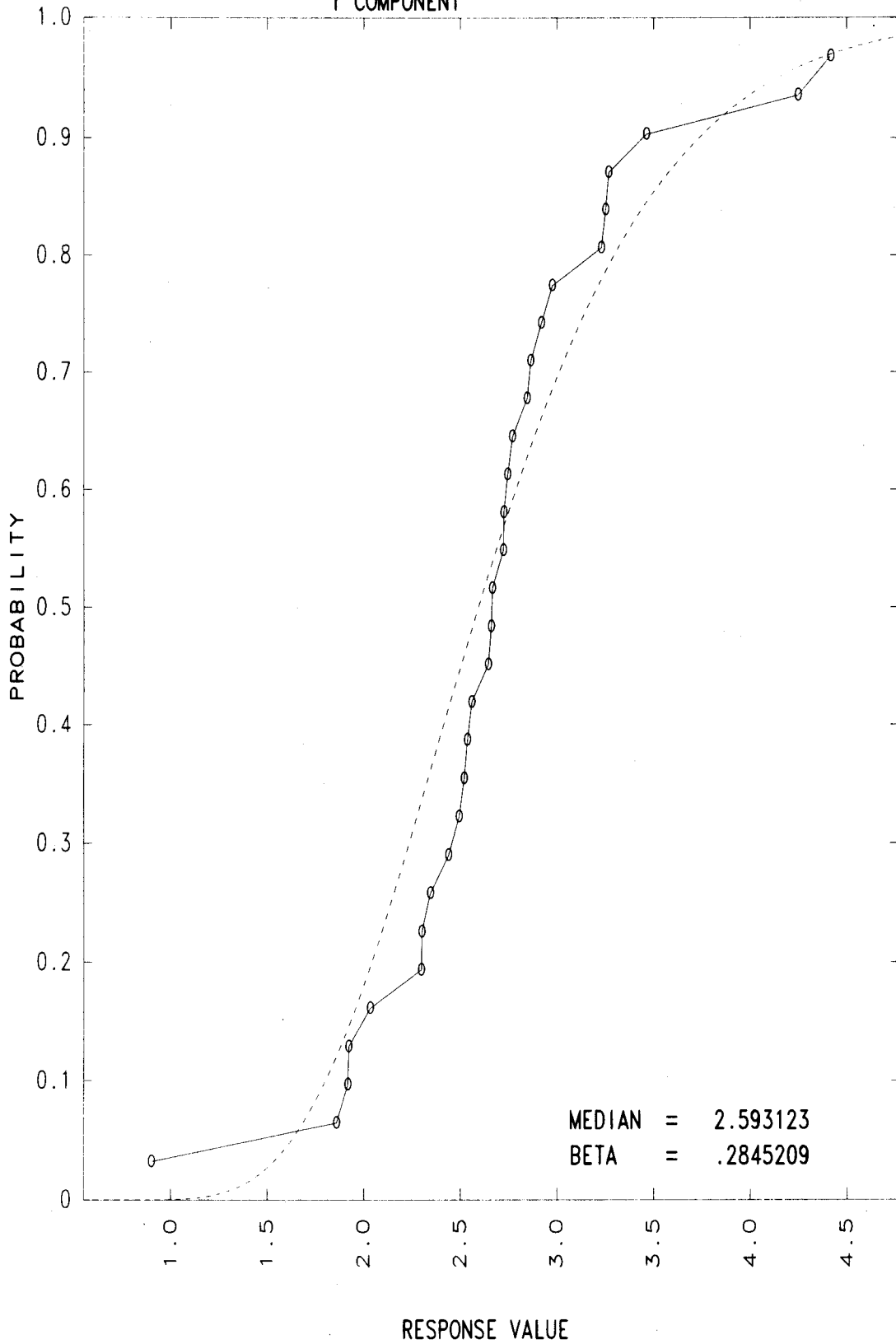
	LOG MEAN	LOG STD.DEV.	LINEAR MEAN	LINEAR COV	MEDIAN OF DATA	MEDIAN FR.LOG	IDENTY	NBE COUNT
1	.8191862E+00	.1799775E+00	.2303023E+01	.1710177E+00	.2334412E+01	.2268653E+01	20000010	
2	.1595699E+01	.2766778E+00	.5121043E+01	.2914497E+00	.5037485E+01	.4931777E+01	20000012	
3	.1357669E+01	.2586146E+00	.4007249E+01	.2413366E+00	.3988783E+01	.3887122E+01	20000013	
			....					
			....					
			....					
323	-.1501493E+02	.9720836E+00	.4511426E-06	.8881215E+00	.2835365E-06	.3013686E-06	10000019040	
324	-.1351647E+02	.9896369E+00	.2037033E-05	.9124335E+00	.1346730E-05	.1348569E-05	10000019050	
325	-.1489703E+02	.1066531E+01	.5399667E-06	.9487286E+00	.3788995E-06	.3390807E-06	10000019060	

PRESTO TEST FOR FIRST BERKELEY PROBLEM

SPECTRAL RESPONSE ACCEL FOR FOUNDATION 1

11:16:47 03/18/82

Y COMPONENT

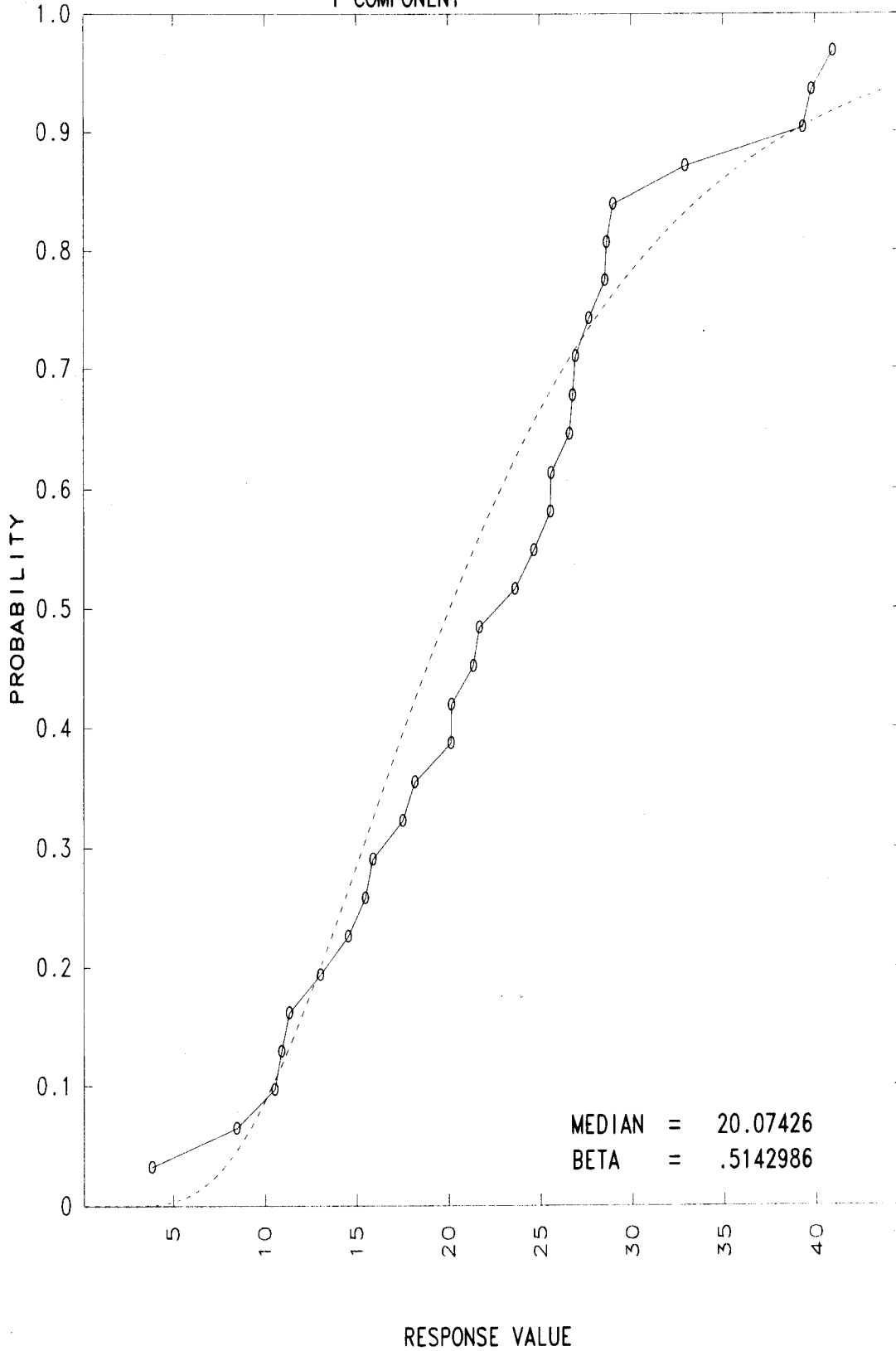


PRESTO TEST FOR FIRST BERKELEY PROBLEM

SPECTRAL RESPONSE STRUCTURE 1, NODE 21

11:16:47 03/18/82

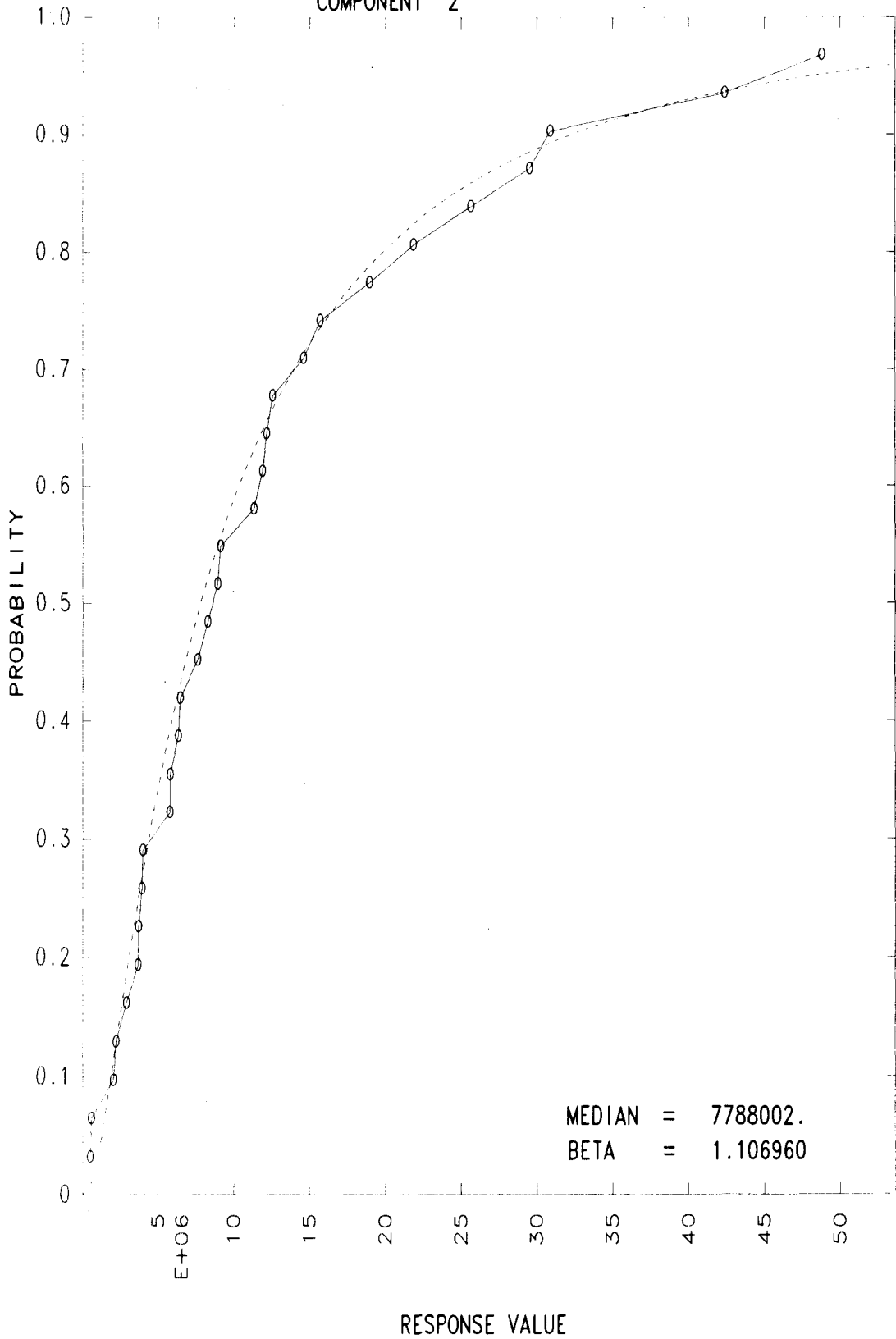
Y COMPONENT



PRESTO TEST FOR FIRST BERKELEY PROBLEM

PEAK RESPONSE STRUCTURE 1, ELEMENT 18  
COMPONENT 2

11:16:47 03/18/82



CHANGO INPUT AND OUTPUT  
for an SSI analysis.

1 D MON=1230 UXON BOX= BOX R38 STAN BUMPUS  
2 ST NCOL=13 FULL PC1=1 PC2=2  
3 RDS PRSOUTA V1=1 V2=2 V3=3 V4= 4 V5= 5 V6= 6  
4 RDS PRSOUTB V1=7 V2=8 V3=9 V4=10 V5=11 V6=12  
5 G 10  
6 S  
7 M 13 FROM 6 / 12 SCALEBY 1.3  
8 W 6 12  
9 I  
10 P 13 T1= TITLE FOR BERKELEY TEST, LINE 1 &  
11 T2= TITLE LINE 2 , RATIOES OF MEDIANS &  
12 YLAB= RATIO OF MEDIANS  
13 N  
14 C WE WILL NOW MAKE THE CROSS-PLOT OF THE MEDIANS  
15 N  
16 P 6 VS 12 T1= TITLE LINE 1 FOR BERKELEY TEST &  
17 T2= CROSS-PLOT OF MEDIANS FROM TWO DIFFERENT SMACS RUNS  
18 E

	IDENTY	6	12
1	20000010	2.268653	2.268653
2	20000012	4.931777	4.931777
3	20000013	3.887122	3.887122
4	20000014	2.773578	2.773578
5	20000020	2.195907	2.195907
6	20000022	4.607657	4.607657
7	20000023	3.590315	3.590315
8	20000024	2.682156	2.682156
9	20000030	1.193606	1.193606
10	20000032	1.988295	1.988295
11	20000033	1.990164	1.990164
12	20000034	1.498033	1.498033
13	0	0.	0.
14	0	0.	0.
15	0	0.	0.
16	0	0.	0.
17	0	0.	0.
18	0	0.	0.
19	0	0.	0.
20	0	0.	0.
21	0	0.	0.
22	0	0.	0.
23	30001010	2.287339	2.253846
24	30001012	5.562811	5.856027
25	30001013	3.922380	3.939350
26	30001014	2.766530	2.742742
27	30001020	2.144013	2.177894
28	30001022	5.192577	5.479728
29	30001023	3.686578	3.748390
30	30001024	2.593123	2.615437
31	30001030	1.088830	1.097583
32	30001032	2.464816	2.433445
33	30001033	2.275294	2.180368
34	30001034	1.419234	1.446130
35	30001040	1.4646440E-02	1.5693950E-02
36	30001042	3.8560400E-02	4.2228730E-02
37	30001043	2.3511670E-02	2.5184650E-02
38	30001044	1.7275800E-02	1.8575760E-02
39	30001050	1.6029800E-02	1.5977160E-02
40	30001052	4.2239460E-02	4.3766950E-02
41	30001053	2.5012950E-02	2.5508910E-02
42	30001054	1.8536890E-02	1.9188180E-02
43	30001060	6.9849200E-05	7.0798480E-05
44	30001062	1.6507370E-04	1.6632210E-04
45	30001063	1.4130090E-04	1.3829100E-04
46	30001064	1.1181120E-04	1.1015260E-04
47	0	0.	0.
48	0	0.	0.
49	0	0.	0.
50	0	0.	0.
51	0	0.	0.
52	0	0.	0.
53	0	0.	0.
54	0	0.	0.
55	0	0.	0.
56	0	0.	0.
57	10010008010	2.287525	2.253946
58	10010008011	7.249539	7.623461
59	10010009010	2.291507	2.257455

This printout was generated  
by the command "W 6 12"  
from input line 8.

343	10000017060	6.9129530E-08	7.2145970E-08
344	10000018060	1.2164810E+09	1.3208490E+09
345	10000019060	3.3908070E-07	3.6534190E-07

FREE FIELD RESPONSES  
(PEAK ACCELERATION)

RESPONSE      DIRECTION  
NUMBER

1	X
2	X
3	X
4	X
5	Y
6	Y
7	Y
8	Y
9	Z
10	Z
11	Z
12	Z

This plotted output was  
generated by the command  
"I" from input line 9.

STRUCTURAL ACCELERATION RESPONSES

RESPONSE NUMBER	LOCATION		DIRECTION	RESPONSE TYPE
23	FOUNDATION	1	X	PEAK ACCEL
24	FOUNDATION	1	X	SPEC (F,D)
25	FOUNDATION	1	X	SPEC 8 HZ
26	FOUNDATION	1	X	SPEC 16 HZ
27	FOUNDATION	1	Y	PEAK ACCEL
28	FOUNDATION	1	Y	SPEC (F,D)
29	FOUNDATION	1	Y	SPEC 8 HZ
30	FOUNDATION	1	Y	SPEC 16 HZ
31	FOUNDATION	1	Z	PEAK ACCEL
32	FOUNDATION	1	Z	SPEC (F,D)
33	FOUNDATION	1	Z	SPEC 8 HZ
34	FOUNDATION	1	Z	SPEC 16 HZ
35	FOUNDATION	1	XX	PEAK ACCEL
36	FOUNDATION	1	XX	SPEC (F,D)

37	FOUNDATION	1	XX	SPEC	8 HZ
38	FOUNDATION	1	XX	SPEC	16 HZ
39	FOUNDATION	1	YY	PEAK	ACCEL
40	FOUNDATION	1	YY	SPEC	(F,D)
41	FOUNDATION	1	YY	SPEC	8 HZ
42	FOUNDATION	1	YY	SPEC	16 HZ
43	FOUNDATION	1	ZZ	PEAK	ACCEL
44	FOUNDATION	1	ZZ	SPEC	(F,D)
45	FOUNDATION	1	ZZ	SPEC	8 HZ
46	FOUNDATION	1	ZZ	SPEC	16 HZ
57	STRUCT. 1	NODE 8	X	PEAK	ACCEL
58	STRUCT. 1	NODE 8	X	SPEC	(F,D)
59	STRUCT. 1	NODE 9	X	PEAK	ACCEL
60	STRUCT. 1	NODE 9	X	SPEC	(F,D)
61	STRUCT. 1	NODE 10	X	PEAK	ACCEL
62	STRUCT. 1	NODE 10	X	SPEC	(F,D)
63	STRUCT. 1	NODE 11	X	PEAK	ACCEL
64	STRUCT. 1	NODE 11	X	SPEC	(F,D)
65	STRUCT. 1	NODE 12	X	PEAK	ACCEL
66	STRUCT. 1	NODE 12	X	SPEC	(F,D)
67	STRUCT. 1	NODE 13	X	PEAK	ACCEL
68	STRUCT. 1	NODE 13	X	SPEC	(F,D)
69	STRUCT. 1	NODE 14	X	PEAK	ACCEL
70	STRUCT. 1	NODE 14	X	SPEC	(F,D)
71	STRUCT. 1	NODE 15	X	PEAK	ACCEL
72	STRUCT. 1	NODE 15	X	SPEC	(F,D)
73	STRUCT. 1	NODE 16	X	PEAK	ACCEL
74	STRUCT. 1	NODE 16	X	SPEC	(F,D)
75	STRUCT. 1	NODE 17	X	PEAK	ACCEL
76	STRUCT. 1	NODE 17	X	SPEC	(F,D)
77	STRUCT. 1	NODE 18	X	PEAK	ACCEL
78	STRUCT. 1	NODE 18	X	SPEC	(F,D)
79	STRUCT. 1	NODE 19	X	PEAK	ACCEL
80	STRUCT. 1	NODE 19	X	SPEC	(F,D)
81	STRUCT. 1	NODE 20	X	PEAK	ACCEL
82	STRUCT. 1	NODE 20	X	SPEC	(F,D)
83	STRUCT. 1	NODE 21	X	PEAK	ACCEL
84	STRUCT. 1	NODE 21	X	SPEC	(F,D)
85	STRUCT. 1	NODE 8	Y	PEAK	ACCEL
86	STRUCT. 1	NODE 8	Y	SPEC	(F,D)
87	STRUCT. 1	NODE 9	Y	PEAK	ACCEL

88	STRUCT.	1	NODE	9	Y	SPEC (F,D)
89	STRUCT.	1	NODE	10	Y	PEAK ACCEL
90	STRUCT.	1	NODE	10	Y	SPEC (F,D)
91	STRUCT.	1	NODE	11	Y	PEAK ACCEL
92	STRUCT.	1	NODE	11	Y	SPEC (F,D)
93	STRUCT.	1	NODE	12	Y	PEAK ACCEL
94	STRUCT.	1	NODE	12	Y	SPEC (F,D)
95	STRUCT.	1	NODE	13	Y	PEAK ACCEL
96	STRUCT.	1	NODE	13	Y	SPEC (F,D)
97	STRUCT.	1	NODE	14	Y	PEAK ACCEL
98	STRUCT.	1	NODE	14	Y	SPEC (F,D)
99	STRUCT.	1	NODE	15	Y	PEAK ACCEL
100	STRUCT.	1	NODE	15	Y	SPEC (F,D)
101	STRUCT.	1	NODE	16	Y	PEAK ACCEL
102	STRUCT.	1	NODE	16	Y	SPEC (F,D)
103	STRUCT.	1	NODE	17	Y	PEAK ACCEL
104	STRUCT.	1	NODE	17	Y	SPEC (F,D)
105	STRUCT.	1	NODE	18	Y	PEAK ACCEL
106	STRUCT.	1	NODE	18	Y	SPEC (F,D)
107	STRUCT.	1	NODE	19	Y	PEAK ACCEL
108	STRUCT.	1	NODE	19	Y	SPEC (F,D)
109	STRUCT.	1	NODE	20	Y	PEAK ACCEL
110	STRUCT.	1	NODE	20	Y	SPEC (F,D)
111	STRUCT.	1	NODE	21	Y	PEAK ACCEL
112	STRUCT.	1	NODE	21	Y	SPEC (F,D)
113	STRUCT.	1	NODE	8	Z	PEAK ACCEL
114	STRUCT.	1	NODE	8	Z	SPEC (F,D)
115	STRUCT.	1	NODE	9	Z	PEAK ACCEL
116	STRUCT.	1	NODE	9	Z	SPEC (F,D)
117	STRUCT.	1	NODE	10	Z	PEAK ACCEL
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119	STRUCT.	1	NODE	11	Z	PEAK ACCEL
120	STRUCT.	1	NODE	11	Z	SPEC (F,D)
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123	STRUCT.	1	NODE	13	Z	PEAK ACCEL
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125	STRUCT.	1	NODE	14	Z	PEAK ACCEL
126	STRUCT.	1	NODE	14	Z	SPEC (F,D)
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128	STRUCT.	1	NODE	15	Z	SPEC (F,D)

129	STRUCT.	1	NODE	16	Z	PEAK	ACCEL
130	STRUCT.	1	NODE	16	Z	SPEC	(F,D)
131	STRUCT.	1	NODE	17	Z	PEAK	ACCEL
132	STRUCT.	1	NODE	17	Z	SPEC	(F,D)
133	STRUCT.	1	NODE	18	Z	PEAK	ACCEL
134	STRUCT.	1	NODE	18	Z	SPEC	(F,D)
135	STRUCT.	1	NODE	19	Z	PEAK	ACCEL
136	STRUCT.	1	NODE	19	Z	SPEC	(F,D)
137	STRUCT.	1	NODE	20	Z	PEAK	ACCEL
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139	STRUCT.	1	NODE	21	Z	PEAK	ACCEL
140	STRUCT.	1	NODE	21	Z	SPEC	(F,D)
141	STRUCT.	1	NODE	8	XX	PEAK	ACCEL
142	STRUCT.	1	NODE	8	XX	SPEC	(F,D)
143	STRUCT.	1	NODE	9	XX	PEAK	ACCEL
144	STRUCT.	1	NODE	9	XX	SPEC	(F,D)
145	STRUCT.	1	NODE	10	XX	PEAK	ACCEL
146	STRUCT.	1	NODE	10	XX	SPEC	(F,D)
147	STRUCT.	1	NODE	11	XX	PEAK	ACCEL
148	STRUCT.	1	NODE	11	XX	SPEC	(F,D)
149	STRUCT.	1	NODE	12	XX	PEAK	ACCEL
150	STRUCT.	1	NODE	12	XX	SPEC	(F,D)
151	STRUCT.	1	NODE	13	XX	PEAK	ACCEL
152	STRUCT.	1	NODE	13	XX	SPEC	(F,D)
153	STRUCT.	1	NODE	14	XX	PEAK	ACCEL
154	STRUCT.	1	NODE	14	XX	SPEC	(F,D)
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156	STRUCT.	1	NODE	15	XX	SPEC	(F,D)
157	STRUCT.	1	NODE	16	XX	PEAK	ACCEL
158	STRUCT.	1	NODE	16	XX	SPEC	(F,D)
159	STRUCT.	1	NODE	17	XX	PEAK	ACCEL
160	STRUCT.	1	NODE	17	XX	SPEC	(F,D)
161	STRUCT.	1	NODE	18	XX	PEAK	ACCEL
162	STRUCT.	1	NODE	18	XX	SPEC	(F,D)
163	STRUCT.	1	NODE	19	XX	PEAK	ACCEL
164	STRUCT.	1	NODE	19	XX	SPEC	(F,D)
165	STRUCT.	1	NODE	20	XX	PEAK	ACCEL
166	STRUCT.	1	NODE	20	XX	SPEC	(F,D)
167	STRUCT.	1	NODE	21	XX	PEAK	ACCEL
168	STRUCT.	1	NODE	21	XX	SPEC	(F,D)
169	STRUCT.	1	NODE	8	YY	PEAK	ACCEL

170	STRUCT.	1	NODE	8	YY	SPEC (F,D)
171	STRUCT.	1	NODE	9	YY	PEAK ACCEL
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173	STRUCT.	1	NODE	10	YY	SPEC (F,D)
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193	STRUCT.	1	NODE	20	YY	SPEC (F,D)
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195	STRUCT.	1	NODE	21	YY	SPEC (F,D)
196	STRUCT.	1	NODE	8	ZZ	PEAK ACCEL
197	STRUCT.	1	NODE	8	ZZ	SPEC (F,D)
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199	STRUCT.	1	NODE	9	ZZ	SPEC (F,D)
200	STRUCT.	1	NODE	10	ZZ	PEAK ACCEL
201	STRUCT.	1	NODE	10	ZZ	SPEC (F,D)
202	STRUCT.	1	NODE	10	ZZ	SPEC 8 HZ
203	STRUCT.	1	NODE	10	ZZ	SPEC 16 HZ
204	STRUCT.	1	NODE	11	ZZ	PEAK ACCEL
205	STRUCT.	1	NODE	11	ZZ	SPEC (F,D)
206	STRUCT.	1	NODE	12	ZZ	PEAK ACCEL
207	STRUCT.	1	NODE	12	ZZ	SPEC (F,D)
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209	STRUCT.	1	NODE	13	ZZ	SPEC (F,D)
210	STRUCT.	1	NODE	14	ZZ	PEAK ACCEL

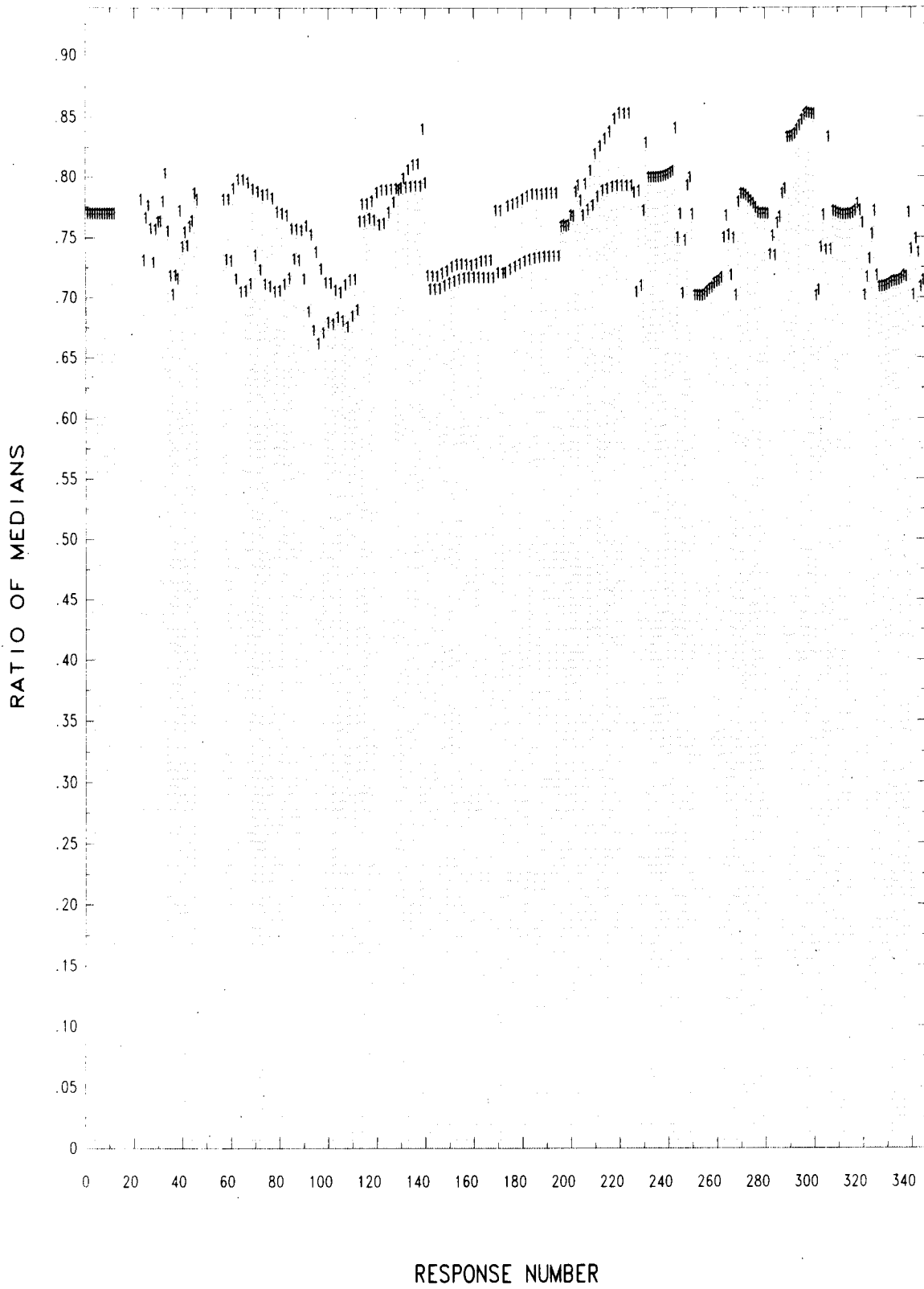
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212	STRUCT.	1	NODE	15	ZZ	PEAK ACCEL
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214	STRUCT.	1	NODE	16	ZZ	PEAK ACCEL
215	STRUCT.	1	NODE	16	ZZ	SPEC (F,D)
216	STRUCT.	1	NODE	17	ZZ	PEAK ACCEL
217	STRUCT.	1	NODE	17	ZZ	SPEC (F,D)
218	STRUCT.	1	NODE	18	ZZ	PEAK ACCEL
219	STRUCT.	1	NODE	18	ZZ	SPEC (F,D)
220	STRUCT.	1	NODE	19	ZZ	PEAK ACCEL
221	STRUCT.	1	NODE	19	ZZ	SPEC (F,D)
222	STRUCT.	1	NODE	20	ZZ	PEAK ACCEL
223	STRUCT.	1	NODE	20	ZZ	SPEC (F,D)
224	STRUCT.	1	NODE	21	ZZ	PEAK ACCEL
225	STRUCT.	1	NODE	21	ZZ	SPEC (F,D)
226	STRUCT.	1			X	BASE FORCE
227	STRUCT.	1			Y	BASE FORCE
228	STRUCT.	1			Z	BASE FORCE
229	STRUCT.	1			XX	BASE FORCE
230	STRUCT.	1			YY	BASE FORCE
231	STRUCT.	1			ZZ	BASE FORCE
232	STRUCT.	1	ELEM	1	1	PEAK FORCE
233	STRUCT.	1	ELEM	2	1	PEAK FORCE
234	STRUCT.	1	ELEM	3	1	PEAK FORCE
235	STRUCT.	1	ELEM	4	1	PEAK FORCE
236	STRUCT.	1	ELEM	5	1	PEAK FORCE
237	STRUCT.	1	ELEM	6	1	PEAK FORCE
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239	STRUCT.	1	ELEM	8	1	PEAK FORCE
240	STRUCT.	1	ELEM	9	1	PEAK FORCE
241	STRUCT.	1	ELEM	10	1	PEAK FORCE
242	STRUCT.	1	ELEM	11	1	PEAK FORCE
243	STRUCT.	1	ELEM	12	1	PEAK FORCE
244	STRUCT.	1	ELEM	13	1	PEAK FORCE
245	STRUCT.	1	ELEM	14	1	PEAK FORCE
246	STRUCT.	1	ELEM	15	1	PEAK FORCE
247	STRUCT.	1	ELEM	16	1	PEAK FORCE
248	STRUCT.	1	ELEM	17	1	PEAK FORCE
249	STRUCT.	1	ELEM	18	1	PEAK FORCE
250	STRUCT.	1	ELEM	19	1	PEAK FORCE
251	STRUCT.	1	ELEM	1	2	PEAK FORCE

252	STRUCT.	1	ELEM	2	2	PEAK FORCE
253	STRUCT.	1	ELEM	3	2	PEAK FORCE
254	STRUCT.	1	ELEM	4	2	PEAK FORCE
255	STRUCT.	1	ELEM	5	2	PEAK FORCE
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257	STRUCT.	1	ELEM	7	2	PEAK FORCE
258	STRUCT.	1	ELEM	8	2	PEAK FORCE
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266	STRUCT.	1	ELEM	16	2	PEAK FORCE
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269	STRUCT.	1	ELEM	19	2	PEAK FORCE
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272	STRUCT.	1	ELEM	3	3	PEAK FORCE
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275	STRUCT.	1	ELEM	6	3	PEAK FORCE
276	STRUCT.	1	ELEM	7	3	PEAK FORCE
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292	STRUCT.	1	ELEM	4	4	PEAK FORCE

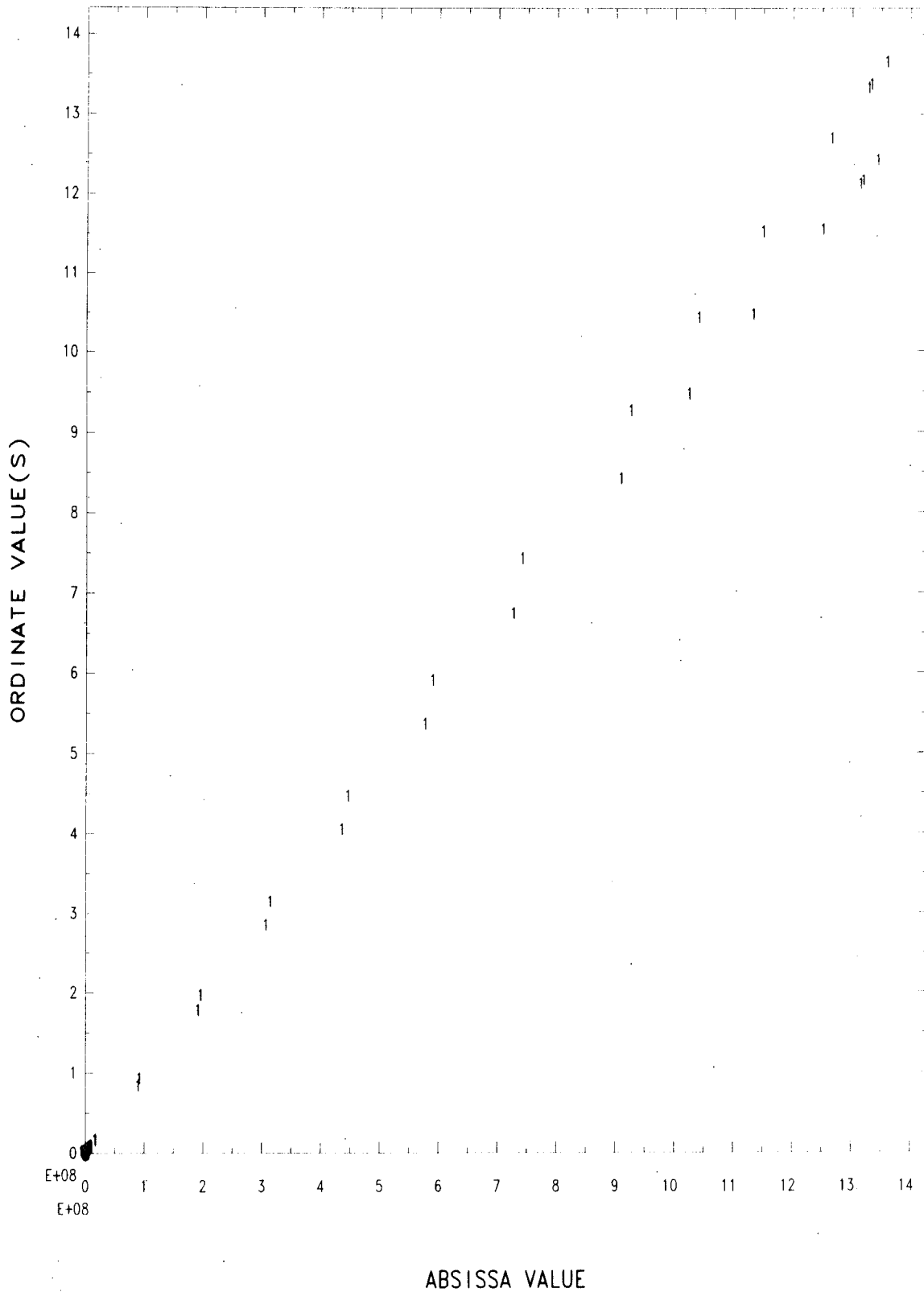
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305	STRUCT.	1	ELEM	17	4	PEAK FORCE
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311	STRUCT.	1	ELEM	4	5	PEAK FORCE
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313	STRUCT.	1	ELEM	6	5	PEAK FORCE
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316	STRUCT.	1	ELEM	9	5	PEAK FORCE
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322	STRUCT.	1	ELEM	15	5	PEAK FORCE
323	STRUCT.	1	ELEM	16	5	PEAK FORCE
324	STRUCT.	1	ELEM	17	5	PEAK FORCE
325	STRUCT.	1	ELEM	18	5	PEAK FORCE
326	STRUCT.	1	ELEM	19	5	PEAK FORCE
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328	STRUCT.	1	ELEM	2	6	PEAK FORCE
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330	STRUCT.	1	ELEM	4	6	PEAK FORCE
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332	STRUCT.	1	ELEM	6	6	PEAK FORCE
333	STRUCT.	1	ELEM	7	6	PEAK FORCE

334	STRUCT.	1	ELEM	8	6	PEAK FORCE
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342	STRUCT.	1	ELEM	16	6	PEAK FORCE
343	STRUCT.	1	ELEM	17	6	PEAK FORCE
344	STRUCT.	1	ELEM	18	6	PEAK FORCE
345	STRUCT.	1	ELEM	19	6	PEAK FORCE

TITLE FOR BERKELEY TEST, LINE 1  
TITLE LINE 2 , RATIOS OF MEDIANS



TITLE LINE 1 FOR BERKELEY TEST  
CROSS-PLOT OF MEDIANS FROM TWO DIFFERENT SMACS RUNS



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4

1

2

1



APPENDIX

How to Use the LBL Computer System

```

XXXX      XX      XX      XXXXXXXXXXXX      XXXXXXXXXXXX      XXXXXXX
XX        XXX      XX      XXXXXXXXXXXX      XXXXXXXXXXXX      XXXXXXXXXXX
XX        XXXX     XX      XX              XX      XX              XX      XX
XX        XXXXX    XX      XX              XX      XX              XX      XX
XX        XX XXX   XX      XX              XX      XXXXXXXXXXXX     XX      XX
XX        XX  XXX  XX      XX              XX      XXXXXXXXXXXX     XX      XX
XX        XX   XXXXX  XX      XX              XX      XX              XX      XX
XX        XX     XXXX  XX      XX              XX      XX              XX      XX
XX        XX      XXX  XX      XX              XX      XX              XX      XX
XXXX      XX        XX      XX              XX      XX              XXXXXXXX

```

**USERS' INTRODUCTION**

TO THE

**LAWRENCE BERKELEY LABORATORY**

**COMPUTING FACILITY**

**28 OCTOBER 1980**

\*\*\*\*\*

TO GET A COPY OF THIS WRITEUP...

```

<JOB CARD>
LIBCOPY,WRITEUPS,OUT,INTRO.
DISPOSE,OUT=PR,DT=I,PA=1F.(USE PA=1F AT BKV ONLY)
<END-OF-JOB CARD>

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## INTRODUCTION

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THIS MANUAL IS AN INTRODUCTORY GUIDE TO THE USE OF THE LAWRENCE BERKELEY LABORATORY COMPUTING FACILITY (BKY). IT DESCRIBES THE HARDWARE, SOFTWARE, AND SERVICE FACILITIES AVAILABLE, AND PRESENTS THE BASIC INFORMATION YOU NEED TO BEGIN USING THE SYSTEM INCLUDING SHORT DISCUSSIONS OF JOB INPUT (FOR BATCH PROCESSING AND INTERACTIVE COMPUTING), DATA STORAGE MEDIA, AND OUTPUT FACILITIES. TO ESTABLISH INITIAL CONTACT FOR USING THE BKY COMPUTERS (SETTING UP AN ACCOUNT, ETC.), PLEASE CONTACT ERIC BEALS (RM. 2232D, BLDG. 50B, EXT. 5351). ANY SUGGESTIONS CONCERNING DOCUMENTATION OR GUIDANCE IN USING THE COMPUTING FACILITIES SHOULD BE DIRECTED TO JOAN FRANZ (RM. 1140B, BLDG. 50A, EXT. 6204).

## ADMINISTRATION

THE LAWRENCE BERKELEY LABORATORY COMPUTING FACILITY IS PART OF THE ENGINEERING AND TECHNICAL SERVICES DIVISION OF THE LABORATORY. ADMINISTRATION OF THE GROUP IS DIVIDED AS FOLLOWS.

NAME	EXT.	ROOM	BLDG.	FUNCTION
DAVID F. STEVENS	6363	2232E	50B	DEPARTMENT HEAD
PAUL A. RHODES	5224	2232C	50B	ASSISTANT DEPARTMENT HEAD
JOAN F. FRANZ	6204	1140B	50A	SOFTWARE SUPPORT AND DEVELOPMENT
MARVIN F. ATCHLEY	5455	2262A	50B	COMPUTER OPERATIONS
ROBERT L. FINK	5692	2248	50B	HARDWARE DEVELOPMENT

## TELEPHONE NUMBERS

TELEPHONE NUMBERS LISTED IN THIS MANUAL ARE THE LAWRENCE BERKELEY LABORATORY EXTENSIONS. FROM ANY TELEPHONE WITHIN THE LABORATORY, YOU MAY SIMPLY DIAL THE FOUR DIGIT EXTENSION. TO DIAL AN LBL EXTENSION VIA FTS (FEDERAL TELEPHONE SYSTEM), PREFIX THE EXTENSION WITH 451. TO DIAL DIRECT, THE NUMBER IS (415) 486-**<FOUR DIGIT EXTENSION>**. THE MAIN LABORATORY SWITCHBOARD NUMBER IS (415) 486-4000.

## SOURCES OF INFORMATION

THERE ARE MANY SOURCES OF FURTHER INFORMATION ABOUT THE LBL COMPUTING FACILITY AND ITS USE. PLEASE REFER TO CHAPTER 4 (USER SERVICES) FOR AN INVENTORY OF THESE RESOURCES.

► SYSTEM HARDWARE  
-----

THE LAWRENCE BERKELEY LABORATORY COMPUTING FACILITY IS EQUIPPED WITH A CDC 7600, A CDC 6600, AND A CDC 6400. THESE MACHINES ALL HAVE A 60-BIT WORD SIZE. THE 7600 HAS 65,536 (DECIMAL) WORDS OF SMALL CORE MEMORY AND 512,000 (DECIMAL) WORDS OF LARGE CORE MEMORY. THE 6600 HAS 131,072 (DECIMAL) WORDS OF MEMORY. THE 7600 IS SERVED BY ONE OR MORE 6000 I/O STATIONS, NORMALLY THE 6400, WHICH HAS 131,072 (60 BIT) WORDS. THE 6600 CAN ALSO SERVE AS A 7600 STATION IN ADDITION TO CARRYING ITS NORMAL LOAD. THE 7600 IS CONSIDERED TO BE THE PRIMARY BATCH MACHINE. THE 6600 IS CONSIDERED TO BE THE PRIMARY INTERACTIVE MACHINE. THE 6400 NORMALLY PROVIDES JOB INPUT AND UNIT RECORD OUTPUT PROCESSING FOR THE 7600 AND 6600 AS WELL AS PROVIDING INTERACTIVE ACCESS.

TEMPORARY FILE STORAGE FOR THE 7600 IS PROVIDED BY TWO CDC 819 DISKS, WITH AN ACCESS TIME OF 25-110 MSECS. AND A TOTAL CAPACITY OF 160,000,000 WORDS. TEMPORARY FILES FOR THE 6600 ARE STORED ON CDC 841 AND 844 MULTIPLE SPINDLE DISKS, WHICH WILL HOLD 25 AND 96 MILLION WORDS RESPECTIVELY. UP TO ABOUT 3 MILLION WORDS MAY BE USED BY AN EXECUTING 6600 JOB (EXCLUDING CERTAIN FILES SUCH AS OUTPUT, PUNCH, PUNCHB, AND PLOT). UP TO ABOUT 30 MILLION WORDS MAY BE USED ON THE 7600 BY ANY ONE COMPUTER JOB.

PERMANENT STORAGE IS AVAILABLE ON MAGNETIC TAPE AND THE RANDOM ACCESS IBM PLUG-COMPATIBLE DOUBLE DENSITY 3350 PSS DISKS (439,560,000 60-BIT WORDS). IN ADDITION, THE CDC 819 DISKS CONTAIN A LIMITED AMOUNT OF HIGH USE SEMI-PERMANENT FILE SPACE. THE INSTALLATION IS EQUIPPED WITH THREE DIFFERENT TYPES OF TAPE DRIVES -- 4 CDC 607 SEVEN TRACK DRIVES WITH DENSITIES 200, 556, AND 800 BPI (BYTES PER INCH), 4 STC NINE TRACK DRIVES WITH DENSITIES 800 AND 1600 BPI, AND 10 STC NINE TRACK DRIVES WITH DENSITIES 1600 AND 6250 BPI. TO FACILITATE THE PROCESSING OF THE FREQUENTLY USED 6250 BPI GSS TAPES, CALCOMP'S AUTOMATED TAPE LIBRARY (ATL), WHICH AUTOMATICALLY MOUNTS TAPES VIA A ROBOT, HAS BEEN INSTALLED. ALL FILES REFERENCED BY A 7600 JOB MUST RESIDE ON A 819 DISK. THAT IS, FILES USED FOR INPUT MUST BE TRANSFERRED TO A 819 DISK BEFORE USING THEM AND FILES USED FOR OUTPUT MUST BE TRANSFERRED FROM THE DISK AFTER THE FILES HAVE BEEN CREATED. THESE ACTIVITIES HAVE BEEN GIVEN THE NAME STAGING.

DATA MAY BE INPUT TO THE COMPUTERS VIA PUNCHED CARDS (USING ONE OF FOUR CDC 405 CARD READERS), INTERACTIVE TERMINALS, REMOTE JOB ENTRY STATIONS (RJE), MAGNETIC TAPE AND 7600 SEMI-PERMANENT DISK FILES.

OUTPUT FROM THE SYSTEM CAN BE OBTAINED IN PRINTED FORM (USING TWO CDC 512 LINE PRINTERS AND FIVE IBM 1403 LINE PRINTERS), ON MICROFILM, ON FOUR CALCOMP PLOTTERS OR ONE ZETA PLOTTER, ON MAGNETIC TAPES, ON PUNCHED CARDS (USING TWO CDC 415 CARD PUNCHES), ON PAPER TAPE (USING A CDC/NCR 3691 PAPER TAPE READ/PUNCH), TYPED ON A REMOTE TERMINAL, OR MAY BE DIRECTED TO A REMOTE BATCH STATION.

TO PROVIDE CONVENIENT DATA STORAGE AND HANDLING, ESPECIALLY FOR JOBS WITH LARGE VOLUMES OF OUTPUT, COMPUTER OUTPUT ON MICROFILM (COM) IS AVAILABLE. THE COM SYSTEM AT THE LBL COMPUTING FACILITY IS A STROMBERG DATAGRAPHIX MODEL 4460 WHICH PRODUCES MICROFICHE

(EASY-TO-HANDLE MICROFILM CARDS) AT 48X OR 24X REDUCTIONS, AS WELL AS MICROFILM OUTPUT IN 35MM AND 16MM STRIP FORM. WITH 48X REDUCTION UP TO 270 PAGES OF LINE PRINTER OUTPUT CAN FIT ON A SINGLE 4X6 INCH MICROFICHE. GRAPHIC AND ALPHANUMERIC OUTPUT ARE BOTH AVAILABLE.

FOUR CALCOMP MODEL 565 INCREMENTAL PLOTTERS (10 INCH DRUM) AND A ZETA 34 INCH PLOTTER ARE AVAILABLE FOR PRODUCING GRAPHIC OUTPUT. IN ADDITION, ALPHANUMERIC AND GRAPHIC OUTPUT MAY BE OBTAINED ON TWO CRT DISPLAY CONSOLES (TEKTRONIX 4014).

THE PIECES OF SYSTEM HARDWARE TO WHICH THE USER HAS DIRECT ACCESS ARE THE REMOTE TERMINALS, DISPLAY CONSOLES, CARD READERS AND PRINTERS IN THE READY ROOM (RM. 1232, BLDG. 509). INTERACTIVE TERMINALS AND A 3M TAPE CARTRIDGE SPOOLING STATION ARE LOCATED IN RM. 2259, BLDG. 508, AND A VARIETY OF REMOTE TERMINALS ARE PLACED AT VARIOUS LOCATIONS THROUGHOUT THE LABORATORY. ALTHOUGH MANY OF THE LBL TERMINALS IN HEAVY-USE LOCATIONS ARE DIRECTLY CONNECTED (HARD-WIRED) TO THE COMPUTEP SYSTEM, THE COMPUTING FACILITY IS ALSO EQUIPPED WITH TELEPHONE LINES FOR COMMUNICATION WITH REMOTE TERMINALS. WITH THIS DIAL-UP CAPABILITY, A REMOTE TERMINAL CAN BE CONNECTED TO THE SYSTEM SIMPLY BY TELEPHONING A DIAL-UP CONNECTION. DIAL-UP TERMINALS REQUIRE AN ACOUSTICALLY COUPLED DATA-SET, WESTERN ELECTRIC 103A COMPATIBLE.)

IN ADDITION TO INTERFACING WITH TERMINALS FOR INTERACTIVE COMPUTING AND REMOTE JOB ENTRY, THE BERKELEY INSTALLATION IS ALSO EQUIPPED WITH A REMOTE BATCH INTERFACE SYSTEM (UNIVERSITY COMPUTING COMPANY COPE CONTROLLER AND A BKY DESIGNED AND IMPLEMENTED COKE SYSTEM). USERS WHO HAVE REMOTE BATCH STATIONS AT THEIR OWN FACILITIES MAY SUBMIT BATCH JOBS AND RECEIVE PRINTED OUTPUT DIRECTLY WITHOUT TRAVELING OR SENDING COURIERS TO THE BERKELEY COMPUTING FACILITY. AT THE COMPUTING FACILITY, DIAL-UP MODEMS CONNECTED TO ORDINARY TELEPHONE LINES ARE AVAILABLE FOR USE BY REMOTE STATIONS. LEASED LINES MAY BE USED BY LARGE-VOLUME REMOTE USERS, AT THEIR EXPENSE.

ALONG WITH THE SYSTEMS COMPONENTS DESCRIBED HERE, A VARIETY OF OFF-LINE PERIPHERAL EQUIPMENT IS PROVIDED FOR ALL USERS OF THE COMPUTING FACILITY. THE READY ROOM ANNEX (RM. 1232A, BLDG. 509) IS EQUIPPED WITH IBM 029 CARD PUNCHES WHICH HAVE BEEN MODIFIED TO PRODUCE THE SAME RESULTS AS THE IBM 026 PUNCHES WITH THE FORTRAN H PLATE. DATA HANDLING AND TABULATING EQUIPMENT IS LOCATED ON THE FIRST FLOOR BETWEEN BUILDINGS 50A AND 50B. THIS EQUIPMENT INCLUDES AN IBM 1401 SYSTEM FOR OFF-LINE DATA TRANSFERS (TAPE TO CARDS, TAPE TO TAPE, TAPE TO LINE PRINTER, AND MANY OTHER OPERATIONS), AS WELL AS TWO IBM 519 REPRODUCING PUNCHES, TWO IBM 557 ALPHABETIC INTERPRETER, AN IBM 083 SORTER AND A 1740 PAPER BURSTER.

PUNCHED CARDS READ IN AT THE LAWRENCE BERKELEY LABORATORY COMPUTING FACILITY MUST CONFORM TO THE FORTRAN H STANDARD FORMAT (AS PRODUCED BY IBM 026 CARD PUNCHES). ALL KEY PUNCHES AT THE LBL COMPUTING FACILITY HAVE BEEN MODIFIED TO CONFORM. METHODS OF CONVERTING IBM AND CDC 029 CARD DECKS TO THE FORTRAN H FORMAT ARE DISCUSSED IN THE UTILITY CHAPTER OF THE BKY USERS' HANDBOOK. FOR FURTHER INFORMATION ON PUNCHED CARDS AND BKY DEFINITIONS OF PUNCHED CARD CODES, SEE EITHER THE CONTROL OR BC010 SUBSETS OF THE HANDBOOK.

**SYSTEM SOFTWARE**  
-----**OPERATING SYSTEMS**

THE OPERATING SYSTEMS AT THE LAWRENCE BERKELEY LABORATORY COMPUTING FACILITY HAVE EVOLVED FROM ORIGINAL CDC SYSTEMS. THE BKY 7600 SYSTEM HAS GROWN OUT OF THE CDC SCOPE 1 SYSTEM, AND THE 6000 SYSTEM HAS ITS ROOTS IN THE ORIGINAL CHIPPEWA OPERATING SYSTEM. BOTH HAVE BEEN TAILORED TO FIT THE PARTICULAR NEEDS OF THE BERKELEY INSTALLATION, AND ARE MAINTAINED BY A STAFF OF SYSTEM PROGRAMMERS AT THE LABORATORY.

THE OPERATING SYSTEMS ARE GIVEN NAMES WHICH CONSIST OF THE LETTERS BKY -- AN INTERNATIONAL CODE NAME DESIGNATING THE LBL COMPUTING FACILITY -- AND THE NUMBER OF THE LATEST SYSTEM VERSION. A RECENT VERSION OF THE 6000 SYSTEM, FOR EXAMPLE, WAS BKY72B.

IN ADDITION TO THE OPERATING SYSTEMS ON THE CDC COMPUTERS, THE LBL COMPUTER CENTER ALSO HAS A VERSION OF BELL LABS' UNIX OPERATING SYSTEM RUNNING ON A PDP 11/70 COMPUTER. ITS USE IS LIMITED TO DOCUMENT AND JOB PREPARATION TASKS. A MORE DETAILED DISCUSSION APPEARS AT THE END OF THIS SECTION.

**PROGRAMMING LANGUAGES**

THERE ARE FOUR FORTRAN COMPILERS IN USE AT BERKELEY. FTN4 (THE LATEST FTN VERSION 4 COMPILER FROM CDC) AND MNF4 (UNIVERSITY OF MINNESOTA FORTRAN COMPILER) ARE THE RECOMMENDED COMPILERS TO USE. MNF, (AN EARLIER VERSION OF MNF4), AND RUN76 (A BERKELEY-MODIFIED VERSION OF THE OLD CDC FUN COMPILER) ARE AVAILABLE BUT ARE NO LONGER SUPPORTED BY THE COMPUTER CENTER. THE WRITEUPS SUBSETS FTN4 AND MNF4 DISCUSS THE RELATIVE MERITS OF THESE COMPILERS. FUNDAMENTAL EXAMPLES OF FORTRAN USAGE ON THE 7600 MAY BE FOUND IN THE HANDBOOK SUBSET SAMPLES.

OTHER LANGUAGES WHICH YOU CAN USE AT THE LBL COMPUTING FACILITY ARE COBOL, SNOBOL, PASCAL, LISP, PL1, AND COMPASS (THE LAST IS AN ASSEMBLY LANGUAGE). REFER TO THE HANDBOOK FOR INFORMATION ON RUNNING JOBS IN THESE LANGUAGES.

### 3.1 JOB PROCESSING UNDER THE BKV OPERATING SYSTEMS

THE BKV SYSTEMS ARE FILE MANIPULATING SYSTEMS. THE USER CREATES FILES, READS, WRITES, AND COPIES FILES. HE/SHE LOADS, EXECUTES, REPOSITIONS, AND RELEASES FILES. FILES ARE ALWAYS REFERRED TO BY NAME, NOT BY DEVICE OR FUNCTION. THE FILE NAME IS SUPPLIED BY THE USER IN ALL BUT A FEW STANDARD CASES (INPUT, OUTPUT, PUNCH, ETC).

ON THE 7600, ALL FILES ARE ON ON DISK. WITH THE 6000'S, ALL FILES ARE DISK FILES UNLESS OTHERWISE SPECIFIED BY THE USER (E.G., BY REQUESTING A TAPE). THE FILE INPUT IS CREATED FROM THE JOB DECK SUBMITTED BY THE USER. ITS FIRST SECTION -- THE CONTROL CARDS -- SPECIFIES THE SEQUENCE OF OPERATIONS TO BE PERFORMED AS THE JOB IS PROCESSED (SEE JOB INPUT DECK SET-UP IN CHAPTER 6). THE OTHER SECTIONS (E.G., A FORTRAN PROGRAM DECK AND DATA DECK) MAY BE CONSIDERED DATA TO BE PROCESSED BY THE PROGRAMS SPECIFIED IN THE CONTROL RECORD.

**CONTROL CARDS**, FOR THE MOST PART, ARE PROGRAM CALLS. RATHER THAN SPECIFYING A FUNCTION FOR THE OPERATING SYSTEM TO PERFORM DIRECTLY, A CONTROL CARD CAUSES THE LOADING AND EXECUTION OF A PROGRAM WHICH RESIDES ON THE FILE WHOSE NAME IS SPECIFIED ON THE CONTROL CARD. THE ARGUMENTS, IF ANY, ARE PARAMETERS REQUIRED BY THAT PARTICULAR PROGRAM. THUS THE CONTROL CARDS **COPY** AND **REWIND**, FOR EXAMPLE, ARE ACTUALLY THE NAMES OF SYSTEM PROGRAMS WHICH CONTROL THE COPYING AND REWINDING OF FILES.

COMPILATION OF A PROGRAM PRODUCES OBJECT CODE ON A FILE WHICH, UNLESS OTHERWISE SPECIFIED BY THE USER, IS NAMED **LGO**. THE OBJECT PROGRAM MAY THEN BE LOADED AND EXECUTED BY THE **LGO** CONTROL CARD. IN FACT ANY DISK FILE, WHETHER CREATED BY THE SYSTEM OR BY THE USER, MAY BE EXECUTED BY SPECIFYING THE FILE NAME ON A CONTROL CARD. FILES ON OTHER MEDIA MUST BE COPIED TO DISK BEFORE DIRECT EXECUTION IS POSSIBLE.

THE FILE **OUTPUT** (A DISK FILE) CONTAINS THE STANDARD PRINT OUTPUT FOR A JOB. FORTRAN **PRINT** STATEMENTS REFER TO **OUTPUT**--THAT IS, THE CURRENT VALUES OF THE ARGUMENTS OF A **PRINT** STATEMENT ARE PLACED ON THE FILE **OUTPUT** (UNLESS DIRECTED ELSEWHERE BY THE PROGRAM HEADER CARD OR AN ARGUMENT ON THE CONTROL CARD). AT JOB TERMINATION, AN ABBREVIATED HISTORY OF THE JOB, CALLED THE **DAYFILE**, IS PLACED AT THE BEGINNING OF **OUTPUT**, AND EVERYTHING ON THE FILE **OUTPUT** IS PRINTED.

### 3.2 THE VARIOUS 6000 SUPPORTING SUBSYSTEMS

ONE OF THE TASKS OF THE 6000 SYSTEM IS THE SUPERVISION OF THE VARIOUS SUBSYSTEMS OF THE COMPUTING FACILITY - THE INPUT, OUTPUT, AND MASS STORAGE DEVICES, FOR EXAMPLE. SOME OF THESE MAJOR FEATURES ARE DESCRIBED BELOW.

#### AUTOMATIC TAPE FETCHING SYSTEM

AN AUTOMATIC TAPE FETCHING SCHEME HAS BEEN IMPLEMENTED AT THE LAWRENCE BERKELEY LABORATORY COMPUTING FACILITY. IT ALLOWS THE OPERATIONS STAFF TO KEEP TRACK OF, AND PROVIDE FAST SERVICE FOR, ABOUT 40,000 ACTIVE LIBRARY TAPES.

LIBRARY USE ANALYSIS SHOWS THAT FEWER THAN 7 PERCENT OF THE 40,000 ACTIVE TAPES ARE USED DURING ANY TWO WEEK PERIOD, AND CHANCES ARE THREE IN FOUR THAT IF A TAPE IS REQUESTED, IT HAS BEEN USED DURING THE PRECEDING TWO WEEKS. USING THIS INFORMATION, THE SYSTEM HAS BEEN DESIGNED TO GREATLY REDUCE BOTH THE AMOUNT OF TAPE HANDLING BY OPERATORS AND THE WAIT TIME FOR FETCHING TAPES FROM THE LIBRARY.

A HIGH CAPACITY (MORE THAN 1,000 REELS) TAPE RACK IS LOCATED IN THE CONSOLE AREA, AND ITS SLOTS ARE LABELED IN A THREE CHARACTER ALPHANUMERIC CODE. A SYSTEM PROGRAM ASSIGNS SLOTS TO ACTIVE LIBRARY TAPES, AND MONITORS THEIR USE. WHEN A LIBRARY TAPE IS REQUESTED, THE PROGRAM CHECKS TO DETERMINE IF THE TAPE IS ALREADY ON FILE IN THE CONSOLE RACK, AND IF IT IS, TELLS THE OPERATOR THE SLOT NUMBER VIA A DISPLAY. IF THE TAPE IS IN THE VAULT, A LABEL WILL BE PRINTED ON A TELETYPE GIVING THE LIBRARY NUMBER AND THE CONSOLE SLOT TO WHICH IT IS ASSIGNED. THE LABEL IS THEN AFFIXED TO THE TAPE AND THE TAPE IS SENT TO ITS CONSOLE SLOT WHERE IT WILL REMAIN UNTIL IT BECOMES THE LEAST ACTIVE TAPE IN THE RACK (PROBABLY SEVERAL WEEKS). TO USE THIS SYSTEM THE LIBRARY TAPE NUMBER MUST BE PLACED ON THE STAGE, STOTAPE, GETTAPE, OR REQUEST CARD IN THE SPECIFIED FORMAT (SEE THE HANDBOOK SUBSET SAMPLES).

THE COMPUTER CENTER HAS INSTALLED CALCOMP'S AUTOMATED TAPE LIBRARY (ATL) FOR USE IN CONJUNCTION WITH THE GETTAPE-STOTAPE SYSTEM (GSS). THE ATL CAN CONTAIN UP TO 2500 REELS OF 6250-BPI 9-TRACK MAGNETIC TAPES. THE TAPES ARE AUTOMATICALLY MOUNTED BY THE ATL ON ONE OF SEVERAL STC DRIVES ATTACHED TO IT IN RESPONSE TO REQUESTS INITIATED BY GSS CONTROL CARDS. (SEE THE WRITEUPS SUBSET GSS FOR MORE ON GSS.) ONCE THE ATL IS FILLED TO CAPACITY, IT WILL SERVE AS A CACHE FOR THE MOST RECENTLY USED GSS TAPES. SELDOM USED TAPES WILL MIGRATE TO THE TAPE VAULT AND BE REPLACED BY RECENTLY REQUESTED TAPES.

#### PROGRAM STORAGE SYSTEM (PSS)

THE PROGRAM STORAGE SYSTEM IS A PERMANENT FILE SYSTEM DESIGNED TO ACCOMMODATE MODERATE SIZED FILES WHICH ARE CHANGED OR USED RELATIVELY FREQUENTLY (E.G., USER PROGRAMS). INFORMATION IN THE PSS SYSTEM RESIDES ON THREE IBM PLUG-COMPATIBLE DOUBLE DENSITY 3350 DISKS.

EACH PSS DISK CONSISTS OF 5328 STRIPS. A STRIP IS DIVIDED INTO ALLOCATABLE UNITS OF 20 TRACKS (1/5 STRIP) AND EACH ALLOCATION UNIT CAN CONTAIN UP TO 5500 WORDS OF DATA. THERE IS NO LIMITATION ON FILE SIZE FOR INFORMATION STORED ON PSS (EXCEPT THE PRACTICAL LIMITATION OF AVAILABLE SPACE WITHIN THE SPACE ALLOCATED TO THE USER).

A PERMANENT FILE WITHIN THE PSS SYSTEM IS CALLED A SUBSET AND SUBSETS ARE GROUPED INTO LIBRARIES. YOU CAN GENERATE YOUR OWN STORAGE LIBRARY, READ OR COPY SUBSETS FROM YOUR LIBRARY, OR ALTER THE CONTENTS OF YOUR STORAGE LIBRARY. YOU CAN ALSO COPY FILES FROM THE VARIOUS PSS LIBRARIES AVAILABLE FOR GENERAL USE. FOR EXAMPLE, THE COMPUTING FACILITY PROGRAM LIBRARIES FOR THE 6000'S AND THE 7600 ARE STORED ON PSS. IN ADDITION, MANY PROGRAM WRITEUPS AND OTHER CURRENT DOCUMENTATION FOR THE SYSTEM ARE STORED IN THE PSS LIBRARIES **HANDBOOK** AND **WRITEUPS**. USE OF THE PSS SOFTWARE IS DESCRIBED IN THE **HANDBOOK** **SUBSET STORAGE** AND IN THE **WRITEUP PSS**, AND ADDITIONAL EXAMPLES ARE SHOWN IN THE **HANDBOOK SUBSET SAMPLES**.

#### REMOTE TERMINAL INTERFACE

THE **RECC** (REMOTE EQUIPMENT CONTROL COMPUTER) SYSTEM IS A COLLECTION OF HARDWARE AND SOFTWARE WHICH PROVIDES INTERACTIVE SERVICE TO BKV 6000 USERS. A FULLY DETAILED DESCRIPTION OF THE USE OF THE **RECC** SYSTEM, AS WELL AS INFORMATION ABOUT INTERACTIVE JOBS IN GENERAL, IS GIVEN IN THE **HANDBOOK SUBSET TTY**. **RECC** PROVIDES ACCESS TO SEVERAL TIME SHARING SYSTEMS, PERMITS USERS TO WRITE THEIR OWN INTERACTIVE 6000 PROGRAMS, AND RETURNS INFORMATION ABOUT THE STATUS OF JOBS RUNNING IN THE 6000'S AND THE 7600. THE PRINCIPAL SUBSYSTEM OPERATING UNDER **RECC** IS **SESAME**. IT IS DESCRIBED FURTHER IN THE CHAPTER ON INTERACTIVE JOBS, BELOW.

THE **RECC** SYSTEM HARDWARE CONSISTS OF TWO LARGE (28,000 12 BIT WORDS) PDP-8E COMPUTERS WHICH ARE CONNECTED TO THE 6000 SYSTEM THROUGH CHANNEL SYNCHRONIZERS. INTERACTIVE TERMINALS ARE CONNECTED TO THE PDP-8'S THROUGH A SET OF MULTIPLEXERS. THE MULTIPLEXERS GENERATE AN INTERRUPT TO THE PDP-8 WHENEVER A KEY ON THE TERMINAL IS PRESSED. A MAXIMUM OF 256 PORTS ARE AVAILABLE, ABOUT 65 OF WHICH MAY BE CONNECTED SIMULTANECUSLY IN FULL DUPLEX MODE. THE MOST FREQUENTLY USED TERMINALS ARE HIGH SPEED CRT'S (CATHODE RAY TUBE TERMINALS).

THE **RECC** SYSTEM SOFTWARE CONSISTS OF THE PDP-8 TELETYPE DRIVER, AND THE 6000 POLLING ROUTINES WHICH SWITCH MESSAGES BETWEEN THE 6000 COMPUTER AND THE PDP-8. THE PDP-8 TELETYPE DRIVER RESIDES PERMANENTLY IN THE PDP-8 SYSTEM, AND IS RESPONSIBLE FOR THE HANDLING OF INDIVIDUAL TELETYPE CHARACTERS THROUGH THE MULTIPLEXERS. EACH OF THE TELETYPE'S CONNECTED TO THE SYSTEM HAS TWO INPUT AND TWO OUTPUT BUFFERS IN THE PDP-8 MEMORY. INFORMATION IS TRANSFERRED BETWEEN THE PDP-8 BUFFER AND THE 6000, ONE LINE AT A TIME.

A 3M TAPE CARTRIDGE SPOOLING STATION IS AVAILABLE IN BLDG. 503, RM. 2259, TO ALLOW TAPE CARTRIDGES TO BE READ OR WRITTEN THROUGH **RECC**. FOR MORE INFORMATION CONTACT STEVEN OKI, EXT. 6497, OR JOHN WOOD, EXT. 5972.

### REMOTE BATCH SYSTEM

A REMOTE BATCH JOB ENTRY SYSTEM IS CONNECTED TO THE 6000'S. FROM A REMOTE BATCH STATION YOU MAY SUBMIT A PUNCHED CARD DECK TO BE RUN ON A CENTRAL COMPUTER AS A BATCH JOB. AFTER COMPLETION OF THE JOB ON THE CENTRAL COMPUTER THE PRINTED OUTPUT IS RETURNED TO THE ORIGINATING REMOTE BATCH STATION FOR PRINTING. SOME STATIONS MAY ALSO HAVE THE ABILITY TO SEND AND RECEIVE FILES TO BE PROCESSED ON OTHER PERIPHERALS (E.G., PLOTTER, CARD PUNCH, MAGNETIC TAPE).

THE REMOTE BATCH JOB ENTRY SYSTEM CONSISTS OF CONTROL COMPUTERS AND RELATED HARDWARE AND SOFTWARE WHICH PERFORM THE TASK OF INTERFACING REMOTE SITES TO THE CENTRAL COMPUTING FACILITY. THE REMOTE SITES ARE CONNECTED TO LBL OVER LEASED OR DIAL-UP LINES.

IF A LEASED LINE IS EMPLOYED, THE USER MUST SUPPORT THE COST OF THE INTERFACE AND MODEM AT THE LBL END AS WELL AS THE LEASED LINE, MODEM, AND REMOTE BATCH STATION AT HIS/HER END.

THE TYPES OF REMOTE BATCH STATION THAT MAY BE CONNECTED TO THE DIAL-UP PORTS INCLUDE THE CDC 200 UT AND THE UNIVAC 1004, OR ANY STATION THAT EMULATES EITHER OF THEM. HOWEVER, THE 1004-TYPE REMOTE BATCH STATION IS INCAPABLE OF RECEIVING MESSAGES (JOB STATUS, ETC.) FROM THE CENTRAL INSTALLATION. FOR THIS, AND OTHER REASONS, WE DISCOURAGE 1004-TYPE STATIONS.

THE LEASED LINE FACILITY SUPPORTS COPE FULL DUPLEX STATIONS AS WELL AS 200U/T- AND 1004-TYPE TERMINALS.

CURRENTLY THE REMOTE BATCH SYSTEM HAS 65 PORTS OPERATING. THIRTY ARE COKE 200U/T DEDICATED LINES, WHILE 10 LINES ARE DEDICATED TO COPE. IN ADDITION, THERE ARE A TOTAL OF 25 DIAL-UP LINES AVAILABLE FOR 200U/T USERS. FOURTEEN OF THESE ARE 4800 BPS LINES, 9 ARE 2000 BPS LINES AND 2 ARE 4800 BPS INTERCAMPUS LINES. THERE ARE 3 SPARE PORTS WHICH ARE USED AS TEMPORARY REPLACEMENTS FOR MALFUNCTIONING PORTS.

### 3.3 THE 7600 OPERATING SYSTEM

THE 7600 OPERATING SYSTEM IS BASED ON CDC'S 7600 SCOPE 1.1.6 SYSTEM. LOCAL MODIFICATIONS ARE CONTINUALLY BEING MADE BY THE BKY SYSTEMS STAFF AND RESIDENT CDC ANALYSTS.

THE BKY 7600 SYSTEM DOES NOT COMMUNICATE DIRECTLY WITH ANY INPUT OR OUTPUT DEVICE EXCEPT ITS OWN HIGH-SPEED DISKS. ALL INPUT DATA, WHETHER FROM TAPE, PSS, CARDS, OR WHATEVER, MUST BE TRANSFERRED TO THE DISK BEFORE IT CAN BE USED BY THE 7600. SIMILARLY, ALL 7600 OUTPUT GOES FIRST TO THE DISK AND MUST BE DELIVERED TO ITS FINAL DESTINATION BY THE SUPPORTING COMPUTER. THE COMPUTER THAT CARRIES OUT THE STAGING (THE SENDING AND RECEIVING OF DATA TO AND FROM THE 7600 DISK) IS KNOWN AS A **STATION**.

#### THE 6000 I/O STATIONS

THE 6000-SERIES COMPUTERS (6400 AND 6600) ARE THE I/O STATIONS FOR THE 7600. THEY RUN UNDER THE BKY 6000 SYSTEM. IT IS THROUGH THEM THAT 7600 JOBS CAN ACCESS THE VARIOUS BKY SUBSYSTEMS (PSS, GSS, MICROFILM, ETC).

#### 7600 DOCUMENTATION

THE 7600 SYSTEM, AS IMPLEMENTED AT LBL, IS DISCUSSED IN LOCALLY WRITTEN DOCUMENTATION. THE BKY USERS' HANDBOOK IS THE USER REFERENCE MANUAL, AND THE WRITEUP BKYNEWS LISTS CURRENT SYSTEM CHANGES AND KNOWN BUGS. OTHER WRITEUPS GIVE EXAMPLES OF CONTROL CARD SEQUENCES FOR USING VARIOUS OF THE BKY SUBSYSTEMS.

FOR FURTHER INFORMATION ON DOCUMENTATION SEE CHAPTER 4 (USER SERVICES).

**3.4 THE UNIX OPERATING SYSTEM**

THE UNIX OPERATING SYSTEM AVAILABLE ON THE LBL COMPUTER CENTER'S PDP 11/70 COMPUTER IS SIMILAR TO THAT AVAILABLE AT THE UNIVERSITY OF CALIFORNIA (BERKELEY CAMPUS) COMPUTER CENTER. IT IS USED PRIMARILY FOR DOCUMENT PREPARATION AND JOB PREPARATION FOR THE CDC 6000'S AND 7600. A LINK BETWEEN THE CDC 6000'S AND UNIX ALLOWS INPUT PREPARED ON UNIX TO BE SUBMITTED TO THE CDC 6000'S OR 7600, WITH OUTPUT OPTIONALLY RETURNED TO UNIX. NO PROGRAMMING LANGUAGES, SUCH AS FORTRAN, BASIC, ETC., OTHER THAN THE LANGUAGE C, ARE AVAILABLE. THE USE OF C IS LIMITED TO SUPPORTING THE DOCUMENT AND JOB PREPARATION TASKS. MANY 6000 INTERACTIVE USERS WILL FIND THEIR INTERACTIVE NEEDS BETTER SERVED ON UNIX THAN ON THE 6000'S.

THE UNIX SYSTEM IS AVAILABLE TO ANY LBL OR DOE-FUNDED OR DOE-RELATED USER WHO HAS A VALID LBL COMPUTER CENTER ACCOUNT NUMBER. BASIC INFORMATION WHICH DESCRIBES THE UNIX SYSTEM AND THE UNIX DOCUMENTATION CAN BE OBTAINED BY RUNNING THE FOLLOWING JOB ON THE CDC COMPUTERS -

```
<JOB CARD>  
LIBCOPY,WRITEUPS,OUT/RR,UNIX.  
DISPOSE,OUT=PR,PA=1F,DT=I. (USE PA=1F AT BKY ONLY)  
<END-OF-JOB CARD>
```

**4.1 SOURCES OF INFORMATION**

BKY PROVIDES A NUMBER OF SERVICES DESIGNED TO MAKE THE COMPUTER SYSTEM EASIER FOR YOU TO USE. THESE SERVICES, WHICH INCLUDE DOCUMENTATION, PROGRAMMING CONSULTANTS, A PROGRAM LIBRARY, A COMPUTING LIBRARY, COURSES, AND SEMINARS, ARE DESCRIBED BELOW.

**DOCUMENTATION****ON-LINE DOCUMENTATION**

IT IS NEARLY IMPOSSIBLE TO MAINTAIN UP-TO-DATE VERSIONS OF PRINTED MANUALS DOCUMENTING A COMPUTER FACILITY THAT IS EXTENSIVE, VARIED, AND SUBJECT TO CONTINUAL MODIFICATION. AT LBL, THE QUEST FOR A MORE FLEXIBLE MODE OF DOCUMENTATION HAS LED TO THE IMPLEMENTATION OF A DYNAMIC DOCUMENTS LIBRARY WHICH IS STORED ON THE PSS DISKS. IT HAS PROVEN PARTICULARLY SATISFACTORY FOR SEVERAL REASONS. FIRSTLY, ADDITIONS AND CHANGES TO THE LIBRARY CAN BE MADE WITHOUT THE DELAY AND EXPENSE OF PUBLISHING. THE PROCEDURE FOR MODIFYING THE LIBRARY HAS BEEN LARGELY AUTOMATED -- THE SETTING UP OF PAGE FORMATS, TABLES OF CONTENTS, AND INDEXES, FOR EXAMPLE, IS DONE FOR THE MOST PART BY THE COMPUTER. ANOTHER ADVANTAGE IS THAT THE WRITEUPS ARE VERY ACCESSIBLE. EVEN AT A REMOTE SITE THE USER CAN HAVE THE LATEST VERSION OF A DESIRED DOCUMENT PRINTED OUT AT ANY TIME.

THE FOLLOWING TABLE SHOWS DOCUMENTS STORED ON PSS WHICH CONTAIN FUNDAMENTAL INFORMATION ABOUT USING THE LBL 6000 AND 7600 SYSTEMS.

	I	SAMPLE CNTROL	I	BASIC REFERENCE	I	BUGS AND	I
	I	CARD SEQUENCES	I	MANUALS	I	CHANGES	I
	I		I		I		I
	-----I		-----I		-----I		-----I
	I		I		I		I
7600	I	SUBSET SAMPLES	I	BKY USERS' HANDBOOK	I		I
	I	IN HANDBOOK	I		I		I
	-----I		-----I		-----I	BKYNEWS	-----I
	I		I		I		I
6000	I	BASIC66	I	HANDBOOK/	I		I
	I		I	TTY	I		I
	I		I		I		I
	-----I		-----I		-----I		-----I

THE PRINCIPAL REFERENCE DOCUMENT FOR THE BKY SYSTEMS IS THE BKY USERS' HANDBOOK. THE HANDBOOK OCCUPIES A PSS LIBRARY, AND EACH OF ITS CHAPTERS IS A SUBSET OF THE LIBRARY. (\*LIBRARIES\* AND \*SUBSETS\* ARE STANDARD PSS STORAGE UNITS.) ANOTHER PRIMARY SOURCE OF LOCALLY WRITTEN DOCUMENTATION IS THE PSS LIBRARY WRITEUPS WHICH CONSISTS OF SUBSETS CONTAINING DOCUMENTS WHICH IN GENERAL ARE LARGER AND/OR MORE SPECIALIZED THAN THOSE CONTAINED IN THE HANDBOOK.

THE SUBSET OF HANDBOOK CALLED CHANGES CONTAINS INFORMATION ON THE

CONTENTS OF BOTH THE HANDBOOK AND WRITEUPS LIBRARIES AND ALSO SHOWS HOW TO GET COPIES OF THE REST OF THE CHAPTERS. IN ADDITION, IT INDICATES THE DATE OF THE MOST RECENT VERSION OF EACH SUBSET OF THE HANDBOOK AND WRITEUPS LIBRARIES. THERE IS ALSO A SEPARATE PAGE LISTING THE MOST RECENTLY CHANGED DOCUMENTS. THIS MAKES IT EASY FOR A USER TO KNOW WHICH OF THE DOCUMENTS IN HIS/HER COLLECTION ARE OUT OF DATE.

TO KEEP TRACK OF THE LOCAL DOCUMENTATION, THEN, ONE SHOULD ALWAYS HAVE THE MOST RECENT VERSION OF CHANGES. IT IS UPDATED WHENEVER THE DOCUMENTATION CHANGES. TO OBTAIN A COPY, RUN THE FOLLOWING JOB -

```
WRITE,7,63,30000.123456,YOUR NAME
LIBCOPY,HANDBOOK,OUT/RR,CHANGES.
DISPOSE,OUT=PR,DT=I,PA=1F.      (USE PA=1F AT BKV ONLY)
<END-OF-JOB CARD>
```

NOTE - YOU NEED TO SUPPLY YOUR OWN ACCOUNT NUMBER (REPLACING 123456), AND YOUR NAME. FOR MORE INFORMATION ON JOB SUBMITTAL, SEE CHAPTER 6. TO OBTAIN OTHER DOCUMENTS FROM THE HANDBOOK, MERELY SUBSTITUTE THE APPROPRIATE NAME FOR "CHANGES" IN THE EXAMPLE ABOVE. SEVERAL DOCUMENTS MAY BE REQUESTED AT ONE TIME BY LISTING THEIR NAMES SEPARATED BY COMMAS, E.G., LIBCOPY,HANDBOOK,OUT/RR,CHANGES,TTY, STORAGE.

DOCUMENTS ON THE WRITEUPS LIBRARY MAY BE OBTAINED BY SUBMITTING A JOB LIKE THE FOLLOWING -

```
GETME,7,63,30000.123456,YOUR NAME
LIBCOPY,WRITEUPS,OUT/RR,CCARD.
DISPOSE,OUT=PR,DT=I,PA=1F.      (USE PA=1F AT BKV ONLY)
<END-OF-JOB CARD>
```

THIS WILL OBTAIN A COPY OF THE WRITEUP CCARD, WHICH LISTS ALL BKV USER CONTROL CARDS WITH A BRIEF DESCRIPTION, A LIST OF ALL OPTIONS AND DEFAULTS AND A POINTER TO THE PRIMARY REFERENCE FOR EACH. OTHER WRITEUPS ARE OBTAINED BY SUBSTITUTING THE APPROPRIATE NAME FOR "CCARD". MORE THAN ONE WRITEUP MAY BE LISTED, SEPARATED BY COMMAS.

OTHER DOCUMENTS WHICH MIGHT BE OF PARTICULAR INTEREST TO NEW USERS ARE -

<b>ESS</b>	DESCRIBES THE GETTAPE/STOTAPE MASS STORAGE SYSTEM, WHICH STORES DATA ON HIGH QUALITY 6250 BPI MAGNETIC TAPES. (IN WRITEUPS)
<b>TTY</b>	IS THE PRIMARY REFERENCE FOR THE BKV INTERACTIVE SYSTEM. (IN HANDBOOK)
<b>STORAGE</b>	DESCRIBES HOW INFORMATION IS STORED ON AND RETRIEVED FROM THE PSS DISKS. ALSO EXPLAINS HOW TO BACK UP PSS INFORMATION ON TAPE. (IN HANDBOOK)

**UPDATE** DESCRIBES THE **UPDATE** PROGRAM WHICH IS USED TO MAINTAIN AND CHANGE SOURCE DECKS IN A BATCH MODE. (IN WRITEUPS)

### MANUALS NOT ON PSS LIBRARIES

#### ---BKY FORTRAN EXTENDED VERSION 4

DISCUSSES IMPLEMENTATION OF FTN VERSION 4 FORTRAN COMPILER ON THE BKY SYSTEM.

THIS MANUAL CAN BE OBTAINED FROM THE COMPUTING LIBRARIAN (SEE BELOW).

#### ---CDC MANUALS

SEVERAL MANUALS PUBLISHED BY CDC ARE PERTINENT. THEY INCLUDE

**COMPASS REFERENCE MANUAL (60190900 - REV. D)**  
**SORT/MERGE REFERENCE MANUAL (60252600 - REV. D)**

REFERENCE SHELVES ON THE FIRST, SECOND, THIRD, AND FIFTH FLOORS OF BUILDING 50B CONTAIN COPIES OF THE PRINCIPAL DOCUMENTS. THERE ARE SHELVES NEAR THE COMPUTING LIBRARY, IN THE USER AREAS AND IN THE READY ROOM ON THE FIRST FLOOR, IN THE VISTA ROOM ON THE SECOND FLOOR AND IN THE DUMBWAITER ROOMS ON THE THIRD AND FIFTH FLOORS.

### CURRENT NOTICES -- NEWSLETTER, BKYNEWS, AND BILLBOARD

INFORMATION OF GENERAL INTEREST TO USERS OF THE COMPUTING FACILITY IS DISSEMINATED THROUGH THE **COMPUTER CENTER NEWSLETTER**, PUBLISHED MONTHLY BY THE COMPUTER CENTER. IT PROVIDES MUCH USEFUL CURRENT INFORMATION TO OUR USERS AND IS MAILED TO THEM, FREE, UPON REQUEST. (CONTACT MAGGIE MORLEY, BLDG 50B, RM. 1245A, X5529). AN INDEX TO THE CONTENTS OF PAST NEWSLETTERS APPEARS IN THE WRITEUP **NINDEX**.

**WRITEUPS** SUBSET **BKYNEWS** DESCRIBES RECENT CHANGES TO THE SYSTEMS AND DOCUMENTATION, LISTS PROMINENT KNOWN BUGS, AND DISCUSSES CURRENT PLANS. IT IS UPDATED FREQUENTLY (3-4 TIMES PER MONTH) AND CONTAINS A GREATER QUANTITY OF SPECIFIC INFORMATION ABOUT THE SYSTEMS THAN DOES THE NEWSLETTER.

THE VERY LATEST INFORMATION ON CHANGES TO THE SYSTEM IS FOUND ON THE **BILLBOARD**, WHICH IS PRINTED ON THE LAST PAGE OF EACH JOB PRODUCED BY THE LBL LINE PRINTERS. AT THE TOP OF THE BILLBOARD ARE THE DATES OF LAST CHANGE TO THE WRITEUPS SUBSET **BKYNEWS** AND TO THE HANDBOOK SUBSET **CHANGES**.

### FEEDBACK SOLICITED

THE USER SERVICES STAFF GREATLY APPRECIATES YOUR COMMENTS ON ANY ASPECT OF THE DOCUMENTATION, AND ON THE **HANDBOOK** AND **WRITEUPS** IN PARTICULAR. PLEASE RELAY YOUR DISCOVERIES OF ERRORS, OBSCURITIES,

OMISSIONS AND THE LIKE TO THE CONSULTANTS' OFFICE (ROOM 1229, BLDG. 50B, EXT. 5981). IN ADDITION, THERE IS A SUGGESTION BOX AVAILABLE IN THE READY ROOM (50B ROOM 1232) IN WHICH WRITTEN QUESTIONS, COMMENTS, CRITICISM, ETC. MAY BE PLACED. THE USER INPUT, ALONG WITH THE RESPONSE FROM THE COMPUTER CENTER, ARE PRINTED IN THE COMPUTER CENTER NEWSLETTER (IN THE VOX POP SECTION).

### COURSES AND SEMINARS

SHORT COURSES AND SEMINARS ARE PRESENTED FROM TIME TO TIME AT THE COMPUTING FACILITY. THESE ARE NON-CREDIT COURSES TAUGHT BY THE LBL COMPUTER CENTER STAFF, AND ARE OPEN TO ALL USERS AT NO CHARGE. ANNOUNCEMENTS OF SCHEDULED COURSES AND SEMINARS ARE PUBLISHED IN THE COMPUTER CENTER NEWSLETTER AND IN WRITEUPS SUBSET BKYNEWS.

IN ADDITION, INFORMAL CLASSES AIMED AT INTRODUCING THE NEW USER TO THE LBL 6000/7600 SYSTEM ARE HELD PERIODICALLY. CLASSES MIGHT INCLUDE ORIENTATION FOR NEW USERS OF BKY, HOW TO USE CONTROL CARDS, HOW TO INTERPRET A DAYFILE AND/OR DUMP, USING VARIOUS STORAGE MEDIA, EFFECTIVE USE OF SUBSYSTEMS (SUCH AS POE AND UPDATE), OR WHATEVER YOU WANT AND NEED TO KNOW. TO ARRANGE A CLASS, CONTACT EITHER DAVE FRY ((415) 486-6291) OR MAGGIE MORLEY ((415) 486-5529). COURSES TO ORDER, AT YOUR SITE AND AT YOUR COST, ARE ALSO AVAILABLE.

### CONSULTING SERVICE

THE COMPUTER CENTER MAINTAINS A CONSULTING SERVICE OPEN TO ALL USERS OF THE COMPUTING FACILITY. ALL CONSULTANTS ARE EXPERIENCED PROGRAMMERS. THEY WILL ANSWER PROGRAMMING AND DEBUGGING QUESTIONS AND PROVIDE NECESSARY ASSISTANCE IN USING THE COMPUTERS.

IF YOU HAVE ANY DIFFICULTIES IN PREPARING, SUBMITTING, OR RUNNING A JOB AT THE COMPUTING FACILITY, SEE THE CONSULTANT ON DUTY, WHO WILL EITHER HELP YOU SOLVE YOUR PROBLEM OR REFER YOU TO SOMEONE WHO CAN.

THE CONSULTING OFFICE IS LOCATED IN ROOM 1229 OF BUILDING 50B. THE EXTENSION IS 5981 (VIA FTS ONLY, DIAL 451-5981; DIRECT DIAL IS (415) 486-5981). CONSULTING HOURS ARE -

MON. - FRI. 830 AM TO 530 PM  
SAT. AND SUN. 11 AM TO 5 PM

CLOSED WEDS. 3 PM TO 430 PM

A CONSULTING SERVICE IS ALSO OFFERED IN BUILDING 90 (ROOM 3135) ON TUESDAYS BETWEEN 10 AM - 12 NOON AND THURSDAYS BETWEEN 2 PM - 4PM.

**4.2 KEYPUNCHING SERVICES**

THE COMPUTER CENTER MAINTAINS A STAFF OF EXPERIENCED KEYPUNCH OPERATORS WHO ARE AVAILABLE TO DO YOUR KEYPUNCHING. TO MAKE USE OF THIS SERVICE BRING YOUR WORK TO VERNEICE ARNETT (RM. 2215A, BLDG. 508, EXT. 6256).

**4.3 LIBRARIES****PROGRAM LIBRARY**

AN EXTENSIVE PROGRAM LIBRARY IS AVAILABLE AT LBL ON PSS OR ON TAPE, PROVIDING SUBROUTINE PACKAGES FOR SOLVING A WIDE SPECTRUM OF MATHEMATICAL AND STATISTICAL PROBLEMS. A VARIETY OF UTILITY ROUTINES IS ALSO AVAILABLE. FOR MORE INFORMATION ON THE SUBROUTINE LIBRARIES SEE **WRITEUPS SUBSET LIBRARY**. IN ADDITION TO LISTING THE ROUTINES AVAILABLE ON THE LIBRARY SOURCE, THIS DOCUMENT PROVIDES A LIST OF ROUTINES AVAILABLE IN THE LIBRARIES LISTED BELOW, WHERE ADDITIONAL DOCUMENTATION CAN BE OBTAINED AND INSTRUCTIONS FOR THE USE OF THE LIBRARIES AT LBL.

THE COMPUTER CENTER HAS THE FOLLOWING LIBRARIES AVAILABLE -

<b>IMSL</b>	THE INTERNATIONAL MATHEMATICS AND STATISTICAL LIBRARY (DOCUMENTATION IS A NON-CIRCULATING CATALOG IN THE COMPUTER CENTER LIBRARY)
<b>SANDIA</b>	A GENERAL MATHEMATICS LIBRARY (A MANUAL IS AVAILABLE FROM THE COMPUTER CENTER LIBRARY)
<b>NAG</b>	NUMERICAL ALGORITHM GROUP LIBRARY; A LARGE COLLECTION OF GENERAL PURPOSE MATHEMATICAL SOFTWARE. (THE NAG MANUALS MAY BE EXAMINED IN THE COMPUTER CENTER LIBRARY.)
<b>NPL</b>	A SET OF OPTIMIZATION AND MINIMIZATION ROUTINES FROM THE NATIONAL PHYSICAL LABORATORY IN ENGLAND. (DOCUMENTATION FOR INDIVIDUAL ROUTINES IS AVAILABLE FROM THE COMPUTER CENTER LIBRARY)
<b>EISPACK</b>	EIGENANALYSIS ROUTINES PLUS DRIVERS FOR COMMON EIGENANALYSIS PROBLEMS (DOCUMENTATION IS ON A GSS TAPE)
<b>FUNPACK</b>	A SPECIAL FUNCTION SUBROUTINE PACKAGE (DOCUMENTATION IS ON A GSS TAPE)
<b>LINPACK</b>	A LIBRARY TO SOLVE SYSTEMS OF LINEAR EQUATIONS (DOCUMENTATION IS A NON-CIRCULATING USERS' GUIDE IN THE COMPUTER CENTER LIBRARY)
<b>NCAR</b>	SEVEN PARTIAL DIFFERENTIAL EQUATION SOLVERS AND SEVEN ILLUSTRATIVE DRIVERS. (DOCUMENTATION IS AVAILABLE FROM THE COMPUTER CENTER LIBRARY)
<b>BLAS</b>	A LIBRARY OF BASIC LINEAR ALGEBRAIC SUBPROGRAMS. (DOCUMENTATION IS ON PSS)
<b>SOURCE</b>	A GENERAL MATHEMATICS LIBRARY PLUS AN ASSORTMENT OF UTILITIES. (DOCUMENTS FOR INDIVIDUAL ROUTINES ARE AVAILABLE IN THE COMPUTER CENTER LIBRARY)
<b>CERN</b>	A GENERAL MATHEMATICS AND SCIENTIFIC LIBRARY (DOCUMENTATION IS A NON-CIRCULATING CATALOG IN THE COMPUTER CENTER LIBRARY)
<b>SPSS</b>	THE STATISTICAL PACKAGE FOR THE SOCIAL SCIENCES (SEE <b>WRITEUPS SUBSET SPSS</b> . THE <b>SPSS</b> MANUAL IS AVAILABLE FROM THE COMPUTER CENTER LIBRARY)

**COMPUTER CENTER LIBRARY**

THE COMPUTER CENTER LIBRARY IS LOCATED IN RM. 1245A OF BLDG. 50B. THE LIBRARY HAS REFERENCE COPIES OF ALL WRITEUPS AND REFERENCE MANUALS APPLICABLE TO THE LBL COMPUTER SYSTEM. IN ADDITION, DOCUMENTATION ON THE PROGRAM LIBRARY ROUTINES IS AVAILABLE THERE.

THE LIBRARIAN, MAGGIE MORLEY, IS ON DUTY IN THE COMPUTING LIBRARY MONDAY THROUGH FRIDAY FROM 10 TO 4. HER EXTENSION IS X5529.

#### 4.4 EXPEDITER SERVICE

THE EXPEDITER SERVICE OFFERS ON-SITE ATTENTION TO SPECIFIC PROBLEMS OF REMOTE USERS. THIS SERVICE IS PERFORMED BY MEMBERS OF THE COMPUTER OPERATIONS GROUP WHO HAVE ACCESS TO ALL COMPUTER INPUT AND OUTPUT FACILITIES, AS WELL AS TO THE TAB EQUIPMENT (DUPLICATOR, SORTER, INTERPRETER), THE 1401 (7 TRACK TAPE MANIPULATION AND DUPLICATION), THE TAPE CLEANER, EVALUATOR AND CERTIFIER, THE BKY DOCUMENTATION, AND SHIPPING AND RECEIVING FACILITIES. THE ABOVE LIST IS NOT EXHAUSTIVE - SERVICES ARE TAILORED TO THE REQUESTS OF THE USER.

USERS ARE REQUIRED TO HAVE OR SUPPLY THE FOLLOWING ITEMS TO USE THE EXPEDITER SERVICE -

1. AN ACTIVE LBL ACCOUNT NUMBER FOR COMPUTER USE WHICH AUTHORIZES LABOR CHARGES (USUALLY WITH THE PHRASE "AND RELATED SERVICES"),
2. A LETTER TO THE EXPEDITERS FROM THE USER SITE OPERATIONS MANAGER, GROUP LEADER, OR SIMILAR AUTHORITY, GIVING AUTHORIZATION FOR SERVICES, AND AGREEING TO BE RESPONSIBLE FOR NOTIFYING EXPEDITER SERVICES OF LABOR CHARGE ACCOUNT NUMBER CHANGES.
3. A LIST OF THE PEOPLE (OPERATORS, PROGRAMMERS) WHO ARE AUTHORIZED TO REQUEST SERVICES, OR WHOSE NAME MIGHT APPEAR ON ANY OF THE MATERIALS (JOB OUTPUT, TAPES, ETC.) TO BE SERVICED.
4. REMOTE BATCH SITE CODE.

#### TYPES OF SERVICE, AND CHARGES

SERVICE IS NORMALLY REQUESTED BY CONTACTING THE EXPEDITERS (BLDG. 508, ROOM 2249B, X6205, VIA FTS 451-6205, DIRECT DIAL (415) 486-6205) AND DESCRIBING WHAT IS NEEDED. A "REQUEST" IS USUALLY CONSIDERED TO BE WHATEVER TASKS ARE SPECIFIED IN ONE CONTACT WITH THE EXPEDITERS. THE CHARGE FOR THE SERVICE DEPENDS ON THE AMOUNT OF TIME NEEDED TO SATISFY THE REQUEST, THE TIME AT WHICH THE SERVICE IS TO BE PERFORMED, AND THE TYPE OF SERVICE REQUESTED. THE SERVICE TIME FOR EACH REQUEST IS ROUNDED TO THE NEAREST 30 MINUTES, AND THERE ARE MINIMUM TIME PERIODS FOR EACH TYPE OF SERVICE. IN ADDITION, SOME REQUESTS MAY INVOLVE MILEAGE CHARGES OR SUPPLIES, WHICH ARE CHARGED AT COST, PLUS LABORATORY OVERHEAD.

#### REGULAR SERVICE

THE REGULAR EXPEDITER HOURS ARE (CURRENTLY) 9 AM TO 5 PM WEST COAST TIME, MONDAY THROUGH FRIDAY (EXCLUDING LBL HOLIDAYS). REQUESTS WHICH ARE RECEIVED AND SERVICED DURING THESE HOURS ARE CHARGED APPROXIMATELY \$10.50 PER HOUR, PLUS LBL OVERHEAD, PER REQUEST. REGULAR SERVICE REQUESTS ARE NORMALLY PROCESSED IN THE ORDER RECEIVED.

**RUSH SERVICE**

RUSH SERVICE IS AVAILABLE IF THE FULFILLMENT OF A USER'S REQUEST WILL REQUIRE AN EXPEDITER'S FULL TIME AND ATTENTION. THE EXPEDITER THEN WORKS CLOSELY WITH THE USER, INFORMING HIM/HER OF ANY ERRORS OR DIFFICULTIES IN PROCESSING AND OF JOB COMPLETION. THE EXPEDITER IS RESPONSIBLE FOR ALL JOB OUTPUT. RUSH SERVICE REQUIRES APPROVAL FROM THE USER'S SITE OPERATIONS MANAGER OR FROM HIS/HER DESIGNEE, AND APPROVAL OF THE EXPEDITER SERVICE COORDINATOR. RUSH SERVICE MAY BE USED FROM 0900 HOURS TO 1700 HOURS MONDAY THROUGH FRIDAY. RUSH SERVICE SHOULD BE REQUESTED IN ADVANCE - NORMALLY, ONE WORKING DAY.

THE RUSH SERVICE USER IS CHARGED TWICE THE TIME IT TAKES THE EXPEDITER TO SATISFY THE REQUEST. THE BASIC CHARGE PER HOUR AND MINIMUM CHARGES ARE THE SAME AS FOR REGULAR OR EXTENDED SERVICE.

**EXTENDED SERVICE**

EXPEDITER SERVICES ARE ALSO AVAILABLE OUTSIDE REGULAR WORKING HOURS, IF THE THE REQUEST IS MADE IN ADVANCE (NORMALLY, ONE WORKING DAY). THE CHARGE IS APPROXIMATELY \$10.50 PER HOUR, PLUS LBL OVERHEAD, AND -

1. ON NORMAL WORKDAYS, THE MINIMUM TIME IS 2 HOURS.
2. ON WEEKENDS AND LBL HOLIDAYS, THE MINIMUM TIME IS 2 HOURS PLUS TRAVELLING TIME TO AND FROM THE LABORATORY.

REQUESTS SHOULD BE MADE NO LATER THAN 1500 HOURS ON THE DAY THE WORK IS REQUESTED. EXPEDITER SERVICE PERSONNEL WILL BE SCHEDULED AS THEY ARE AVAILABLE.

**ON-CALL SERVICE**

ON-CALL SERVICE IS OFFERED FOR CASES WHERE THE USER WISHES TO HAVE AN EXPEDITER AVAILABLE, ON-CALL, AT REGULAR EXPEDITER HOURS. AGAIN, THIS SERVICE SHOULD BE REQUESTED SUFFICIENTLY IN ADVANCE (NORMALLY, ONE WORKING DAY).

THE USER IS CHARGED FOR ALL THE TIME THE EXPEDITER IS ON STANDBY OR IN TRANSIT AS WELL AS FOR THE TIME SPENT PERFORMING THE DESIRED TASK. THE CHARGE PER HOUR AND MINIMUM CHARGES ARE THE SAME AS FOR EXTENDED SERVICE. A SPECIFIC CUT-OFF TIME MUST BE INCLUDED WHEN MAKING REQUESTS FOR ON-CALL SERVICE.

**MINIMUM CHARGE FOR OVERLAPPING EXTENDED SERVICE**

ON OCCASIONS WHERE EXTENDED SERVICE REQUESTS FROM A NUMBER OF USERS OVERLAP, THE MINIMUM TIME REQUIREMENT WILL BE DIVIDED EVENLY BETWEEN ALL THE USERS. THAT IS, IF THE TOTAL HOURS NECESSARY TO SATISFY ALL THE REQUESTS IS GREATER THAN THE MINIMUM, NO USER WILL BE CHARGED THE MINIMUM. IF THE TOTAL TIME IS LESS THAN THE MINIMUM, THE REMAINDER WILL BE DIVIDED EVENLY AMONG THE USERS SERVED.

ON OCCASIONS WHERE ON-CALL REQUESTS OVERLAP, THE STANDBY AND TRANSIT TIME WILL BE DIVIDED EVENLY AMONG THE USERS SERVED.

### EXPEDITER ACCOUNTING SERVICES

THE COMPUTER SERVICE PROVIDES ACCOUNTING INFORMATION ON ITS CHARGES TO USERS ON A WEEKLY BASIS, A MONTHLY BASIS, OR BOTH. ANY GROUP OR COMPANY MAY HAVE THIS INFORMATION WRITTEN ON A TAPE, OR MAY HAVE A REPORT GENERATED FOR ALL ITS COMPUTER ACCOUNTS. THERE IS A CHARGE FOR PERFORMING THIS SERVICE. WRITTEN REQUESTS FOR THIS SERVICE ARE REQUIRED.

THE REQUEST FORM IS CONTAINED IN THE DOCUMENT "ACCOUNTING TAPES" WHICH MAY BE OBTAINED FROM EXPEDITER SERVICES OR FROM PSS BY EXECUTING THE FOLLOWING CONTROL CARDS -

**LIBCOPY,EXPLIB,OUT/RR,NAMES.  
DISPOSE,OUT=PR,PA=1F,DT=I.**

(USE PA=1F AT RKY ONLY)

FOR FURTHER INFORMATION ON EXPEDITER SERVICES, CONTACT IRENE PARTYKA OR VIRGINIA WILLIAMS, EXTENSION 6205.

### EXPEDITER TAPE SERVICES

PLEASE NOTE THAT PROCEDURES FOR TAPE HANDLING ARE AS FOLLOWS -

WE REQUEST THE NAME (COMPANY, AGENCY, OR UNIVERSITY), LIBRARY GROUP NUMBER, TAPE NAME, PROGRAMMER'S NAME, A VALID ACCOUNT NUMBER, AND A PHONE NUMBER WHERE WE MAY REACH THE PERSON MAKING THE REQUEST. ALL OF THIS INFORMATION IS VERY IMPORTANT SO THAT WE CAN QUICKLY AND ACCURATELY FULFILL THE REQUEST. WHEN SENDING TAPES, PLEASE FILL OUT THE SPECIAL EXPEDITER FORM. TO GET 15 COPIES OF THIS FORM, RUN THE FOLLOWING JOB -

<JOB CARD>

**LIBCOPY,EXPLIB,TEMP/RR,USER.**

**NCOPY,TEMP,OUT,15.**

**DISPOSE,OUT=PR,DT=I,PA=1F. (USE PA=1F AT BKY ONLY)**

<END-OF-JOB CARD>

PLEASE MAKE SURE THAT YOUR TAPES HAVE THE TAPE SEALS AND ARE PROPERLY PACKED TO AVOID DAMAGE IN TRANSIT TO OUR SITE. ALSO RECHECK THAT A LETTER CONTAINING THE ABOVE INFORMATION IS INCLUDED IN YOUR PACKAGE.

IF TAPES ARE TO BE RELEASED FROM THE LBL LIBRARY, THE SAME INFORMATION IS REQUIRED, IN ADDITION TO THE LBL LIBRARY TAPE NUMBER, WHICH IS ESSENTIAL FOR PERFORMING THE SERVICE. A REQUEST FOR UP TO THREE TAPES TO BE RELEASED FROM THE LBL TAPE LIBRARY MAY BE MADE VIA PHONE. FOR MORE THAN THREE TAPES, A WRITTEN REQUEST IS REQUIRED.

DUE TO LBL POLICY WE CANNOT SEND ANYTHING WEIGHING OVER THREE POUNDS THROUGH THE U.S. MAIL UNLESS WE ARE SUPPLIED WITH GOVERNMENT LABELS. FOR THIS REASON, WE ARE UNABLE TO SEND MAGNETIC TAPES THROUGH THE U.S. MAIL. WE REQUEST THAT YOU DO NOT SEND US MAGNETIC TAPES VIA U.S. MAIL EITHER, AS THEIR ARRIVAL IN GOOD CONDITION CANNOT BE

GUARANTEED. MINIMUM TIME FOR TAPES ENTERED OR SENT FROM THE LBL LIBRARY IS AS FOLLOWS - 1-3 TAPES, 1.5 HOURS. EVERY ADDITIONAL TAPE, 0.5 HOURS.

### SHIPMENTS

THE FOLLOWING SHIPPING ALTERNATIVES ARE AVAILABLE -

1. VIA U.S. MAIL FOR SHIPMENTS UNDER 3 POUNDS, E.G., SMALL PRINTOUT, MICROFICHE, MICROFILM, SMALL PUNCH OUTPUT.
2. ONCE A WEEK, I.E., ALL DATA WILL BE HELD UNTIL A SPECIFIC DAY OF THE WEEK, AT WHICH TIME THE SHIPMENT WILL BE MADE. THIS PROCEDURE WILL REMAIN STANDARD FOR GROUPS REQUESTING THIS TYPE OF SERVICE UNTIL CHANGED BY THE OPERATIONS MANAGER.
3. DAILY - SHIPMENTS MADE MONDAY THROUGH FRIDAY.
4. SHIPMENTS MAY BE MADE TO A THIRD PARTY OTHER THAN USER'S SITE, AND BILLED TO THE REQUESTING USER BY FREIGHT/COURIER SERVICE. ALL SHIPMENTS SENT TO USERS' SITES ARE SENT C.O.D.

**SHIPMENTS CAN NOT BE MADE TO A PRIVATE ADDRESS VIA U.S. MAIL.**

WHEN MAKING A REQUEST FOR SHIPMENT, THE FOLLOWING INFORMATION IS REQUIRED -

1. COMPANY, AGENCY, OR UNIVERSITY NAME.
2. DEPARTMENT AND/OR ROOM NUMBER.
3. CONSIGNEE'S NAME ("ATTENTION OF").
4. A SPECIFIC STREET ADDRESS. POST OFFICE BOXES MAY NOT BE USED UNLESS U.S. MAIL SERVICES ARE REQUESTED AND COME UNDER THE THREE POUND LIMIT.
5. CITY, STATE, AND ZIP CODE.

### INCOMING SHIPMENTS

ALL SHIPMENTS TO LBL MUST BE SENT PREPAID AND DELIVERED. THE ADDRESS IS

LAWRENCE BERKELEY LABORATORY  
ATTENTION EXPEDITER SERVICE  
BLDG. 508, ROOM 2249B  
1 CYCLOTRON ROAD  
BERKELEY, CALIF. 94720

FOR SHIPMENTS SENT TO LBL NOT DELIVERED, RUSH SERVICE CHARGE WILL APPLY FOR PICKUP SERVICES.

**OUTGOING SHIPMENTS**

ALL SHIPMENTS ARE SENT TO THE USER ON A C.O.D. BASIS. SHIPMENTS UNDER THE THREE POUND LIMIT ARE SENT VIA U.S. MAIL UNLESS OTHERWISE SPECIFIED. PICKUP BY COMMERCIAL DELIVERY SERVICES MUST BE ARRANGED IN CONJUNCTION WITH EXPEDITER SERVICES. ALL OUTPUT TO BE SHIPPED ON A GIVEN DATE MUST BE READY FOR PACKAGING BY 3.00 P.M.

RUSH SHIPMENTS ARE AVAILABLE THROUGH EXPEDITER SERVICES AT A SOMEWHAT HIGHER RATE. FOR INFORMATION REGARDING RUSH SHIPMENTS, PLEASE CONTACT THE EXPEDITER SERVICES, EXTENSION 6205.

**FEDERAL EXPRESS SERVICE**

FEDERAL EXPRESS SERVICE IS AVAILABLE FOR EXPEDITER SERVICE USERS. THE POST OFFICE GUARANTEES DELIVERY OF FEDERAL EXPRESS MAIL WITHIN 24 HOURS FOR PARCELS MAILED BY 3 P.M. ON ANY WORKING DAY. THERE IS A SMALL ADDITIONAL CHARGE FOR THIS SERVICE.

**MISCELLANEOUS INFORMATION****MAGNETIC TAPES**

LBL-OWNED MAGNETIC TAPES ARE NOT ALLOWED TO BE TAKEN FROM THE LABORATORY. USERS REQUIRING THAT MAGNETIC TAPES OWNED BY LBL BE SENT TO THEIR SITE MUST PURCHASE REPLACEMENTS FROM LBL.

**ROUTING INFORMATION**

THE BKY HANDBOOK SUBSET CONTROL DESCRIBES TWO EASY-TO-USE METHODS OF SPECIFYING ROUTING INFORMATION FOR JOB PRINT, PUNCH, PLOT, AND MICROFILM OUTPUT. IN GENERAL, THE ROUTING INFORMATION NEEDED IS (1) SPECIFICATION THAT THE OUTPUT SHOULD BE ROUTED TO EXPEDITER SERVICES, AND (2) THE NAME OF YOUR COMPANY. CONTACT AN EXPEDITER FOR THE EXACT ROUTING INFORMATION NEEDED TO ROUTE YOUR JOB OUTPUT TO THE EXPEDITERS. USERS WILL BE CHARGED 30 MINUTES EACH DAY JOB OUTPUT IS FOUND WITHOUT ROUTING INFORMATION. IT IS IMPERATIVE THAT ALL JOBS, WHETHER TO BE DELIVERED TO BERKELEY OR BACK TO THE USER'S SITE, HAVE ROUTING INFORMATION IN THE EVENT THAT THE USER'S TERMINAL IS DOWN AND REQUIRES DIVERSION TO BERKELEY.

**INVOICING**

THE EXPEDITER SERVICE CHARGES ARE INVOICED UNDER SCIENTIFIC AND GENERAL OVERHEAD. REQUESTS WHICH INVOLVE MILEAGE CHARGES OR SUPPLIES ARE CHARGED AT COST, AND ARE INVOICED UNDER OTHER EXPENSES AND STORES ISSUES, RESPECTIVELY.

FOR ANY QUESTIONS ABOUT EXPEDITER SERVICES, PLEASE CONTACT EITHER IRENE PARTYKA, HEAD OF EXPEDITER SERVICES, OR VIRGINIA WILLIAMS. BOTH ARE AT EXTENSION 6205.

**5.1 .PRELIMINARY ARRANGEMENTS****ESTABLISHING A VALID COMPUTER ACCOUNT NUMBER**

PROSPECTIVE USERS OF THE COMPUTING FACILITY WHO DO NOT ALREADY HAVE AN ACCOUNT NUMBER SHOULD CONTACT

ERIC R. BEALS  
BUILDING 50B, ROOM 2232D  
LAWRENCE BERKELEY LABORATORY  
BERKELEY, CALIFORNIA 94720

PHONE NUMBER WITHIN LBL X5351,  
VIA FTS 451-5351; DIRECT DIAL (415) 486-5351

FOR INFORMATION ON HOW TO OBTAIN A LAWRENCE BERKELEY LABORATORY ACCOUNT NUMBER.

**GUEST CARDS AND PARKING PERMITS**

ANYBODY WHO COMES TO THE SITE OF THE LAWRENCE BERKELEY LABORATORY MUST BE EITHER AN EMPLOYEE OR A REGISTERED GUEST, OR MUST BE ACCOMPANIED BY SUCH A PERSON. IF YOU ARE COMING TO VISIT SOMEONE AT LBL BE SURE TO MAKE ARRANGEMENTS WITH THAT PERSON SO THAT THERE WILL BE NO DIFFICULTY GETTING ONTO THE SITE. IF YOU EXPECT TO SPEND SOME TIME WORKING AT THE BERKELEY SITE BUT ARE NOT A REGULAR LBL EMPLOYEE, YOU SHOULD REGISTER AS A GUEST. TO DO THIS, SEE EITHER OF THE COMPUTER CENTER SECRETARIES, LESLIE SCHROEDER OR MARGARET YAMADA, RM. 2232, BLDG. 50B, EXT. 5654.

WHEN REGISTERING AS A GUEST YOU MUST FILL OUT A MEDICAL FORM, APPLY FOR A PARKING PERMIT, AND OBTAIN A GUEST CARD WITH YOUR PICTURE ON IT. IF YOU ARE NOT A CITIZEN OF THE UNITED STATES OF AMERICA, APPROVAL FOR YOU TO WORK AT LBL MUST BE OBTAINED FROM D.O.E. (DEPARTMENT OF ENERGY). SUCH APPROVAL IS AUTOMATIC IN MOST CASES.

**ESTABLISHING A REMOTE TERMINAL**

IF YOU HAVE A TELETYPE (MODELS 33, 35, OR 37) OR A TELETYPE COMPATIBLE TERMINAL THAT YOU WISH TO CONNECT TO THE LBL COMPUTING FACILITY, CONTACT ERIC BEALS (RM. 2232D, BLDG. 50B, EXT. 5351). YOU CAN EITHER USE THE DIAL-UP CONNECTION, IN WHICH CASE YOU NEED A MODEM (WESTERN ELECTRIC 103A COMPATIBLE) ATTACHED TO YOUR REMOTE TERMINAL, OR YOU CAN OBTAIN A LEASED LINE PORT, IN WHICH CASE YOU NEED (EXCEPT FOR ON-SITE USERS) TWO MODEMS--ONE AT EACH END OF THE LEASED LINE.

THE HANDBOOK SUBSET TTY DESCRIBES MANY OF THE FEATURES AVAILABLE TO THE REMOTE TERMINAL USER.

**ESTABLISHING A REMOTE BATCH STATION**

INFORMATION ON REMOTE BATCH STATIONS IS CONTAINED IN WRITEUPS  
SUBSET **OPTERN**.

TO ESTABLISH A REMOTE BATCH STATION OR TO REPORT HARDWARE PROBLEMS,  
CONTACT -

**SIG ROGERS**

ROOM 6134A, BUILDING 50A

PHONE NUMBER WITHIN LBL X6713,

VIA FTS 451-6713; DIRECT DIAL (415) 486-6713

ANY QUESTIONS REGARDING REMOTE BATCH STATION SOFTWARE SHOULD BE  
DIRECTED TO -

**DON ZURLINDEN**

ROOM 1145A, BUILDING 50A

PHONE NUMBER WITHIN LBL X6329,

VIA FTS 451-6329; DIRECT DIAL (415) 486-6329

## 5.2 TYPES OF JOB INPUT AVAILABLE

YOU CAN SUBMIT A PROGRAM TO THE COMPUTER IN SEVERAL WAYS - THE MOST CONVENIENT INPUT METHOD WILL DEPEND ON THE NATURE OF THE JOB.

STANDARD BATCH PROCESSING JOBS, PARTICULARLY ROUTINES WHICH WILL BE RUN FREQUENTLY WITH LARGE QUANTITIES OF DATA, ARE USUALLY SUBMITTED ON DECKS OF PUNCHED CARDS. PART OR ALL OF A PROGRAM (WITH THE EXCEPTION OF CERTAIN CONTROL CARDS) MAY BE SUBMITTED ON MAGNETIC TAPE OR FROM A PERMANENT STORAGE DEVICE.

A GENERAL-PURPOSE INTERACTIVE SYSTEM, SESAME, LETS YOU ENTER, EDIT, DEBUG, AND RUN PROGRAMS FROM A REMOTE CONSOLE. SESAME PROGRAMS MAY USE ALL THE LANGUAGES AND EQUIPMENT OPTIONS AVAILABLE ON THE BKY OPERATING SYSTEM. IF DESIRED, YOU MAY SUBMIT A PROGRAM TO SESAME ON PUNCHED CARDS AND THEN EDIT, DEBUG, OR RUN IT FROM YOUR REMOTE CONSOLE.

CHAPTER 7 OF THIS INTRODUCTION DESCRIBES HOW TO SUBMIT A JOB USING EACH OF THE ABOVE SYSTEMS.

IN ADDITION, IF YOU HAVE ACCESS TO A REMOTE BATCH STATION, YOU MAY SUBMIT YOUR JOB THROUGH THAT STATION.

### 5.3 TYPES OF JOB OUTPUT AVAILABLE

MOST PROGRAMS GENERATE ALPHANUMERIC OUTPUT WHICH IS PRINTED ON A LINE PRINTER, ALONG WITH A STANDARDIZED RECORD OF THE JOB'S PROGRESS THROUGH THE SYSTEM. THIS LATTER RECORD IS CALLED THE **DAYFILE**. IF YOU SO SPECIFY, ALPHANUMERIC JOB OUTPUT MAY BE TYPED OUT AT A REMOTE TERMINAL, WRITTEN ON A MAGNETIC TAPE, OR RECORDED ON MICROFILM.

GRAPHIC OUTPUT CAN BE DISPLAYED ON A VARIETY OF DEVICES. THESE INCLUDE **CALCOMP** AND **ZETA** PLOTTERS, MICROFILM, AND **TEKTRONIX** TERMINALS TO LIST A FEW. FOR MORE INFORMATION ON GRAPHIC HARDWARE AT **BKY** SEE SUBSET **GRAPHIC** OF THE **PSS LIBRARY HANDBOOK**.

CHAPTER 9 OF THIS **USERS' INTRODUCTION** GIVES ADDITIONAL INFORMATION ON EACH OF THESE TYPES OF JOB OUTPUT.

IN ADDITION, IF YOU HAVE ACCESS TO A REMOTE BATCH STATION, THE OUTPUT FROM YOUR JOB CAN BE DIRECTED TO THAT STATION.

### GRAPHICS

THERE ARE TWO SUPPORTED GRAPHIC SOFTWARE PACKAGES CURRENTLY AVAILABLE AT **BKY**; THEY ARE **GRAFPAC** AND **IODS**. **IODS** PROVIDES HIGH LEVEL GRAPHIC ROUTINES AND **GRAFPAC** PROVIDES BOTH BASIC PLOTTING ROUTINES AND INTERACTIVE GRAPHICS CAPABILITIES. BOTH OF THESE PACKAGES ARE DEVICE INDEPENDENT AND **FORTRAN** CALLABLE. FOR MORE INFORMATION ON **GRAFPAC** SEE SUBSET **GRAFPAC** OF **PSS LIBRARY WRITEUPS**. FOR MORE INFORMATION ON **IODS**, SEE THE **PSS LIBRARY IODS SUBSET WRITEUP**. A GENERAL OVERVIEW OF THE GRAPHICS CAPABILITIES AT **BKY** CAN BE FOUND IN SUBSET **GRAPHIC** OF THE **PSS LIBRARY HANDBOOK**.

**5.4 OBTAINING FILE SPACE FOR PERMANENT DATA STORAGE**

AT THE LBL COMPUTING FACILITY, FILES MAY BE STORED EITHER ON MAGNETIC TAPE (7- OR 9-TRACK), OR ON THE IBM 3350 DISKS (PSS). A RANDOM ACCESS MASS STORAGE SUB-SYSTEM. 6000 DISK STORAGE IS USED FOR TEMPORARY FILES ONLY, AND IS UNDER THE CONTROL OF THE SYSTEM (THE USER MAY NOT CREATE PERMANENT 6000 DISK FILES).

**MAGNETIC TAPE**

ALL TAPES USED AT LBL MUST BE IN THE TAPE LIBRARY. NEW LIBRARY TAPES MAY BE ASSIGNED AT JOB EXECUTION TIME THROUGH AN AUTOMATED TAPE LIBRARY SCHEME; THIS FEATURE IS DESCRIBED IN THE WRITEUPS SUBSET **LIBTAPE**. EXISTING DATA TAPES MAY BE PUT IN THE TAPE LIBRARY BY CONTACTING TAPE SERVICES, RM. 2249, BLDG. 508, EXT. 6218) OR EXPEDITER SERVICES. (SEE SECTION 4.4 ABOVE)

WHEN USING A TAPE BE SURE TO USE THE PROPER FORM OF THE **STAGE**, **STOTAPE**, **GETTAPE**, OR **REQUEST CONTROL CARD** (SEE THE HANDBOOK SUBSET **STAGING** OR EITHER OF THE WRITEUPS SUBSETS **BASIC66** OR **GSS**).

**PSS (IBM 3350 DISKS)**

SPACE ON THE PROGRAM STORAGE SYSTEM (PSS) IS ASSIGNED ON A CONTROLLED BASIS FOR OPTIMUM ALLOCATION OF THE AVAILABLE FILE SPACE. FOR INFORMATION ON OBTAINING FILE SPACE SEE **BOB RENDLER** (RM. 2274A, BLDG. 508, EXT. 5942). NOTE - SUFFICIENT FILE SPACE IS AVAILABLE FOR ALL USERS. ASSIGNMENT OF FILE SPACE SIMPLY CONTRIBUTES TO THE EFFICIENT ADMINISTRATION OF THE SYSTEM.

INFORMATION ON USING **PSS** IS PRESENTED IN **HANDBOOK SUBSET STORAGE**.

**7600 "PERMANENT FILES" AND CACHE SYSTEM**

DISK SPACE IS AVAILABLE FOR USERS TO CREATE "PERMANENT FILES" USING THE 7600 PERMANENT FILE SUBSYSTEM. THESE FILES SHOULD ACTUALLY BE CONSIDERED TRANSIENT - MORE RELIABLE PERMANENT STORAGE IS AVAILABLE ON THE PSS DISKS AND ON TAPE.

FILES STAGED IN FROM TAPE OR FROM PSS THAT WILL ONLY BE READ -- NOT WRITTEN ON -- MAY BE SAVED ON DISK IN THE "CACHE SYSTEM". THE CACHE SYSTEM IS SIMILAR TO THE PERMANENT FILE SYSTEM, BUT IS SIMPLER TO USE.

A SINGLE CONTROL CARD (FETCHMT FOR FETCHING MAGNETIC TAPES, FETCHGSS FOR FETCHING GSS TAPES, OR FETCHPS FOR FETCHING DATA FROM PSS) WILL SUFFICE TO CAUSE DATA TO BE STAGED TO THE 7600 AND A COPY OF IT SAVED IN THE CACHE, OR, IF THE DATA IS ALREADY IN THE CACHE, SIMPLY TO COPY IT FROM THERE TO THE USER'S FILE.

FOR MORE INFORMATION ON THE CACHE AND THE PERMANENT FILE SYSTEM, SEE THE **HANDBOOK SUBSET STAGING**.

**6.1 JOB INPUT DECK SET-UP**

(NOTE -- EXTENSIVE EXAMPLES OF CONTROL CARD SEQUENCES MAY BE FOUND IN THE HANDBOOK SUBSET SAMPLES.)

A TYPICAL BATCH PROCESSING JOB INPUT DECK SUBMITTED TO THE LBL COMPUTING FACILITY HAS THE FOLLOWING FORMAT --

INPUT DECK CARDS	DESCRIPTION
JOBNAME,5,63,50000.123456,JOE USER (SPECIAL DIRECTIVES) (COMPILER CALL) (CALL TO LOAD AND EXECUTE) EXIT. (ERROR PROCESSING) 7-8-9 CARD PROGRAM MAIN(INPUT,OUTPUT)	JOB CARD  CONTROL CARD RECORD
* * * *	LOGICAL RECORD TERMINATOR
END	FORTRAN SOURCE RECORD
7-8-9 CARD	LOGICAL RECORD TERMINATOR
* * * *	DATA RECORD (IF REQUIRED)
END-OF-JOB CARD	END OF JOB INDICATOR

THE FIRST CARD IN AN INPUT DECK MUST BE A JOB CARD AND THE LAST CARD MUST BE AN END-OF-JOB CARD. WHEN THE INPUT DECK IS READ IN, THE SYSTEM COPIES THE CARD IMAGES TO A DISK FILE WHICH BECOMES THE FILE INPUT AT THE TIME THE JOB BEGINS EXECUTION.

EACH CARD IMAGE IS A UNIT RECORD. THE FILE IS ALSO DIVIDED INTO LARGER UNITS CALLED LOGICAL RECORDS. THE TYPICAL FORTRAN DECK SHOWN ABOVE CONSISTS OF THREE LOGICAL RECORDS. THE CONTROL CARDS COMPRISE THE FIRST, THE FORTRAN SOURCE PROGRAM THE SECOND, AND THE DATA FOR THE FORTRAN PROGRAM MAKES UP THE THIRD.

LOGICAL RECORDS ARE SEPARATED BY 7-8-9 CARDS -- CARDS WITH 7, 8, AND 9 MULTI-PUNCHED IN COLUMN 1.

FOR JOBS READ IN THROUGH THE CARD READERS AT BKY, THE END OF A JOB IS INDICATED BY A CARD WITH 6,7,8, AND 9 PUNCHES IN ALL FOUR CORNERS (PRE-PUNCHED END-OF-JOB CARDS ARE AVAILABLE NEAR THE CARD READERS). REMOTE BATCH SITES MAY HAVE THEIR OWN STYLE OF END-OF-JOB CARD.

**JOB CARD**

THE JOB CARD MUST CONTAIN THE JOBNAME, THE ACCOUNT NUMBER AND PROGRAMMER'S NAME. IT MAY ALSO GIVE OTHER SPECIFICATIONS FOR THE JOB (HOWEVER, IF YOU DO NOT SPECIFY THEM, DEFAULT VALUES WILL BE SUPPLIED BY THE SYSTEM).

**EXAMPLES**

**JOBNAME,7,40,50000.123456,PROGRAMMER NAME**  
**JOBNAME.123456,PROGRAMMER NAME**

THE JOBNAME MUST BEGIN IN COLUMN 1 OF THE JOB CARD. THE FIRST CHARACTER MUST BE ALPHABETIC AND IT MAY CONTAIN UP TO SIX ADDITIONAL ALPHANUMERIC CHARACTERS.

YOUR ACCOUNT NUMBER ALWAYS BEGINS IN THE FIRST COLUMN AFTER THE PERIOD. IT MUST BE A VALID SIX DIGIT LAWRENCE BERKELEY LABORATORY ACCOUNT NUMBER. BLANKS ARE IGNORED IN THE JOBCARD (EXCEPT THAT THE FIRST CHARACTER OF THE JOBCARD MUST NOT BE A BLANK).

BETWEEN THE JOBNAME AND THE PERIOD, THREE PARAMETERS MAY BE SPECIFIED -- JOB PRIORITY, COMPUTING UNIT (CU) LIMIT, AND FIELD LENGTH. IF THEY ARE SPECIFIED, THEY MUST BE SEPARATED BY COMMAS AND MUST BE IN THE ORDER SHOWN. BLANKS ON THE JOB CARD ARE IGNORED, EXCEPT IN THE ACCOUNT NUMBER.

THE OCTAL JOB PRIORITY DETERMINES THE TURNAROUND TIME FOR YOUR JOB, AND ALSO AFFECTS THE CHARGE FOR RUNNING THE JOB. THE FOLLOWING PRIORITY CATEGORIES ARE AVAILABLE.

CATEGORY	VALUE	DESCRIPTION
<b>SPECIAL HANDLING</b>	17	JOB HELD IN INPUT QUEUE UNTIL OPERATOR RELEASES IT. REQUIRES PRIOR ARRANGEMENT WITH OPERATIONS. CHARGED AND TREATED AS A NORMAL JOB OTHERWISE.
<b>INSTANT</b>	5-16 AND CU LIMIT 63 OR LESS	BEST SERVICE AVAILABLE FOR SHORT JOBS. CHARGED AS RUSH OR NORMAL, DEPENDING ON PRIORITY USED. <b>7600 ONLY.</b>
<b>RUSH</b>	10-16	BEST SERVICE AVAILABLE FOR THE RESOURCE USAGE - COSTS 2.0 TIMES AS MUCH AS A NORMAL JOB.
<b>NORMAL</b>	5-7	NORMAL SERVICE
<b>DEFERRED</b>	2-4	EXECUTES ONLY WHEN THERE ARE NO JOBS WITH A HIGHER PRIORITY - COSTS 0.75 TIMES

AS MUCH AS A NORMAL JOB.

THE DEFAULT VALUE FOR JOB PRIORITY IS 5. IF THE CU LIMIT IS NO MORE THAN 63 WITH PRIORITY 5 THRU 16, THE JOB RUNS AS AN INSTANT JOB ON THE 7600.

THE DECIMAL COMPUTING UNIT LIMIT SPECIFIES THE MAXIMUM NUMBER OF COMPUTING UNITS THE JOB MAY USE. CU'S ARE ACCUMULATED DURING JOB EXECUTION. THE DEFAULT NUMBER OF CU'S IS 63 FOR 7600 BATCH JOBS. FOR INTERACTIVE JOBS THE DEFAULT CU LIMIT IS INFINITE. HOWEVER, AN INITIAL VALUE OF 63 CU'S, WHICH CAN BE RESET BY THE USER, IS IMPOSED BY THE SYSTEM TO PREVENT THE ACCUMULATION OF EXCESSIVE COSTS IN CASE AN INFINITE LOOP OCCURS.

### CONTROL CARD RECORD

IT WAS MENTIONED PREVIOUSLY THAT CONTROL CARDS ARE, FOR THE MOST PART, PROGRAM CALLS. THE REST OF THE CARDS IN THE DECK MAY BE CONSIDERED INPUT DATA FOR PROGRAMS CALLED INTO EXECUTION BY THE CONTROL CARDS. ALL 80 COLUMNS OF A CONTROL CARD ARE READ. (CONTINUATION IS FACILITATED BY PUNCHING A + IN COLUMN 1 OF THE NEXT CARD. THERE IS NO PRACTICAL LIMIT TO THE NUMBER OF CONTINUATION CARDS.)

JUST PRIOR TO THE CONTROL CARDS PROPER COME THE SPECIAL DIRECTIVES. THEY ARE USED TO INDICATE ROUTING TO A SPECIFIC MACHINE (\*B), USE OF A PARTICULAR DEVICE (\*PSS OR \*PTAPE), USE OF THE USER PRINTER (\*USERPR), OR TO CAUSE OUTPUT TO TEMPORARILY REMAIN IN THE OUTPUT QUEUE (\*HOLDOUT). THERE IS A \*LOCAL CARD WHICH CAN BE USED BY REMOTE STATIONS TO CAUSE ALL PRINT, PUNCH, PLOT, AND FILM FILES TO BE PROCESSED AT LBL AND A \*SC= CARD WHICH CAN DIRECT SUCH FILES TO ANY SITE. THERE IS ALSO A SPECIAL PASSWORD CARD FOR ACCOUNTS USING PASSWORDS.

EACH CONTROL CARD CONTAINS A FILE OR PROGRAM NAME OF SEVEN CHARACTERS (OR LESS) IN LENGTH, AND MAY HAVE UP TO 51 ARGUMENTS, SEPARATED BY COMMAS. THE CONTROL CARD NORMALLY TERMINATES WITH A PERIOD. NO ARGUMENT MAY BE LONGER THAN TEN CHARACTERS IN LENGTH: AND MOST ARE RESTRICTED TO SEVEN CHARACTERS.

ONCE THE CARD HAS BEEN DECODED, A SCAN IS MADE FOR A USER FILE WITH THE SAME NAME AS THE FIRST WORD ON THE CONTROL CARD. IF ONE IS FOUND, IT IS ASSUMED TO CONTAIN A PROGRAM AND THE FILE IS LOADED AND EXECUTED. IF NO SUCH FILE IS FOUND, A LIST OF SYSTEM PROGRAMS IS SEARCHED. IF THE PROGRAM CANNOT BE FOUND, THE CONTROL CARD IS DECLARED ILLEGAL AND THE JOB IS TERMINATED.

EACH CONTROL CARD IS ALLOWED THE FIELD LENGTH SPECIFIED ON THE JOBCARD. THIS DEFAULT FIELD LENGTH CAN BE RESET BY THE SFL CONTROL CARD AND REMAINS RESET UNTIL ANOTHER SFL IS ENCOUNTERED.

THE FOLLOWING **6600** EXAMPLE SHOWS HOW TO GET A COPY OF **HANDBOOK** SUBSET **TTY**, WHICH IS THE PRIMARY REFERENCE FOR INTERACTIVE COMPUTING AT **BKY**.

```

86600,7,63,20000.123456, JOE USER
*6
LIBCOPY,HANDBOOK,OUT/RR,TTY.
DISPOSE,OUT=PR,DT=I,PA=1F. (USE PA=1F AT BKY ONLY)
6-7-8-9 CARD

```

THE **\*6** CARD IS A SPECIAL DIRECTIVE. IT INDICATES THAT THE JOB IS TO BE RUN IN THE **6600**.

THE **LIBCOPY** CARD CAUSES THE SYSTEM PROGRAM **LIBCOPY** TO BE LOADED AND EXECUTED. IT COPIES THE SUBSET CALLED **TTY** FROM THE PSS LIBRARY **HANDBOOK** TO THE FILE **OUT**.

BELOW IS AN EXAMPLE OF THE MINIMUM **7600** CONTROL CARD DECK REQUIRED TO COMPILE AND EXECUTE A SIMPLE **FORTRAN** PROGRAM USING **FTN4**, A **FORTRAN** COMPILER. (A COMPLETE EXAMPLE APPEARS IN THE FOLLOWING SECTION.)

```

DOIT,7,40,50000.123456, JOE USER
FTN4.
LGO.
7-8-9 CARD

```

THE COMPILER, CALLED BY THE **FTN4** CONTROL CARD, READS THE **FORTRAN** SOURCE DECK FROM THE FILE **INPUT** (WHICH IMMEDIATELY FOLLOWS THE **7-8-9** CARD), COMPILES ONE ROUTINE AT A TIME, PLACES THE OBJECT CODE ON THE FILE **LGO** AND PUTS THE SOURCE LISTING ON THE FILE **OUTPUT**.

THE **LGO.** CARD TELLS THE SYSTEM TO LOAD THE FILE **LGO** INTO MEMORY, LOAD ANY SYSTEM ROUTINES REQUIRED, REDUCE THE FIELD LENGTH TO THE MINIMUM NECESSARY FOR EXECUTION, AND BEGIN EXECUTION.

MORE INFORMATION ON **7600** CONTROL CARDS IS PRESENTED IN THE **HANDBOOK** SUBSETS **CONTROL** AND **SAMPLES**. FOR INFORMATION ON THE **6000'S**, SEE THE WRITEUP **BASIC66**. FOR A COMPLETE LIST OF ALL **7600/6000'S** CONTROL CARDS SEE THE **WRITEUPS** SUBSET **CCARD**.

### FORTRAN SOURCE PROGRAM RECORD

THIS DECK WILL TYPICALLY INCLUDE A **FORTRAN** MAIN PROGRAM TOGETHER WITH ALL THE SUBPROGRAMS IT EMPLOYS (EXCEPT FOR LIBRARY ROUTINES SUCH AS **SIN**, **SQRT**). THE MAIN PROGRAM SHOULD OCCUR FIRST.

THE FIRST CARD OF YOUR MAIN PROGRAM IS THE **PROGRAM CARD**. FOR EXAMPLE -

```

PROGRAM MAIN(INPUT,OUTPUT)

```

ALL FILES REFERENCED IN THE PROGRAM MUST BE SPECIFIED ON THE **PROGRAM** CARD. REFER TO THE **HANDBOOK** SUBSET **SAMPLES** OR THE **WRITEUPS** SUBSET

BASIC66 FOR EXAMPLES OF PROGRAMS WITH VARIED PROGRAM CARDS.

### DATA RECORD

THE DATA DECK, SEPARATED FROM THE SOURCE PROGRAM DECK BY A 7-8-9 CARD, CONSISTS OF THE DATA CARDS (IF ANY) REQUIRED FOR THE EXECUTION OF THE FORTRAN PROGRAM. THE INPUT DECK MUST END WITH AN END-OF-JOB CARD.

### A COMPLETE SAMPLE 7600 FORTRAN JOB

JNXX,7,40,50000.123456, JIMMY

FTN4.

LGO.

EXIT.

DUMP,0.

GRUMP.

7-8-9 CARD

PROGRAM JAA (INPUT,OUTPUT)

1 READ 100,A

IF (A.LE.0.) STOP

B = SQRT(A)

C = A\*\*2

PRINT 200,A,B,C

GO TO 1

100 FORMAT (F10.5)

200 FORMAT (X,\*A= \*F10.5\* SQRT(A)= \*F10.6,7H A\*\*2= ,F10.4)

END

7-8-9 CARD

3.14159

5.45674

16.4750

-1.

END-OF-JOB CARD

**6.2 SUBMITTING A BATCH JOB**

TO SUBMIT A BATCH JOB LOCALLY, PREPARE YOUR JOB INPUT DECK AS DESCRIBED ABOVE AND TAKE IT TO THE **READY ROOM** (RM. 1232, BLDG. 50B). THREE SELF-SERVICE CARD READERS ARE PROVIDED THERE FOR SUBMITTING JOBS. (ASK FOR ASSISTANCE AT THE **I/O** COUNTER IF YOU ARE NOT FAMILIAR WITH THE CARD READER OPERATION OR GLANCE AT THE WRITEUPS SUBSET **IOGUIDE**.)

WHILE YOUR INPUT DECK IS BEING READ IN, THE CRT DISPLAY LOCATED NEAR THE CARD READER WILL RESPOND WITH A **MODIFIED JOBNAME** FOR YOUR JOB. THE SYSTEM REPLACES THE SIXTH AND SEVENTH CHARACTERS OF YOUR JOBNAME WITH A TWO-DIGIT NUMBER TO PRODUCE A UNIQUE SEVEN CHARACTER **MODIFIED JOBNAME**. THE FIRST TIME YOU SUBMIT ANY JOB, THIS TWO-DIGIT NUMBER WILL USUALLY BE **00**. IF YOUR JOB IS RESUBMITTED (OR ANY JOB WITH THE SAME JOBNAME IS SUBMITTED) WHILE THE ORIGINAL JOBNAME IS STILL KNOWN TO THE SYSTEM, THE NEWLY INPUT JOB WILL BE ASSIGNED THE NEXT TWO-DIGIT NUMBER IN SEQUENCE SO THAT IT TOO WILL HAVE A UNIQUE **MODIFIED JOBNAME**.

**EXAMPLES**

<b>JOBNAME</b>	<b>MODIFIED JOBNAME</b>		
JOBNAME	JOBNA00	JOBNA01	JOBNA02
MINE	MINE000	MINE001	MINE002
JOB2	JOB2000	JOB2001	JOB2002

IF YOU WISH TO INQUIRE ABOUT THE STATUS OF YOUR JOB WHILE IT IS RUNNING, BE SURE TO NOTE THE **MODIFIED JOBNAME** WHEN YOU SUBMIT YOUR JOB.

AFTER YOUR JOB HAS BEEN COMPLETELY READ IN (I.E., AFTER THE END-OF-JOB CARD HAS BEEN SENSED) THE CRT DISPLAY LOCATED BY THE INPUT CARD READERS WILL RESPOND WITH A MESSAGE TELLING HOW MANY CARDS WERE READ, AND THE **MODIFIED JOBNAME**. FOR EXAMPLE -

**132 CARDS READ - JOBNA01**

BE SURE TO CHECK THIS.

TO SUBMIT A BATCH JOB FROM REMOTE BATCH STATIONS, PLEASE SEE THE **WRITEUP OPTERN**.

**6.3 HOW TO INQUIRE ABOUT JOB AND SYSTEM STATUS**

YOU CAN USE ANY INTERACTIVE TERMINAL (CONNECTED TO THE SYSTEM) TO INQUIRE ABOUT THE STATUS OF A BATCH JOB. JUST TYPE TWO GREATER-THAN CHARACTERS (>>) FOLLOWED BY THE MODIFIED JOBNAME AND PRESS THE RETURN KEY. FOR EXAMPLE, >>JOBNA00 OR >>JOBNA02.

THE SYSTEM WILL RESPOND BY TYPING THE STATUS OF YOUR JOB, INFORMING YOU WHETHER IT IS IN THE INPUT QUEUE, IS BEING EXECUTED, IS IN THE OUTPUT QUEUE, ETC.

TO OBTAIN A REPORT ON THE STATUS OF THE 7600, TYPE >7, THEN A CARRIAGE RETURN, AT A REMOTE TERMINAL.

## EXAMPLE

>7  
XEQ-114 PSS-1 TAPE-1 INPUT Q-216

THIS REPORT STATES THAT 114 JOBS ARE EXECUTING IN THE 7600, ONE JOB IS WAITING FOR PSS STAGING, ONE JOB IS WAITING FOR TAPE STAGING AND THE INPUT QUEUE CONSISTS OF 216 JOBS.

SIMILARLY, THE STATUS OF THE 6600 MAY BE OBTAINED BY TYPING >B, AND OF THE 6400 BY >C.

THE >> COMMAND PROVIDES A TABULATED STATUS OF ALL THREE SYSTEMS SIMULTANEOUSLY. TYPING THE \*AT\* SYMBOL WILL PROVIDE INFORMATION ON THE GENERAL CONDITION OF THE SYSTEMS AS A WHOLE INCLUDING INFORMATION ABOUT CURRENT PROBLEMS AND AN ESTIMATE OF WHEN THEY WILL BE SOLVED.

## USING SESAME

SESAME IS A SYSTEM WHICH ENABLES YOU TO COMMUNICATE WITH A CDC 6000 COMPUTER FROM AN INTERACTIVE TELETYPE TERMINAL. THE PRIMARY CONVENIENCE OF SESAME IS THAT IT ALLOWS YOU TO PERFORM SMALL-SCALE TASKS DIRECTLY AT A TERMINAL, RATHER THAN BY CREATING A PUNCHED-CARD INPUT DECK. SEE HANDBOOK SUBSET TTY FOR MORE INFORMATION.

ONCE YOU ARE LOGGED IN, YOU CAN DIRECTLY EXECUTE CONTROL CARDS ON THE 6000, OR SUBMIT NEW JOBS TO THE 6000'S OR 7500. YOU MAY CREATE NEW FILES OR EDIT EXISTING ONES WITH EITHER OF THE TEXT EDITORS POE OR NETED (SEE THE WRITEUPS SUBSET EDITING) AND STORE THEM AWAY. FILES WHICH ARE GENERATED DURING YOUR TERMINAL SESSION ARE CALLED LOCAL FILES BECAUSE THEY ARE LOCAL TO YOUR JOB. TO PREVENT THEIR LOSS DUE EITHER TO LOGGING OFF OR TO SYSTEM CRASHES, USERS STORE IMPORTANT FILES THEY ARE WORKING WITH ON THE COMMON FILE SYSTEM (SEE HANDBOOK SUBSET FILES). COMMON FILES USUALLY LAST ABOUT ONE DAY AFTER THEIR LAST ACCESS, BUT MAY DISAPPEAR AT ANY TIME DUE TO CERTAIN TYPES OF SYSTEM CRASHES. OPERATORS WILL ALSO DELETE THEM IF THE SYSTEM BECOMES OVERLY CONGESTED. MORE PERMANENT STORAGE IS AVAILABLE ON THE PSS SYSTEM AND ON TAPE (SEE HANDBOOK SUBSET STORAGE). FILES MAY BE STORED ON TAPE AND ACCESSED BY NAME USING GSS (THE GETTAPE - STOTAPE SYSTEM; SEE WRITEUPS SUBSET GSS).

## LOGGING IN TO SESAME

TO LOG IN FROM A TELETYPE OR SIMILAR TERMINAL CONNECTED TO RECC, TYPE

DL

AND PRESS THE RETURN KEY.

THE SYSTEM MAY RESPOND WITH TWO LINES...

LOGIN CP-24 TTY-009 14.34.23.\*\*BKY72C\*B\*08/23/79.  
ENTER JOBCARD OR STOP

OR IT MAY PLACE YOU IN A LOG-IN QUEUE BY RESPONDING (FOR EXAMPLE) --

14.15 NOW RANKED 05 IN B LOGIN QUEUE

THE SYSTEM WILL PLACE YOU IN THE LOG-IN QUEUE IF THE TIMESHARING SYSTEM IS OPERATING AT CAPACITY. WHEN YOUR TURN COMES TO LOG IN, THE SYSTEM WILL ASK YOU TO ENTER YOUR JOB CARD AS ABOVE.

IN EITHER CASE THE SYSTEM WILL PROMPT FOR YOU TO ENTER A JOBCARD WHEN IT IS READY. E.G., IF YOUR JOBCARD IS -

**OPEN.123456,ALI BABA**

THE SYSTEM WILL NOW RESPOND-

**OPEN800 LOGGED IN. LOGIN 4.6  
SESAME 4.5  
OK - SESAME**

YOU ARE NOW LOGGED IN, AND THE SESAME SUBSYSTEM AWAITS YOUR PLEASURE.

NOTE THAT INFORMATION IS SENT FROM THE TELETYPE TO THE SYSTEM ONE LINE AT A TIME. THE LINE THAT YOU TYPE IS NOT TRANSMITTED TO THE SYSTEM UNTIL YOU PRESS THE RETURN KEY.

WHEN YOU ARE FINISHED USING SESAME, TERMINATE BY TYPING **▷KILL**, WHICH DELETES ALL YOUR FILES; OR BY TYPING **▷STOP** WHICH PRINTS ON THE LINE PRINTER THE DAYFILE OF YOUR TERMINAL SESSION, AS WELL AS PRINTING ANY QUEUED FILES SUCH AS OUTPUT GENERATED ON THE FILE OUTPUT. THE SYSTEM WILL ACKNOWLEDGE THE COMMAND BY RESPONDING

**JOB ENDED - DISCONNECTED**

#### **EXECUTING CONTROL CARDS FROM SESAME**

ONCE LOGGED IN TO SESAME, ANY CONTROL CARD VALID ON THE 6000'S MAY BE EXECUTED. SESAME ALLOWS CONTROL CARDS TO BE EXECUTED WITHOUT THE TRAILING PERIOD AT THE END OF THE COMMAND. COMMAS USED AS SEPARATORS MAY BE REPLACED BY BLANKS. FOR EXAMPLE, THE CONTRCL CARD -

**LIBTAPE,N=1.**

WHICH ASSIGNS A LIBRARY TAPE TO A REGISTERED TAPE OWNER CAN ALSO BE TYPED AS

**LIBTAPE N=1**

#### **GENERATING LINES OF TEXT WITH A TEXT EDITOR**

TO GENERATE A FILE WHICH CONTAINS LINES OF TEXT SUCH AS AN INPUT DECK, CONTROL CARDS OR A PROGRAM, USE EITHER OF THE TEXT EDITORS **POE** OR **NETED**. FOR EXAMPLE, SUPPOSING YOU WANT TO GENERATE A COPY OF THIS WRITEUP **INTRO** ON THE NARROW PAPER FROM YOUR TERMINAL. FIRST YOU TYPE THE **SESAME** COMMAND

**POE,TEMP**

(FOR EXAMPLE) WHICH CAUSES YOUR TERMINAL SESSION TO ENTER THE SUBSYSTEM POE. THE PARAMETER TEMP SPECIFIES A LOCAL FILE NAME WHICH WILL EVENTUALLY CONTAIN THE TEXT YOU GENERATE WITH POE. BECAUSE THE SPECIFIED FILE TEMP DOES NOT EXIST, POE RESPONDS

**POE 2.14  
TEMP NOT FOUND.  
INPUT.**

AND ENTERS ITS INPUT MODE. IN THIS MODE EACH LINE TYPED IS CONSIDERED AS TEXT TO BE ACCUMULATED. TO GET OUT OF INPUT MODE YOU ENTER THE . (PERIOD) IN COLUMN 1 FOLLOWED BY A CARRIAGE RETURN. THUS, WHEN POE RESPONDS **INPUT.**, YOU TYPE IN YOUR FILE. IN THIS EXAMPLE THE FILE LOOKS LIKE THIS-

**<JOB CARD>  
\*6  
LIBCOPY,WRITEUPS,OUT,INTRO.  
DISPOSE,OUT=PR,PA=1F.**

NOW YOU ENTER THE PERIOD IN COLUMN 1 AND ENTER EDIT MODE. NOTE THAT YOU ENTERED NO END OF JOB CARD - THE SYSTEM ADDS IT FOR YOU. IF YOU MADE ANY MISTAKES TYPING IN THE LINES, YOU MAY NOW CORRECT THEM USING THE VARIOUS POE OR NETED EDITING AND LISTING COMMANDS. (SEE THE WRITEUPS SUBSET **EDITING** FOR MORE INFORMATION.)

TO SAVE THE TEXT IN YOUR LOCAL FILE (TEMP), ENTER THE COMMAND

**SAVE**

WHICH CAUSES THE LOCAL FILE TEMP TO BE WRITTEN AND THE POE TEXT EDITOR TO BE EXITED. THE SYSTEM WILL NOW RESPOND-

**OK - SESAME**

AND YOU MAY NOW ENTER THE **DISPOSE** COMMAND (AS SHOWN BELOW) TO SUBMIT YOUR JOB TO THE INPUT QUEUE.

### SUBMITTING JOBS TO THE INPUT QUEUE

THE **DISPOSE** CONTROL CARD MAY BE USED TO SEND A JOB TO THE INPUT QUEUE OF THE 7600 OR EITHER 6000 JUST AS IF YOU HAD READ IN A DECK OF CARDS AT A CARD READER. TO SUBMIT THE JOB GENERATED ABOVE WITH POE, SIMPLY TYPE

**DISPOSE,TEMP=IN**

**EXECUTING CONTROL CARDS DIRECTLY WITH THE CONTROL CARD "CALL"**

THE CONTROL CARD CALL CAN BE USED TO EXECUTE A SERIES OF CONTROL CARDS WHICH ARE CONTAINED IN A LOCAL FILE. IN THE EXAMPLE ABOVE, A JOB WAS CREATED AND SUBMITTED TO THE 6000 INPUT QUEUE TO GENERATE A COPY OF THIS WRITEUP. THE SAME TASK CAN BE PERFORMED BY TYPING THE LIBCOPY AND DISPOSE CONTROL CARDS DIRECTLY INTO SESAME, BUT IF YOU MISTYPE A CONTROL CARD YOU WILL HAVE TO RETYPE ALL OF IT. WITH CALL YOU CAN TYPE THE CONTROL CARDS INTO A FILE AND EXECUTE THEM AS A GROUP. THE CONTROL CARDS NECESSARY WOULD THEN BE -

**LIBCOPY,WRITEUPS,OUT,INTRO.  
DISPOSE,OUT=PR,PA=1F,DT=I.**

ASSUMING THAT THESE CONTROL CARDS WERE CONTAINED IN THE FILE CCT, YOU WOULD NOW TYPE THE FOLLOWING COMMAND TO HAVE THEM EXECUTED-

**CALL,CCT**

NOTE THAT THE PARAMETER DT=I WAS ADDED TO THE DISPOSE CARD TO DETACH THE PRINT FILE IMMEDIATELY FROM YOUR TERMINAL SESSION AND SEND IT TO THE PRINT QUEUE. ALSO THE PARAMETER PA=1F SHOULD BE USED ONLY IF THE OUTPUT WILL BE PRINTED AT BKY.

**FOR MORE INFORMATION**

GENERAL INFORMATION ON INTERACTIVE ACCESS TO THE 6000'S MAY BE FOUND IN THE HANDBOOK SUBSET TTY. INFORMATION ON THE TEXT EDITORS MAY BE FOUND IN THE WRITEUPS SUBSET EDITING. THE BEST WAY TO FIND OUT ABOUT ANY SPECIFIC ASPECT OF THE SYSTEM IS TO CONSULT THE HANDBOOK SUBSET INDEX. NEW ADDITIONS TO THE SYSTEM ARE ALWAYS NOTED IN THE WRITEUPS SUBSET BKYNEWS AND ARE FREQUENTLY DISCUSSED IN THE LBL NEWSLETTER. IF ALL ELSE FAILS, THE CONSULTANTS ARE AVAILABLE TO POINT YOU IN THE RIGHT DIRECTION AND GUIDE YOU TO THE RIGHT CONTROL CARDS TO USE.

## 8.1 MAGNETIC TAPE STORAGE

SEVEN AND NINE TRACK TAPE DRIVES ARE AVAILABLE TO ALL JOBS. STANDARD REELS CONTAIN 2400 FEET OF TAPE. SEVEN TRACK TAPES MAY BE EITHER EVEN (BCD) OR ODD (BINARY) PARITY; NINE TRACK TAPES ARE AVAILABLE IN ODD PARITY ONLY. FOR SEVEN TRACK TAPES THE THREE DENSITIES AVAILABLE ARE 800, 556 AND 200 BPI; FOR NINE TRACK TAPES 800, 1600 AND 6250 BPI DENSITIES ARE AVAILABLE. MOST RELIABLE ARE THE HIGH DENSITY (1600 AND 6250 BPI) STC NINE TRACK TAPE DRIVES. THE BKV SYSTEMS DO NOT USE, OR SUPPORT, INTERNAL TAPE LABELS. (LABELLED TAPES MAY BE PROCESSED, OF COURSE, BUT THE USER MUST DO THE LABEL PROCESSING.)

### MAGNETIC TAPE LIBRARY

THE TAPE LIBRARY IS INTENDED TO BE A FILING AND RETRIEVING SERVICE FOR DATA INPUT/OUTPUT TAPES USED IN THE COMPUTING FACILITY. THE USE OF THIS SERVICE IS MANDATORY FOR THOSE WHO WISH TO USE MAGNETIC TAPES AT LBL. ALL REELS INCLUDED IN THE TAPE LIBRARY ARE SERIALIZED WITH A FIVE DIGIT NUMBER. ADDITIONAL EXTERNAL IDENTIFICATION ON EACH REEL IS PROVIDED BY A GUMMED LABEL BEARING THE USER'S NAME AND HIS/HER TAPE IDENTIFICATION.

EACH TAPE PEEL IS ENCLOSED IN A TAPE-SEAL INSTEAD OF A CANISTER. REELS ARE FILED SERIALY IN A TAPE VAULT, WHICH HAS A CONTROLLED ENVIRONMENT IN ORDER TO MINIMIZE ERRORS CAUSED BY THERMAL STRESS. THE TAPE VAULT IS ACCESSIBLE ONLY TO OPERATING PERSONNEL, AND HANDLING OF LIBRARY TAPES IS LIMITED TO COMPUTER OPERATORS AND TAPE LIBRARIANS. IF IT BECOMES NECESSARY TO TRANSPORT THE TAPE TO ANOTHER SITE, THE USER MAY CHECK THE TAPE OUT OF THE LIBRARY.

USE OF THE TAPE LIBRARY IS DISCUSSED IN THE WRITEUPS SUBSET LIBTAPE.

**8.2 PERMANENT FILE STORAGE****THE IBM PSS DISKS -- PSS**

THE PSS DISKS ARE ACCESSIBLE TO BOTH 6000 AND 7600 JOBS. A COMPLETE DESCRIPTION OF THE PROGRAM STORAGE SYSTEM (INCLUDING A DESCRIPTION OF THE PSS CONTROL LANGUAGE) IS PRESENTED IN THE WRITEUP PSS.

EXAMPLES OF PSS USAGE ARE SHOWN IN THE HANDBOOK SUBSET STORAGE.

**7600 PERMANENT FILES**

INSTRUCTIONS AND SUGGESTIONS FOR USING THE BKV PERMANENT FILE SUBSYSTEM ARE FOUND IN THE HANDBOOK SUBSET STAGING.

**7600 CACHE SYSTEM**

DISCUSSIONS AND EXAMPLES OF THE CACHE SYSTEM MAY BE FOUND IN THE HANDBOOK SUBSET STAGING.

## LINE PRINTER OUTPUT

ALPHANUMERIC OUTPUT FROM THE COMPUTER SYSTEM IS NORMALLY PRODUCED ON A LINE PRINTER. FOR THIS STANDARD PRINTOUT, USE PRINT STATEMENTS, OR EQUATE A FILE TO OUTPUT AND WRITE TO THAT FILE WITH FORTPAN FORMATTED WRITE STATEMENTS. THESE TECHNIQUES ARE SHOWN IN THE HANDBOOK SUBSET SAMPLES AND THE WRITEUP BASIC66.

## TYPED OUTPUT AT AN INTERACTIVE TERMINAL

IT IS POSSIBLE TO EXAMINE OUTPUT GENERATED BY BATCH JOBS AT AN INTERACTIVE TERMINAL USING THE CLAIM CONTROL CARD, AN INTERACTIVE EDITOR AND THE DIRECTIVE \*HOLDOUT AS DESCRIBED IN HANDBOOK SUBSET TTY. ALSO A NORMAL BATCH JOB CAN BE CONVERTED SO THAT IT TYPES ITS OUTPUT ON THE TELETYPE INSTEAD OF THE LINE PRINTER. RELEVANT INFORMATION APPEARS IN HANDBOOK SUBSET TTY AND WRITEUPS SUBSET BKYLIB.

## GRAPHIC OUTPUT

GRAPHIC OUTPUT CAN BE GENERATED USING IDDS OR GRAFPAC. HARDCOPY IS AVAILABLE ON MICROFILM (MICROFICHE, 35MM, AND 16MM), THE DICOMED D48, THE CALCOMP AND ZETA PLOTTERS AND THE LINE PRINTERS. ON THE 6000'S ONLY, INTERACTIVE GRAPHICS ARE AVAILABLE TO A VARIETY OF GRAPHICS AND NON-GRAPHICS TERMINALS. TWO TEKTRONIX 4014'S AND A HARDCOPY UNIT ARE AVAILABLE IN THE VISTA ROOM, BLDG. 50B, ROOM 2259, FOR GENERAL USE BY COMPUTER CENTER USERS. MORE INFORMATION IS AVAILABLE IN THE HANDBOOK SUBSET GRAPHIC.

## MAGNETIC TAPE OUTPUT

ON THE 7600, OUTPUT CAN BE WRITTEN ON A MAGNETIC TAPE BY STAGING A DISK OUTPUT FILE TO TAPE AFTER THE PROGRAM EXECUTION. THIS IS DISCUSSED IN THE HANDBOOK SUBSET STAGING.

ON THE 6000'S, OUTPUT CAN BE WRITTEN ON A MAGNETIC TAPE BY REQUESTING THE FILE BE ASSIGNED TO A MAGNETIC TAPE DRIVE. SEE THE WRITEUP BASIC66 FOR THE FORMAT OF THE REQUEST CONTROL CARD.

THE GETTAPE-STOTAPE SYSTEM (GSS) IS A CONVENIENT WAY TO STORE UNRELATED DATASETS ON HIGH DENSITY MAGNETIC TAPE. DATASETS STORED IN THIS SYSTEM ARE ACCESSIBLE BY NAME. SEE WRITEUPS SUBSET GSS FOR MORE DETAILS.

## REMOTE BATCH

THE TYPE OF OUTPUT AVAILABLE AT A REMOTE BATCH STATION DEPENDS ON THE STATION CONFIGURATION.

SERVICE	NAME	ROOM	BLDG.	PHONE (EXT.)
CONSULTANTS		1245	508	5981
ESTABLISHING AN ACCOUNT	JERRY MORE OR MARTHA BANKS	413	930	5214, 4126
EXPEDITER SERVICE	IRENE PARTYKA	22493	508	6205
KEYPUNCHING SERVICE	VERNEICE ARNETT	2215A	508	6256
GUEST CARDS, PARKING PERMITS	MARLENE COLLINS	2232	508	5654
ESTABLISHING A REMOTE BATCH TERMINAL	SIG ROGERS	341	50A	6713
TAPE SERVICES	ED BOYUM	2249	508	6218
OBTAINING PSS DISK SPACE	PAT GILLENWATER	2276	508	5234
CHANGING ACCOUNT NUMBERS, PASSWORDS	FRAN PERMAR	2258	508	6310
CCPE OPERATOR				5311
COMPUTER OPERATIONS				6211

TO DIAL ANY OF THE ABOVE NUMBERS VIA FTS DIAL 451-<FOUR DIGIT EXTENSION>; TO CALL DIRECT DIAL (415) 486-<FOUR DIGIT EXTENSION>.

THE PHONE NUMBER OF THE MAIN LABORATORY SWITCHBOARD IS (415) 486-4000

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